

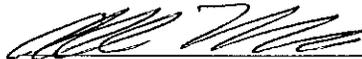
U.S. ROUTE 40/61 BRIDGE OVER THE MISSOURI RIVER
ST. CHARLES AND ST. LOUIS COUNTIES, MISSOURI
MoDOT JOB NO. J6P1436

FINAL ENVIRONMENTAL IMPACT STATEMENT

Submitted Pursuant to 42 USC 4332 (2)(c)
And where applicable, 49 USC 303 by the

U.S. Department of Transportation
Federal Highway Administration
And
Missouri Department of Transportation

Cooperating Agencies:
U.S. Coast Guard
U.S. Army Corps of Engineers – St. Louis District



For FHWA

8/27/04

Date of Approval



For MoDOT

8/27/04

Date of Approval

The following persons may be contacted for additional information concerning this document:

Mr. Donald Neumann, Programs Engineer
Federal Highway Administration
209 Adams Street
Jefferson City, MO 65101-3203
573-636-7104

Mr. Kevin Keith, Chief Engineer
Missouri Department of Transportation
P.O. Box 270
Jefferson City, MO 65102-0270
573-751-3758

The proposed project is an improved Missouri River crossing in the U.S. Route 40/61 corridor in St. Charles and St. Louis counties. The project is approximately 2.1 miles (3.4 kilometers) in length from the Missouri Research Park overpass to Chesterfield Airport Road. The project proposes a new four-lane bridge upstream of the eastbound bridge and the continued use of both existing bridges. This project will accommodate projected traffic demands and economic development trends and improve safety for the study area. This document includes a description of the environmental conditions and evaluates the potential impact of the alternatives developed for this project.

Comments on this Final Environmental Impact Statement are due by OCT 11 2004 and should be sent to the persons listed above.

Executive Summary

S.1 Project Description

The proposed project is a bridge location study of an improved Missouri River crossing in the U.S. Route 40/61 (Route 40/61) corridor in St. Charles and St. Louis counties, Missouri. The project is approximately 2.1 miles (mi) [3.4 kilometers (km)] in length and involves a new crossing of the Missouri River and rehabilitation of the existing bridges across the river.

The project also involves improvements to the Chesterfield Airport Road interchange in St. Louis County, and also includes connections to the proposed one-way collector-distributor road system along Route 40/61 in Chesterfield Valley.

The purposes of the proposed project are: to improve the transportation system by meeting increased travel demands by providing more capacity across the river, which also improves safety; provide a new bridge across the river to address the aging westbound bridge (opened in 1935); provide system continuity between roadway improvements in both St. Charles and St. Louis counties; and provide a facility that accommodates current economic development trends.

S.2 Other Significant Actions in the Project Vicinity

Other major actions, or projects, are being planned or proposed within the vicinity of the proposed project. Ultimately, if implemented, these planned/proposed projects may have an effect on the use of the proposed project. These planned/proposed projects include:

- The raising of the Monarch Levee in Chesterfield Valley to a protection level of 500-year plus 3 feet. The proposed action crosses the proposed location of the Monarch-Chesterfield Levee. The portion of the Monarch Levee on the downstream side of Route 40/61 in St. Louis County has yet to be completed.
- Phases Two and Three of the Page Avenue Extension (Route 364) in St. Charles County. Phase One has already been completed, which includes a new Missouri River bridge approximately 11 river miles downstream of the Route 40/61 corridor. The new bridge has the potential to attract up to 15,000 vehicles per day (vpd) away from the Route 40/61 corridor.

S.3 Alternatives Considered

In order to meet the transportation objectives for the Route 40/61 bridge over the Missouri River, a number of transportation strategies were considered including the following:

- No Action;
- Transportation System Management (TSM);
- Mass Transit;
- Upgrade of the current bridge structures and approaches; and
- New bridge construction and new approach roadways.

For this project, new bridge construction was considered viable for further study. A number of build alternatives were considered and evaluated within the study area. The study area is a 2,000-foot (ft) [610-meter (m)] wide band centered on the existing highway. This area was kept in close proximity to the existing bridge crossings to avoid extensive new improvements to either approach, since these approaches have recently been improved. The length of the study area is 2.1 mi (3.4 km) and extends from the Missouri Research Park overpass in St. Charles County to Chesterfield Airport Road in St. Louis County.

The alternatives considered for new bridge construction were the following:

- A1 – A new six-lane bridge upstream of the existing eastbound bridge to accommodate four lanes of eastbound traffic and two lanes of westbound traffic; the conversion of the existing eastbound bridge to two lanes of westbound traffic; and the removal of the existing westbound bridge (Figure 2-1).
- A2 – A new four-lane bridge upstream of the existing eastbound bridge to accommodate eastbound traffic; the conversion of the existing eastbound bridge to two lanes of westbound traffic; and two lanes of westbound traffic on the existing westbound bridge (Figure 2-2).
- A2' – A variation of A2; a new four-lane bridge upstream of the existing eastbound bridge to accommodate eastbound traffic; the conversion of the existing eastbound bridge to three lanes of westbound traffic; and lowering the number of westbound lanes on the existing westbound bridge from two to one (Figure 2-6).
- B3 – A new six-lane bridge downstream of the existing westbound bridge to accommodate four lanes of westbound traffic and two lanes of eastbound traffic; two lanes of eastbound traffic on the existing eastbound bridge; and the removal of the existing westbound bridge (Figure 2-3).
- B5 – A new four-lane bridge downstream of the existing westbound bridge to accommodate westbound traffic; two lanes of eastbound traffic on the existing eastbound bridge; and two lanes of eastbound traffic on the existing westbound bridge (Figure 2-5).

Ultimately, a Preferred Alternative (A2') was identified which most closely responded to the Purpose and Need and achieved the project transportation objectives and goals while integrating a full consideration of the potential impacts to the human and natural environment. MoDOT has identified A2' as the Preferred Alternative through public involvement and assessment of the socioeconomic and environmental consequences.

S.4 Environmental Impacts

S.4.1 Land Use/Socioeconomics

A new bridge over the Missouri River is included in the region's 20-year Long Range Transportation Plan [East-West Gateway Coordinating Council (EWGCC), 2002] and the City of Chesterfield Comprehensive Plan (2002). Although not specifically identified, a new bridge over the Missouri River at Route 40/61 would be consistent with the city of Weldon Spring and St. Charles County land use plans (City of Weldon Spring, 2000 and St. Charles County, 1996). The proposed project will provide a more efficient transportation facility for interstate commerce and should accommodate the economic development trends within the area.

Alternative A2' (Preferred) does not displace any residents or businesses. No impacts to public services and facilities are anticipated, and impacts to the tax base are anticipated to be negligible.

S.4.2 Traffic, Transportation, and Navigation

Route 40/61 serves as a major arterial between St. Charles and St. Louis counties. Development pressures in both counties have necessitated the study of improved capacity over the river. Currently, the eastbound bridge is striped with four lanes, and the westbound bridge is striped with three lanes. Neither bridge can be striped for more lanes due to the widths of the bridges. Currently, the traffic volume on Route 40/61 across the Missouri River is 81,700 vpd (both directions). This volume is expected to grow to 96,900 vpd in the construction year 2014

and to 134,300 in the design year 2034. Phase One of the Page Avenue Extension is projected to attract up to 15,000 vpd off of Route 40/61. These growth forecasts were developed after reconciling forecasts from five different sources, particularly the land use projections. If no action is taken to improve the capacity of the river crossing, the level of service (LOS) is expected to degrade to LOS E by 2014 and to LOS F in the late 2020s.

The proposed action must meet all navigation requirements of the U.S. Coast Guard (USCG) which includes matching the existing bridge pier locations and maintaining adequate horizontal and vertical clearances. Alternative A2' (Preferred) meets these basic requirements. A more detailed hydraulic analysis will be needed at the time of bridge design.

S.4.3 Air Quality

Based on the conformity analysis conducted as part of the long-range plan development, the projects and programs included in the EWGCC long-range transportation plan (2002) (which includes the Route 40/61 bridge project over the Missouri River) are found to be in conformity with the requirements of the Clean Air Act Amendments of 1990 (CAAA), the relevant sections of the Final Conformity Rule 40 Code of Federal Regulation (CFR) Part 93, and the Missouri State Conformity Regulations 10 Code of State Regulations (CSR) 10-5.480. The finding is documented in a companion report, Air Quality Conformity Determination and Documentation.

S.4.4 Noise

A preliminary noise analysis was not performed because there are no noise receptors located adjacent to the existing roadway alignment.

S.4.5 Natural Resources

The construction of and subsequent operation of the proposed bridge will not substantially impact the water quality of the Missouri River. All construction activities will comply with the existing rules and regulations of governmental agencies having jurisdiction over streams and water supplies in the area.

Alternative A2' (Preferred) does not impact jurisdictional wetlands. The total impact to floodplains associated with Alternative A2' is approximately 7.2 acres (ac) [2.9 hectares (ha)].

Federally listed species within the vicinity of the study area include the pallid sturgeon, bald eagle, and Indiana bat. The Preferred Alternative is not anticipated to adversely affect these species.

S.4.6 Cultural Resources

Alternative A2' (Preferred) could potentially affect two previously recorded archaeological sites that are not considered to be Section 4(f) resources, and any unavoidable impacts could be mitigated through data recovery excavation. The companion westbound Daniel Boone bridge (J1000R) was determined to be National Register of Historic Places (NRHP)-eligible. Alternative A2' (Preferred) will utilize the existing historic bridge in place. No architectural resources will be affected by the Preferred Alternative.

S.4.7 Impacts to Public Lands and Potential Section 4(f) Properties

Approximately 1.5 ac (0.6 ha) of the Weldon Spring Conservation Area (CA) managed by the Missouri Department of Conservation (MDC) will be required for the Preferred Alternative (A2'). The impacted property is primarily wooded. There are no recreational facilities or features that

could be impacted by the proposed project that would qualify the area as a Section 4(f) property.

The Katy Trail State Park will be spanned by the bridge structures associated with the Preferred Alternative. There will be no long-term impact to the trail. The trail may be temporarily closed to users for short periods of time during construction for safety reasons.

Missouri Research Park is a commercial/light industrial area owned and managed by the University of Missouri. The research park also contains a 235-ac (95-ha) golf course and wooded recreational trails. Approximately 9.6 ac (3.9 ha) of Missouri Research Park will be required by Alternative A2' (Preferred). This portion of the research park is located immediately adjacent to the Preferred Alternative and is undeveloped. The Preferred Alternative will not affect the function of the research park.

S.4.8 Hazardous Waste Sites

The only site identified within the study area is associated with petroleum spills and/or releases into the Missouri River. Any unknown sites that are found during project construction will be handled in accordance with federal and state laws and regulations.

S.4.9 Cost

Estimated construction and right of way cost for the Preferred Alternative (A2') is \$123.9 million in 2007 dollars. Costs are in 2007 dollars to provide consistency with previous estimates made by MoDOT, which were also in 2007 dollars.

S.4.10 Areas of Controversy

There are no known areas of controversy.

S.4.11 Regulatory Compliance

The following permits are anticipated to be required for the Preferred Alternative:

- USCG Section 9 of the Rivers and Harbors Act permit;
- U.S. Army Corps of Engineers (USACE) Section 10 of the Rivers and Harbors Act permit;
- Floodplain development permit from State Emergency Management Agency (SEMA) for projects within regulatory floodways, a "no-rise" certificate, if applicable should be obtained; and
- A Clean Water Act (CWA) Section 404 permit from the USACE issued contingent on water quality certification under Section 401 of the CWA.

The USCG and USACE are cooperating agencies on this proposal and will be involved in ongoing coordination.

Hydraulic studies and analysis performed as part of the design process will ensure that there is no increase in the base floodwater elevation within the regulatory floodway.

Federal and state resource agencies have been and will continue to be involved in consultation and coordination throughout the various phases of project development and implementation on this proposed action. Other considerations, such as Clean Air Act concerns and water quality permits, will be adequately addressed.

A summary of impacts related to the Alternative A2' (Preferred) and the No Action Alternative is provided in Table S-1. Approximately 19.3 ac (7.8 ha) will be required for the new right of way for the Preferred Alternative

Table S-1. Potential Environmental, Cultural, Social, and Economic Impacts (shaded column represents the Preferred Alternative)

Criterion/Resource	Alternative					
	A1	A2	A2'	B3	B5	No Action
Costs (in millions; 2007 dollars)						
Construction	\$141.3	\$122.9	\$122.7	\$139.2	\$120.7	\$0
Right of Way	\$1.2	\$1.2	\$1.2	\$0.9	\$0.9	\$0
Miscellaneous	\$50.9	\$44.3	\$44.2	\$50.1	\$43.4	\$0
Total	\$193.4	\$168.4	\$168.2	\$190.3	\$165.1	\$0
Farmland, ac (ha)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0(0)
Displacements						
Residential	0	0	0	0	0	0
Commercial	0	0	0	1	1	0
Other	0	0	0	0	0	0
Right of Way, ac (ha)	19.3 (7.8)	19.3 (7.8)	19.3 (7.8)	13.7 (5.5)	13.7 (5.5)	0(0)
Environmental Justice	No Impact					
Air Quality	Minor, short term	Moderate to significant, long term				
Noise	Short term, construction	No new receptors				
Wetlands, #/ac (ha)	0/0.0 (0.0)	0/0.0 (0.0)	0/0.0 (0.0)	1/0.28 (0.11)	1/0.28 (0.11)	0/0(0.0)
Water Quality	No Impact					
Missouri River Floodplain, ft crossed (m crossed)	4,100 (1,250)	4,100 (1,250)	4,100 (1,250)	4,100 (1,250)	4,100 (1,250)	No new crossings
Wild/Scenic Rivers	No Impact					
Permits Required?						
Section 401	Yes	Yes	Yes	Yes	Yes	No
Section 404	Yes	Yes	Yes	Yes	Yes	No
Section 9	Yes	Yes	Yes	Yes	Yes	No
Section 10	Yes	Yes	Yes	Yes	Yes	No
Floodplain	Yes	Yes	Yes	Yes	Yes	No
Threatened and Endangered Species	See below*	None				
Geologic Features						
Caves	None	None	None	None	None	None
Sinkholes	None	None	None	None	None	None
Mines	None	None	None	None	None	None
Public Lands†	2 (non recreational)	2 (non recreational)	2 (non recreational)	None	None	None
Cultural Resources						
Architecture	None	None	None	None	None	None
Archaeology	2	2	2	1	1	None
Westbound Bridge	Demolished	Retain**	Retain**	Demolished	Retain**	Retain
Hazardous Waste	1	1	1	1	1	None
Construction Impacts	Minor, short term	None‡				

* All alternatives could involve the habitats of the Indiana bat, pallid sturgeon, and bald eagle.

† All alternatives span the Katy Trail in addition to the public land impacts listed above.

** Alternatives A2 and B5 require the use of the westbound bridge (historic) for mainline (future interstate) traffic, which could necessitate an earlier removal of the bridge due to wear and fatigue.

‡ Maintenance activities may become more involved for the westbound bridge.

Source: MACTEC, 2004.

Table of Contents

<u>Section</u>		<u>Page</u>
1.0	Project Description, and Purpose and Need	1-1
1.1	Introduction.....	1-1
1.2	Project History	1-1
1.3	Logical Termini and Independent Utility	1-2
1.4	Project Purpose.....	1-3
1.5	Project Needs.....	1-3
	1.5.1 Geometric Deficiencies.....	1-4
	1.5.2 Bridge Structural Deficiencies.....	1-5
	1.5.3 Travel Demands	1-6
	1.5.4 Safety.....	1-8
	1.5.5 System Continuity.....	1-8
	1.5.6 Economic Development.....	1-9
2.0	Project Alternatives.....	2-1
2.1	Transportation Strategies Considered.....	2-1
	2.1.1 No Action	2-1
	2.1.2 Transportation System Management (TSM).....	2-1
	2.1.3 Mass Transit	2-1
	2.1.4 Upgrading of the Current Bridge Structures	2-1
	2.1.5 New Bridge Construction.....	2-2
2.2	Calculation of Capacity Development.....	2-2
2.3	Development of Preliminary Constraints	2-3
2.4	Criteria for the Development of Study Alternatives.....	2-4
	2.4.1 Purpose for Developing Study Alternative Criteria	2-4
	2.4.2 Criteria for Development of the Study Alternatives.....	2-4
2.5	Preliminary Bridge Location and Design Alternatives.....	2-5
	2.5.1 Alternative A – Option 1	2-5
	2.5.2 Alternative A – Option 2.....	2-5
	2.5.3 Alternative B – Option 3.....	2-5
	2.5.4 Alternative B – Option 4.....	2-5
	2.5.5 Alternative B – Option 5.....	2-5
2.6	Alternatives Retained for Evaluation (Final Alternatives)	2-6
2.7	Evaluation of Final Alternatives and Preferred Alternative	2-7
2.8	Value Engineering Study.....	2-8
3.0	Affected Environment.....	3-1
4.0	Environmental Consequences.....	4-1
4.1	Land Use Impacts.....	4-1
	4.1.1 Land Use Planning	4-1
	4.1.2 Land Use Characteristics.....	4-3
	4.1.3 Existing Land Use Impacts	4-4
	4.1.4 Future Land Use	4-5
4.2	Farmland Impacts.....	4-5

**Table of Contents
(continued)**

<u>Section</u>	<u>Page</u>
4.3 Socioeconomic Impacts.....	4-5
4.3.1 Area Community Characteristics	4-6
4.3.2 Public Services and Facilities	4-7
4.3.3 Regional Population Trends	4-7
4.3.4 Age Characteristics.....	4-8
4.3.5 Racial Characteristics.....	4-8
4.3.6 Educational Level	4-9
4.3.7 Housing Characteristics.....	4-9
4.3.8 Community Cohesion	4-10
4.4 Acquisition Impacts.....	4-10
4.5 Income and Economic Characteristics and Impacts.....	4-12
4.6 Traffic, Transportation, Safety, and Navigation	4-15
4.6.1 Existing Traffic and Travel Patterns.....	4-15
4.6.2 Traffic Volume Forecasts (2034)	4-16
4.6.3 Safety.....	4-19
4.6.4 Mass Transit	4-19
4.6.5 Bicycle and Pedestrian Use.....	4-20
4.6.6 Navigation.....	4-20
4.7 Air Quality Impacts	4-23
4.8 Noise Impacts.....	4-25
4.9 Water Quality Impacts	4-26
4.10 Permits	4-28
4.11 Wetlands/Waters of the U.S. Impacts.....	4-28
4.12 Floodplain Impacts	4-29
4.12.1 Hydrologic Analysis	4-30
4.12.2 Permits.....	4-31
4.12.3 FHWA Only Practicable Alternative Finding – Floodplain.....	4-31
4.13 Wild and Scenic Rivers.....	4-31
4.14 Threatened or Endangered Species/Impacts to Flora and Fauna in General ...	4-32
4.14.1 Resources in the Project Area	4-32
4.14.2 Environmental Consequences.....	4-33
4.15 Historical and Archaeological Resources.....	4-35
4.15.1 Previous Archaeological Investigations	4-36
4.15.2 Previously Recorded Archaeological Sites	4-36
4.15.3 Steamboat Wrecks	4-38
4.15.4 Bridges.....	4-39
4.15.5 Architecture.....	4-40
4.15.6 Cemeteries	4-40
4.15.7 Other Historic Properties	4-40
4.15.8 Summary	4-41
4.16 Impacts to Public Lands and Potential Section 4(f) Properties.....	4-42
4.16.1 Public Parks, Recreation, and Wildlife Management.....	4-43
4.16.2 Other Public Lands	4-44
4.16.3 Planned Facilities.....	4-45
4.16.4 Environmental Consequences.....	4-46
4.16.5 Section 4(f) Considerations	4-47
4.17 Hazardous Waste Sites	4-48

Table of Contents
(continued)

<u>Section</u>	<u>Page</u>
4.18.1 Existing Visual Quality.....	4-49
4.18.2 Visual Impacts.....	4-50
4.19 Energy Impacts	4-50
4.20 Construction Impacts.....	4-51
4.21 Secondary and Cumulative Impacts	4-53
4.22 The Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity	4-55
4.23 Any Irreversible or Irretrievable Commitments of Resources Which Would Be Involved in the Proposed Action	4-55
5.0 Coordination.....	5-1
5.1 Public Involvement	5-1
5.1.1 Summary of Public Concerns.....	5-1
5.1.2 Public Outreach	5-5
5.1.3 Other Public Outreach	5-5
5.2 Agency Coordination (Prior to the Draft EIS)	5-5
5.2.1 Federal Transit Administration	5-6
5.2.2 U.S. Fish and Wildlife Service	5-6
5.2.3 Missouri Department of Conservation	5-6
5.2.4 U.S. Coast Guard.....	5-6
5.2.5 U.S. Army Corps of Engineers	5-6
5.2.6 Municipal and Public Coordination	5-7
5.3 Agency Coordination (After the Draft EIS and Prior to the Final EIS).....	5-7
5.3.1 Native American Tribal Consultation	5-7
5.3.2 U.S. Army Corps of Engineers	5-7
5.3.3 U.S. Department of the Interior	5-8
5.3.4 U.S. Environmental Protection Agency	5-9
5.3.5 Missouri Legislature	5-9
5.3.6 Missouri Department of Conservation	5-9
5.3.7 Missouri Department of Natural Resources.....	5-10
5.3.8 State of Missouri Emergency Management Agency	5-10
5.3.9 Municipal and Public Coordination	6-1
6.0 List of Preparers	7-1
7.0 Agencies, Organizations, and Persons Who Received the Final EIS.....	8-1
8.0 References.....	9-1
9.0 Index	

**Table of Contents
(Continued)**

	<u>Page</u>
List of Tables	
Table 1-1 Average Daily Traffic (ADT) Volumes at the Route 40/61 Bridges.....	1-7
Table 1-2 Level of Service (LOS) Characteristics for Freeways.....	1-7
Table 1-3 LOS at the Route 40/61 Bridge.....	1-8
Table 2-1 Advantages and Disadvantages of Each Build Alternative.....	2-9
Table 2-2 Potential Environmental, Cultural, Social, and Economic Impacts.....	2-11
Table 4-1 Generalized Regional Land Use.....	4-3
Table 4-2 Existing Land Use within the Study Area.....	4-4
Table 4-3 Existing Land Use Impacts by Alternative.....	4-4
Table 4-4 Future Land Use within the Study Area.....	4-5
Table 4-5 Demographic Characteristics, 2000.....	4-6
Table 4-6 Municipality, County, and State Population Trends.....	4-8
Table 4-7 Age Characteristics.....	4-8
Table 4-8 Racial Characteristics, 2000.....	4-9
Table 4-9 Educational Characteristics, 2000.....	4-9
Table 4-10 Housing Characteristics, 2000.....	4-10
Table 4-11 Building and Parcel Impacts.....	4-10
Table 4-12 Estimated Costs of Build Alternatives.....	4-11
Table 4-13 Per Capita Personal Income.....	4-13
Table 4-14 Median Household Income and Poverty Level Characteristics, 1999.....	4-13
Table 4-15 Major Employers in St. Louis County.....	4-13
Table 4-16 Labor Force Characteristics by Job Type, 2000.....	4-14
Table 4-17 Assessed Value of Real Estate By County – 2002.....	4-14
Table 4-18 Existing Traffic Counts, Route 40/61 at Missouri River.....	4-16
Table 4-19 Comparison of Forecasts, Route 40/61 at the Missouri River.....	4-17
Table 4-20 Projected Daily Traffic Volumes, Route 40/61 at Missouri River (No Action Alternative).....	4-18
Table 4-21 National Ambient Air Quality Standards.....	4-23
Table 4-22 Noise Abatement Criteria (NAC) Hourly A Weighted Sound Level – dBA.....	4-26
Table 4-23 Potential Impacts to Wetlands and Waters of the U.S. Associated with Improvements to U.S. Route 40/61, St. Charles and St. Louis Counties, Job No. J6P1436.....	4-28
Table 4-24 Bridges within the Proposed Alternatives for Improvements to Route 40/61, St. Charles and St. Louis Counties, Job No. J6P1436.....	4-39
Table 4-25 Cultural Resource Potential for the Proposed Alternatives for Improvements to U.S. Route 40/61, St. Charles and St. Louis Counties, Job No. J6P1436.....	4-41

Table of Contents (Continued)

List of Figures (Figures are located at the end of each respective section)

Figure 1-1	Western St. Louis Metro Region, Route 40/61 Corridor
Figure 1-2	Study Area, Route 40/61 Bridge Over the Missouri River
Figure 2-1	Alternative A1
Figure 2-2	Alternative A2
Figure 2-3	Alternative B3
Figure 2-4	Alternative B4
Figure 2-5	Alternative B5
Figure 2-6	Alternative A2'
Figure 3-1	Potential Environmental Issues
Figure 4-1	Existing Land Use and Community Facilities
Figure 4-2	Future Land Use
Figure 4-3	Existing Zoning
Figure 4-4	Wetland, Floodplain and Floodway Impacts
Figure 4-5	Abandoned Shipwrecks on Missouri River Channel Maps of 1879 and 1954

List of Appendices

Appendix A	Tort Liability Statement – Accident Statistics and Safety Data
Appendix B	Bridge Analysis Technical Memorandum
Appendix C	Correspondence
Appendix D	Traffic and Travel Demands
Appendix E	Preliminary Plan and Profile Plates and Preliminary Cost Estimate
Appendix F	Missouri State Operating Permit Water Pollution Control Program
Appendix G	Programmatic Agreement Between the Federal Highway Administration and the Missouri State Historic Preservation Officer

Table of Contents (Continued)

List of Abbreviations and Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ac	acre
ADT	average daily traffic
BMPs	Best Management Practices
CA	Conservation Area
CAAA	Clean Air Act Amendments of 1990
CARES	Center for Agricultural, Resource and Environmental Systems
CBB	Crawford Bunte Brammeier
C-D	collector-distributor
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
cm	centimeters
CO	carbon monoxide
CSR	Code of State Regulations
CWA	Clean Water Act of 1977
dB	decibels
dba	sound pressure levels measured on the A scale of a sound meter
dbh	diameter at breast height
DOI	Department of the Interior
DHV	design hour volume
EIS	Environmental Impact Statement
ESA	Endangered Species Act
EWGCC	East-West Gateway Coordinating Council
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRMS	Flood Insurance Rate Maps
FPPA	Farmland Protection Policy Act
FSA	Food Security Act
ft	foot
FTA	Federal Transit Administration
GIS	geographical information system
ha	hectare
HBRRP	Highway Bridge Replacement and Rehabilitation Program
HCM	Highway Capacity Manual
I-64	Interstate 64
ITS	intelligent transportation system
km	kilometer
km/hr	kilometers per hour
L _{eq}	the equivalent steady-state sound level over a stated time period
LOMR	Letter of Map Revision
LOS	Level of Service
LWCF	Land and Water Conservation Fund
m	meter
MDC	Missouri Department of Conservation
MDNR	Missouri Department of Natural Resources
µg/m ³	micrograms per cubic meter

Table of Contents (Continued)

mg/m ³	milligrams per cubic meter
mi	mile
MKT	Missouri Kansas Texas
MoDOT	Missouri Department of Transportation
mph	miles per hour
MPO	Metropolitan Planning Organization
mst	millions of short tons
MSWP	Missouri State Water Patrol
MTIA	Major Transportation Investment Analysis
NAC	Noise Abatement Criteria
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NO _x	nitrous oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
pc/mi/ln	passenger cars per mile per lane (pc/mi/ln)
PEM	palustrine emergent wetland
PFO	palustrine-forested wetland
PMR	Physical Map Revision
PM ₁₀	particulate matter less than or equal to 10 microns in diameter
ppm	part per million
PUB	palustrine unconsolidated bottom
RM	River Mile
ROD	Record of Decision
RSMo	Missouri Revised Statutes
SEMA	State Emergency Management Agency
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
TIP	Transportation Improvement Plan
TSM	Transportation System Management
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCG	U.S. Coast Guard
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VE	value engineering
VOC	volatile organic compounds
vpd	vehicles per day
VMT	vehicle miles traveled
WSSRAP	Weldon Spring Site Remedial Action Project

1.0 Project Description, and Purpose and Need

1.1 Introduction

U.S. Route 40/61 (Route 40/61) is a major arterial running west to east through the St. Louis metropolitan area. This arterial passes through the communities of Wentzville, Lake St. Louis, and Weldon Spring in St. Charles County and Chesterfield, Town and Country, Frontenac, Ladue, Richmond Heights, and St. Louis in St. Louis County. This arterial crosses the Missouri River near Chesterfield in St. Louis County and Weldon Spring in St. Charles County, where the river forms the boundary between the two counties. Route 40/61 is designated as Interstate 64 (I-64) east of I-270 in St. Louis County and is planned to be designated I-64 from I-270 west to I-70 at Wentzville in St. Charles County including the portion across the Missouri River (Figure 1-1). To achieve interstate designation west of I-270, Route 40/61 must be improved to interstate standards from the Missouri River west to I-70 in St. Charles County. The portion of Route 40/61 between I-270 and the Missouri River has already been improved to an interstate standard. The existing bridge crossing is a necessary part of this planned upgrade to interstate standards. Improvements have already begun on Route 40/61 in St. Charles County from the Missouri River to Route 94 approximately 2 miles (mi) [3.2 kilometers (km)] west. Currently there are three lanes striped on the westbound bridge (opened in 1935 and rehabilitated in 1990) and four lanes striped on the eastbound bridge (opened in 1990). Both bridges over the river consist of a four-span through-truss type construction.

The river crossings closest to the Route 40/61 bridges are the Page Avenue (Route 364) bridges 11 mi (18 km) downstream, and the Route 47 bridge at Washington, 23 mi (37 km) upstream.

1.2 Project History

The Daniel Boone Study Area Major Transportation Investment Analysis (MTIA) [Missouri Department of Transportation (MoDOT), 1997] recommended additional lanes to Route 40/61 which included additional lanes across the Missouri River; however, funding for the bridge (estimated at about \$40,000,000 in 2000) is not available. Although no funding is currently programmed for a new bridge, it is appropriate to begin the design process now with a location or conceptual study for this proposed improvement.

In 1998, the Federal Highway Administration (FHWA) approved an interim design exception to carry three lanes on the existing 32-foot (ft) [9.8-meter (m)] wide westbound bridge, with the understanding that MoDOT identify and add to the long-range plan a project to replace the westbound bridge. In December 2001, MoDOT striped the existing westbound bridge, from two 12-ft (3.6-m) lanes (standard width) to three 10-ft (3.0-m) lanes (substandard width). This was conducted in accordance with the completion of the lane widening on the St. Louis County side to three lanes in each direction and to avoid a bottleneck situation at the westbound bridge. The eastbound bridge was already striped for three 12-ft (3.6-m) lanes at the time and has since been striped to include a fourth 12-ft (3.6-m) lane. The resulting action left the westbound bridge with 1-ft (0.3-m) shoulders. This action implemented FHWA's requirement that MoDOT study the need for a new bridge crossing over the Missouri River. Therefore, in late 2001, MoDOT undertook a bridge location study for a new bridge for Route 40/61 over the Missouri River.

This project is not in the 5-year Transportation Improvement Plan (TIP) for the East-West Gateway Coordinating Council (EWGCC). However, a new bridge over the Missouri River is

included in the region's 20-year Long Range Transportation Plan (EWGCC, 2002) and the City of Chesterfield Comprehensive Plan (2002).

The area developed for this study is a 2,000-ft (610-m) wide band centered on the existing highway. This area was kept in close proximity to the existing bridge crossings to avoid extensive new improvements to either approach, since these approaches have recently been improved. The length of the study area is 2.1 mi (3.4 km) and extends from the Missouri Research Park overpass in St. Charles County to Chesterfield Airport Road in St. Louis County (Figure 1-2). The study area incorporates the municipalities of Chesterfield on the St. Louis County side and Weldon Spring on the St. Charles County side. This study area falls within the larger improvement plan to upgrade Route 40/61 to interstate standards as mentioned earlier.

Key landmarks near the study area are the Missouri Research Park and the Katy Trail in St. Charles County and Spirit of St. Louis Airport in St. Louis County. The Katy Trail follows the north side of the Missouri River in St. Charles County and serves hiking and bicycling interests. It is managed by the Missouri Department of Natural Resources (MDNR) as a state park. Sharing the trail bed with the Katy Trail is a portion of the Lewis and Clark Trail, administered by the National Park Service (NPS). This trail passes beneath the existing bridges on the St. Charles County side.

The Route 40/61 bridge study is a combined bridge location study and Environmental Impact Statement (EIS). The proposed bridge and surrounding improvements need to provide a sufficient amount of traffic lanes in each direction to carry future Route 40/61 (ultimately I-64) traffic over the Missouri River. Currently, the existing westbound bridge carries three lanes across the Missouri River and the existing eastbound bridge carries four lanes of traffic. The outer lane on the existing eastbound bridge functions as an auxiliary lane between the Route 94 entrance in St. Charles County and the Chesterfield Airport Road exit in St. Louis County.

Since the westbound bridge is nearly 70 years old, a key element of the study is to investigate the viability of leaving it in place as part of a future bridge improvement across the river. Another goal of the study is to tie the proposed alignment back into the existing alignment in the shortest distance possible to reduce environmental impacts and costly redevelopment of the newly constructed approaches on each side. This study is not intended to define a specific type of construction for the new bridge unless it becomes essential in determining the best location. The bridge type will be determined during the design phase of the project.

1.3 Logical Termini and Independent Utility

The proposed project is intended to improve safety, to reduce congestion, to mitigate geometric deficiencies on the existing westbound bridge, and to provide system continuity across the Missouri River. The eastern terminus, in St. Louis County, connects to recent improvements to Route 40/61 in the Chesterfield Valley. These improvements are constructed to interstate standards and provide six lanes of traffic (three in each direction). The western terminus, in St. Charles County, connects to recent improvements to Route 40/61 in Weldon Spring, which are also constructed to interstate standards. Route 40/61 currently has a minimum of three lanes in each direction from the Missouri River west to Route 94. The project termini need to be established in order to fully encompass not only the necessary bridge improvements, but other ancillary improvements in the study area (e.g., Chesterfield Valley collector-distributor road system, Chesterfield Airport Road interchange, and Missouri Research Park interchange).

The proposed project demonstrates independent utility, indicating that the proposed solution best addresses the aspects of the identified project Purpose and Need without construction of any additional improvements either to the east or west of the project termini, or within the study area. Specifically, the proposed project will:

- Improve the safety and traffic flow at the Route 40/61 bridges over the Missouri River by providing additional capacity through the development of a new bridge and improved merge conditions for westbound traffic by using the existing westbound bridge as a collector-distributor roadway;
- Improve the structural condition of the Missouri River bridges by either replacement or rehabilitation of the westbound structure; and
- Provide system continuity to the freeway systems already developed on each side of the Missouri River.

Given the establishment of logical termini, this project will meet its Purpose and Need even if no other improvements are made. Specifically, the logical termini for this project are:

- Eastern terminus: A point approximately 1,200 ft (366 m) east of the Chesterfield Airport Road interchange in St. Louis County. This terminus allows for the necessary redevelopment of this interchange and the collector-distributor road system in Chesterfield Valley as they tie into the bridge improvements.
- Western terminus: The Missouri Research Park interchange in St. Charles County.

1.4 Project Purpose

The objectives, or purposes, of the proposed Route 40/61 bridge improvements include:

- Provide adequate operational efficiency and safety for traffic crossing the Missouri River at the Route 40/61 bridges;
- Provide a facility that accommodates recent mainline upgrades to Route 40/61 that is consistent with current interstate design standards;
- Maintain transportation service to existing and planned economic development in the project area and within the St. Louis metropolitan area;
- Accommodate a safe travel way over the Missouri River for bicyclists and pedestrians and a possible connection to the Katy Trail in St. Charles County; and
- Accommodate current economic development trends in the area.

The merged National Environmental Policy Act (NEPA)/404 process was not used for this project.

1.5 Project Needs

The need for the proposed action is based on a number of factors relating primarily to the bridge's geometric deficiencies and functional obsolescence, which equate to safety issues. Other needs include transportation demand, system continuity, and economic development.

The basic underlying needs of the project include the following:

- Improve geometric deficiencies by providing a river crossing for mainline Route 40/61 with standard lane widths of 12 ft (3.6 m) and adequate shoulders of 10 ft (3.0 m);
- Provide a river crossing that addresses the projected structural deficiencies of the aging westbound bridge either with rehabilitation or replacement;
- Improve traffic flow by providing enough lanes across the river to accommodate the projected travel demands of the region over the next 30 years;

- Improve safety for motorists using the Route 40/61 bridges for regional travel; and
- Provide system (interstate standard) continuity across the river between the improvements (either in place or planned) in St. Charles and St. Louis counties.

State law generally requires that each time a road or highway is redesigned or reconstructed, it be done so in compliance with the highway and road design guidelines generally accepted at that time. The failure to follow current design guidelines may subject the Missouri Highways and Transportation Commission to liability unless the deviation from those guidelines is done with the exercise of good engineering judgment, and the basis for that decision is documented. Section 573.600.1(2), Missouri Revised Statutes (RSMo) 2000.

1.5.1 Geometric Deficiencies

1.5.1.1 Route 40/61 Roadway Geometry

The reconstruction of the existing roadway approach on the St. Louis County side of the river was completed in December 2001. The St. Charles County approach was completed prior to the St. Louis County approach. Between Route 94 and Chesterfield Airport Road, both approaches carry three 12-ft (3.6-m) lanes in the westbound direction and four 12-ft (3.6-m) lanes in the eastbound direction. There are no existing roadway deficiencies on either approach. However, the westbound lanes narrow on the existing westbound bridge. This is discussed further in Section 1.5.1.2.

1.5.1.2 Deficient Bridge Geometry

The overall geometric deficiency and functional obsolescence of the Route 40/61 westbound bridge (J1000R) is the critical need that prompted this study. The westbound bridge was opened in 1935 as a two-lane two-way bridge, but subsequently was striped to three lanes with no shoulders with the center lane operating as a reversible lane. It functioned this way until MoDOT opened a companion structure for eastbound traffic in 1990 to accommodate capacity needs resulting from development along Route 40/61 in St. Charles and St. Louis counties. From 1990 until December 2001, it carried two lanes of westbound traffic. In December 2001, the lane widening of Route 40/61 to three lanes in each direction was completed on each side of the river (MoDOT Job Nos. J6U1047 and J6P0672F, Route K to Clarkson Road). The westbound bridge was then striped to three lanes to accommodate the third lane.

The westbound bridge is a 2,614-ft (797-m) long steel truss bridge. It is 32-ft (9.8-m) wide and currently striped for three 10-ft (3-m) lanes with 1-ft (0.3-m) shoulders, which creates a substandard condition for motorists (narrow lanes and almost no shoulders). Additional warning signs and lights and a reduced speed zone have been put in place to monitor the narrow lanes.

The eastbound bridge (A4017) is a 2,614-ft (797-m) long steel truss bridge and has a deck of slightly over 51-ft (15.6-m) wide. It carried two lanes of traffic until an auxiliary lane was added in 2000. It has recently been restriped and now carries four 12-ft (3.6-m) lanes (three through and one auxiliary). The right and left shoulders are just over 1-ft (0.3-m) wide.

The Route 40/61 roadway is a principal arterial that will be designated as an interstate. Based on an interstate standard, new bridges must be at least as wide as the roadbed width. The approach roadways at each bridge are 60-ft (18.3-m) wide, which is 28 ft (8.5 m) wider than the westbound bridge. The truss design of the westbound bridge does not support widening the deck without completely reconstructing the bridge. Based on current geometry, the Route 40/61

bridges currently fail to meet American Association of State Highway and Transportation Officials (AASHTO) standards.

The substandard width of the westbound bridge creates less than optimal driving conditions. The posted speed limit is 60 miles per hour (mph) [96 kilometers per hour (km/hr)]. No buffer exists between the travel lanes and the edge of the bridge. The geometric deficiencies of the westbound Route 40/61 bridge adversely affect traffic operations on the bridge. The size and mix of vehicles on the bridge also create delays. When larger vehicles such as trucks, buses, recreational vehicles, or emergency vehicles use the bridge, drivers of smaller vehicles may feel squeezed. Additionally, the lack of shoulders presents safety issues for emergency vehicles when responding to incidents on the bridge as a disabled vehicle would block at least one lane of through traffic.

The existing bridge cross section also discourages bicyclists from crossing the river on a dedicated bicycle lane or on a shoulder. As stated in Section 1.4, a safe bicycle crossing across the river is one element of the project purpose. With the proximity of the project to the Katy Trail, an opportunity also exists for a connection between a bicycle lane across the river and the Katy Trail. Attendance figures in 2002 for the Katy Trail ranged from a low of 766 in January to a high of 7,316 in September (Debra Ray, MDNR, 2002). Some bicycle and hiking groups have expressed interest in being able to cross the Missouri River from Chesterfield to access the Katy Trail. The city of Chesterfield also has plans to develop a bike trail in Chesterfield Valley (Appendix C, letter dated February 7, 2003). Before the westbound bridge was striped with three lanes and the eastbound bridge was striped with four lanes, bicyclists used the bridges to cross the river. For comparison, the Page Avenue Extension incorporates a bicycle-dedicated lane across the Missouri River.

1.5.2 Bridge Structural Deficiencies

The bridge sufficiency rating is derived from a formula that is composed of three separate factors. These factors are combined to calculate the bridge's sufficiency to remain in service. These factors are:

1. Structural Adequacy and Safety – 55 percent of total rating;
2. Serviceability and Functional Obsolescence – 30 percent of total rating; and
3. Essentiality for Public Use – 15 percent of total rating.

Special reductions can be applied to this rating to account for other characteristics of the bridge that can have a negative impact on its sufficiency, including the length of any required detours, the main structure type, and traffic safety features on the structure. The sufficiency rating is a numerical rating of a bridge based on its structural adequacy and safety, serviceability and functional obsolescence, and essentiality for public use. The sufficiency rating is used as a basis for establishing eligibility and priority for replacement of bridges in accordance with the Highway Bridge Replacement and Rehabilitation Program (HBRRP) [23 Code of Federal Regulations (CFR) 650 D]. Generally, a bridge with a sufficiency rating of 50 or less is a candidate for replacement HBRRP funds, and a bridge with a sufficiency rating of 80 or less is a candidate for rehabilitation HBRRP funds; however, deficient bridges with sufficiency ratings between 50 and 80 may be replaced if it can be shown to be more cost effective than rehabilitation using a life cycle cost analysis (see Appendix C, letter from FHWA to MoDOT dated February 25, 1993).

As mentioned earlier, the westbound bridge was completed in 1935. A rehabilitation of the bridge was completed in 1990. It is in fair condition overall. The National Bridge Inventory

(March 22, 2001) rated the existing westbound bridge as structurally sound with a sufficiency rating of 61.4 on a scale of 100; however, this sufficiency rating was based on two 12-ft (3.6-m) lanes and does not reflect the re-striping that occurred after this inspection. In December 2001, the westbound bridge was restriped to three 10-ft (3.0-m) lanes. The sufficiency rating will probably be lower following the next inspection based on these narrow lanes.

The eastbound bridge was opened in 1990. The National Bridge Inventory rated the existing eastbound bridge as structurally sound, giving it a sufficiency rating of 91 on a scale of 100.

Fatigue considerations are important in the estimate of the remaining life of a relatively old structure. While some repairs are economically viable, others are too great in magnitude to be economically feasible. In the case of the westbound bridge, the 1990 rehabilitation had already identified and repaired apparent fatigue problems along the bridge. Recent routine maintenance has identified fatigue related problems with small cracks noted in the floor beams of the deck truss members. Several elements of this structure are apparently approaching the end of their useful fatigue life. When these fatigue considerations are combined with the age of the bridge, and given the narrowness of the bridge, another major retrofit is not likely to be economically prudent. The life of a typical bridge deck is 25 to 30 years. Since the existing deck was replaced in 1990, a likely timeframe to consider replacement of the westbound bridge is between 2015 and 2020 if the westbound bridge is subjected to the same type of free-flow traffic loading as it is now. The bridge life could be extended if the loadings on the bridge were lessened by removing Route 40/61 free-flow traffic from the bridge. Based on this analysis, the construction year for the project is identified as 2014 (1 year prior to the 2015-2020 timeframe). Therefore, the design year, based on 20 years from the construction year, has been identified as 2034.

A detailed report depicting the analyses of the existing bridges is provided in Appendix B.

1.5.3 Travel Demands

1.5.3.1 Existing and Future Traffic

The existing average daily traffic (ADT) volume on Route 40/61 between Route 94 and Chesterfield Airport Road is 81,700 vehicles per day (vpd). Aggressive growth (estimated at 3 percent per year) is expected to continue for the next 5 years, until 2007, as high-density employment centers continue to develop along the Route 40/61 corridor in St. Charles County. The first phase of the Page Avenue extension (from I-270 to Route 94) is expected to attract approximately 15,000 vpd from the Route 40/61 corridor. From 2007 until the construction year of 2014, growth is estimated to continue at 2.1 percent per year to a level of 96,900 vpd. After that time, the growth rate projections become highly speculative.

Additionally, it is speculated that the second and third phases of the Page Avenue Extension will be complete by 2018, which would be expected to divert up to 10,000 to 15,000 vpd from the Route 40/61 corridor. If the 2.1 percent per year rate of increase continues to the design year of 2034, the Route 40/61 bridges would carry 134,300 vpd. However, unless the greater St. Louis region is able to attract new growth in contrast to recent trends, long-term growth within this corridor would be expected to eventually subside. A more conservative rate of 1 percent per year would result in a volume of 115,000 vpd on the Route 40/61 bridges in 2034.

Trucks currently comprise approximately 10 percent of the ADT; this figure falls within the range of 3 to 22 percent trucks typical of urban interstates. The projected traffic increase may increase

the number of accidents on the bridge. As Route 40/61 is upgraded ultimately to I-64 from the Missouri River to I-70 in Wentzville, the corridor is likely to become even more attractive to trucks as it is a more direct route from the central part of the St. Louis metropolitan area to I-70 at Wentzville. Table 1-1 summarizes the traffic data discussed above.

2002	2014 (Construction Year)	2034 (Design Year)	2009
81,700 vpd	97,000 vpd	134,000 vpd	85,600

* The volumes indicated here reflect the affects of the Route 364 (Page Avenue Extension) through St. Charles County and highest growth rate scenario.

Source: MACTEC, 2003.

There are plans to upgrade sections of Route 40/61 to I-64 through St. Charles County in MoDOT's 2007-2010 investment period (Legacy, 2025, The Transportation Plan for the Gateway Region, 2002). These sections include the Missouri River bridges, the section from Route K to Route DD, and the section west of Lake St. Louis to I-70. However, the overall upgrade of Route 40/61 to I-64 is not fully funded at this time.

1.5.3.2 Level of Service

Level of service (LOS) is a qualitative measure used to assess the capacity of a highway based on existing or anticipated traffic volumes. It is a means of referencing traffic conditions encountered by a driver traveling through an intersection, interchange or open section of roadway given various traffic and geometric conditions. LOS is a function of traffic volume, percentage of trucks in the traffic flow, number of lanes, roadway alignment and geometry, and other physical factors (Table 1-2). An LOS A describes nearly free flow operation of vehicles, virtually unaffected by the presence of other traffic. In contrast, LOS E describes operation at capacity. Traffic flow is very unstable and any flow interruption or disruption produces extensive delay. When the LOS for a section of roadway decreases from LOS C to LOS D, E, or F, problems with function and efficiency can occur. Generally LOS C or better is considered an acceptable operational condition, with LOS D permissible in urban conditions.

Table 1-2 Level of Service (LOS) Characteristics for Freeways

LOS	Characteristics
A	Free flow; low volumes and high speeds; most drivers can select own speed
B	Stable flow; speeds somewhat restricted by traffic; service volume used for design of rural highways
C	Stable flow; speed controlled by traffic; service volume used for design of urban highways
D	Approaching unstable flow; lower speeds
E	Unstable flow; low, varied speeds; volumes at or near capacity
F	Forced flow; low speeds to stoppages; volume exceeds capacity

Source: Transportation Research Board, 2000 (Highway Capacity Manual).

Decreased LOS can result from such factors as an insufficient number of traffic lanes to accommodate traffic volumes, inadequate intersection or interchange capacity or design, lack of signalization or poor timing on existing signals, poor geometry that causes vehicles to slow

below the posted speed limit, the presence of disruptive traffic movements such as those induced by at-grade intersections, and the lack of turning lanes in areas with numerous at-grade entrances.

Given the existing and projected traffic volumes and the current bridge geometry, the existing bridges operate at an LOS D at peak periods of flow. As the traffic volumes on the bridges grow, and given the diversion of traffic volume to the Page Avenue Extension, degradation in the level of service, to LOS E, is expected to occur between 2014 and 2018. This timetable coincides with the identified construction year of 2014. Given continued growth and the effect of phases two and three of the Page Avenue Extension, degradation in the level of service to LOS F is expected to occur between 2027 and 2034 depending on the level of growth the surrounding area is able to sustain.

Table 1-3 LOS at the Route 40/61 Bridge

2002 (Peak Hour)	2014 (Peak Hour)	2034 (Peak Hour)
D	E	F

Source: MACTEC, 2003.

1.5.4 Safety

Crash statistics and safety data summarized or presented in this Final EIS are protected under federal law (Appendix A).

From January 1, 1999, to December 31, 2003, there were 100 crashes on the westbound bridge. Of these, approximately 69 percent were rear-end collisions and 10 percent were classified as passing. There were 22 crashes on the eastbound bridge in this same time period; more than half were rear-end collisions. During the 1999 to 2003 cited period, the 32-ft (9.8-m) wide westbound bridge was restriped from two 12-ft (3.6-m) lanes with 5-ft (1.5-m) shoulders to three 10-ft (3-m) lanes with no shoulders in December 2001. The 48-ft (14.6-m) wide eastbound bridge had three 12-ft (3.6-m) through lanes and one 12-ft (3.6-m) auxiliary lane with no shoulders. The number of crashes remained statistically similar before and after the re-striping of the westbound bridge from two to three lanes in December 2001. The high percentage of rear end crashes is consistent before and after the re-striping suggesting that lane width has no statistical bearing on the number of rear end collisions on the bridge. However, the number of crashes on the westbound bridge (100) is more than four times the number on the eastbound bridge (22). This would suggest that the extra lane of capacity on the eastbound bridge helps to reduce the crash rate as compared to the westbound bridge.

1.5.5 System Continuity

The proposed bridge project provides a link between the planned or present improvements in the Route 40/61 corridor between I-270 in St. Louis County and I-70 in St. Charles County. As mentioned previously, the designation of Route 40/61 as an interstate facility is dependent upon the upgrade of the existing bridges to interstate standards. Without any further improvements to the existing bridge crossing, the cross-county link is severed and the Route 40/61 corridor loses continuity at the Missouri River.

1.5.6 Economic Development

The primary community interest in the Route 40/61 bridges is the service they provide to commuters traveling between St. Charles and St. Louis counties and beyond. With the growth of the Chesterfield Valley and St. Charles County, commuter demand continues to increase. The bridges also serve regional, statewide, and interstate trips.

The Route 40/61 corridor is one of the fastest growing commercial and office areas in the St. Louis region [Appendix D, Traffic Analysis, Crawford Bunte Brammeier (CBB), 2002]. In St. Louis County, the Chesterfield Valley has been heavily developed since the 1993 flood. In St. Charles County, the Missouri Research Park has developed along with other growth in the Route 40/61 corridor in the past 10 years. Residential growth in St. Charles has been shifting to the Route 40/61 corridor as the I-70 corridor is more heavily developed.

With the improvements along the Route 40/61 corridor, truck traffic has increased and is projected to continue increasing as the corridor is brought up to full interstate standards. Route 40/61 and I-64 along with I-70 provide east-west interstate travel through St. Louis and St. Charles counties. Route 370 provides relief for I-70. Route 364 (Page Avenue Extension from I-270 to Route 94) provides relief to both I-70 and Route 40/61. These four highway facilities will be the only connections across the Missouri River from central St. Charles County to St. Louis County for the predictable future and serve as the primary arterials for interregional travel.

The Route 40/61 corridor is important for interstate commerce and is an integral part of the continuing economic development in St. Charles and St. Louis counties. This project accommodates current economic development trends in St. Charles and St. Louis counties.

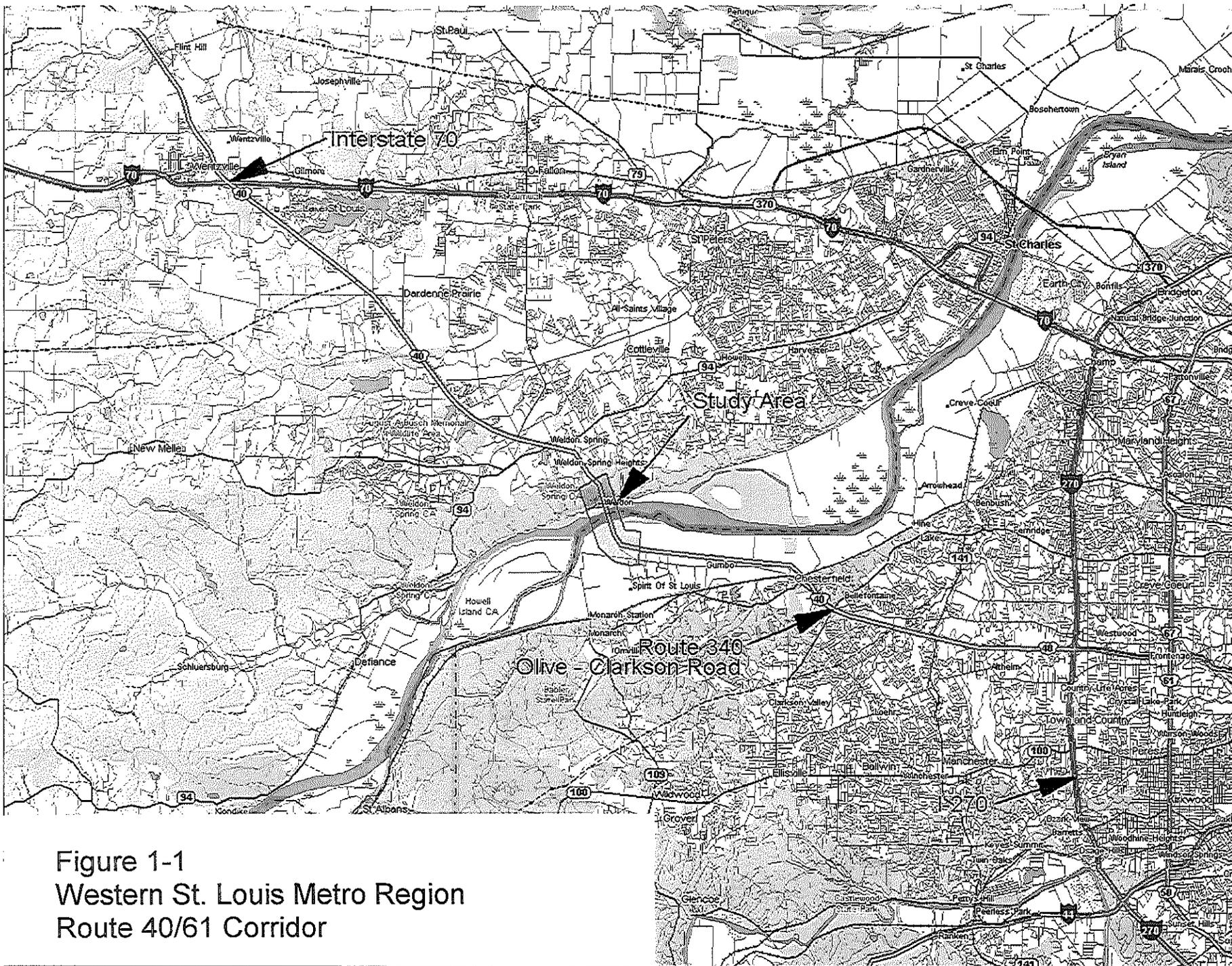


Figure 1-1
 Western St. Louis Metro Region
 Route 40/61 Corridor

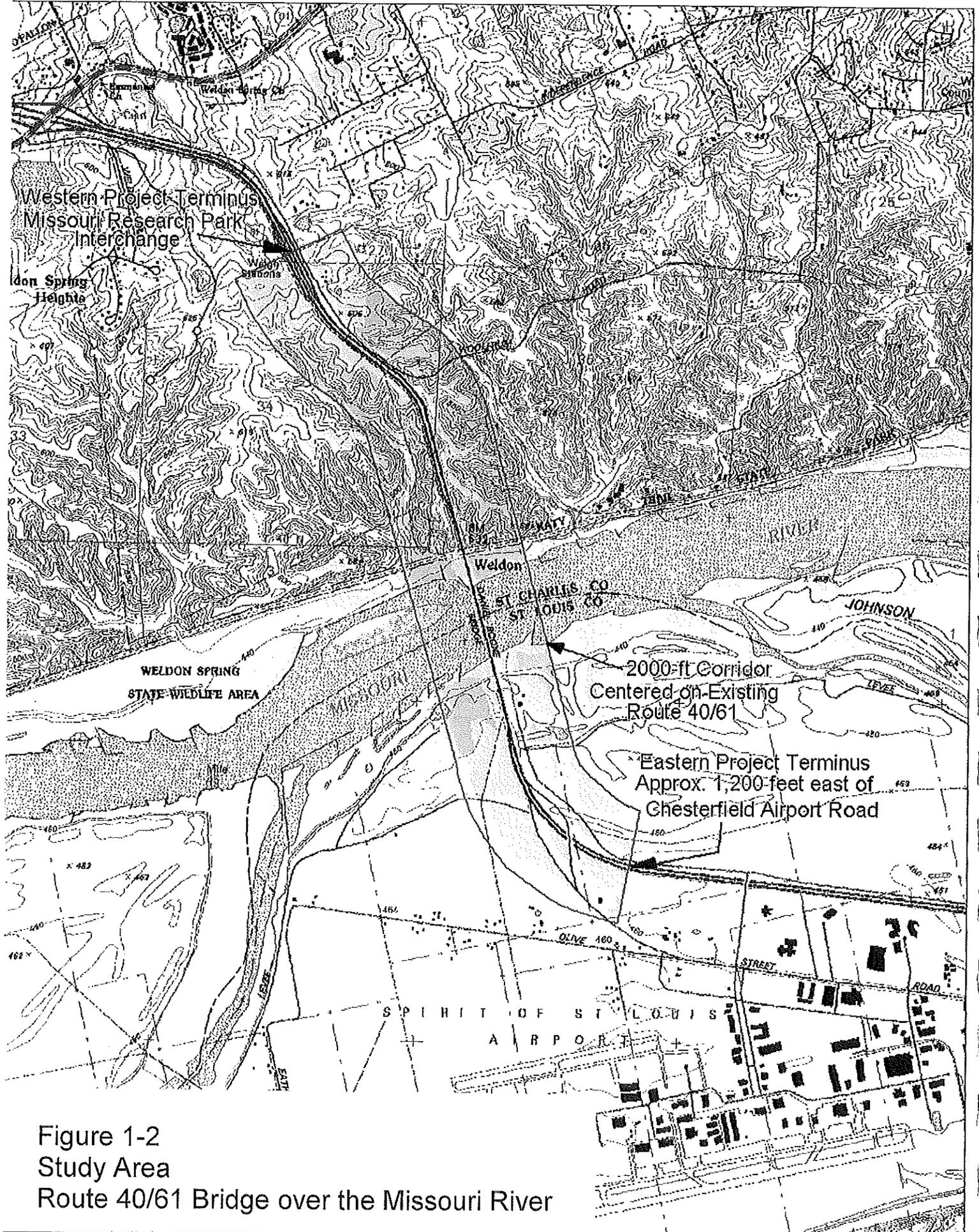


Figure 1-2
 Study Area
 Route 40/61 Bridge over the Missouri River

2.0 Project Alternatives

2.1 Transportation Strategies Considered

Several types of transportation strategies were considered in order to meet the future transportation needs of the Route 40/61 bridges across the Missouri River. Specifically, the following transportation strategies were considered:

- No Action;
- Transportation System Management (TSM);
- Mass transit;
- Upgrading the current bridge structures and approaches; and
- New bridge construction and new approach roadways.

2.1.1 No Action

The No Action strategy fails to meet the objectives or address the needs outlined in the project Purpose and Need. The No Action strategy was not considered a viable option and was eliminated from subsequent study. However, the No Action strategy was retained as a basis for comparison against the other alternatives.

2.1.2 Transportation System Management (TSM)

TSM actions were determined not to be a viable option because of the through-traffic (free-flow) nature of the existing road and bridge configurations. There are no intersections, signalization or other typical TSM elements in the study area. As a result, this strategy was not considered in detail as a reasonable solution and was subsequently eliminated.

2.1.3 Mass Transit

The only component of mass transit in the study area is bus transit. An MTIA for the Daniel Boone Study Area, completed in July 2000 by Parsons Brinckerhoff Quade & Douglas, Inc., indicates that there are no plans for the extension of mass transit facilities along the Route 40/61 (I-64) corridor through the study area. Light rail transit is planned to stop at Westport (I-270 and Page Avenue) and is not planned to run west of I-270. Due to the lack of long range plans to introduce mass transit into the study area, this strategy was eliminated from further consideration.

2.1.4 Upgrading of the Current Bridge Structures

Both existing bridges were initially designed to carry two lanes of traffic. The westbound bridge was restriped in December 2001 to provide three lanes of westbound traffic. Also in December 2001, the eastbound bridge was striped to provide four lanes of eastbound traffic. This new striping configuration has maximized the lane capacity of each bridge. This current, maximized condition fails to meet the objectives and identified needs (i.e., accidents and safety, congestion, and system continuity) presented in the project Purpose and Need. Therefore, improved bridge capacity can only result from a build alternative in order to add additional traffic lanes to the system. While rehabilitation of the existing bridges is part of the final strategy, upgrading the current structures was not given further consideration as a stand-alone solution, since additional traffic lanes cannot be added to the existing structures.

2.1.5 New Bridge Construction

For this project, new bridge construction was considered viable for further study with the strategy of developing alternatives that meet the stated Purpose and Need with consideration of long-term cost effectiveness and potential environmental impacts and displacements. For the project, a design year of 2034 was used to forecast traffic growth.

2.2 Calculation of Capacity Development

The calculations of capacity requirements are summarized in this section, but are provided in more detail in Appendix D of this report.

The current access between St. Louis County and St. Charles County on Route 40/61 is by two separate, parallel bridges. Each bridge was originally designed to carry two lanes of traffic. As noted previously, each bridge has been restriped to increase lane capacity. While the current configuration allows the two bridges to carry a total of seven lanes of traffic, the recent striping of these existing bridges was permitted by FHWA contingent on MoDOT conducting a location study for a new bridge to more adequately handle projected traffic loads.

The study team reviewed traffic projections prepared by the EWGCC, MoDOT, and other agencies or consulting teams. Using data from these sources (based on five different sets of projections) as well as an evaluation of existing traffic data in the corridor, the study team independently prepared consolidated projections of design year traffic volumes within the study area. These projections reflected the identified and proposed changes in land use in St. Charles County that could add as many as 8,000 vpd to Route 40/61 across the Missouri River. Likewise, development in St. Louis County (Chesterfield Valley in particular) could increase volumes by another 10,000 to 15,000 vpd.

Given the recent development trends in the corridor, annualized growth rates of 2.1 to 2.4 percent were deemed viable. Based on this information and measurements of existing traffic (81,700 vpd, 2002), the Route 40/61 bridges are estimated to carry nearly 84,000 vpd in 2007 and 96,900 vpd in the construction year 2014, which represents the lower threshold of LOS E for the existing westbound bridge. The volume increases to up to 134,300 vpd by the design year 2034, which represents the threshold of capacity failure, or LOS F conditions. It is therefore clear that a new bridge will be required before this time.

Based upon estimated design hour volumes (DHVs), the number of lanes needed to serve design year traffic was calculated using Highway Capacity Manual (HCM) (Transportation Research Board, 2000) methodologies. It should be noted that the westbound bridge would be expected to fail prior to the design year, so the calculations reflected a new bridge with 12-ft (3.6-m) lanes and full-width shoulders. It was concluded that design year volumes require four lanes in each direction by 2015 to retain a LOS D. These eight total lanes include three through-traffic lanes and one auxiliary lane in each direction.

Since the two existing structures were originally designed to carry two lanes of traffic, the projected capacity requirements dictate the addition of four new traffic lanes across the Missouri River.

2.3 Development of Preliminary Constraints

Constraints considered during this process entailed those that represented environmental concerns as well as those that had implications with regard to engineering feasibility. Examples of environmental constraints considered during the location study include:

- Community/business Impacts;
- Wetlands;
- Floodplain/floodway of the Missouri River;
- Surface water resources (streams, water bodies);
- Threatened and endangered species;
- Rare or unique ecological communities;
- Geologic resources;
- Potential or known hazardous waste sites;
- 4(f) and 6(f) lands;
- Archaeological or historic sites;
- Noise Impacts;
- Churches, schools, and cemeteries; and
- Residential and commercial areas.

Similarly, constraints were also identified that had implications on engineering feasibility or on the efficiency of the transportation system. Examples of such considerations included:

- Terrain;
- Capacity of the existing roadway (i.e., LOS);
- Accident patterns;
- Navigation channel of the Missouri River;
- Access to existing development; and
- Existing infrastructure (roads, utilities, transmission lines).

Constraint information was developed by acquiring and consolidating information from a variety of sources including public involvement meetings, field reconnaissance, and file information from the following agencies:

State

- MoDOT;
- MDNR;
- Missouri Department of Conservation (MDC); and
- State Emergency Management Agency (SEMA).

Federal

- Natural Resources Conservation Service (NRCS);
- U.S. Fish and Wildlife Service (USFWS);
- U.S. Environmental Protection Agency (USEPA);
- Federal Emergency Management Agency (FEMA);
- U.S. Geological Survey (USGS);
- U.S. Coast Guard (USCG);
- U.S. Army Corps of Engineers (USACE)

The result of this analysis was the development of alternative alignments that satisfactorily achieved the objectives of the project.

2.4 Criteria for the Development of Study Alternatives

2.4.1 Purpose for Developing Study Alternative Criteria

Criteria were developed to guide and direct the development of study alternatives. These criteria were used as a framework by which to develop study alternatives that are logical and reasonable based upon information identified in the project Purpose and Need. The criteria were largely based upon transportation and engineering information (i.e., traffic and access issues, and engineering considerations relative to topographic and geologic conditions). Additionally, the criteria took into account environmental resources (i.e., those listed in Section 2.3) so that alternative development initiated the process of avoiding and minimizing impacts. The ultimate goal of the study team was to understand the sensitivity and relative importance of various environmental resources in the corridor to allow for the development of logical and reasonable alternatives that minimized and/or avoided these resources. The environmental resources were derived from USGS, National Wetland Inventory (NWI) maps, and other state-run spatial data sites through the University of Missouri. These resources were then incorporated into a Geographic Information System (GIS) for use in the study.

Engineering considerations include traffic and transportation issues and ease of construction. Access to adjacent properties and high accident locations were the primary traffic elements considered. Terrain and access to adjacent land use played an integral role in determining the ease of construction.

Environmental considerations included impacts to the natural and human environment, and cultural resources. Structures eligible and potentially eligible for listing on the National Register of Historic Places (NRHP) were considered important cultural resources.

2.4.2 Criteria for Development of the Study Alternatives

The following criteria were determined to be reasonable for the development of the study alternatives.

1. **Improve Efficiency and Safety** – The study alternatives should be developed to improve traffic flow by facilitating through traffic and minimizing congestion within the study area. An emphasis was also placed on the need to maintain access to local traffic (via the adjacent interchanges within the corridor) without degrading through traffic (or free-flow traffic of mainline Route 40/61) or safety.
2. **Minimize or Avoid Environmental Impacts While Developing Reasonable Project Alternatives** – The study alternatives should be developed to avoid and minimize impacts to the previously-listed resources (see Section 2.3):
 - Those that are protected under existing laws or regulations (i.e., threatened and endangered species);
 - Those resources that, if impacted, would result in additional documentation, permitting, mitigation, and/or agency coordination [i.e., impacts to 4(f)/6(f) properties, wetlands]; and
 - Those that would incur, via impact, relatively high costs to MoDOT and FHWA (i.e., disruption of business districts, displacement of existing infrastructure or utilities, and clean-up activities of properties listed as containing hazardous materials).

2.5 Preliminary Bridge Location and Design Alternatives

With the assumption that at least four additional traffic lanes are required across the Missouri River, the study team considered possible locations for the new bridge construction. While various locations were considered, the study team determined that the most appropriate location for the new construction would be in close proximity to the existing bridges. Locating the new structure away from the existing bridges only serves to increase the length and the costs of the bridge approach roadways and the land disturbance and potential environmental impact of this construction.

While the study team concluded that the new bridge structure should be built in the general area of the existing structures, there are a number of possibilities for location and design alternatives. Initially, five study alternatives were proposed and considered for evaluation. A description of each of the alternatives is provided below and shown on Figures 2-1 through 2-5.

2.5.1 Alternative A – Option 1

This study location (Alternative A1) includes the construction of a new six-lane bridge on the upstream side of the existing eastbound bridge and the demolition of the existing westbound bridge (Figure 2-1). The new six-lane bridge carries four lanes of eastbound traffic and two lanes of westbound traffic separated by a concrete median barrier. The existing eastbound bridge converts to two westbound lanes.

2.5.2 Alternative A – Option 2

This study location (Alternative A2) includes the construction of a new four-lane bridge on the upstream side of the existing eastbound bridge and the continued use of both existing bridges as two-lane bridges (Figure 2-2). The new four-lane bridge carries eastbound traffic only, while the existing two bridges each carry two lanes of westbound traffic.

2.5.3 Alternative B – Option 3

This study location (Alternative B3) includes the construction of a new six-lane bridge on the downstream side of the existing westbound bridge and demolition of the existing westbound bridge (Figure 2-3). The new six-lane bridge carries four lanes of westbound traffic and two lanes of eastbound traffic separated by a concrete median barrier. The existing eastbound bridge is then striped to only two eastbound lanes.

2.5.4 Alternative B – Option 4

This study location (Alternative B4) includes the construction of a new three-lane bridge on the downstream side of the existing westbound bridge to carry westbound traffic, the striping of the existing eastbound bridge from four to three lanes of eastbound traffic, and configuring the existing westbound bridge into a two-lane, reversible flow (eastbound in the morning and westbound in the afternoon) structure to accommodate peak hour demands (Figure 2-4).

2.5.5 Alternative B – Option 5

This study location (Alternative B5) includes the construction of a new four-lane bridge on the downstream side of the existing westbound bridge and the continued use of both bridges as two-lane bridges (Figure 2-5). The new four-lane bridge carries westbound traffic only, while the existing two bridges each carry two lanes of eastbound traffic.

2.6 Alternatives Retained for Evaluation (Final Alternatives)

After additional review, the study team concluded that Alternative B4 should be eliminated from further consideration. Reversible lanes introduce additional safety concerns into the corridor, as motorists have to be vigilant in observing the time-of-day traffic patterns. Additionally, the traffic studies indicate that the current morning and evening peak hour directional flows gradually equalize over the study period to a point that a reversible lane system does not alleviate peak hour congestion.

The ability of the existing westbound bridge to remain viable for an extended period of time was investigated by the study team. Based on the MoDOT inspection report prepared in 2001, it was concluded that the bridge is in satisfactory condition. The bridge underwent a rehabilitation in 1990 that could extend its service life until 2020. At that time, it is likely that the bridge will need another rehabilitation to extend its service life to 2050. This second rehabilitation is not included in the alternatives. At that time, the bridge would probably need to be replaced. More detailed information concerning the conditions of both existing bridges is available in Appendix B – Bridge Analysis Technical Memorandum. Based on the available information and analyses, alternatives that utilize the existing westbound bridge as part of the option were retained for further consideration.

During the development of the final alternatives, issues were raised concerning the use of the westbound bridge for mainline Route 40/61 traffic, including the age of the structure and anticipated future seismic requirements. As a result, an additional option Alternative A – Option 2' (Alternative A2') was developed which is a variation of Alternative A2. It increases the number of westbound lanes on the existing eastbound bridge from two to three and decreases the number of westbound lanes on the existing westbound bridge from two to one (Figure 2-6). With this option, the existing westbound bridge only carries westbound traffic from Chesterfield Airport Road and the future westbound collector-distributor road proposed through Chesterfield Valley. Truck traffic on mainline Route 40/61 does not utilize the existing westbound bridge with this alternative.

The ability of the existing westbound structure to meet seismic design guidelines was one of many issues that influenced the decision to add Alternative A2'. The westbound structure does not meet current AASHTO seismic design guidelines and will require significant seismic retrofit in the future to continue to carry mainline traffic. It is anticipated that the seismic retrofit will increase in scope as seismic design guidelines are currently under revision. The guide specification for seismic design of bridges is expected to be adopted by AASHTO in 2005. It is anticipated that the revised seismic design guidelines will be more severe than that of the current AASHTO guidelines. Due to the fact that the seismic design guidelines are being revised, the cost of the future seismic retrofit was not determined. However, the need to retrofit the existing westbound structure at some point in the future to meet the future seismic guidelines was a concern contributing to the development of Alternative A2'.

With the addition of Alternative A2', a total of five final alternatives were considered by the study team. They are:

- Alternative A1;
- Alternative A2;
- Alternative A2';
- Alternative B3; and,
- Alternative B5.

2.7 Evaluation of Final Alternatives and Preferred Alternative

The five final alternatives and the No Action Alternative were evaluated and screened in an effort to select a preferred alternative. The methodology used to screen the alternatives was the "list method." To use this method, the study team first had to quantify potential impacts to the natural and human environment resulting from each alternative. Additionally, the study team developed a range of resource criteria to be used as the basis of the evaluation. Each alternative was then evaluated based on each resource criterion and was given a "+", "0", or "-" mark. A "+" mark was given if there were no impacts to the resource in question. A "0", or neutral, mark was given if there was an impact to the resource, but the impact was relatively minor or did not have a significant adverse affect on the resource. A "-" mark was given if there was a relatively major impact to the resource or if the impact resulted in an adverse affect.

With the methodology determined, the study team developed criteria, definitions and indicators to be used in the evaluation of the final alternatives. Four categories were developed, which include:

1. Traffic and Operations;
2. Engineering Constructability;
3. Avoidance of Critical and Environmental Resources; and
4. Socioeconomics.

The study team prepared cost estimates for each final alternative based on the preliminary layouts. Elements of the cost estimates include:

1. Bridge Construction;
2. Roadway Construction;
3. Right of Way;
4. Engineering and Administration; and
5. Contingency.

To be consistent with other departmental documents, all costs were estimated in 2007 dollars. To calculate the 2007 estimates, current costs (2003) were projected forward using a future value formula with a 4 percent annual inflation rate (Appendix E).

Given each of the final study alternatives listed above, **Alternative A2' is recommended as the Preferred Alternative**. This alternative provides improved service to traffic flow, helps extend the life of the westbound bridge by removing mainline traffic from the bridge, accomplishes the goals of the Purpose and Need, and minimizes impacts to environmental resources. MoDOT has identified this alternative as the Preferred Alternative through public involvement and assessment of the socioeconomic and environmental consequences.

A summary of the relative advantages and disadvantages for each alternative is provided in Table 2-1.

A number of public and civic meetings were held that provided the study team with feedback from the community at large (see Section 5.1.2, Public Outreach). Generally, the public was split in favor of either an upstream or a downstream location. However, the public comments were in support of keeping the westbound bridge as part of the final alternative in order to save cost and preserve the existing system. The primary interest of civic leaders from St. Charles County,

St. Louis County, and Chesterfield is to provide a sufficient amount of lanes across the river to accommodate the growing inter-county travel demand.

The environmental impacts and estimated costs (in 2007 dollars) of the five final alternatives are provided on Table 2-2.

2.8 Value Engineering Study

A value engineering (VE) study was conducted by MoDOT during the week of December 1-5, 2003 at MoDOT's Chesterfield district office. The VE team used the Caltrans performance rating matrix and broke the study into three areas: (1) evaluation of the recommended bridge alternative; (2) evaluation of the recommendations for the south (St. Louis County) approach; and (3) evaluation of the recommendations for the north (St. Charles County) approach. The goals of the VE study were to review what has been developed to date in the MTIA and Draft EIS, develop recommendations to improve upon the preferred alternatives, and develop recommendations for new alternatives that provide the same function and add value to the project.

A summary of recommendations from the VE study follows:

1. Eliminate the Chesterfield Airport Road westbound flyover bridge on the south approach and redirect the traffic making this movement to the Spirit of St. Louis Boulevard overpass. Traffic would then enter Route 40/61 via an on-ramp at the Spirit overpass.
2. Install reverse curves on the north approach to align the preferred alternative with the existing approach roadways and utilize more of the existing pavement.
3. Reduce the median width on the north approach.
4. Extend a fourth lane on the north approach to the Route 94 interchange.

These recommendations result in a potential cost savings of \$4.5 million (in 2003 dollars). A complete VE study is available for viewing upon request from MoDOT's Chesterfield district office, 1590 Woodlake Drive, Chesterfield, Missouri 63017.

Table 2-1. Advantages and Disadvantages of Each Build Alternative

Build Alternative	Advantages	Disadvantages
A1	<ul style="list-style-type: none"> Provides the maximum bridge system life expectancy Provides adequate shoulders for both directions of travel No impact on any architectural structures No negative impact on water resources No negative impact on existing wetlands No hazardous waste site impacts No negative impact on existing agricultural lands No negative impact on socioeconomic elements 	<ul style="list-style-type: none"> Presence of lane splits/major diversions One weaving section of 4,500 to 7,500 ft (1,372 to 2,286 m) Two weaving sections greater than 7,500 ft (2,286 m) Need for advance signage of exits [greater than 7,500 ft (2,286 m)] Introduction of Route 94 traffic in weave areas Higher initial cost Potential impact on existing archaeological sites Potential section 4(f) impact with removal of westbound bridge Negative impact on forested land
A2	<ul style="list-style-type: none"> Provides adequate shoulders for both directions of travel Lower initial cost through use of 1935 bridge Does not negatively impact any architectural structures No Section 4(f) impacts No negative impact on water resources No negative impact on existing wetlands No hazardous waste site impacts No negative impact on existing agricultural lands No negative impact on socioeconomic elements 	<ul style="list-style-type: none"> Presence of lane splits/major diversions One weaving section of 4,500 to 7,500 ft (1,372 to 2,286 m) and two weaving sections greater than 7,500 ft (1,372 m) Need for advance signage of exits [greater than 7,500 ft (1,372 m)] Introduction of Route 94 traffic in weave areas Utilizes the westbound bridge for mainline Route 40/61 traffic Shorter bridge system life expectancy Potential impact on existing archaeological sites Negative impact on forested land
A2'	<ul style="list-style-type: none"> No lane splits/major diversions No excessive advance exit signage required No weaving less than 7,500 ft (2,286 m) Provides adequate shoulders for both directions of travel Does not use the westbound bridge for mainline Route 40/61 traffic Lower initial cost No negative impact on any architectural structures No Section 4(f) impacts No negative impact on water resources No hazardous waste site impacts No negative impact on existing agricultural lands No negative impact on socioeconomic elements 	<ul style="list-style-type: none"> Introduction of Route 94 traffic into weave area Shorter bridge system life expectancy by using the westbound bridge Potential impact on existing archaeological sites. Negative impact on forested land

Does it? ←

Table 2-1. Advantages and Disadvantages of Each Build Alternative

Build Alternative	Advantages	Disadvantages
B3	<ul style="list-style-type: none"> • Provides adequate shoulders for both directions of travel • Provides the maximum bridge system life expectancy • No impact on any architectural structures • No negative impact on water resources • No hazardous waste site impacts • No negative impact on existing agricultural lands • No negative impact on socioeconomic elements 	<ul style="list-style-type: none"> • Presence of lane splits/major diversions • Potential for lane channelization at South Outer Road/Chesterfield Airport Road • Higher initial cost • Increased demolition costs for removal of the westbound bridge • Potential negative impact on existing archaeological sites • Potential Section 4(f) impact with removal of the westbound bridge
B5	<ul style="list-style-type: none"> • Provides adequate shoulders for both directions of travel • Lower initial cost • No impact on any architectural structures • No Section 4(f) impact • No negative impact on water resources • No hazardous waste site impacts • No negative impact on existing agricultural lands 	<ul style="list-style-type: none"> • Presence of lane splits/major diversions • Utilizes the westbound bridge for through traffic • Potential for lane channelization at South Outer Road/Chesterfield Airport Road • Increased demolition costs for removal of the westbound bridge • Potential negative impact on existing archaeological sites

Source: MACTEC, 2003.

Table 2-2. Potential Environmental, Cultural, Social, and Economic Impacts (shaded column represents the Preferred Alternative)

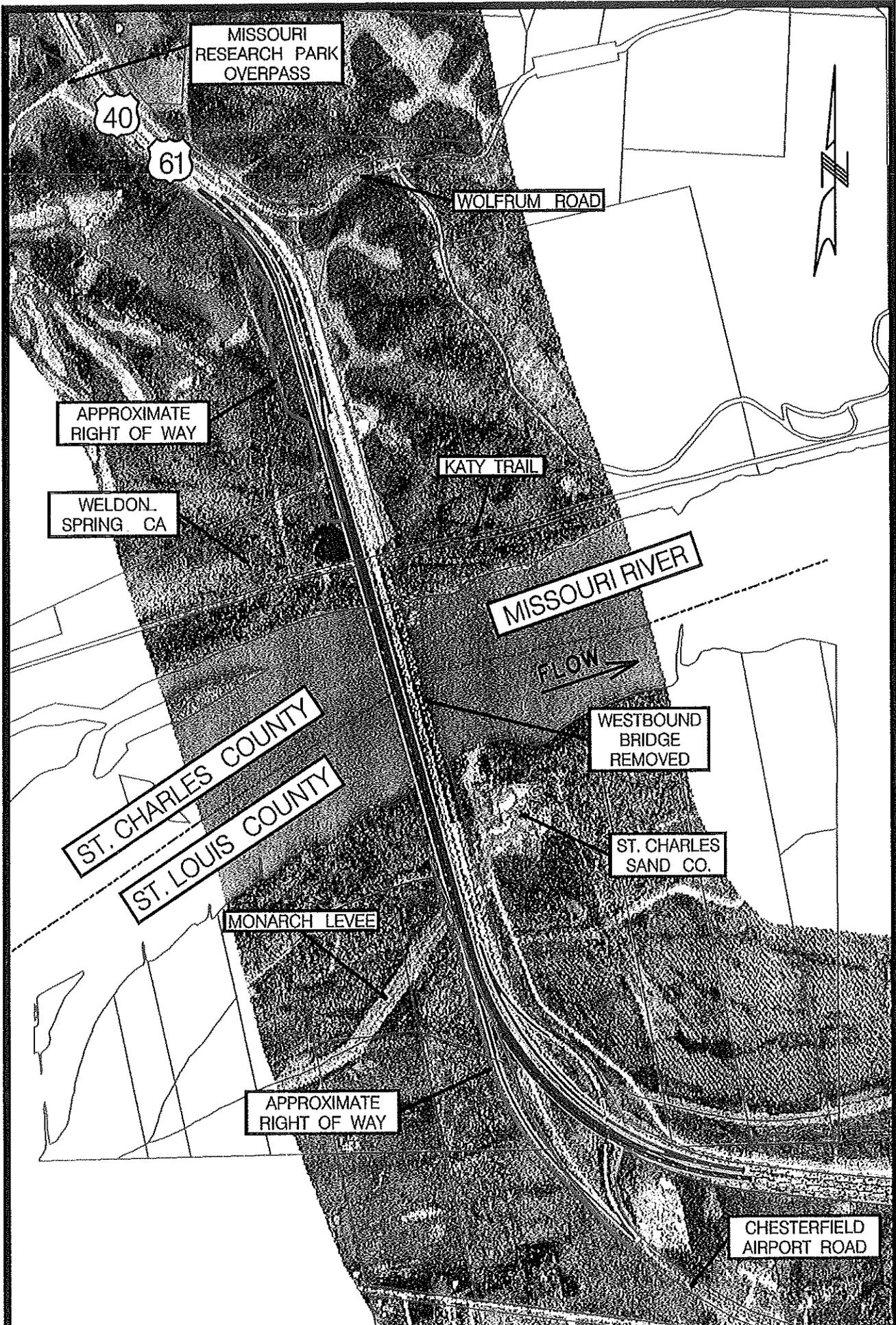
Criterion/Resource	Alternative				
	A1	A2	A2'	B3	B5
Costs (in millions; 2007 dollars)					
Construction	\$141.3	\$122.9	\$122.7	\$139.2	\$120.7
Right of Way	\$1.2	\$1.2	\$1.2	\$0.9	\$0.9
Miscellaneous	\$50.9	\$44.3	\$44.2	\$50.1	\$43.4
Total	\$193.4	\$168.4	\$168.2	\$190.3	\$165.1
Farmland, acres (hectares)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Displacements					
Residential	0	0	0	0	0
Commercial	0	0	0	1	1
Other	0	0	0	0	0
Right of Way, acres (hectares)	19.3 (7.8)	19.3 (7.8)	19.3 (7.8)	13.7 (5.5)	13.7 (5.5)
Environmental Justice	No Impact				
Air Quality	Minor, short term				
Noise	Short term, construction				
Wetlands, #/acre (hectare)	0/0.0 (0.0)	0/0.0 (0.0)	0/0.0 (0.0)	1/0.28 (0.11)	1/0.28 (0.11)
Water Quality	No Impact				
Missouri River Floodplain, ft crossed (m crossed)	4,100 (1,250)	4,100 (1,250)	4,100 (1,250)	4,100 (1,250)	4,100 (1,250)
Wild/Scenic Rivers	No Impact				
Permits Required?					
Section 401	Yes	Yes	Yes	Yes	Yes
Section 404	Yes	Yes	Yes	Yes	Yes
Section 9	Yes	Yes	Yes	Yes	Yes
Section 10	Yes	Yes	Yes	Yes	Yes
Floodplain	Yes	Yes	Yes	Yes	Yes
Threatened and Endangered Species	See below*				
Geologic Features					
Caves	None	None	None	None	None
Sinkholes	None	None	None	None	None
Mines	None	None	None	None	None
Public Lands†	2 (non recreational)	2 (non recreational)	2 (non recreational)	None	None
Cultural Resources					
Architecture	None	None	None	None	None
Archaeology	2	2	2	1	1
Westbound Bridge	Demolished	Retain**	Retain**	Demolished	Retain**
Hazardous Waste	1	1	1	1	1
Construction Impacts	Minor, short term				

* All alternatives could involve the habitats of the Indiana bat, pallid sturgeon, and bald eagle.

† All alternatives span the Katy Trail in addition to the public land impacts listed above.

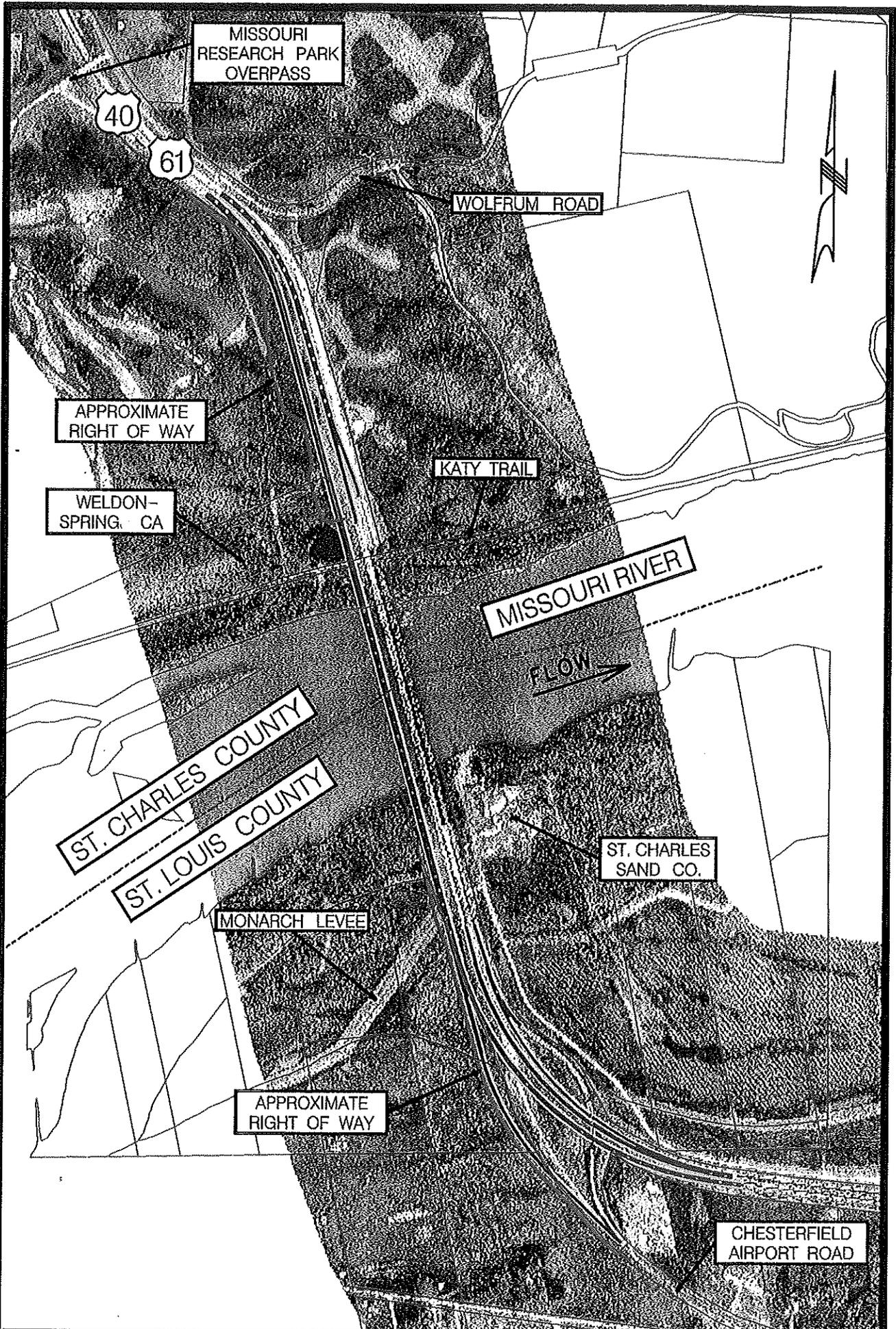
** Alternatives A2 and B5 require the use of the westbound bridge (historic) for mainline (future interstate) traffic, which could necessitate an earlier removal of the bridge due to wear and fatigue.

Source: MACTEC, 2003.



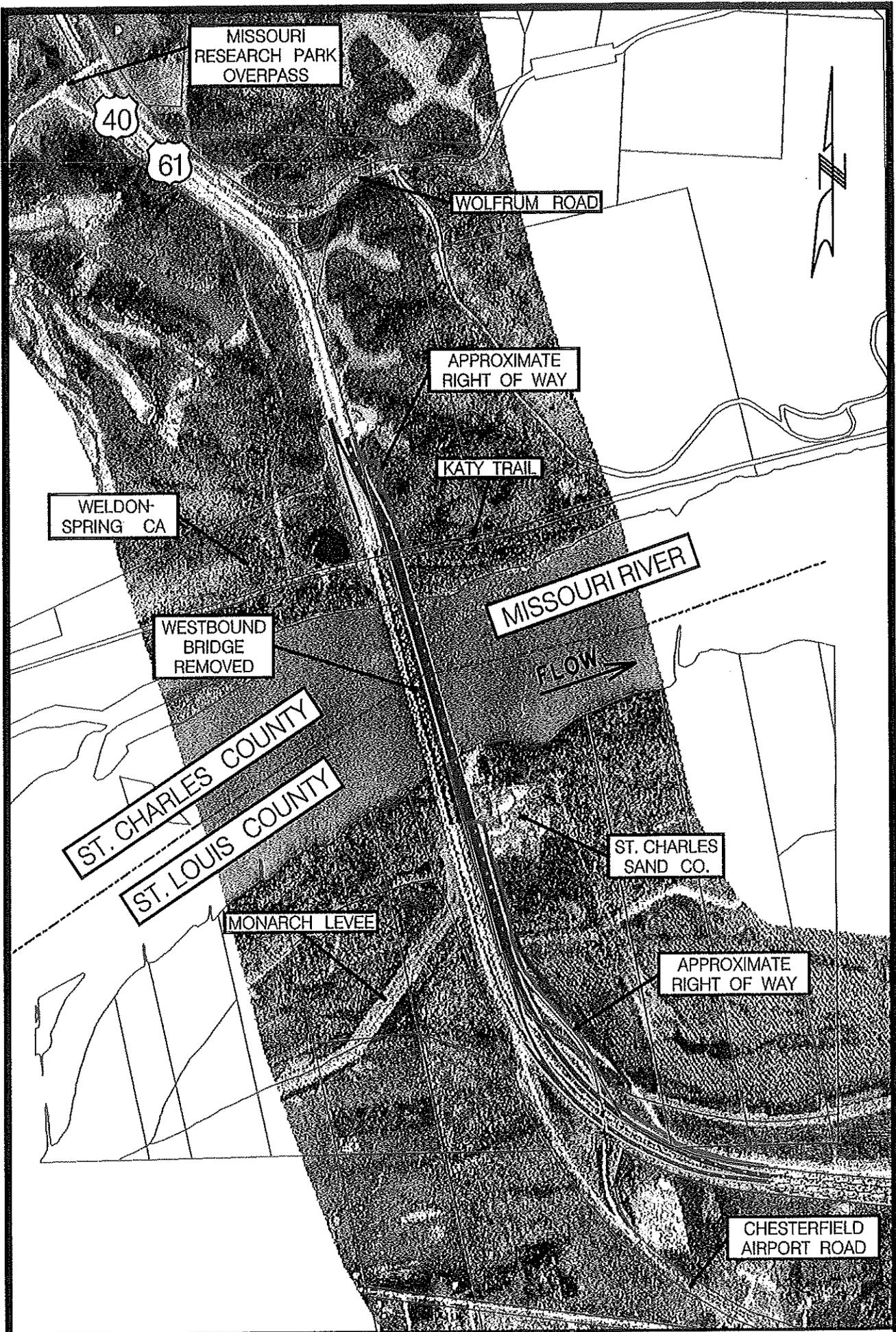
Job No. J6P1436
 SCALE: 1" = 1200'

Figure 2-1
 Alternative A1



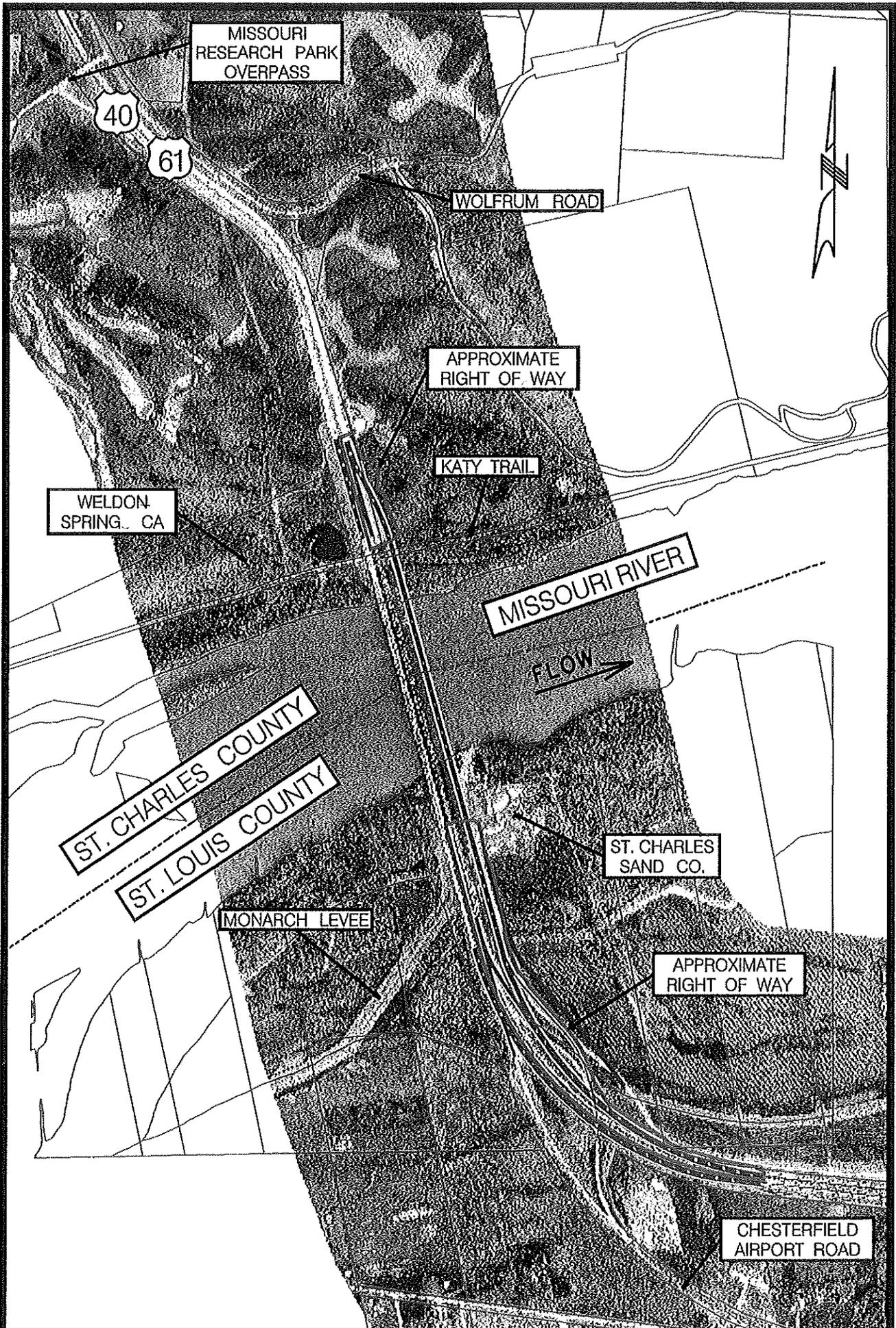
Job No. J6P1436
 SCALE: 1" = 1200'

Figure 2-2
 Alternative A2



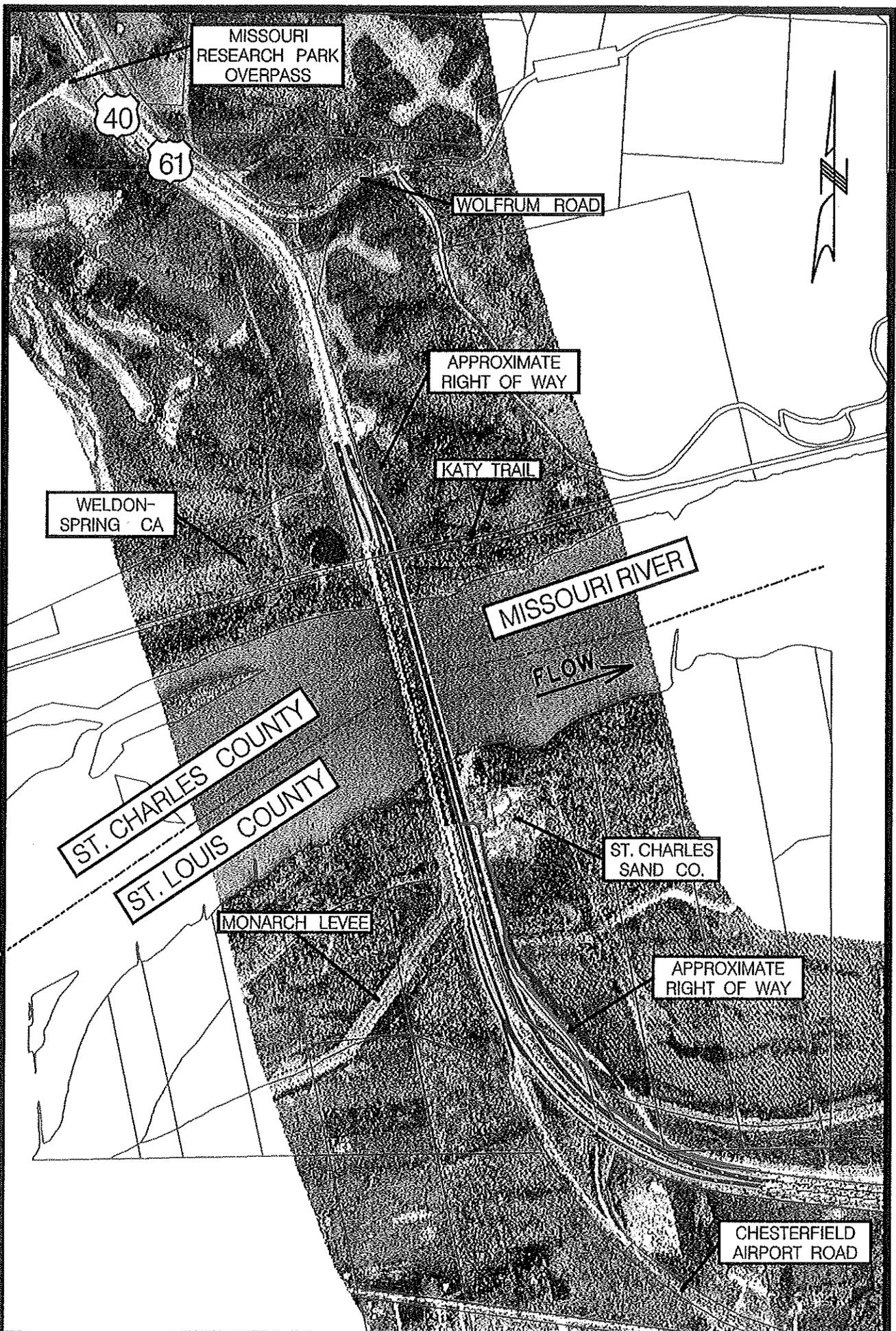
Job No. J6P1436
 SCALE: 1" = 1200'

Figure 2-3
 Alternative B3



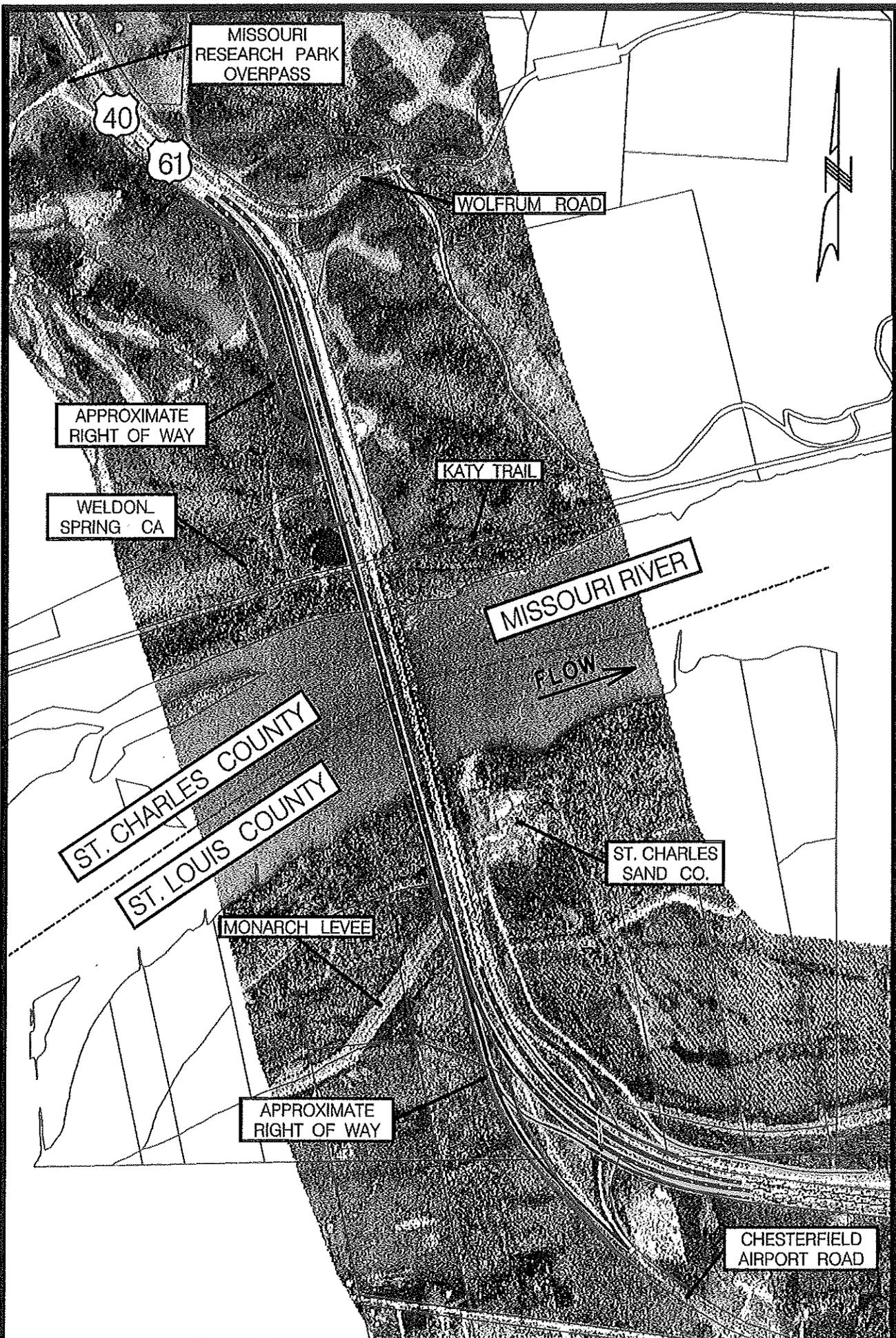
Job No. J6P1436
 SCALE: 1" = 1200'

Figure 2-4
 Alternative B4



Job No. J6P1436
 SCALE: 1" = 1200'

Figure 2-5
 Alternative B5



MISSOURI
RESEARCH PARK
OVERPASS

40

61

WOLFRUM ROAD

APPROXIMATE
RIGHT OF WAY

WELDON
SPRING CA

KATY TRAIL

MISSOURI RIVER

FLOW

ST. CHARLES COUNTY

ST. LOUIS COUNTY

ST. CHARLES
SAND CO.

MONARCH LEVEE

APPROXIMATE
RIGHT OF WAY

CHESTERFIELD
AIRPORT ROAD

3.0 Affected Environment

The upland areas of the study area lie within the Ozark Border Natural Division, which comprises about 13 percent of the state of Missouri (Figure 3-1). This division includes rugged river hills with deep, relatively productive soils along both sides of the lower Missouri River and extending along the lower Mississippi River on the eastern border of the state to the Mississippi Lowlands Natural Division. The division roughly corresponds with Sauer's (1920) Missouri and Mississippi River Border Provinces and with Bennitt and Nagel's (1937) Northern and Eastern Ozark Border (Thom and Wilson, 1980).

While most of the Ozark Border Division is physiographically part of the Ozark Plateau Province (Fenneman, 1938), some of the region is not normally thought of as being part of the Ozarks. The Ozark border is a broad ecotonal belt, wherein the Ozarks grade into neighboring natural divisions on the north and east. Geographic location, soils, topography, and plant and animal distribution distinguish the Ozark Border Division. It is primarily characterized by river hills topography, with features of sandstone and limestone cliffs and pinnacles along the rivers, although a few isolated rolling plains are present.

Sections within the Ozark Border Division are differentiated from each other by river drainages, geography, biota, and presettlement vegetation. Upland deciduous forest was the main presettlement vegetation; however, glade, prairie, and bottomland forest communities were also present, with prairie accounting for less than 10 percent. Several plants that are generally restricted to the Ozark Border Division in Missouri include shining clubmoss (*Lycopodium lucidulum*), white trillium (*Trillium flexipes*), Forbes's saxifrage (*Saxifraga pensylvanica* var. *forbesii*), and hay-scented fern (*Dennstaedtia punctilobula*). The wood frog's (*Rana sylvatica*) Missouri distribution appears to be centered on this natural division.

The Missouri River Section of the Ozark Border Natural Division is drained by streams flowing into the Missouri River. Most of the section is highly dissected, but there are isolated rolling plains in the western part and gently sloping ridge tops and valley bottoms occur throughout. There are more perennial streams, and these are generally larger and more turbid than in the Ozark Natural Division. Geology is mainly Ordovician, but Pennsylvanian, Mississippian, and Silurian-Devonian formations also occur. St. Peter Sandstone crops out in portions of this section and stream cutting has formed steep-sided, sandstone canyons and bluffs. The presettlement vegetation was mostly deciduous forest, but upland prairies, glades, and marshes also occurred. Caves, sinkholes, springs, bluffs, and rock pinnacles are features of this section. Many of the soils are derived from loess and are relatively productive.

The river itself and the banks of the river are within the Big Rivers Natural Division. This division, comprising about 5 percent of the state, includes the floodplains and terraces of the largest rivers, primarily the Missouri and Mississippi but also the lower Grand and the lower Des Moines. Soils are mostly alluvial, deep, and productive. Presettlement natural features included mesic to wet prairie, bottomland and upland forests, marshes, sloughs, islands, sand and mud bars, oxbow ponds, and rivers. Bedrock is generally covered with alluvial deposits.

The Big Rivers Natural Division has a distinct aquatic fauna, and Pflieger (1975) treats it as a separate Fish Faunal Region. It forms the center of distribution in Missouri for 30 fishes and 10 species are restricted to it. The shovelnose sturgeon (*Scaphirhynchus platorhynchus*), pallid sturgeon (*Scaphirhynchus albus*), plains spadefoot toad (*Scaphiopus bonbifrons*) and Illinois mud turtle (*Kinosternon flavescens spooneri*) are some animals that are generally restricted in

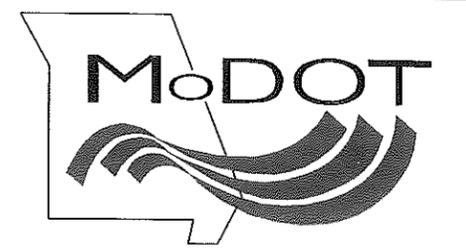
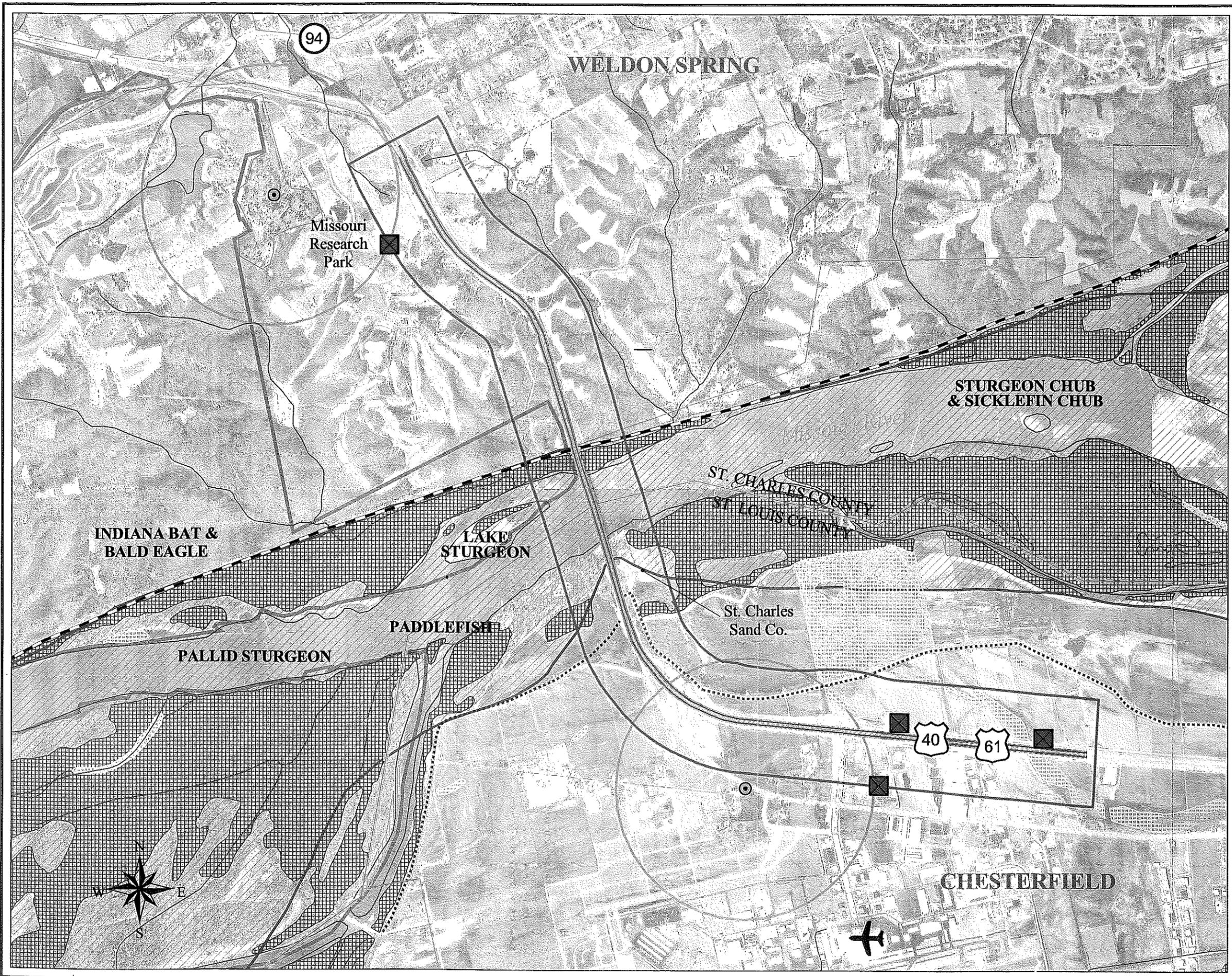
Missouri to this division. A few of the division's many characteristic plants are river bulrush (*Euphorbia serpens*), sand dropseed (*Sporobolus cryptandrus*), bushy cinquefoil (*Potentilla paradoxa*), peach-leaved willow (*Salix amygdaloides*), cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*), pecan (*Carya illinoensis*), and pin oak (*Quercus palustris*).

The Lower Missouri Section of the Big Rivers division was essentially devoid of prairie even in presettlement times. Reed (*Phragmites communis*), great bulrush (*Scirpus acustus*), and dock (*Rumex mexicanus*) are characteristic plants. Seaside crowfoot (*Ranunculus cymbalaria*) and spurge (*Euphorbia glyptosperma*) are two plants that are generally restricted to this section. Black bullhead (*Ictalurus melas*), flathead chub (*Hybopsis gracilis*), western silvery minnow (*Hybognathus argyritis*), and western massasauga rattlesnake (*Sistrurus catenatus tergeminus*) are animals characteristic of this section.

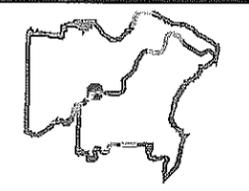
The proposed alternatives are located within portions of unincorporated St. Charles County and the municipalities of Chesterfield and Weldon Spring. The topography north of the Missouri River consists of rolling, wooded upland and bluffs, in contrast with the relatively flat, low-lying floodplain south of the river. The St. Charles County side is sparsely developed because of the bluffs along the river. The University of Missouri Research Park (an office park with a golf course) and the August A. Busch Wildlife Area are south and west of Route 40/61. Weldon Spring, a small city that is developing with mostly residential subdivisions and commercial properties along Route 40/61 and Route 94, is north and east of the highway. The Katy Trail State Park, a 200-mile-long Rail-to-Trail pedestrian and bicycle path, runs beneath the bridges between the bluff and the river.

The Missouri River valley in St. Louis County has developed rapidly in the past decade, although the land nearest the bridges is used mostly for agriculture. There is a sand plant for dredging sand from the river on the east side of the bridge. The Spirit of St. Louis Airport and associated light industrial and commercial buildings are south of the bridge beyond the project limits.

Figure 3-1 depicts some potential environmental constraints identified in the vicinity of the project. The four potential hazardous waste sites identified in the figure are based on unconfirmed location data and were obtained from the Center for Agricultural, Resource and Environmental Systems (CARES); College of Agriculture, Food and Natural Resources; University of Missouri - Columbia) database. The CARES database identified the four locations as Missouri Research Park, St. Louis Gumbo Nursery, NE of Correctional Facility, and Ballfields. Further research showed that these sites, with the exception of the Ballfields, are located outside the footprint of the project. None of these sites present any hazardous waste concerns for the project. As stated in Section 4.17, the only hazardous waste site identified in the project area is associated with petroleum spills and/or releases.



**US ROUTE 40/61
(DANIEL BOONE
BRIDGE)**



St. Louis & St. Charles Counties

Legend

- Study Area
- Municipal Boundary
- State Route 94
- US Route 40/61
- Katy Trail
- Existing Monarch-Chesterfield Levee
- Proposed Monarch-Chesterfield Levee
- County Line
- Stream

Environmental Issues

- Potential Hazardous Waste Site
- Public Well
- Airport
- Public Water Supply
- Floodway
- MDC Ownership
- NWI Wetlands**
- PEM
- PSS
- PFO

0.3 0 0.3 Miles

1:23000

UTM, NAD 83, Meter

Date: July 3, 2003

**Figure 3-1
Potential
Environmental Issues**

Unincorporated Lands

Unincorporated lands are located within St. Charles County west of Weldon Spring and north of the Missouri River. This area can be characterized as primarily recreational lands managed by MDC with some commercial and industrial business area.

Study Area

The study area is defined as a 2,000-ft (610-m) wide corridor centered on the existing highway extending for 2.1 mi (3.4 km) from the Missouri Research Park overpass to Chesterfield Airport Road (Figure 4-1). The predominant land uses within the study area are agriculture/vacant/open country, urban (right of way for road facilities), and commercial and industrial business areas (Table 4-2).

Table 4-2. Existing Land Use within the Study Area

	Acres	Hectares
Agricultural/Vacant/Open Country	252.2	102.1
Urban	175.6	71.1
Commercial/Industrial Mix	131.2	53.1
Industrial	106.9	43.3
Commercial	14.2	5.7
Public/Semi-Public/Recreational	87.3	35.3
Water	67.5	27.3
Office	36.2	14.7
Residential	1.8	0.7

Source: MACTEC 2003.

4.1.3 Existing Land Use Impacts

Impacts to existing land uses are through direct acquisition of right of way for highway construction. Land use impacts, therefore, reflect the acquisition and conversion of land uses outside of the existing highway right of way. The amount and type of land that would be acquired by land use classification and/or ownership for the final alternatives are presented in Table 4-3.

Table 4-3. Existing Land Use Impacts by Alternative, ac (ha)

	A1	A2	A2'	B3	B5
Agricultural/Vacant/Open Country	8.2 (3.3)	8.2 (3.3)	8.2 (3.3)	3.5 (1.4)	3.5 (1.4)
Industrial	0	0	0	9.9 (4.0)	9.9 (4.0)
Commercial/Industrial Mix	9.6 (3.9)	9.6 (3.9)	9.6 (3.9)	0	0
Commercial	0	0	0	0	0
Public/Semi-Public/Recreational	1.5 (0.6)	1.5 (0.6)	1.5 (0.6)	0.3 (0.1)	0.3 (0.1)
Water	0	0	0	0	0
Urban	0	0	0	0	0
Office	0	0	0	0	0
Residential	0	0	0	0	0
Total	19.3 (7.8)	19.3 (7.8)	19.3 (7.8)	13.7 (5.5)	13.7 (5.5)

Source: MACTEC 2003.

Impacts for each alternative would require a total acquisition of approximately 13.7 to 19.3 acres (ac) [5.5 to 7.8 hectares (ha)]. Impacts to land use for each alternative are similar with the majority of impacts to agricultural/vacant/open country and commercial and industrial business areas.

4.1.4 Future Land Use

Future land uses are represented in comprehensive plans for the cities of Weldon Spring and Chesterfield (Figure 4-2 and Table 4-4). Future land use is a reflection of existing development patterns and where government agencies believe that certain types of development are appropriate based on current conditions. These conditions include access to transportation facilities, the ability to provide basic utility infrastructure, and existing vicinity land uses. The majority of the project study area is designated for commercial development followed by office land use.

Table 4-4. Future Land Use within the Study Area

	Acres	Hectares
Agriculture/Floodplain/Conservation	146.8	59.4
Commercial	283.5	114.7
Mixed Use (retail/office/warehouse)	76.9	31.1
Office	212.2	85.9
Open Country	7.2	2.9
Public/Semi-public/recreational	88.2	35.7
Urban	173.6	70.2
Water	67.5	27.3

Source: MACTEC, 2003.

The final alternatives are not anticipated to interfere with future land use plans for the city of Weldon Spring, St. Charles County, or the city of Chesterfield. As future land use includes commercial and light industrial land use adjacent to Route 40/61 within the study area, the proposed project is consistent with these plans and could provide better access to these areas.

Zoning

Zoning reflects the existing land use controls implemented by the cities of Weldon Spring and Chesterfield (Figure 4-3). Zoning maps were obtained from the cities of Weldon Spring and Chesterfield; however, they were not available for unincorporated St. Charles County. The majority of the study area is zoned office, commercial, and industrial. The Preferred Alternative would be consistent with the existing zoning of the cities.

4.2 Farmland Impacts

Land associated with the proposed project is either within the Chesterfield or Weldon Spring city limits or has otherwise been set aside for specific uses. Therefore, it meets the definition of "land committed to other uses" as contained in the Farmland Protection Policy Act (FPPA), and farmland impact will not be further evaluated.

4.3 Socioeconomic Impacts

Analysis of potential impacts begins with the identification of a study area's population, neighborhoods and communities, housing, income distribution, and employment characteristics. Two geographic areas have been examined to document the existing socioeconomic conditions of the affected environment. The term "region" refers to St. Louis and St. Charles counties, Missouri. The term "study area" refers to the smaller area within these two counties that includes the 2.1-mi (3.4-km) corridor from the Missouri Research Park overpass in St. Charles County to Chesterfield Airport Road in St. Louis County.

4.3.1 Area Community Characteristics

The study area consists of portions of the city of Weldon Spring and the city of Chesterfield, and an unincorporated area west of the city of Weldon Spring. The city of Weldon Spring can be characterized as primarily a rural community with low-density residential housing and limited commercial growth located primarily along Route 94 and Route 40/61. The primary factors affecting future development are the floodways, steep terrain, and numerous cemeteries (City of Weldon Spring Comprehensive Plan, 2000).

The city of Chesterfield is one of the fastest growing urban communities in the St. Louis metropolitan area. Chesterfield has experienced considerable commercial growth, primarily located along Route 40/61 and in the area located between the Missouri River and the base of the river bluffs, known as the Chesterfield Valley. The construction of three stormwater pump stations and the ongoing improvements to the Chesterfield-Monarch levee will aid in protecting this portion of Chesterfield from flooding. The primary factor affecting future development is the lack of undeveloped land within the city limits (City of Chesterfield Plan, 2002).

The unincorporated area immediately west of Weldon Spring and Route 40/61 consists of conservation areas managed by MDC and a mixed commercial/light industrial park. Additionally, the Katy Trail State Park managed by MDNR extends underneath the Route 40/61 bridges adjacent to the Missouri River.

The study area is represented by three census tracts; two in St. Charles County and one in St. Louis County. Census tract 3111.03 is located east of Route 40/61 in St. Charles County, and census tract 3122.01 is located west of Route 40/61 in St. Charles County. Census tract 2216.01 is located in St. Louis County on both the north and south sides of Route 40/61. Table 4-5 summarizes the demographic characteristics of these census tracts. Census tracts within this study area indicate a primarily middle-aged, Caucasian population.

Table 4-5. Demographic Characteristics, 2000

	St. Charles Co.		St. Louis Co.
	Census Tract 3111.03	Census Tract 3122.01	Census Tract 2216.01
Population	5,566	4,494	11,256
Median Age	40.2	39.4	38.1
Percent Age 65 and Older	14.7	9.9	11.6
Percent White	95.3	99.0	92.3
Percent Black	1.3	0.1	1.9
Percent Asian	2.0	0.7	4.1
Percent Other	1.4	0.1	1.7
Average Household Size	2.87	2.80	2.36
Percent Handicapped*	12.3	11.2	8.9

* Population 5 years and older.

Source: U.S. Census, 2000.

4.3.2 Public Services and Facilities

For information of public parks, recreational lands, and other public lands, see Section 4.16.

4.3.2.1 Schools and School Districts

The study area is served by one school district in Chesterfield (Rockwood) and one school district in St. Charles County (Francis Howell). In addition, Chesterfield and St. Charles County have numerous parochial/private schools and two higher education institutions.

4.3.2.2 Fire and Police Facilities

There are no fire stations or police stations located in the study corridor. The city of Chesterfield is served by the Chesterfield Fire Protection District and the Metro West Fire Protection District. There are six fire stations within city limits and one training facility. Weldon Spring is served by the Cottleville Fire Protection District.

Police protection for the study area is provided by the Chesterfield Police Department and Cottleville Police Department.

4.3.2.3 Churches

There are numerous churches located throughout the cities of Chesterfield and Weldon Spring; however none are located in the study area.

4.3.2.4 Medical Facilities

The study area is served by St. Luke's Hospital located in Chesterfield. It is a full service, non-profit hospital that specializes in a variety of areas. There are also three medical buildings and the St. Luke's Institute for Health Education (City of Chesterfield Comprehensive Plan, December 2002).

4.3.2.5 Airports

The Spirit of St. Louis Airport is located in the city of Chesterfield. Owned and operated by the St. Louis County government, it is the prime reliever for Lambert Airport. It is the second busiest general aviation airport in the Federal Aviation Administration (FAA) Central Region (Missouri, Arkansas, Kansas, and Iowa), and it has over 500 aircraft and two runways (www.spiritairport.com).

4.3.2.6 Public Service Facilities Impacts

None of the final alternatives will impact school, fire, police, church, medical, or airport (Spirit of St. Louis Airport) facilities serving the communities of Weldon Spring or Chesterfield, and these services will be maintained during construction.

4.3.3 Regional Population Trends

The study region has experienced an increase in population since the 1980 Census (Table 4-6). St. Charles County has exhibited a higher growth rate (33.3 percent) since 1990 than St. Louis County (2.3 percent) or the state of Missouri (9.4 percent). Between 1990 and 2000, Weldon Spring (located in St. Charles County) increased from 1,470 persons to 5,070 persons (244.9 percent). Although St. Louis County's growth rate for 1990 to 2000 is lower than the state of Missouri, the city of Chesterfield has exhibited a greater growth rate than the state (23.6 percent).

Table 4-6. Municipality, County, and State Population Trends

	1980	1990	2000	% Change 1990-2000
St. Charles County	144,107	212,907	283,883	33.3%
St. Louis County	973,896	993,529	1,016,315	2.3%
Incorporated Areas				
Chesterfield*	--	37,991	46,973	23.6%
Weldon Spring†	--	1,470	5,070	244.9%
State of Missouri	4,916,686	5,117,073	5,596,687	9.4%

* The city of Chesterfield was not incorporated until 1988; therefore 1980 Census information is not available.

† The city of Weldon Spring was not incorporated until 1984; therefore 1980 Census information is not available.

Source: U.S. Census, 2000.

4.3.4 Age Characteristics

With the exception of St. Charles County, the 2000 median age of the study area is generally higher than the state of Missouri (Table 4-7). Although St. Charles County has a lower 2000 median age than the state of Missouri, the three subsections of the county exhibit a higher median age than the state.

Table 4-7. Age Characteristics

	Year	Median Age	18 and Under (%)	65 and Older (%)
St. Charles County	1990	30.7	31.4	6.9
	2000	34.3	29.0	8.8
Census Tract 3111.03	1990	35.9	31.3	4.9
	2000	40.2	29.2	14.7
Census Tract 3122.01	1990	34.9	27.5	11.0
	2000	39.4	27.1	9.9
St. Louis County	1990	34.6	25.8	13.1
	2000	37.5	25.2	14.1
Census Tract 2216.01	1990	33.6	24.0	9.5
	2000	38.1	24.7	8.8
Chesterfield	1990	36.8	29.0	9.0
	2000	41.8	24.6	14.7
Weldon Spring	1990	35.3	27.9	6.7
	2000	42.4	26.6	16.2
State of Missouri	1990	33.6	27.1	14.0
	2000	36.1	25.5	13.5

Sources: U.S. Department of Commerce, Bureau of the Census, 1990 and 2000, www.census.gov.

4.3.5 Racial Characteristics

The racial compositions within the study area census tracts are comparable and have a lower percentage of minorities than the state of Missouri (Table 4-8). St. Louis County has a greater percentage of minorities than the state, whereas St. Charles County has a lower percentage of minorities.

Table 4-8. Racial Characteristics, 2000

	White (%)	Black (%)	American Indian and Alaskan Native (%)	Asian (%)	Native Hawaiian and Other Pacific Islander (%)	Other Race (%)
St. Charles County	94.7	2.7	0.2	0.9	0.0	0.5
Census Tract 3111.03	96.3	1.5	0.1	1.1	0.0	0.3
Census Tract 3122.01	98.4	0.5	0.2	0.3	0.0	0.2
St. Louis County	76.8	19.0	0.2	2.2	0.0	0.5
Census Tract 2216.01	91.9	1.7	0.2	4.8	0.0	0.6
Incorporated Areas						
Chesterfield	91.3	1.9	0.1	5.6	0.0	0.4
Weldon Spring	96.0	1.8	0.2	1.1	0.0	0.3
State of Missouri	84.9	11.2	0.4	1.1	0.1	0.8

Source: U.S. Census Bureau, Census 2000.

4.3.6 Educational Level

All areas in the study area have a lower percentage of high school graduates (including equivalency) and a higher percentage of advanced degrees compared with the state of Missouri (Table 4-9). The percentage of high school (only) graduates in census tract 2216.01 and the city of Chesterfield are considerably lower (19 percent) than the state, but the percentage with advanced degrees is noticeably higher (26 percent or more) than the state.

Table 4-9. Educational Characteristics, 2000

Area	Persons 25 Years or Older	High School Graduate (includes equivalency)	Bachelor's Degree or Higher
St. Charles County	178,498	29.6%	18.5%
Census Tract 3111.03	3,702	21.3%	26.5%
Census Tract 3122.01	3,012	29.5%	18.5%
St. Louis County	677,027	24.0%	22.0%
Census Tract 2216.01	7,768	12.8%	40.6%
Incorporated Areas			
Chesterfield	32,689	12.8%	36.6%
Weldon Spring	3,552	21.3%	27.0%
State of Missouri	3,634,906	32.7%	14.0%

Source: U.S. Census Bureau, 2000, www.census.gov.

4.3.7 Housing Characteristics

The average household size for the study area counties, census tracts, and cities are generally consistent with or slightly higher than the state average of 2.5 (Table 4-10). The percentages of occupied units in the study area are higher than the state of Missouri. With the exception of census tract 2216.01 in St. Louis County, the percentages of owner occupied units are higher than the state average.

Table 4-10. Housing Characteristics, 2000

	Households		Housing		
	Number	Average Size	Number	% Occupied Units	% Owner-Occupied Units
St. Charles County	101,663	2.8	105,514	96.4	82.0
Census Tract 3111.03	1,866	2.9	1,906	97.9	88.1
Census Tract 3122.01	1,604	2.8	1,692	94.8	89.9
St. Louis County	404,313	2.5	423,749	95.4	74.1
Census Tract 2216.01	4,641	2.4	4,944	93.9	61.5
Incorporated Areas					
Chesterfield	18,060	2.5	18,738	96.4	77.9
Weldon Spring	1,880	2.7	1,926	97.6	87.4
State of Missouri	2,194,594	2.5	2,442,017	89.9	70.3

Source: U.S. Census, 2000.

4.3.8 Community Cohesion

None of the final alternatives would disrupt current land use patterns or community components, cause a considerable change in communities, or result in segmentation. There are no residential displacements or residential properties required by the final alternatives. No neighborhood segmentation or isolation of communities would occur as a result of the proposed project.

4.4 Acquisition Impacts

The improvements to Route 40/61 would require the purchase of additional right of way and the acquisition of buildings located within the right of way. In addition, those buildings within 10 ft (3 m) of the right of way whose properties and access would be greatly impacted by the new facility would also need to be acquired. Residential, commercial, and industrial impacts by each alternative are depicted in Table 4-11. Centerlines for each alternative are depicted in Appendix E, Plates 1 through 12 and 17 through 22. There would be no residential, commercial, or industrial displacements or residential parcels required with any of the final alternatives.

Table 4-11. Building and Parcel Impacts

	Alternative					No Action
	A1	A2	A2'	B3	B5	
Buildings						
Residential	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Industrial	0	0	0	1	1	0
Total Number of Buildings Affected	0	0	0	1	1	0
Parcels						
Number of Total Acquisitions	0	0	0	0	0	0
Number of Partial Acquisitions	5	5	5	4	4	0
Agricultural	3	3	3	1	1	0
Commercial	1	1	1	0	0	0
Industrial	0	0	0	2	2	0
Open Country	0	0	0	1	1	0
Public/Semi-Public	1	1	1	0	0	0
Total Number of Parcels Affected	5	5	5	4	4	0
Total Right of Way, ac (ha)	19.3 (7.8)	19.3 (7.8)	19.3 (7.8)	13.7 (5.5)	13.7 (5.5)	0
Maximum Extent of New Right of Way Width*, ft (m)						
St. Charles County	260 (79)	260 (79)	260 (79)	220 (67)	220 (67)	0
St. Louis County	180 (55)	180 (55)	180 (55)	200 (61)	200 (61)	0

* New right of way is irregular in shape. Maximum widths are depicted.

Source: MACTEC, 2003.

Alternatives A1, A2, and A2' (Preferred) would potentially impact portions of five parcels, one of which is a commercial property (the Missouri Research Park). These alternatives will potentially impact approximately 9.6 ac (3.9 ha) of the northeastern corner of the Missouri Research Park (a business park owned by the University of Missouri). The affected portion of the Missouri Research Park is immediately adjacent to Route 40/61, primarily forested, and the function of this business park would not be disrupted. Three parcels consist of agricultural land, which are immediately adjacent to Route 40/61. One parcel is managed as the Weldon Spring Conservation Area (CA) by the MDC. The affected portion is primarily wooded and classified as having dispersed recreation and is not considered a Section 4(f) resource.

Alternatives B3 and B5 (neither of which is a preferred alternative) would potentially affect portions of four parcels and one industrial building. The St. Charles Sand Company consists of two industrial parcels. Alternatives B3 and B5 would impact the southwestern area of these industrial parcels immediately adjacent to Route 40/61. The affected portion of the St. Charles Sand Company is primarily open space with some trees adjacent to Route 40/61. These alternatives could potentially require that the office trailer be relocated to another location of the property. The St. Charles Sand Company could remain operational with Alternatives B3 and B5 but would require modifications to its access road (driveway) and to equipment for the business including the dock at the river, which may need to be relocated to another location on the property. At the driveway entrance near the office trailer, the driveway would need to be shifted approximately 60 ft (18 m) east of its present location. At this phase of analysis, it is difficult to determine the exact nature and cost of the potential damages incurred by the St. Charles Sand Company as a result of Alternatives B3 and B5. The remaining two parcels potentially affected by Alternatives B3 and B5 are agricultural and open country and are located immediately adjacent to Route 40/61. The affected portion of the open country parcel, located north of the Missouri River and adjacent to Route 40/61 is primarily wooded.

In addition to land acquisition, the project may require temporary or permanent easements for construction or utility location. All parcels would continue to have access to Route 40/61. No parcel would be landlocked as a result of right of way purchase and road construction. No uneconomical remnants are anticipated as a result of the preferred alternative.

The estimated costs are based on construction, right of way acquisition, and miscellaneous (easements, costs of partial acquisitions, etc.) (Table 4-12).

Table 4-12. Estimated Costs* of Build Alternatives

	A1	A2	A2'	B3	B5
Construction	\$141.3	\$122.9	\$122.7	\$139.2	\$120.7
Right of Way	\$1.2	\$1.2	\$1.2	\$0.9	\$0.9
Miscellaneous	\$50.9	\$44.3	\$44.2	\$50.1	\$43.4
Total	\$193.4	\$168.4	\$168.2	\$190.3	\$165.1

* In millions, 2007 dollars.

Source: MACTEC, 2003.

Acquisition for the project would be accomplished in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and Amendments (Act). The Act, as well as Missouri state law, requires that just compensation be paid to the owner of private property taken for public use. The appraisal of fair market value is the basis of determining just compensation to be offered to the owner for property to be acquired. An appraisal is defined in the Act as a written statement independently and impartially prepared by a qualified appraiser setting forth an opinion of defined value of an adequately described property as of a specific date, and supported by the presentation and analysis of relevant market information.

During the relocation phase, MoDOT is responsible for assuring that a displaced person will not be required to move unless the agency has made comparable, decent, safe, and sanitary

housing available and that the displacee will not be required to move without at least a 90-day notice in writing. The Act requires that comparable, decent, safe, and sanitary replacement housing within a person's financial means be made available before that person may be displaced. Should this project include persons who cannot readily be moved using the regular relocation program benefits and/or procedures [i.e., when there is a unique housing need or when the cost of available comparable housing would result in payments in excess of statutory payment limits (\$22,500 or \$5,250)], MoDOT's relocation policy commits to utilizing housing of last resort. Housing of last resort involves the use of payments in excess of statutory maximums or the use of other unusual methods of providing comparable housing.

Any displaced owner-occupant or tenant of a dwelling who qualifies as a displaced person is entitled to payment of his or her actual moving and related expenses, as MoDOT determines to be reasonable and necessary. A displaced owner-occupant who has occupied a displacement dwelling for at least 180 days is also eligible to receive up to \$22,500 for a replacement housing payment which includes the amount by which the cost of a replacement dwelling exceeds the acquisition cost of the displacement dwelling, increased interest costs, and incidental costs. A displaced owner-occupant who has occupied a displacement dwelling for a least 90 days but less than 180 days and a tenant who has occupied a displacement dwelling for at least 90 days, is entitled to a payment not to exceed \$5,250 for either a rental or down payment assistance.

The MoDOT Right of Way Division would carry out the acquisition and relocation of commercial and industrial properties in accordance with the Act of 1970, as amended. Business owners would be paid fair market value for the real property to be acquired and for relocation costs. Acquisition of commercial properties would not involve relocation of businesses if no operating business is located on the property.

Any displaced business, farm operation, or nonprofit organization which qualifies as a displaced person is entitled to payment of their actual moving and related expenses, as MoDOT determines to be reasonable and necessary. In addition, a business, farm, or non-profit organization may be eligible to receive a payment, not to exceed \$10,000 for expenses incurred in reestablishing their business, farm operation, or non-profit organization at a replacement site.

A displaced business may be eligible to choose a fixed payment in lieu of the payments for actual moving and related expenses, and actual reasonable reestablishment expenses. The payment amount of this entitlement alternative is based on the average net earnings of the business. This fixed payment amount cannot be less than \$1,000 or more than \$20,000.

4.5 Income and Economic Characteristics and Impacts

The 2000 per capita personal income levels in the study area are above the state of Missouri, as shown in Table 4-13. Census tracts 3111.03 and 3122.01 both had higher per capita incomes than St. Charles County, but were lower than the city of Weldon Spring. Census tract 2216.01 had a higher per capita income than the city of Chesterfield and St. Louis County.

Table 4-13. Per Capita Personal Income

	1990*	2000†	% Change 1990-2000
St. Charles County	\$15,366	\$23,592	53.5
Census Tract 3111.03	\$23,408	\$38,153	63.0
Census Tract 3122.01	\$15,927	\$25,817	62.1
St. Louis County	\$18,625	\$27,595	48.1
Census Tract 2216.01	\$30,598	\$46,323	51.4
Incorporated Areas			
Chesterfield	\$28,019	\$43,288	54.5
Weldon Spring	\$22,367	\$40,810	82.5
State of Missouri	\$12,989	\$19,936	53.5

* 1989 Income Information, U.S. Census Bureau, 1990.

† 1999 Income information, U.S. Census Bureau, 2000.

Source:

Economic data relating to median household income and poverty levels are depicted in Table 4-14. This data indicates higher median household incomes for the census tracts and municipalities within the study area than the counties and state. Median household incomes for the census tracts and municipalities ranged from approximately \$30,000 to \$50,000 more than the state of Missouri.

Table 4-14. Median Household Income and Poverty Level Characteristics, 1999

	Median Household Income	Persons Below Poverty Level
St. Charles County	\$57,258	4.0%
Census Tract 3111.03	\$90,823	3.6%
Census Tract 3122.01	\$66,058	2.6%
St. Louis County	\$50,532	6.9%
Census Tract 2216.01	\$78,908	3.5%
Incorporated Areas		
Chesterfield	\$83,802	2.6%
Weldon Spring	\$87,998	4.3%
State of Missouri	\$37,934	11.7%

Source: 1999 Income information, U.S. Census Bureau, 2000, www.census.gov.

Income thresholds by family size and composition, developed by the U.S. Department of Health and Human Services, are used by the Census Bureau to determine persons who are considered poor, or below poverty level. Table 4-14 presents data on the percentage of persons in the study area counties, municipalities, and census tracts that fall below the poverty level. All counties, municipalities, and census tracts in the study area had a lower percentage of persons below the poverty level in 1999 than the state of Missouri.

In 1995, 70 percent of St. Charles County workers commuted outside of the county, particularly into St. Louis County (St. Charles County Master Plan, 1996). On a county-wide level, Table 4-15 depicts the major employers for the study area.

Table 4-15. Major Employers in St. Louis County

Company	# of Employees
The Boeing Company	16,400
Schnuck's Markets, Inc.	12,393
McDonald's Restaurants of St. Louis and Metro East	11,000
SSM Health Care System	10,700
Washington University	10,300
St. John's Mercy Health Care	10,100
Daimler Chrysler Corporation	8,200
United Parcel Service	5,200
Tenet St. Louis	4,800

Source: 2002 St. Louis County Fact Book.

In 2000, job types that accounted for the largest percentages of workers in the study area were those representing the “educational, health, and social services” sector (Table 4-16).

Table 4-16. Labor Force Characteristics by Job Type, 2000

	St. Charles Co.		St. Louis Co.		Incorporated Areas			
	St. Charles Co.	Census Tract 3111.03	Census Tract 3122.01	St. Louis Co.	Census Tract 2216.01	City of Chesterfield	Weidon Spring City	State of Missouri
Percent Distribution by Industry								
Agriculture, forestry, fishing, and mining	0.4	1.1	2.6	0.2	0.4	0.3	1.2	2.2
Construction	7.7	7.6	12.9	4.9	2.5	2.5	7.2	6.9
Manufacturing	16.2	15.0	13.4	12.7	15.5	14.2	12.9	14.8
Wholesale Trade	4.1	9.6	4.5	4.2	6.6	5.3	9.5	3.7
Retail Trade	13.2	12.2	12.7	11.3	9.1	10.9	12.5	11.9
Transportation and warehousing, and utilities	6.0	3.1	4.5	5.4	2.6	3.0	2.2	5.7
Information	3.7	1.9	3.2	3.8	3.7	3.6	2.9	3.0
Finance, insurance, real estate, and rental and leasing	7.5	7.4	8.8	9.0	14.7	12.3	9.6	6.7
Professional, scientific, management, administrative, and waste management services	9.0	10.6	8.9	11.1	14.7	13.9	11.3	7.5
Educational, health and social services	16.7	18.0	17.9	21.7	18.4	22.8	18.0	20.4
Arts, entertainment, recreation, accommodation and food services	7.5	7.5	4.0	7.6	7.6	7.0	6.2	7.8
Other services (except public administration)	4.7	4.0	3.3	4.8	2.2	4.1	3.3	5.0
Public Administration	3.2	1.9	3.4	3.3	1.9	1.7	1.7	4.6

Note: Employed persons are those 16 years or older.

Source: U.S. Census, 2000.

As shown in Table 4-17, greater than two-thirds of St. Charles tax base is residential properties. In contrast, St. Louis County’s tax base is largely commercial. Agricultural land makes up a small percentage of both counties.

Table 4-17. Assessed Value of Real Estate By County – 2002

	Residential	Agriculture	Commercial	Total
St. Charles County	\$2,596,847,150	\$22,377,920	\$849,985,090	\$3,469,210,160
St. Louis County	\$141,570,600	\$591,680	\$1,583,955,270	\$1,726,117,550

Source: Personal Communication, County Assessors’ offices in St. Charles and St. Louis Counties, 2003.

Employment Impacts and Economic Development

Employment impacts are measured by jobs lost and generated by the proposed project. There are no business impacts with the final alternatives; therefore, no jobs would be lost as a result of the proposed project.

The proposed action will create construction-related jobs. Positive economic effects may be realized during the construction period due to the expenditure of public funds within the study area. This includes direct income for construction workers which may be expended for goods and services within the area. Local materials suppliers may benefit from providing goods to the construction contractor for the project. The level at which these positive impacts will occur is determined to a great degree by the contractor based upon the extent that local labor and materials are used in the construction project.

Both the cities of Weldon Spring and Chesterfield have experienced business developments in areas adjacent to Route 40/61 within the study area. Both cities intend to foster commercial and light industrial development for areas outside of the floodplain area and within the high technology corridor in St. Charles County and the Chesterfield Valley in St. Louis County. The recent past and current economic development trends are anticipated to continue in this rapidly developing part of the St. Louis metropolitan area. Although the proposed project will not provide any substantial new access, this project will assist with accommodating those economic development trends and could foster economic development within those areas.

Tax Impacts

The total new right of way acreage required for each alternative ranges from 13.7 to 19.3 ac (5.5 to 7.8 ha). Alternatives A1, A2, and A2' (Preferred) have approximately 11.1 ac (4.5 ha) in St. Charles County and 8.2 ac (3.3 ha) in St. Louis County. Alternatives B3 and B5 have approximately 3.1 ac (1.3 ha) in St. Charles County and 10.6 ac (4.3 ha) in St. Louis County. Given the total assessed values of real estate within each county (see Table 4-17) relative to the amount of land required for the right of way [13.7 to 19.3 ac (5.5 to 7.8 ac)], the impact to the tax base would be considered negligible.

Environmental Justice

Executive Order 12898, entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" mandates that federal agencies identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of the programs on minority and low-income populations. The FHWA Order 6640.23 establishes policies and procedures to use in complying with Executive Order 12898. A minority population is defined as a group of people and/or a community experiencing common conditions of exposure or impact that consists of persons classified by the U.S. Bureau of the Census as Negro/Black/African-American, Hispanic, Asian or Pacific Islander, American Indian, Eskimo, Aleut, or other non-white persons. As defined in the FHWA Order 6640.23, low income "means a household income at or below the U.S. Department of Health and Human Services poverty guidelines."

The study area was evaluated to identify the presence of low income or minority residents and the potential impacts to them in accordance with Executive Order 12898. The study area does not contain high populations of minorities or low-income groups when compared with the state of Missouri and the counties (see Tables 4-5 and 4-8). The final alternatives would not have disproportionate adverse impacts on minority and/or low-income populations as defined by Executive Order 12898 and FHWA Order 6640.23.

4.6 Traffic, Transportation, Safety, and Navigation

This section provides the relative advantages and disadvantages of each final study alternative. These advantages and disadvantages are based largely on roadway capacity and safety. The methods used to analyze the traffic data are discussed in further detail in Appendix D. This section also presents data associated with traffic safety and impacts to navigation.

4.6.1 Existing Traffic and Travel Patterns

The impact of any of the final study alternatives on travel patterns over the Missouri River is not likely to be of significance. Route 40/61 currently has controlled access with breaks at Chesterfield Airport Road and Missouri Research Park. None of the study alternatives propose to change the controlled access already in place. Currently, the Route 40/61 bridges carry 81,700 vpd across the Missouri River. An aggressive growth of 3 percent per year over the next 5 years is expected in the Route 40/61 corridor. However, the first phase of the Page Avenue

Extension (Route 364) over the Missouri River is forecasted to attract approximately 15,000 vpd away from the Route 40/61 corridor, lowering the traffic volume on Route 40/61 to 66,700 vpd. Traffic volumes are then projected to rise to 77,300 vpd by 2007. Travel patterns across the Route 40/61 bridges will likely be more dependent on the development patterns in St. Charles County and in Chesterfield Valley. Table 4-18 provides an historic and current summary of the traffic volumes on the Route 40/61 bridges.

Table 4-18. Existing Traffic Counts Route 40/61 at Missouri River

	Eastbound	Westbound	Total
1999 Counts (Two Lanes Each Direction)			
A.M. Peak Hour	4,400	1,500	5,900
P.M. Peak Hour	1,800	3,400	5,200
Daily			61,800
2002 Counts (Three Lanes Each Direction)			
A.M. Peak Hour	4,600	2,300	6,900
P.M. Peak Hour	2,200	4,600	6,800
Daily			81,700

Source: CBB, 2003.

Traffic increased by approximately 32 percent over the last 3 years. However, this is largely attributed to the opening of the third lane on the westbound bridge in December 2001.

Additional growth will occur after improvements in the vicinity of Clarkson Road/Chesterfield Parkway and Routes 94/K are completed (thereby providing a minimum of three continuous lanes in each direction). Finally, an increase in traffic across the Route 40/61 bridges may also be attributed to significant development that has occurred in Chesterfield Valley and St. Charles County during the last few years. For example, Chesterfield Commons generates approximately 3,300 daily shopping trips across the river. Furthermore, over 3,000 office jobs have recently been added along the Route 40/61 corridor in O'Fallon, which could account for another 3,000 trips per day (or more) across the river.

These recent development trends are expected to continue throughout the next 5 years, so river crossing volumes may continue to rise dramatically. In total, the level of reserve capacity currently available on the existing three-lane bridges will quickly be consumed. A more detailed discussion on the existing traffic conditions and travel patterns is provided in Appendix D.

4.6.2 Traffic Volume Forecasts (2034)

Various forecasts for the Route 40/61 bridge crossings have been produced by a number of different analyses over the last 6 years. An attempt was made to validate the content of each forecast in order to measure their consistency and applicability. As best as could be determined, all of the forecasts considered a total of six lanes crossing the river. The forecasts are from the following:

- An internal MoDOT memorandum dated June 2001 provided traffic forecasting information for the Eatherton Road/Route 109 corridor, including its terminus with Route 40/61;
- A March 2000 study performed by Parsons Brinckerhoff Quade & Douglas, Inc. for MoDOT (as part of an evaluation of Route 40/61 in St. Charles County);
- The 1996 MTIA report conducted by the Route 40/61 MTIA Management Group;
- The 1997 Final Environmental Assessment for Route 40/61 conducted by MoDOT and FHWA; and
- Forecasts recently prepared by the EWGCC.

A summary of these forecasts is provided below in Table 4-19.

Table 4-19. Comparison of Forecasts, Route 40/61 at the Missouri River

Source of Forecast	Construction Year Forecast		Design Year Forecast	
	Year	Volume	Year	Volume
2001 Eatherton Road Evaluation	n/a	n/a	2020	104,000
2000 Parson's Forecast for Route K	2000	66,400	2020	100,400
1996 MTIA for Route 40/61	1995	51,500	2015	82,500
1997 EA for Route 40/61	1998	55,300	2018	88,500
2001 EWGCC Forecasts	2004	68,400	2020	76,300

Source: CBB, 2003.

As can be seen, there is loose correlation in the construction year forecasts despite the use of different horizon years. However, the divergence between forecasts is amplified in the design year due, in part, to the different years chosen.

For the purposes of this analysis, the construction year and design year for the Route 40/61 bridge complex would be extended to 2014 and 2034, respectively, though the design year for a major river crossing could arguably be extended out over 30 to 40 years instead of just 20. While it is acknowledged that the regional travel demand model is based on land use changes, there is no projected land use information available beyond 2020. Therefore, it was necessary to evaluate equivalent growth rates based on modeled land use trends.

Initially, it was suspected that the two highest sets of forecasts may have omitted the Page Avenue Extension, thereby inflating volumes. However, given the fact that these forecasts were all generated within the last 6 years, it can be assumed that the Page Avenue Extension was included in each of the forecasts. Furthermore, all of the forecasts were reportedly based upon files from EWGCC's regional travel demand model which, ultimately, includes committed projects such as the Page Avenue Extension.

An attempt was made to validate the land use assumptions for the Route 40/61 corridor in St. Charles County based on approved, completed or identified developments and to verify future growth potential. Land use data provided by EWGCC indicates that substantial levels of development were considered, but those projections (which were based on the 1990 Census) may not have adequately reflected recent development trends.

Specifically, based on the recent platting of several large subdivisions in the Wentzville area (south of I-70 and west of Route 40/61), it appears that EWGCC has underestimated the number of new households in the Route 40/61 corridor. This discrepancy was likely based upon a perceived lack of services, but utilities were recently extended in that area, and development is accelerating. It is estimated that there could be an additional 2,500 homes in this area (beyond that considered by EWGCC) by 2020.

There has also been an appreciable increase in "other commercial" employment (predominantly offices) in the corridor during the last 5 years. It is estimated that the number of office employees in the corridor could exceed EWGCC's projections by over 11,000 people based on the addition of the MasterCard, CitiGroup, and MCI/WorldCom facilities alone. Conversely, there could be approximately 1,500 fewer retail employees in recognition of land use shifts that occurred in the vicinity of the WingHaven interchange. Overall, additional land uses in St. Charles County could generate 27,000 vpd (net), of which as many as 8,000 vpd could be added to Route 40/61 at the Missouri River bridge (assuming the Page Avenue Extension is

completed to Route 40/61 and that the corridor is upgraded to freeway status from the Missouri River to I-70).

Development in Chesterfield Valley could also exceed the projections from EWGCC. This development increases the volumes to the east of the river crossing. Up to 6.3 million square feet of commercial development have been proposed in Chesterfield Valley, with the potential to generate a gross total of 75,000 vpd. Though it will likely take more than 20 years for that much development to be "absorbed", it could, speculatively, add another 10,000 to 15,000 vpd to the Missouri River crossing.

Upon resolving the various studies, forecasts, and land development assumptions, the study team arrived at what was deemed reasonable forecasts for the Route 40/61 crossing. For the purposes of this study, the westbound bridge was used as the control in the determination of level of service, because of its narrower section (three lanes is the most it can carry).

Table 4-20 indicates the projected daily traffic volumes across the Missouri River. The levels of service on the westbound bridge (given no action is taken in the study area) in the construction year 2014 and the design year 2034 are highlighted.

Table 4-20. Projected Daily Traffic Volumes, Route 40/61 at Missouri River (No Action Alternative)

Year	Bridge Volume (ADT)	Comments
2002	81,700	Current count with three lanes each way.
2004	76,700	Aggressive (3%) growth offset by diversion (10,000 vpd net) to the Page Avenue Extension
2007	83,800	Aggressive growth ends
2014*	96,900	Assumes continuous growth (2.1%) – CONSTRUCTION YEAR.
2018	95,300	Continued growth offset by diversions (10,000 net) to Phases Two and Three of the Page Avenue Extension
2020	99,300	Consistent growth
	100,400	Per Parsons in 2000 (using EWGCC model)
2034†	115,400	Suppressed growth (1%) – DESIGN YEAR
	134,300	Continuous growth (2.1%) – DESIGN YEAR

* Westbound bridge at LOS E.

† Westbound bridge at LOS F.

Source: CBB, 2003.

The operating conditions of each of the build alternatives are much better. The forecasted levels of service for the proposed bridge cross-sections (as calculated for the peak direction of travel during the peak periods in the design year) are based on the provision of four lanes in each direction (three through lanes on the mainline and one auxiliary lane). All of the build alternatives produce LOS D conditions, while the No Action Alternative yields failing operating conditions (LOS F).

Though LOS C is often used as a design standard, MoDOT and other agencies consider LOS D to be acceptable in an urban/suburban environment during peak periods. This condition reflects the realities of high-population areas and the infeasibility of over-building the infrastructure system. In many cases, there simply isn't enough funding or resources available to develop the urban/suburban infrastructure to achieve an LOS C. Additionally, natural, cultural or socioeconomic resources in an urban/suburban environment often prohibit the expansion of the

infrastructure without significant impacts to these resources. In this case, achieving LOS C on the bridge would have significant implications in that it would require additional lanes across the Missouri River, which would increase the project cost and its impacts.

4.6.3 Safety

This section provides discussion on the safety characteristics relative to the potential effects of the final study alternatives. These characteristics are based primarily on capacity issues and roadway geometry associated with merges and weaves. In order to facilitate the evaluation of the final study alternatives, traffic and operation criterion were developed that provided some level of differentiation between the various build and no action scenarios. These criteria are defined below.

Physical Safety Implications

Physical safety implications are evaluated as an increased potential for accidents due to substandard lateral clearances, narrow lanes and/or the presence of major lane shifts at the bridge approaches. This criterion isolated the disadvantages of the No Action Alternative due to the narrow lanes and lack of shoulders. In addition, most of the build alternatives included a major lane shift, which was deemed potentially hazardous. Major lane shifts also require advance signage ahead of the lane shift, which could lead to driver confusion. Alternative A2' was the only option not having any of these undesirable features.

Operational Safety Implications

Operational safety is based on the increased potential for accidents due to increased weaving activity on the mainline. Shorter weaving sections [less than 4,500 ft (1,372 m)] were deemed to have greater accident potential, while those in excess of 9,000 ft (2,743 m) were considered of less consequence. Alternatives A1 and A2 each contained three weaving sections, while all of the other build alternatives had only two (one in each direction). However, Alternatives B3 and B5 each had weaves of less than 4,500 ft (1,372 m), while both of the weaves in Alternative A2' were in excess of 9,000 ft (2,743 m).

Operational Constraints

Operational constraints reflect the increased potential for lane violations due to unconventional lane configurations, short weaving sections or the intensification of (major) weaving with the Route 94 interchange. Due to the introduction of weaves between the Missouri River bridges and Route 94, all of the build alternatives have less-than-desirable weaving movements, although Alternatives B3 and B5 also had increased potential for lane violations at the eastbound exit for Chesterfield Airport Road/South Outer Road.

Complexity of Operations

The complexity of the operations is an inference of increased motorist confusion associated with requirements for advance exits. Exits placed greater than 1 mi (1.6 km) in advance of the cross street are deemed to have greater potential for confusion. Alternatives A1 and A2 require westbound exits more than 7,500 ft (2,286 m) in advance of the Missouri Research Park interchange. However, no such requirement exists for Alternative A2'. Alternatives B3 and B5 require eastbound exits approximately 5,000 ft (1,524 m) in advance of the Chesterfield Airport Road/South Outer Road interchange.

4.6.4 Mass Transit

The only current component of mass transit in the study area is bus transit. Presently, there are no regional plans to extend light rail transit into St. Charles County from Chesterfield Valley. Two proposed MetroLink corridors were analyzed as part of the Daniel Boone Study Area MTIA

(MoDOT, 1997) to serve Chesterfield Valley, one from Maryland Heights/Westport on the north and one along I-64 from the east. However, neither of these corridors extended across the river to St. Charles County. It was later concluded that neither alternative would offer St. Louis urban core residents good access to jobs in Chesterfield Valley because of extreme transit travel times (City of Chesterfield Comprehensive Plan, 2002). Therefore, the MTIA concluded that a MetroLink extension west of I-270 was not justified over the 20-year planning timeframe.

If light rail transit were to ever be proposed across the Missouri River in the Route 40/61 corridor, the westbound bridge is the likely facility to carry the light rail across the river. The development of a light rail transit component on the westbound bridge is dependent on several issues. First, assuming dual tracks for the light rail service, the bridge would have to be used exclusively for light rail. Shared light rail/roadway use is not feasible due to the relatively narrow bridge deck width. Even a single light rail track would leave only adequate room for one roadway traffic lane. Widening the truss for shared light rail and roadway traffic would also not be feasible economically since it would essentially require replacement of the entire truss and its flooring system. A new structure for westbound roadway traffic would have to be constructed. Second, extensive deck framing modifications may be required. While it is likely that the truss itself and the floor beams could adequately carry the light rail loading, it is unlikely that the floor system stringers could safely carry a light rail maintenance vehicle load. Third, extensive approach roadway work would be required to either direct westbound roadway traffic to a new structure, or eastbound roadway traffic to the new structure and westbound roadway traffic to the existing eastbound bridge.

In summary, the westbound bridge has the potential, with modifications, to carry light rail traffic. However, it would require extensive structural and approach roadway modifications to make it possible, and would not appear to be economically justifiable. Therefore, any proposed light rail transit improvements across the river in the Route 40/61 corridor would likely need to be developed independent of the existing bridge complex.

4.6.5 Bicycle and Pedestrian Use

Pursuant to 23 CFR Part 652, an inventory and analysis of existing bicycle routes and pedestrian walkways were conducted within the study area. Bicycle and pedestrian walkways in the study area consist of the Katy Trail in St. Charles County along the left bank of the river. The preferred alternative has no direct impact to the Katy Trail. However, temporary closures of the trail may be necessary during construction for safety.

The city of Chesterfield is currently planning a hiking/bicycle trail system in Chesterfield Valley with the hopes of making a trail connection across the Missouri River to the Katy Trail (personal communication, Michael Herring, City Administrator, City of Chesterfield, 2002). The Preferred Alternative, A2', provides an opportunity for a connection of the proposed Chesterfield bike trail to the Katy Trail via the existing westbound bridge. The other final study alternatives prohibit any trail development on the westbound bridge either because the bridge is to be removed or because the bridge deck is needed for automobile traffic lanes. There are no known planned cycling events in the study area.

4.6.6 Navigation

The center of the study area crosses the Missouri River at river mile (RM) 43.9. The study area is located about midway through the Monarch Bend. This bend begins approximately at RM 45.7, transitioning from Doziers Bend, continuing to approximately RM 43.7 where Monarch Bend transitions to Weldon Spring Bend. Monarch Bend is on the right bank of the river, Doziers

and Weldon Spring bends are on the left bank. The navigation channel is near mid river at the Route 40/61 river crossing.

The preferred bridge alternative is to be adjacent to and upstream of the existing bridge. It would appear that no more than 50 ft (15 m) would separate the bridges, once the proposed bridge is complete. Upstream of the bridge are two pipeline crossings, both owned by the Shell Oil Company. Additionally, an abandoned pipeline is upstream of the operational pipeline. They are located at RM 44.3 and RM 44.1 (estimated), respectively.

The depth of the Missouri River at the existing Route 40/61 bridges ranges from 19 to 23 ft (5.8 to 7.0 m) deep upstream of the bridge and 12 to 28 ft (3.7 to 8.5 m) downstream. At the bridge, the navigation channel is closer to the right bank, but is located toward the left bank as the channel passes the bridge.

The bridge is located in an area that is significantly higher on the left bank than on the right. The Missouri River bluffs are on the left bank and the floodplain is on the right bank. The bridge has warning lights that flash when fog is present, as a safety warning for navigation. As the preferred bridge alternative is upstream of the existing structure, there is no additional hazard from fog in the area than there is at the present time.

The piers of the preferred bridge alternative will be in alignment with the existing bridges and navigational clearance will remain the same. During construction, barges will be used for at least a portion of the work. A material and equipment loading area will be adjacent to the construction site and there will be additional boats and barges. There should be no additional considerations as conditions will remain approximately as they are now.

Emergency Operations, National Defense Activities, and Channel Maintenance Activities

The USACE does not maintain emergency services and operations (personal communication Mike Chapman, USACE Kansas City District) but the USCG and Missouri State Water Patrol (MSWP) do.

The USCG has responsibility for many national defense activities, more so under Homeland Security and this is likely to continue for the foreseeable future. This does include local security activities, such as patrolling river bridge crossings with the MSWP for special events and as directed.

The USACE Kansas City District has responsibility for operations and maintenance activities on the Missouri River. The navigation channel is maintained to a minimum of 9 ft (2.7 m). The river dredge "Potter" was last used in 2002. The river has been so constricted by bluffs and levees it is essentially self scouring. Dredging is done about once every 10 years, and it is entirely possible that dredging operations will likely be discontinued completely on the Missouri River. The Potter is based out of St. Louis. Maintenance is generally limited to adding more rock to wing dikes along the river. The bridge construction will have no impact on these operations (personal communication Mike Chapman, USACE Kansas City District).

Present and Prospective Recreational Navigation

The MSWP duties include law enforcement activities on the lakes and rivers statewide. MSWP District 4 includes this reach of the Missouri River. The MSWP does not maintain a regular patrol on this reach of the Missouri River as recreational boating activity is infrequent. Few boating related facilities are available except at conservation areas. MSWP District 4 includes all of the Mississippi River north of St. Louis and all of the reservoirs and lakes of northwest Missouri. Unless their presence is requested, the MSWP is rarely on the Missouri River and

they do not anticipate changing that practice in the near future (personal communication Corporal Mike Porter, St. Charles MSWP District 4).

MDC has two conservation areas (CAs) near the Route 40/61 bridge:

- Weldon Spring CA (from RM 49.7 to RM 44.2 along the left bank), and
- Howell Island CA (from RM 49.7 to RM 44.8 along the right bank).

The Weldon Spring CA has a boat ramp between Femme Osage Creek and Femme Osage Slough, at approximately RM 48.7. The following information on Weldon Spring CA was provided through personal communication by John Vogel, Area Manager, Weldon Spring CA, MDC. There are no plans to enlarge or provide additional recreational opportunities via the river accesses at this CA. The parking lot has a capacity for 40 to 50 cars and trailers, which has never been observed to be full. Although there is quite a bit of activity, Weldon Spring CA is still considered a three-season use area primarily by power boat users, but canoeists and kayakers also use it. Many of the recreational visits are for hunting and fishing. When the causeway to Howell Island CA is under water, the usage at Weldon Spring CA goes up as it serves as a put-in point for water access to Howell Island CA. There are some commercial fishermen on this reach of the Missouri River but their numbers are very low. Camping and picnicking are popular on the sand bars near the proposed bridge location. There are several sand bars located at RM 44.3 along the left bank, approximately 0.5 mi (0.8 km) upstream of the Route 40/61 bridge. Johnson Island is located 0.5 mi (0.8 km) downstream, on the right bank and extends for about 3 river miles. A chute is located behind the island that may be floatable during parts of the year. In summary, there are a number of water-oriented recreational opportunities within a few miles of the bridges, both upstream and downstream.

Present and Prospective Commercial Navigation

Information was obtained from the Navigation Data Center, USACE, Waterborne Commerce Statistics Center in New Orleans. The latest information for commodities carried is from 2001. The latest information available for Trips and Drafts of Vessels is from 1999.

Commodities transported include petroleum and petroleum products, chemicals, crude materials, food and farm products and others. From 1994 to 2001, Missouri River totals ranged from a low in 1995 of 6.88 millions of short tons (mst) to a high of 9.73 mst in 2001. The average was 8.48 mst per year. Crude materials (which include forest products, soil, sand, gravel, rock and stone, iron and steel scrap, non-ferrous scrap, sulphur, clay, and salt) accounted for 88 percent of the upbound river traffic and 86 percent of the downbound river traffic on the Missouri River in 2001. Food and farm products accounted for 14 percent of the downbound traffic in 2001.

In 1999 there were a grand total of 51,878 trips by self-propelled and non self-propelled vessels from Kansas City to the mouth of the Missouri River. This includes both upbound and downbound river traffic.

There is one local facility that does have barge mooring/docking. The St. Charles Sand Company loading facility (a.k.a. St. Charles Sand Company Plant No. 2) has a single barge unloading mooring downstream of the existing Route 40/61 bridges. It is located at RM 43.9 along the right bank. The community name is Gumbo (Missouri River Navigation Charts, Kansas City, Missouri to Mouth, USACE Kansas City District). The mooring facility is not open to general river traffic. The downstream bridge location alternatives (B3 and B5) have a significant impact on the operations of the company, where the upstream bridge location alternatives (A1, A2 and A2') do not. Jeff Viehmann of the St. Charles Sand Company stated that his company dredges sand from the Missouri River. During peak season, about 100 trucks

per day leave his facility loaded with sand. About four to five barges are filled during the course of the day, taking about an hour and half to fill; then they are unloaded and the sand is sent to the various piles for sorting and drying. No sand leaves by barge, all the material leaves the site by truck. There are no plans for expansion or reduction of the operation. The St. Charles Sand Company operates about 10 months a year or for the length of time the Missouri River is open for navigation (personal communication, January 15, 2003, St. Charles Sand Company).

River Access

The preferred bridge alternative (A2') does not block access to any local service facilities. There are no repair shops, parts distributors or fuel stations located near or adjacent to the preferred bridge location.

There are no alternative routes available to river traffic on the Missouri River. There are no locks and/or dams on this section of the Missouri River. The preferred bridge alternative is of a similar length and height as the existing structures and the pier locations match with the existing structures. Thus, any vessel passing through the existing bridges will be able to navigate the new bridge as well.

There are no local harbor facilities blocked by the preferred bridge alternative. As noted above, the preferred bridge alternative matches the length, height, and pier locations of the existing structures, thus allowing navigational passage.

4.7 Air Quality Impacts

Pollutants of common concern in highway planning studies are carbon monoxide (CO), ozone, and nitrous oxides (NO_x). The primary air pollutant standards are shown in Table 4-21.

Table 4-21. National Ambient Air Quality Standards

Criteria Air Pollutant	Averaging Time	Primary Standard	Secondary Standard
Carbon Monoxide	1-Hour Maximum ^a	40 mg/m ³ ^b (35 ppm) ^c	
	8-Hour Maximum ^a	10 mg/m ³ (9 ppm)	
Lead	3-Month Arithmetic Mean	1.5 µg/m ³ ^d	Same as primary
Nitrogen Dioxide	Annual Arithmetic Mean	100 µg/m ³ (0.05 ppm)	Same as primary
Ozone	1-Hour Average ^a	0.12 ppm (235 µg/m ³)	Same as primary
	8-Hour Average ^e	0.08 ppm (157 µg/m ³)	Same as primary
Particulate Matter (PM ₁₀)	Annual Arithmetic Mean	50 µg/m ³	Same as primary
	24-Hour Average ^f	150 µg/m ³	
Particulate Matter (PM _{2.5})	Annual Arithmetic Mean ^g	15 µg/m ³	Same as primary
	24-Hour Average ^h	65 µg/m ³	
Sulfur Dioxide	24-Hour Maximum ^a	365 µg/m ³ (0.14 ppm)	
	Annual Arithmetic Mean	80 µg/m ³ (0.03 ppm)	
	3-Hour Maximum ^a		1,300 µg/m ³ (0.5 ppm)

a Not to be exceeded more than once a year for primary and secondary standards

b mg/m³ = milligrams per cubic meter

c ppm = part per million

d µg/m³ = micrograms per cubic meter

e Established for a 3-year average of the 4th highest daily maximum concentration.

f Established for a 3-year average of the 99th percentile of data

g Established for a 3-year average

h Established for a 3-year average of the 98th percentile of data

The conformity procedures of 23 CFR 770 apply to this project. The MPO is responsible for making the conformity determinations, which must also be approved by the FHWA, the Federal Transit Administration (FTA), and the USEPA.

As the designated MPO for the eight-county St. Louis metropolitan area, the EWGCC established a specific goal for the transportation planning process — to reduce transportation-related air pollution in accordance with federal, state, and local health standards and priorities.

Procedures for attaining that goal are those established by federal law to ensure conformity between transportation plans and air quality improvement plans.

The conformity process is intended to ensure that the programs and activities proposed in long-range transportation plans conform to the purpose of the State Implementation Plan (SIP) for Air Quality. The Clean Air Act Amendments of 1990 (CAAA) define conformity as ". . . conformity to the (implementation) plan's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards and achieving expeditious attainment of such standards . . ." The USEPA Final Rule, 40 CFR Part 93, as amended September 15, 1997, amplifies the provisions of the CAAA relative to conformity. (These provisions are interpreted in the context of 1999 Court decisions relating to the conformity process, and guidance to this effect is contained in the USEPA Memorandum of May 14, 1999, Conformity Guidance on Implementation of the March 2, 1999 Conformity Court Decision.)

Under the provisions of the CAAA, the EWGCC, as the regional MPO, is responsible for making the determination of conformity. The conformity finding relates to those pollutants produced by automobiles and other road transportation, generally described as mobile source emissions. The pollutant that is of most concern in this region is ozone. Ozone is not, however, produced directly by automobiles. It results from chemical reactions in the atmosphere involving various compounds in automobile exhausts that are identified as the precursors of ozone formation. These compounds comprise two groups, volatile organic compounds (VOCs) and NO_x.

SIPs set out benchmarks against which progress is measured in meeting national goals for cleaner and healthier air. Each state is responsible for preparing a SIP. The present determination of conformity for the Missouri part of the region is made in relation to the revised Missouri Attainment Demonstration SIP. The primary purpose of the conformity process is to ensure that predicted future mobile emissions resulting from planned and programmed transportation projects fall below the 2014 emission budget levels set out in the SIPs for both VOCs and NO_x.

The proposed project is included in the EWGCC's long-range transportation plan, *Legacy 2025: The Transportation Plan for the Gateway Region*. Federal and state regulations require that projects included in *Legacy 2025* must pass the following emissions test for each of three analysis years, 2014, 2020, and 2025:

1. Emissions of VOCs resulting from implementation of the long-range plan and TIP will be less than the 2014 VOC mobile source emissions budget for Missouri as set out in the relevant Maintenance Plans, i.e., 47.14 tons per day.
2. Emissions of NO_x resulting from implementation of the plan and TIP in Missouri will be less than the 2014 NO_x mobile source emissions budget of 68.59 tons per day as set out in the Maintenance Plans.

Like many metropolitan areas, the St. Louis region has a history of air pollution levels that exceeded health-based atmospheric air quality standards and thus was previously classified as a non-attainment area for ozone. (The USEPA uses the term *non-attainment area* to describe metropolitan areas where air quality fails to meet health standards for particular pollutants. An ozone non-attainment area that has met the ozone level monitoring requirements over a 3-year period may request reclassification to a maintenance area based on compliance with the ozone level monitoring requirements.)

In 2002, the St. Louis region attained the one-hour ozone standard, based on three years of air quality monitoring data for the 2000-2002 period. In December 2002, the MDNR submitted Maintenance Plans and re-designation requests to USEPA. USEPA approved the

re-designation requests and Maintenance Plans on May 12, 2003, and classified the entire eight-county St. Louis metropolitan area as a maintenance area for ozone under the one-hour standard. The Conformity Determination for the FY 2005-2009 TIP and related amendments to *Legacy 2025* will use the one-hour ozone standard.

The USEPA identified the St. Louis area as a non-attainment area for the eight-hour ozone standard and designated its classification as "moderate" in the April 30, 2004, Federal Register. This designation became effective June 15, 2004. The non-attainment area includes Franklin, Jefferson, St. Charles, and St. Louis Counties as well as the city of St. Louis. EWGCC has until June 15, 2005, to perform a Conformity Determination under the 8-hour ozone standard.

Based on the conformity analysis conducted as part of the long-range plan development, the projects and programs included in *Legacy 2025* are found to be in conformity with the requirements of the CAAA of 1990, the relevant sections of the Final Conformity Rule 40 CFR Part 93, and the Missouri State Conformity Regulations 10 Code of State Regulations (CSR) 10-5.480. The finding is documented in a companion report, Air Quality Conformity Determination and Documentation.

The FHWA and FTA have concurred in a joint signature (see letter dated March 10, 2003, Appendix C) to the EWGCC's January 29, 2003, Air Quality Conformity Determination. This determination concluded that the projects in the St. Louis Region's 2025 Transportation Improvement Plan, *Legacy 2025*, are in conformity with the CAAA and the relevant sections of the Final Conformity Rule 40 CFR Part 93.

4.8 Noise Impacts

Noise is defined as unwanted sound. Sound is produced by the vibration of sound pressure waves in the air. The loudness or intensity of sound is measured by sound pressure levels and described in terms of decibels (dB). Sound is composed of varying frequencies, which provide the tonal quality of sound. Since the human ear does not respond equally to all frequencies, sound level meters filter out selected frequencies in order to approximate the frequency response of the human ear.

The A scale on a sound level meter best approximates the frequency response of the human ear; sound pressure levels measured on the A scale of a sound meter are abbreviated as dBA. Since noise varies with time, an additional descriptor, L_{eq} , is used to express noise levels; L_{eq} is defined as the equivalent steady-state sound level over a stated time period. The equivalent A weighted sound level (L_{eq} dBA) defines a single number indicator to describe the mean energy or intensity level over a specified period of time during which the sound level fluctuated. The range of sound pressure levels most frequently encountered in evaluating traffic-generated noise on highways is 50 to 95 dBA. Traffic noise impacts occur when projected traffic noise levels exceed predetermined noise abatement threshold levels for certain land uses. As indicated in Table 4-22, the noise abatement threshold for residences is approached at 66 dBA and the threshold for commercial establishments is 72 dBA.

The Federal Aid Highway Act of 1970 established the requirements contained in 23 CFR Part 772 that traffic noise control be a part of the planning and design of all federally aided highway projects. The requirements state that when the predicted noise level for sensitive receptors, such as the exteriors of houses, schools, or libraries, exceeds 67 dBA, noise abatement will be considered as part of the highway construction project unless the receptor site does not meet policy approved noise abatement criteria.

Table 4-22. Noise Abatement Criteria (NAC) Hourly A Weighted Sound Level - 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	66 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.

Based on this act, MoDOT has implemented a noise abatement policy that is approved by FHWA. The policy states that noise abatement measures will be considered as part of the highway construction project if they are deemed reasonable and feasible and meet the requirements of the noise abatement criteria. When the predicted L_{eq} for noise sensitive receptors exceeds 66 dBA, MoDOT will consider noise abatement as part of the highway construction project unless any one of the following cannot be satisfied:

- (a) Noise wall must provide noise reduction of at least 5 dBA for all primary receptors. Primary receptors are those which are closest to the highway.
- (b) Noise wall must provide attenuation for more than one receptor.
- (c) Noise wall must be 18 feet or less in height above normal grade.
- (d) Noise wall must not interfere with normal access to the property.
- (e) Noise wall must not pose a traffic safety hazard.
- (f) Noise wall must not exceed a cost of \$30,000 per benefited receptor. A benefited receptor is defined as a receptor which receives a noise reduction of 5 dBA or more.
- (g) The majority of the affected residents (primary and benefited receptors) must concur that a noise wall is desired.

A preliminary noise analysis was not performed because there are no noise receptors located adjacent to the existing roadway alignment.

4.9 Water Quality Impacts

The proposed project area is in the Missouri River watershed. There are two groundwater wells just outside the study area, one near each terminus. These wells are on the south or west side of the existing road structure.

The Missouri Clean Water Commission has established water quality standards that designate beneficial uses for individual watercourses. The defined beneficial use for the Missouri River is "Aquatic Habitat." Section 303(d) of the Clean Water Act of 1977 (CWA) provides for states to prepare a list of waters that do not meet the state's water quality standards. The state of Missouri lists the Missouri River as not meeting their water quality standards. The impairment of this stretch of the Missouri River is caused by habitat loss due to channelization.

As mentioned previously in Section 3.0, portions of the project area are within the Missouri River Section of the Ozark Border Natural Division and caves and sinkholes are features of this section. In late fall of 2001, Dr. Kenneth C. Thomson of Southwest Missouri State University's Department of Geology, Geography and Planning was contacted regarding locations of known

caves or other significant karst features in the project area. Dr. Thomson indicated in a subsequent phone conversation that his sources did not indicate any known caves in the area.

Water quality impacts would be similar for all build alternatives. Short-term impacts to surface water quality arise primarily during the construction phase of a project. Impacts such as erosion, siltation, an increase in nutrient levels or the discharge of fuels, lubricants, or other harmful contaminants during construction could occur with any of the build alternatives; but would not under the No Action Alternative.

No significant impacts to the identified public water supply wells or to the water quality of the Missouri River are expected to occur as a result of the construction of and subsequent operation of the proposed Route 40/61 bridge. Best management and construction practices will minimize erosion and sedimentation. Any fill material used will be clean and will meet the specifications of MoDOT.

MoDOT must comply with the provisions of the MDNR storm water regulations found at 10 CSR 20-6.010 to protect water quality during highway construction. In accordance with the National Pollutant Discharge Elimination System (NPDES) requirements of the CWA, MoDOT also operates under the provisions of NPDES Permit No. MO-R 100007, a 5-year, general permit issued for road construction projects statewide. This permit limits the amount of pollutants that can leave a job site and requires the implementation of erosion controls (Appendix F).

All construction activities will comply with the existing rules and regulations of governmental agencies having jurisdiction over streams and water supplies in the area. To prevent or minimize adverse impacts to streams, water courses, lakes, ponds, or other water impoundments within and adjacent to the project area, MoDOT's Pollution Prevention Plan will be implemented. This plan was approved by the MDNR on July 3, 1997, and is a component of MoDOT's stormwater permit issued by MDNR under the provisions of the NPDES. The plan was designed to reduce suspended solids, turbidity, and downstream sedimentation that may degrade water quality and adversely impact aquatic life. The plan provides for temporary erosion and sediment control measures that will be included within construction contract specifications.

Under the MoDOT program, the control of water pollution will be accomplished through the use of berms, slope drains, ditch checks, sediment basins, silt fences, and rapid seeding and mulching, as well as other erosion control devices or methods. These temporary measures to be employed during construction will be coordinated with planned permanent erosion control features to assure effective and continuous erosion control.

The program also provides for limiting the exposed surface area of erodible earth material by selective clearing and grubbing, excavation, and borrow and fill operations. Clearing of trees and other vegetation will be confined to that which is absolutely necessary for construction of the project, to preserve as much existing natural growth as possible.

In addition, contract specifications will require implementation of Best Management Practices (BMPs) to prevent petroleum products, other toxic substances, and construction debris from entering water or otherwise contaminating the riparian or stream environment. Disturbed areas will be seeded and mulched or sodded as quickly as possible after completion of construction. All construction activities will comply with the existing rules and regulations of governmental agencies having jurisdiction over streams and water supplies in the area. These measures will diminish possible impacts to water quality.

4.10 Permits

The proposed improvement will require a USCG Section 9 Bridge Permit, a USACE Section 10 permit, a floodplain development permit from the SEMA, and a Department of the Army Section 404 permit, issued contingent on water quality certification under Section 401 of the CWA.

4.11 Wetlands/Waters of the U.S. Impacts

Wetlands are defined (Federal Register, 1982) as *“Those areas that are inundated or saturated by surface or groundwater at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil condition.”* Recognizing the variety of beneficial functions performed by wetlands, Executive Order 11990 (Wetlands Protection) mandates consideration of wetland impacts, as does Missouri's Executive Order 96-03. Furthermore, a no-net-loss of national wetlands policy is mandated under Executive Order 11990. Section 404 of the CWA authorizes the USACE to regulate the discharge of dredged or fill material in all waters of the United States, including wetlands.

NWI maps [prepared by the Department of the Interior (DOI), USFWS] and NRCS Food Security Act (FSA) wetland maps were used to identify potential wetland impacts for each of the proposed alternatives. The NWI mapping was visually analyzed with ArcView® (Figure 4-4).

None of the final alternatives would impact of palustrine unconsolidated bottom (PUB), which is synonymous with open water habitat. None of the palustrine emergent wetlands (PEM) on the east end of the project area are affected by any of the final alternatives. This includes all changes to roadway approaches and connections to the new bridge.

Alternatives B3 and B5 would potentially impact approximately 0.28 ac (0.11 ha) of palustrine forested wetland (PFO) each. These wetlands are considered jurisdictional at this time. Field delineation will be conducted to confirm jurisdiction of mapped wetlands.

Table 4-23. Potential Impacts to Wetlands and Waters of the U.S. Associated with Improvements to U.S. Route 40/61, St. Charles and St. Louis Counties, Job No. J6P1436

Alternative	Palustrine Emergent ac (ha)	Palustrine Forested ac (ha)	Palustrine Scrub-Shrub ac (ha)	Farmed Wetland ac (ha)	Open Water ac (ha)	Stream Crossings
Alternative A	None	None	None	None	None	Missouri River
Alternative A2	None	None	None	None	None	Missouri River
Alternative A2'	None	None	None	None	None	Missouri River
Alternative B3	None	0.28 (0.11)	None	None	None	Missouri River
Alternative B5	None	0.28 (0.11)	None	None	None	Missouri River

Section 404 Permitting/Wetland Mitigation Requirements

Streams and wetlands in the project area are considered waters of the United States, regulated by the USACE. A Department of the Army permit is usually required for crossing of waters of the United States. The USACE is required to assess impacts to waters of the U.S. in their analysis of permit applications. All build alternatives would cross the Missouri River. At this time, blue line streams within the study corridor on the topographic map (Figure 1-2) are considered jurisdictional. Any of the alternatives should be permissible under Nationwide Permits; however, an individual permit may be required. This determination will be made when an exact route is chosen. The exact route will help determine the exact impacts and the jurisdiction thereof.

FHWA Only Practicable Alternative Finding — Wetlands

In accordance with Executive Order 11990, the FHWA ensures that this project avoids to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands.

Alternative A2', the Preferred Alternative, would affect 0 ac (0 ha) of wetlands. Any unanticipated permanent wetland impacts would most likely occur on the river side of the levee and could only be associated with the new pier placements. Such impacts would be mitigated in the manner prescribed by the associated Section 404 Clean Water Act Permit.

4.12 Floodplain Impacts

Executive Order 11988 (Floodplain Management) and subsequent federal floodplain management guidelines as well as Missouri's Executive Order 82-19 mandate an evaluation of floodplain impacts. When available, National Flood Insurance Program (NFIP) flood hazard boundary maps and flood insurance studies for the project area are used to determine the limits of the base (100-year) floodplain and the extent of encroachment for each project alternative.

The FEMA and FHWA guidelines 23 CFR 650 have identified the base (100-year) flood as the flood having a 1 percent probability of being equaled or exceeded in any given year. The base floodplain is the area of 100-year flood hazard within a county or community. The regulatory floodway comprises the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood discharge can be conveyed without increasing the base flood elevation more than a specified amount. FEMA has mandated that projects can cause no rise in the regulatory floodway and no more than a 1-ft (0.3-m) cumulative rise for all projects in the base (100-year) floodplain. For projects that involve the state of Missouri, the SEMA issues floodplain development permits. In the case of projects proposed within regulatory floodways, a "no-rise" certificate, if applicable, should be obtained prior to issuance of a permit.

Flood Insurance Rate Maps (FIRMs) are available for St. Charles and St. Louis counties. A floodplain development permit and "no-rise" certificate from SEMA will be required. Hydraulic studies and analyses will be performed as part of the design process. There is approximately 100 ft (30 m) of Zone AE base (100-year) floodplain at Weldon Spring, on the St. Charles County side. Base flood elevations have been determined. The project spans about 1,500 ft (460 m) of regulatory floodway over the Missouri River, then traverses approximately 2,500 ft (760 m) of 100-year floodplain in St. Louis County.

Design procedures will minimize impacts to the floodplain to ensure that any increase of floodplain elevation shall be less than 1 ft (3 m), or no rise at all in the case of regulatory floodway, in accordance with FEMA standards. Natural and beneficial floodplain values shall be preserved to the extent possible. These include sediment storage and flood conveyance, water quality maintenance, groundwater recharge, biological productivity, fish and wildlife habitat, recreational opportunities, and areas for scientific study and outdoor education. Where impacts are unavoidable, all practicable measures shall be taken to restore lost floodplain values.

Alternates A1, A2, and A2' (Preferred) would each potentially impact approximately 7.2 ac (2.9 ha) of 100-year floodplain, while Alternates B3 and B5 would each potentially impact 9.0 ac (3.6 ha) of 100-year floodplain. Current plans for the replacement bridge incorporate pier placement and span lengths that match the existing bridge; therefore, there should be no rise in either the regulatory floodway or the 100-year floodplain. Should design changes later in the process make mitigation measures necessary, they may include a Letter of Map Revision (LOMR) and Physical Map Revision (PMR), in consultation with SEMA.

4.12.1 Hydrologic Analysis

The Route 40/61 bridges are twin existing truss bridges located at RM 43.9 (westbound) and RM 44.0 (eastbound) on the Monarch Bend of the Missouri River. The north abutments are located in St. Charles County and the south abutments are located in St. Louis County.

The eastbound bridge is the upstream of the two bridges. The substructure of the bridge is perpendicular to the bridge and slightly skewed to the direction of flow. This bridge has eight spans and totals 2,613 ft (796 m) in length. The two main river spans are 513 ft (156 m) in length each. The current bridge clearance is 447 ft (136 m) horizontal, 66 ft (20 m) vertical for normal navigation flow, and 54 ft (16 m) vertical during flood stage. According to the record drawings, the 2 percent flow line elevation is 455 ft (139), and the low chord elevation is 508 ft (155 m).

The westbound bridge is approximately 40 ft (12 m) downstream of the eastbound bridge. The bridge substructure is perpendicular to the bridge and slightly skewed to the direction of flow. This bridge has spans matching the locations of the newer bridge, but offset slightly to the north to allow for the skew of the river channel to the bridge. The current bridge clearance is also 447.0 ft (136 m) horizontal, 66 ft (20 m) vertical for normal navigation flow, and 54 ft (17 m) vertical during flood stage.

Review of the FEMA FIRMs indicates that the 100-year floodplain on the Missouri River at this location is bounded by a levee on the right bank and by high ground just north of the abandoned Missouri Kansas Texas (MKT) Railroad embankment on the left bank. The floodway limit is the abandoned MKT Railroad embankment on the left bank; upstream of the bridge, the floodway extends into the floodplain of the right bank to the Monarch Levee, then narrows gradually at the bridge opening before widening out again. It does not extend completely to the Monarch Levee in the reach downstream of the bridge. The top of levee elevation in this location is approximately 470 ft (143 m) and the top of the bluff elevation is approximately 530 ft (162 m). The width of the floodway is approximately 2,400 ft (732 m) at the bridge locations and is confined between the existing bridge abutment on the right bank and the abandoned railroad embankment on the left bank. The 100-year flood elevation (Zone AE) is 467 ft (142 m) on the upstream side of the bridge. The map states that the levees protect the area from the 100-year flood.

The existing FEMA model is likely in HEC-2 format, but is probably a translation from the KC Backwater computer program developed by the USACE-Kansas City District. The Kansas City District prepared a new hydraulic model using UNET, a one-dimensional, unsteady flow model. The Kansas City District recently revised the predicted flood discharges for the Missouri River, based upon a flow frequency analysis performed for the upper Mississippi River. The revised discharges have not officially been submitted to nor accepted by FEMA; the magnitude of change is probably less than 10 percent of the existing flood discharges. The new UNET model is currently being reviewed within the USACE. However, UNET does not forecast flood heights at bridges, and the USACE will need to run a revised HEC-RAS model based on the newer UNET flow data. FEMA Flood Insurance Studies and FIRMs are not presently scheduled to be updated, although discussions are ongoing between FEMA and the USACE. Such updates would probably not be complete until 2008 to 2010.

The Preferred Alternative, A2', must match the spans and pier locations of the existing two bridges. Additionally, the horizontal and vertical clearances in the navigation span must be at least the same as the existing bridges. This is a requirement per communication with the USCG (letter dated November 18, 2002). The Preferred Alternative meets these requirements.

Additionally, the Preferred Alternative crosses the Missouri River floodplain a distance of 4,100 ft (1,250 m). This impact is the same for all alternatives. Approximately 2,800 ft (853 m) of this total is levee-protected by the Monarch Levee system (a 500-year levee) leaving approximately 1,300 ft (396 m) that is not levee-protected, much of it being the river itself. The Preferred Alternative impacts approximately 7.2 ac (2.9 ha) of Missouri River floodplain. This impact occurs on levee-protected land in St. Louis County west of the existing highway. The impact consists of a narrow strip of impact no more than approximately 175 ft (53 m) wide adjacent to the existing highway. Since the impact occurs on the levee-protected side of the 500-year Monarch-Chesterfield levee, there are no impacts to floodplain in terms of flood storage or conveyance, as the levee already controls the river flow in this area.

MoDOT has recently improved Route 40/61 to six lanes in each direction through the Chesterfield Valley. These improvements occurred while matching the existing roadway profile through the valley given the presence of the Monarch-Chesterfield Levee. Should future flooding cause a breach in the levee, similar to what occurred in 1993, much of Chesterfield Valley would be at risk of inundation. This would result in flooding of the entire stretch of Route 40/61 through Chesterfield Valley. To mitigate this condition, MoDOT would have had to construct approximately 5 miles (8 km) of Route 40/61 at a much higher elevation [approximately 8 ft (2.4 m)] in order to remain above flood levels. This cost proved to be prohibitive given the investment being made in the Monarch-Chesterfield Levee.

4.12.2 Permits

A floodplain development permit will be required; SEMA issues floodplain development permits for projects that involve the state of Missouri. For projects that involve regulatory floodways, MoDOT should issue a "no-rise" certificate prior to the permit application.

4.12.3 FHWA Only Practicable Alternative Finding – Floodplain

The crossings of all regulated floodplains will be designed and constructed in compliance with applicable floodplain regulations, including Executive Order 11988. There will be no increases in base flood elevations attributable to the implementation of the proposed roadway improvements. During the design process, a detailed hydraulic analysis of the flows and water surface elevations will be made in accordance with the requirements of the FEMA and the USACE to ensure the absence of any encroachments upon regulatory floodways as well as to avoid any adverse impacts.

The proposed action conforms to applicable state of Missouri and local floodplain protection standards.

Based on the above considerations, and for the reasons stated in this EIS, the FHWA determines that the Preferred Alternative is the only practicable alternative.

4.13 Wild and Scenic Rivers

There are no streams or rivers within the project area that are either part of the National Wild and Scenic Rivers System or under study for designation to that system. Therefore, the proposed project will not impact any part of the National Wild and Scenic Rivers System or potential candidates to the system.

4.14 Threatened or Endangered Species/Impacts to Flora and Fauna in General

4.14.1 Resources in the Project Area

Overall, the wildlife in the area is typical of urban and residentially developed areas. The birds, mammals, reptiles, and amphibians present are species that have adapted to living in close proximity to activities of humans. Common mammals in the area include white-tailed deer, squirrels, cottontail rabbits, opossums, moles, gophers, raccoons, skunks, and other species that have adapted to urban residential and commercial areas. Common birds are the starling, grackle, robin, blue jay, cardinal, and house sparrow. There is also a great blue heron rookery located a short distance upstream from the project area. Agricultural fields and woody border areas offer food, breeding, and wintering areas for species that are less tolerant of human disturbance.

As part of MoDOT's early coordination process, letters requesting comments on the project were sent (December 4, 2001) to the Columbia Field Office of the USFWS and MDC. The agencies were also invited to attend a January 9, 2002, agency coordination meeting on the project at the Federal Building in St. Louis. An MDC representative attended the scoping meeting and stated an MDC preference of a downstream location for the new bridge.

The USFWS did not attend the agency coordination meeting but provided comments on the project in a letter dated March 12, 2002. The USFWS identified three federally listed threatened or endangered species that may occur in the project area – the pallid sturgeon (*Scaphirhynchus albus*), bald eagle (*Haliaeetus leucocephalus*), and Indiana bat (*Myotis sodalis*). The USFWS recommended designing the project to avoid loss of trees favored by bald eagles (discussed below). The letter cited section 7(c) of the Endangered Species Act (ESA) as requiring preparation of a biological assessment to determine effects of proposed work on the three federally protected species.

Federally Listed Species

The endangered pallid sturgeon is widely distributed in the Missouri River. Limited data is available concerning preferred habitats, but the species has been captured in tributary mouths, over sandbars, along main channel borders, side channels, and in deep holes. Small sturgeon have been captured in off-channel backwaters. Recent research indicates that they use deep holes for overwintering habitat.

The threatened bald eagle is a common migrant and winter resident throughout the state and an uncommon breeder along some of the major rivers and larger reservoirs in the state. During winter, they congregate near rivers and reservoirs with open water and often near large concentrations of waterfowl. Wintering eagles usually occupy river habitats between November 15 and March 1 and use large-diameter riparian tree species as daytime perches and night roosts. During the daytime, they usually perch within a riparian corridor or along lakeshores and prefer areas with limited human activity. At night, wintering bald eagles may congregate at communal roosts and will travel as much as 12 mi (19 km) from feeding areas to a roost site. The period from January 1 to March 1 is important for initiating nesting activity; March 1 to May 15 is the most critical time for incubation and rearing of young.

Bald eagles are known to prefer trees greater than 11 inches [28 centimeters (cm)] in diameter at breast height (dbh) and within 100 to 600 ft (30 to 183 m) of water for perching sites. Eagles also tend to roost on the tallest trees [greater than 63 ft (19 m) above ground level]. Cottonwood

(*Populus deltoides*) and sycamore (*Platanus occidentalis*) are often selected over other trees for perching and roosting.

From late fall through winter, Indiana bats in Missouri hibernate in caves in the Ozarks and Ozark Borders Natural Divisions. During spring and summer, Indiana bats utilize living, injured (e.g., split trunks and broken limbs), dead, or dying trees throughout the state for roosting/maternity colonies. Indiana bat roost trees tend to be greater than 9 inches (23 cm) dbh [optimally greater than 20 inches (51 cm) dbh], with loose or exfoliating bark. Structural characteristics that provide adequate space for bats to roost are most important. Preferred roost sites are located in forest openings, at the forest edge, or where the overstory canopy allows some sunlight exposure to the roost tree, which is usually within 0.6 mi (1 km) of water. Indiana bats forage for flying insects in and around the tree canopy of floodplain, riparian, and upland forests.

State Listed Species

The pallid sturgeon, lake sturgeon (*Acipenser fulvescens*), bald eagle, and Indiana bat are all listed as state endangered in Missouri. The MDC Heritage Database indicates that several state rare species have been observed in this area; these species include the paddlefish (*Polyodon spathula*), sturgeon chub (*Macrhybopsis gelida*), and sicklefin chub (*Macrhybopsis meeki*). These are all big river species that could be found throughout the Missouri River. Any projects that modify big river habitat should consider possible impacts to these species.

4.14.2 Environmental Consequences

Construction of any transportation facility may temporarily affect flora and fauna within the project limits. However, this region of Missouri has a long history of disturbance by man.

Conversion of the floodplain to agricultural use and residential and commercial development has largely eliminated the floodplain forests of the area. Residential development has also encroached upon upland forests. Today the Missouri River bears little resemblance to the wide, braided channel it was prior to 1900. Since 1879, about 50 percent of the original surface area of the Missouri River has been lost. The surface area of the islands was reduced by more than 90 percent during this time. Backwater habitat was eliminated and the main channel was deepened and widened. Most of the original vegetation has been replaced by buildings or agriculture. Only those species of plants and animals that have adapted to those changes have remained.

Although there may be some initial stress on the carrying capacity of the ecosystem, this project should have minimal impacts to the fish and wildlife of the area because nearby areas of similar habitat are expected to support the majority of indigenous wildlife potentially displaced by the project. With the exception of some tree clearing for right of way, there would only be minor impacts to plant life in the area. MoDOT's tree planting policy of planting more trees (generally 2 to 1) than are removed could actually result in a long-term benefit because of the overall increase in the total number of trees.

Federally Listed Species

According to the USFWS, three federally listed threatened or endangered species, the bald eagle, Indiana bat, and the pallid sturgeon, could occur in the project area.

Bald eagles frequently winter in forested habitats along the Missouri River where they feed primarily on fish and waterfowl. They generally use larger trees [12 inches (30 cm) dbh] along the banks of the river for perching and roosting. Despite the occurrence of some wooded areas within the corridor for all of the alternatives, the MDC's Heritage Database does not list any

known locations of eagle roost sites within the corridor. Once an alternative is selected, avoiding individual trees to protect the larger individuals will not be possible. As noted however, eagles have not been documented to use this area and the number of trees that would be removed for this project is an extremely small percentage of the total number of trees along the Missouri River. Therefore, this should not have a negative impact on this species. As mentioned earlier in Section 4.14.1, bald eagles prefer areas with limited human activity. Since all of the proposed alternatives are adjacent to an existing highway in a rapidly developing area, there may be too much human disturbance for this species to tolerate.

The number of bald eagle nests in the state of Missouri has been rapidly increasing in recent years. However, most of these nests are in and around the large reservoirs in the state. There are no known bald eagle nest locations within 1 mi (1.6 km) of the corridor for any of the proposed alternatives. Should a pair of bald eagles begin construction of a new nest (January 1–May 15) within 1 mi (1.6 km) of the proposed bridge construction site prior to or during construction, activities that may disturb the eagles will be halted until additional consultation with USFWS is completed.

The pallid sturgeon is widely distributed in the Missouri River but has not been reported to occur in the project area. However, USFWS personnel have indicated that potentially suitable overwintering habitat for the species may be present upstream from the existing bridge. During the overwintering period, the species is vulnerable to disturbance and habitat destruction. Restricting construction activities below the ordinary high water elevation during the overwintering period (November 1–May 31) will help avoid or significantly minimize potential impacts of this project. Placement of temporary structures should also be completed outside this time period to avoid disturbance to the sturgeon. Construction activities for this project are temporary and will not significantly alter the flow of the Missouri River, and the bridge piers will occupy only a small portion of the river crossing.

MoDOT's Pollution Prevention Plan will be implemented during construction activities. This plan, approved by MDNR, was designed to reduce suspended solids, turbidity, and downstream sedimentation that may degrade water quality and adversely impact aquatic life.

The USFWS considers the entire state of Missouri to be within the breeding range of the Indiana bat. However, during the summer months, the species has been more commonly found north of the Missouri River and most of the winter hibernaculum are found south of the Missouri River. Impacts to this species during summer months result from destruction or disturbance of their roost trees. Trees that are greater than 9 inches (23 cm) dbh [optimally, greater than 20 inches (51 cm) dbh], with loose or peeling bark or cracks or cavities present, are considered suitable roost trees. The USFWS previously recommended not cutting suitable Indiana bat roost trees during the breeding season (April 1 through September 30) to avoid negative impacts to this species. This guidance applied to all actions.

However, after reviewing new information on summer Indiana bat use and roost tree availability in Missouri, the USFWS determined that the best scientific and commercial information did not support seasonal tree cutting as a general measure to avoid impacts and formal consultation. The USFWS now requests that impacts of proposed actions be evaluated on a case-by-case basis, taking into consideration the value of the site for Indiana bats and all relevant factors pertaining to the action that could impact the species. This evaluation must consider summer habitat as well as winter habitat. Examples of such factors are: (1) whether the action occurs in a county or general part of the state that Indiana bats are known or expected to occupy during summer (i.e., Knox, Macon, or Shelby counties); (2) proximity of the action to known hibernaculum, maternity, or male roosts, and/or important foraging areas; (3) the composition

and extent of trees to be cut; (4) land use of the action area after project completion; and (5) consideration of the magnitude, scope, frequency, duration, and other pertinent environmental changes associated with the action in reference to the importance of the area to the Indiana bat. Based on these factors, at the present time this project is not likely to have an adverse impact on the Indiana bat. However, things could change between now and the beginning of project construction. For example, new information about the species may become available or the species status could change.

Since project construction is not scheduled to begin for at least 10 years and designs for the project have not been completed, it cannot be determined now how the project may impact any of these three species. Therefore, after completing the design phase of this project and prior to construction, MoDOT will reinstate informal consultation with the USFWS to discuss potential construction impacts to any threatened or endangered species and the best ways to minimize those impacts. Ideally this consultation will occur 2 to 3 years prior to construction, allowing ample time to complete the consultation and implement any modifications needed to avoid or minimize impacts. If impacts to federally listed species cannot be avoided, FHWA and MoDOT will initiate formal consultation with the USFWS. Conducting consultation at that time should be more productive for all the participants and will facilitate consideration of the latest information on listed species and construction technologies that will have developed during the interim.

State Listed Species

The MDC lists the pallid sturgeon, lake sturgeon, bald eagle, and Indiana bat as endangered in Missouri. The pallid sturgeon, bald eagle, and Indiana bat are also federally listed and are discussed above under "Federally Listed Species." MoDOT will implement the two reasonable and prudent construction restrictions detailed in those earlier discussions of the bald eagle and the pallid sturgeon. Activities that modify big river habitat, such as channelization, dam construction, gravel dredging, and sedimentation, can be detrimental to the lake sturgeon. The proposed project should not create any major modifications to the Missouri River. Piers will be placed in the river but will only modify a very small portion of the river. Therefore, MoDOT does not believe that construction of the Preferred Alternative will adversely affect these species.

Several state rare species have been observed in this area; these species include the paddlefish, sturgeon chub, and sicklefin chub. These are all big river species that could be found throughout the Missouri River. Any projects that modify big river habitat could impact these species. Since construction activities for this project are temporary and will not alter the flow of the Missouri River and the bridge piers will occupy only a small portion of the river crossing, MoDOT does not believe that construction of the Preferred Alternative will adversely affect these species.

4.15 Historical and Archaeological Resources

In accordance with NEPA and Section 106 of the National Historic Preservation Act (as amended), the MoDOT Cultural Resources Section conducted a background search to identify known and potential cultural resources within a 1,000-ft (305-m) wide corridor under consideration for construction of a new bridge on Route 40/61 across the Missouri River between Chesterfield in St. Louis County and Weldon Spring in St. Charles County. A preliminary reconnaissance of the corridor was also conducted to provide an assessment of potential effects the project may have on architectural resources.

A literature review was conducted at the cultural resources library of the MDNR State Historic Preservation Office (SHPO) to determine the extent of previous cultural resources surveys in the vicinity of the Daniel Boone bridge project area.

Background research identified three archaeological sites (23SC89, 23SC219, and 23SC886) and two historic properties (the circa 1935 Daniel Boone Bridge and the MKT Railroad Corridor) within the study corridor. The preferred alternate (A2') would affect archaeological site 23SC89 and may affect site 23SC219 but would not affect site 23SC886, the historic Daniel Boone Bridge, or the MKT railroad corridor.

The FHWA, the Missouri SHPO, and MoDOT developed a project-specific Programmatic Agreement (PA) to comply with Section 106 of the National Historic Preservation Act. The PA provides for an archaeological survey of the preferred alternative, evaluation of any sites that may be present, and provides a framework for mitigation of impacts to any NRHP-eligible resources that cannot be avoided. A signed copy of the PA appears in Appendix G.

As specified in the PA, a systematic cultural resources survey will be conducted for the Preferred Alternative. Any archaeological sites that may be affected by the project will be evaluated and addressed in accordance with the regulations (36 CFR 800) implementing Section 106 of the National Historic Preservation Act [16 United States Code (USC) 470]. Identified cultural resources will be evaluated according to the DOI's "Standards and Guidelines for Archaeology and Historic Preservation," in consultation with the Missouri State Historic Preservation Officer.

4.15.1 Previous Archaeological Investigations

Three previous archaeological surveys (Hass, 1978; Shopland, 1979; and Piazza, 1995) included portions of the study area in St. Charles County. Three archaeological sites (23SC89, 23SC219, and 23SC886) have been identified within the St. Charles County portion of the project area.

The St. Louis County portion of the study area was partially examined during two archaeological surveys (Shopland, 1979 and Harl et al., 1994). There are no previously recorded archaeological sites within the St. Louis County portion of the study area, although it is possible that historic or prehistoric sites in the Missouri River bottom may be buried and obscured by modern flood deposits.

4.15.2 Previously Recorded Archaeological Sites

St. Charles County

University of Missouri-Columbia graduate students Daniel Haas and Roger Boyd surveyed portions of the Weldon Spring CA in St. Charles County as part of Haas' thesis research (Haas, 1978). The 1977 survey recorded 151 archaeological sites in the 'River Hills' area between Route 40/61 and Femme Osage Creek. Two of the sites Haas and Boyd recorded (23SC89, 23SC219) are located within the Daniel Boone bridge study area; constructing the preferred alternative would affect site 23SC89 and may affect site 23SC219.

MoDOT archaeologists Russell Miller, John Shopland, and Mark Kross revisited and tested site 23SC89 in 1979 before construction of a new Route 40/61 bridge (Job No. 6-P-40-298, bridge A4017). Site 23SC89 is located about 400 ft (122 m) north of the bluff edge along a narrow ridge west of the southbound lanes of Route 40/61. MoDOT archaeologists defined the site limits [450 ft (137 m) N-S, 200 ft (61 m) E-W] and made a controlled, surface collection in a 10-ft by 10-ft (3-m by 3-m) square raked clean at Station 651+00/240' right. Artifact recovery in the controlled collection area consisted of 377 pieces of culturally modified stone, including a stemmed projectile point base, a distal biface fragment, 333 flakes and flake fragments, one utilized flake, 40 core or shatter fragments, and a piece of fire-cracked rock. The chipped stone was described as high quality Burlington Chert. At Station 652+10/235' right, 356 pieces of

cultural material were recovered from excavation of a 3-ft by 3-ft (0.9-m by 0.9-m) test unit. Artifacts were confined to the upper 6 inches (15 cm) of soil in that test unit. The few diagnostic artifacts recovered from this site suggest that it dates from the middle-late Archaic Period.

Although site 23SC89 had been disturbed by previous highway construction, utility corridors, a two-track road, and a fence along the boundary of the CA, in 1979 it appeared to include undisturbed areas where important information may still be recoverable. MoDOT archaeologists recommended avoiding the site during construction of bridge A4017 and suggested covering the site with a blanket of rock fill to limit potential impacts from construction and later erosion that may result from runoff associated with the adjacent highway improvements.

Since an upstream alignment, Alternative A2', has been designated as the Preferred Alternative, Phase II testing will be necessary to evaluate the significance and integrity of site 23SC89.

Site 23SC219 is a nineteenth-century historic site recorded by Haas and Boyd in 1977. Site 23SC219 is located on a ridge spur on the west side of Route 40/61, west of the Shell pipeline near the northern end of the study area. The survey identified two stone building foundations, two cisterns, and two circular areas of stone rubble that may represent chimney fall. The current condition of this site is not known. Site 23SC219 could potentially be affected, since an upstream alignment, Alternative A2', has been designated as the Preferred Alternative; however, conceptual plans for both the upstream and downstream alignments suggest that potential impacts to this site could be avoided. If site 23SC219 cannot be excluded from the area of potential effect, archival research and additional field work would be necessary to evaluate its significance and integrity.

Site 23SC886 is an extensive prehistoric lithic scatter located north of the bluff edge on the east side of Route 40/61. MoDOT archaeologists recorded this site (Piazza, 1995) during a 1992 survey before planned improvements to Route 40/61 between the Missouri River and I-70 under Job No. J6P0672. During the 1992 MoDOT survey, chert flakes were noted between Stations 645+00 and 650+00 left of the centerline. Although this site was initially described as being 902 ft (275 m) north of the Missouri River, it is actually located between 902 and 1,640 ft (275 and 500 m) north of the bluff line and is larger than originally recorded. The site was thought to be completely outside the impact area for the J6P0672 job and consequently was not recommended for any additional work. A vertical profile of the site was exposed along the edge of the right of way during the winter of 2001–2002 when utilities were adjusted and a retaining wall was built in association with the J6P0672 job. MoDOT archaeologist Rusty Weisman examined the site and found a few exposed chert flakes in the upper 10 inches (25 cm) of the soil profile but observed no diagnostic artifacts or evidence of intact deposits or cultural features. It does not appear that any information of importance to prehistory was lost or destroyed at site 23SC886 as a result of the recent construction activity along Route 40/61. Other recent activity in the site area includes construction of a large public water supply tank, which appears not to have had any associated archaeological investigation. Selection of either of the downstream alternatives (B3 or B5) could affect site 23SC886 and limited Phase II testing would then be necessary to evaluate the integrity and significance of affected portions of the site.

The three previously recorded sites in the study area are not known to include graves nor are they known to have sacred or religious significance to Native American tribes. These three sites do not appear to have important interpretive value that would merit preservation in place nor are they considered to be Section 4(f) resources.

Section 106 of the National Historic Preservation Act (16 U.S.C. §470 et seq.) provides for consultation between federal agencies and Native American tribes with respect to federal undertakings. Pursuant to NHPA Section 101(d)(6)(B) (36 CFR 800.2(c)(2)(ii)(A)), the FHWA initiated consultation with eleven Indian Tribes (the Choctaw Nation of Oklahoma, Iowa Tribe of Kansas and Nebraska, Iowa Tribe of Oklahoma, Kaw Nation of Oklahoma, Osage Tribe of Oklahoma, Peoria Tribe of Indians in Oklahoma, Quapaw Tribe of Indians of Oklahoma, Sac and Fox Nation of Oklahoma, Sac and Fox Nation of Missouri in Kansas and Nebraska, Sac and Fox Tribe of the Mississippi in Iowa, and the United Band of Cherokee Indians in Oklahoma) that have historic ties to the area or may attach traditional religious or cultural significance to archaeological sites in the project area. Letters describing the Daniel Boone Bridge project and its potential to impact both previously identified and unknown archaeological sites were sent to each tribe along with an electronic copy of the Draft EIS (a copy of the letter sent to the Sac and Fox Tribe of the Mississippi in Iowa is included in Appendix C. All letters to other tribes were identical). The Peoria Tribe of Indians of Oklahoma were the only respondents. The Peoria are unaware of any religious sites in the project area and have no objection to the proposed construction. However, the Peoria asked to be contacted immediately in the event that ancestral human remains, sacred objects, or objects of cultural patrimony are discovered during planned archaeological investigations or during construction.

St. Louis County

There are no previously recorded archaeological sites within the St. Louis County portion of the study area. The Missouri River floodplain is a dynamic landscape shaped by periodic floods as well as the continuous cut-and-fill processes associated with meandering of the river channel. Some studies have suggested that few sites are present in the floodplain (Harl et al., 1989; Harl et al., 1994; Harl, 1995; Levy, 1978; Songer et al., 1993). However, where survey methods have included deep testing and geomorphological studies, intact archaeological sites have been found in bottomland floodplain settings along the Missouri River. Although there is a potential for both historic and prehistoric archaeological sites to be preserved in the floodplain portions of the study area, it is likely that any sites that are present are buried beneath modern sediments and unlikely that they will be detected unless deep testing methods are utilized.

Comparison of maps of the Missouri River channel in 1868, 1879, 1954, and 1996 shows little change in the channel position in the immediate vicinity of the Daniel Boone bridge. The stability of the channel near the bridges suggests that historic and prehistoric sites and steamboat wrecks could be preserved there.

4.15.3 Steamboat Wrecks

In 1897, USACE Captain H.M. Chittenden compiled a comprehensive list of Missouri River steamboat wrecks and maps showing the approximate locations of the wreck sites (Chittenden, 1897). The USACE Kansas City District recently published (2000) a set of maps showing the location of Missouri River wrecks, based in part on Chittenden's research (Figure 4-5). The wrecks are plotted with respect to the 1897 channel, which is overlaid on a modern (1954) map of the river. The resulting composite map illustrates the wreck sites and historic shifts in the Missouri River channel. These maps also include a separate analysis of the shipwreck data compiled from published sources (prior to 1962) by Dr. E.B. Trail.

Steamboat wrecks recorded by Chittenden near the Daniel Boone bridge include the Osage, a side-wheeler that sank in 1848, and the Fearless, a deep draft stern-wheel towboat that sank in 1882. Chittenden placed the Osage wreck site near Howell's Landing on the south bank, just west of the Route 40/61 bridges. However, Trail's analysis placed the Osage wreck site farther downstream, in Green's Chute on the north side of Bonhomme Island (USACE, 2000; Chittenden, 1897). Chittenden recorded the wreck of the Fearless near the south bank of the

river just east of the existing bridges, while Trail located the Fearless on the north bank about 1 mi (1.6 km) farther east. Variance in the reported locations may be due in part to changes in river mile distances over time because of the shifting channel and meandering of the river. Captain Chittenden's locations of the steamboat wrecks are considered to be the most accurate. Other steamboat wrecks that may be located near the bridges include the A.C. Goddin, a sidewheeler sunk in 1857, the James Lyons, a stern-wheeler sunk in 1882, the Helena, a sternwheeler sunk in 1887, and the Warsaw, sunk in 1846.

Although no steamboat wreck sites have been verified in the study area, the published locations for the historically documented wrecks are imprecise and the possibility that a steamboat wreck could be present within the study area cannot be ruled out. MoDOT will conduct additional archival research on historic wrecks in the area prior to further project development. If that research is inconclusive, a magnetometer survey could be conducted to rule out the presence of buried steamboat wrecks in the areas of deep impacts.

4.15.4 Bridges

Three bridges are located within the study area. Bridge A2168, completed in 1991, is a ramp carrying westbound old Route 40 over Route 40/61 (Chesterfield Airport Road on-ramp) and is considered to be non-eligible for the NRHP. Eastbound bridge A4017, completed in 1990, carries Route 40/61 over the Missouri River and is considered to be non-eligible for the NRHP.

The companion westbound bridge (J1000R) carrying Route 40/61 over the Missouri River was originally evaluated as possibly NRHP-eligible in Clayton Fraser's 1996 draft Missouri Historic Bridge Inventory and was later determined to be NRHP-eligible at a Historic Bridge Advisory Committee meeting held in July 1996. The bridge was designed by the Missouri State Highway Department, was fabricated and constructed by the Kansas City Bridge Company, and completed in 1935; it consists of a steel riveted cantilever through truss, with steel deck truss approach spans. The substructure consists of concrete abutments, wingwalls, and spill-through piers with Art Moderne detailing. The bridge is 2,614 ft (797 m) in total length with a roadway width of 32 ft (9.8 m).

The bridge was named for pioneer woodsman, surveyor, and trailblazer, Daniel Boone, who died a few miles west of the bridge site. Missouri Governor Lloyd C. Stark performed the ribbon cutting ceremony, which was attended by a 2-year-old direct descendant of Boone. The Daniel Boone bridge is considered historically significant because it ". . . played an integral role in the development and expansion of the St. Louis/St. Charles area by facilitating traffic to metropolitan St. Louis. The state's 17th Missouri River bridge, the Daniel Boone bridge stands as a symbol of mid-western urban expansion in the 1930s" (Fraser, 1996).

Table 4-24. Bridges within the Proposed Alternatives for Improvements to U.S. Route 40/61, St. Charles and St. Louis Counties, Job No. J6P1436

Bridge	Location	Built	NRHP Evaluation	Effect
A2168	Old Route 40 over Route 40/61	1991	Non-eligible	No effect
A4017	Route 40/61 over Missouri River	1991	Non-eligible	No effect
J1000R	Route 40/61 over Missouri River	1935	Eligible	Adverse effect for Alternatives A1, B3 (and possibly A2, B5); No effect for A2' (Preferred)

A study of the useful life of the Daniel Boone bridge (J1000R) determined that, with rehabilitation, the bridge would provide another 30+ years of service at a cost savings over options that would totally replace it. Since the 1935 bridge is an NRHP-eligible Section 4(f) resource, a Section 4(f) evaluation and development of avoidance alternatives would be required if the selected alternative would result in harm to the bridge or changes that would significantly alter its historic character. Alternatives A2, A2' (Preferred) and B5 would leave the existing historic bridge, J1000R, in place. However, the A2 and B5 alternatives would each require an undesirable split of the mainline traffic and would carry mainline (future interstate) traffic on the historic bridge, possibly leading to premature (before 30+ years of potential service) removal of the historic bridge. Construction of Alternatives A1 and B3 would lead to removal of bridge J-1000R. Demolition or substantial alteration of any of the bridges in the project area would require formal Section 106 clearance through the State Historic Preservation Office.

4.15.5 Architecture

A review of records on file at the SHPO indicates that there are no architectural resources within the project area listed in the NRHP.

MoDOT architectural historian Karen Daniels examined maps of the area, conducted a cursory reconnaissance of the study area, and determined that there are no buildings within the study area greater than 50 years old. The only buildings in the corridor are associated with the sand mining operation located on the St. Louis County side of the river downstream from the 1935 bridge. Buildings and structures associated with this business are not considered historic properties. Conceptual plans suggest that the downstream alternatives, B3 and B5, may have some impact on plant operations and one building. The upstream alternatives, A1, A2, and A2' (Preferred), would not affect the sand plant.

4.15.6 Cemeteries

No public cemeteries are indicated on the USGS Weldon Spring quadrangle map within the study area. It is always possible that unmarked cemeteries could be present. Any marked or unmarked cemeteries discovered during the archaeological survey of the preferred alignment will be treated in accordance with state law (Missouri Revised Statutes Chapter 194 or Chapter 214).

4.15.7 Other Historic Properties

The proposed bridge would span the Katy Trail State Park, which is developed on the abandoned MKT Railroad corridor on the St. Charles side of the river. The rail company that would later become the MKT organized under another name in 1865 and was renamed the Missouri, Kansas & Texas Railway (M. K. & T) in 1870. M. K. & T was eventually changed to MKT Railway, nicknamed the Katy Railroad. In July 1893 the St. Louis division of the MKT railroad opened for traffic as far east as St. Charles. The railroad was a financial success until after the Second World War. In 1986, following a long period of post-war decline, the financially struggling MKT railroad ceased running between St. Charles and Sedalia and was absorbed by the Union Pacific Railroad in 1988.

With disuse and reversion causing extensive losses in the U.S. rail system, Congress enacted the Railroad Revitalization and Regulatory Reform Act of 1976, which prescribed preservation of abandoned rails for public use. In 1983, faced with rapidly dismantling railroad systems, Congress passed the "railbanking" statute, which called for keeping rail corridors intact for future transportation use by allowing their interim use as public trails. The National Trails System Act

[16 USC 1247 (d)] defines railbanking as a voluntary agreement between a railroad company and a trail agency to use an out-of-service rail corridor as a trail until some railroad may need the corridor again for rail service. The railbanking provisions of the National Trails System Act enabled the state of Missouri (through MDNR) to acquire the old MKT rail corridor for interim use as a recreational trail. Two pilot sections of the MKT recreational trail were constructed in the early 1990s but were damaged extensively by the 1993 flood and additional flooding in 1995. In 1996, the Katy Trail State Park was officially dedicated.

The Missouri SHPO considers all major railroad corridors including the MKT corridor to be historic properties. In consultation with SHPO staff, it has been determined that the proposed bridge, which will span the historic railroad corridor, would not be considered an adverse effect.

4.15.8 Summary

The Daniel Boone bridge study area includes five alternatives, three on the upstream side of the existing bridges [A1, A2, and A2' (Preferred)] and two (B3 and B5) on the downstream side. There are no historic buildings or known cemeteries within the study area. Three previously recorded archaeological sites, a historic bridge, and a historic railroad corridor are present within the study area. Alternatives A1, A2, and A2' could potentially affect two previously recorded archaeological sites, 23SC89 and 23SC219, while Alternatives B3 and B5 could affect one known site, 23SC886. The known sites are not considered to be Section 4(f) resources and any unavoidable impacts to those sites could be mitigated through data recovery excavation. Additional archaeological sites could be present.

The number of archaeological sites estimated to exist within each of the alternative corridors can be calculated based on the acreage of the alignment and a site density value derived from similar areas that have been systematically surveyed for archaeological sites. Using a site density value of 0.05 sites per acre (the recorded site density in the adjoining portion of the 'River Hills' area surveyed by Haas and Boyd), each of the alternatives would be predicted to affect about one site. It should be noted that the study area includes three known sites, a higher than predicted number. Although the number of archaeological sites can be estimated, the significance and integrity of the resources within the different alignments cannot be readily predicted or compared. Archaeological field work will be required to detect and evaluate the actual sites.

Historic records suggest the possibility that the study area could include nineteenth-century steamboat wrecks on the St. Louis County side of the river. Four of the five alternatives, Alternatives A1 and B3 [and possibly A2 and B5 (refer to earlier discussion of bridges)], would directly or indirectly result in an impact to a Section 4(f) resource (removal of the historic 1935 Daniel Boone bridge). None of the studied alternatives would adversely affect the MKT Railroad corridor. Table 4-25 summarizes and compares the impacts to known archaeological resources, historic buildings, and bridges within the alternatives proposed for improvements to the Route 40/61 Missouri River bridges.

Table 4-25. Cultural Resource Potential for the Proposed Alternatives for Improvements to Route 40/61, St. Charles and St. Louis Counties, Job No. J6P1436

	Upstream			Downstream	
	A1	A2	A2'	B3	B5
Area of Potential Effect. ac (ha)	19.3 (7.8)	19.3 (7.8)	19.3 (7.8)	13.7 (5.5)	13.7 (5.5)
Architectural Resources	0	0	0	0	0
Archaeological Resources	2	2	2	1	1
4(f) Properties	1	0	0	1	0
Total Impacts	3	3	2	2	2
Rank Order	1	1	3	2	2

Rank order comparison of the alternatives is based on the sum of the architectural resources (0), the known and estimated archaeological site potential (two sites upstream and one downstream), and the effects on known Section 4(f) resources (the 1935 Daniel Boone bridge, J1000R). The highest ranked alternative (1=highest) has the greatest effect on historic resources, while the lowest ranked alternative would have the least effect.

Alternatives A1 and B3 (and possibly A2 and B5) have relatively greater impacts because they affect the Daniel Boone bridge, a Section 4(f) resource. Alternatives A1 and B3 include removal of the historic 1935 bridge (J1000R). Although Alternatives A2 and B5 do not specify removal of the historic bridge, those alternatives would not allow the most practical long-term use (local traffic) of the historic bridge and would likely result in its premature removal. The Preferred Alternative, A2', has the least impact to known cultural resources.

4.16 Impacts to Public Lands and Potential Section 4(f) Properties

Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966 (now codified at 49 USC 303 and 23 USC 138) was designed to help preserve the natural beauty of the countryside and public parks and recreation lands, wildlife and waterfowl refuges, and historic sites. A Section 4(f) property is any publicly owned park, public land, or any historic site eligible for inclusion on the NRHP that falls under the purview of Section 4(f) of the USDOT Act of 1966. Relevant passages state that:

(a) It is the policy of the United States Government that special effort be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites.

(b) The Secretary of Transportation shall cooperate and consult with the Secretaries of the Interior, Housing and Urban Development, and Agriculture, and with the states, in developing transportation plans and programs that include measures to maintain or enhance the natural beauty of lands crossed by transportation activities or facilities.

(c) The Secretary may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge, or land of an historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, recreation area, refuge, or site) only if —

- (1) there is no feasible and prudent alternative to using that land; and
- (2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.

Section 4(f) mandates that all USDOT-funded transportation projects must avoid impacts to public parkland and cultural resources deemed eligible for the NRHP, unless it is successfully demonstrated that no feasible and prudent alternative exists that avoids "use" or impacts to the resource and that the project includes all possible planning to minimize harm from such use. FHWA regulation governing application of Section 4(f) is found at 23 CFR 771. If an impacted resource is deemed by FHWA to be protected by Section 4(f), a Section 4(f) evaluation is prepared to address these issues.

Section 6(f) is part of the Land and Water Conservation Fund (LWCF) Act, which was implemented to provide restrictions on the conversion of public recreation facilities funded with LWCF federal grants. The LWCF Act provides funds for the acquisition and development of public outdoor recreation facilities that could include community, county, and state parks, trails, fairgrounds, conservation areas, boat ramps, shooting ranges, etc. If impacted, LWCF-assisted facilities require mitigation that includes replacement land of at least equal monetary value and recreational utility.

Pittman-Robertson Act funding (known more formally as the Federal Aid in Wildlife Restoration Act, as amended) provides grants to states for the purpose of restoring and managing wildlife. An excise tax on the sale of firearms and ammunition funds the program. The USFWS administers the grant program, in cooperation with state conservation departments such as the MDC.

The Dingell-Johnson Act (Federal Aid in Fish Restoration Act, as amended) is similar to the Pittman-Robertson Act, providing federal grants to support and maintain sport fish populations. An excise tax on the sale of fishing gear funds this program of state assistance, which is also administered by the USFWS.

4.16.1 Public Parks, Recreation, and Wildlife Management

Public lands used for recreation and/or wildlife management in the study area include lands owned by MDC, MDNR, and the city of Chesterfield.

August A. Busch Memorial Conservation Area

The MDC manages three large tracts of land within the area. The August A. Busch Memorial CA (Busch Memorial CA), consists of a 6,987-ac (2,828-ha) parcel, roughly bounded by Route DD to the west and north, Route 40/61 to the east, and Route D to the south. This area is accessible from Route D, and is located northwest of the study area. This area is noted for the 32 lakes and many small ponds totaling 526 ac (213 ha). This area also has five viewing blinds, seven hiking trails, picnic areas, a staffed firearms range, fishing jetties, and floating docks. Two areas within this CA have been developed as wildlife refuges. Major recreational activities include fishing, hunting, picnicking, hiking, auto touring, bicycling, and wildlife watching.

Weldon Spring Site

The Weldon Spring Site is a Department of Energy environmental restoration site located west of the study area, south of Busch Memorial CA, and north of Weldon Spring CA. The site consists of two noncontiguous areas: a 220-ac (89-ha) former chemical plant (former uranium processing facility) and a 9-ac (3.6 ha) quarry. The Weldon Spring Site Remedial Action Project (WSSRAP) focuses on the cleanup and storage of chemical and radioactive contaminants remaining from the operation of the former Weldon Spring Uranium Feeds Materials Plant. The site now consists of the 45-ac (18-ha) disposal cell with a viewing platform and information signs, the Weldon Spring Site Interpretive Center, and the Hamburg Trail that connects the cell, interpretive center and surrounding area to the Katy Trail State Park.

Weldon Spring CA

The MDC owns and manages two large tracts of land in the study area. The Weldon Spring CA consists of about 8,100 ac (3,278 ha) in St. Charles County and is located adjacent to and west of existing Route 40/61. It encompasses an area roughly bounded by the Missouri River on the south, Route 40/61 and the Missouri Research Park on the east, Routes 94 and D on the north, and Routes DD and 94 on the west. Several locations along Route 94 have public access; there is no formal access to the area from Route 40/61.

MDC's brochure for the Weldon Spring CA describes the area as once being part of a 17,000-ac (6,880-ha) munitions plant operated by the federal government during and after World War II. Most of the property, except the munitions plant, was later given to the University of Missouri. In the late 1970s, the MDC purchased 7,230 ac (2,926 ha) from the university to establish Weldon Spring CA.

Management of the area includes extensive provision for public use, including hunting, hiking, fishing, bicycling, and nature study. Three established trails, totaling over 21 mi (34 km), wind throughout the area. Fishing opportunities include several lakes and ponds and the Missouri River, Little Femme Osage Creek, and Femme Osage Creek. The Katy Trail extends for 5.3 mi (8.5 km) through the area. The 385-ac (156-ha) Weldon Spring Hollow Natural Area, located in the southeastern portion of the Weldon Spring CA, contains upland and bottomland forest and rugged "river breaks" topography.

Howell Island CA

The MDC owns and manages the Howell Island CA. Howell Island CA is located southwest of the study area. Howell Island CA consists of about 2,548 ac (1,031 ha) of mostly bottomland forest on an island within the Missouri River. MDC purchased the area in 1978. The Howell Island area brochure indicates that activities on the island include fishing access to the Missouri River and Centaur Chute, hunting, picnicking, and bird watching. Land access is only possible from the St. Louis County side over Centaur Chute, via Eatherton Road.

Katy Trail State Park

The Katy Trail State Park (Katy Trail) is a cross-state hiking and biking trail managed by the MDNR. The trail follows the route of an abandoned railroad and currently extends approximately 225 mi (362 km) from St. Charles to Clinton. The park is still being developed from St. Charles to Machens. The trail was established through provisions of the National Trail Systems Act (Rails to Trails), which provides that railroad corridors no longer needed for active rail service can be reserved for future transportation and used on an interim basis for recreational trails (MDNR Katy Trail internet website, August 2002). The trail roughly parallels the north bank of the Missouri River through the study area and passes beneath the existing Route 40/61 bridges.

In 1995, the NPS designated a 165-mi (266 km) portion of Katy Trail State Park as an official segment of the Lewis and Clark National Historic Trail, making this section a part of the National Trails System. This section corresponds to the segment from Boonville to Machens.

Chesterfield Athletic Complex

The Chesterfield Athletic Complex is located on the north side of existing Route 40/61, adjacent to the Spirit of St. Louis Boulevard bridge over Route 40/61. The city of Chesterfield owns this approximately 128-ac (52-ha) public recreational facility.

There are no other known city parks, public school grounds, deed-restricted public lands, or wildlife refuges located within the study area.

Gateway Golf Center

The Gateway Golf Center is a privately-owned, recreational facility located adjacent to Route 40/61 in the study area. This area consists of a driving range and putting greens.

4.16.2 Other Public Lands

Missouri Research Park

The University of Missouri owns and manages the Missouri Research Park, opened in 1985. The research park is located south of Route 94 and west of Route 40/61, adjacent to the Weldon Spring Heights area. The area comprises about 750 ac (304 ha), bounded on two sides by the Weldon Spring CA and on one side by existing Route 40/61. The research park currently hosts 13 high-tech and research facility tenant companies and two federal agencies, occupying about 130 ac (53 ha) of land (Missouri Research Park internet website, August 2002). The research park also contains a 235-ac (95-ha) golf course and wooded recreational trails.

4.16.3 Planned Facilities

Missouri Department of Conservation

MDC staff has indicated that no changes are anticipated in the management of areas of the Weldon Spring CA that are adjacent to Route 40/61. MDC staff recognizes that the area adjacent to the Missouri River (riverward of the Katy Trail) provides desirable wetland and backwater slough habitat. Management of this area includes the goal of preservation in its current undeveloped state.

City of Chesterfield

The city's Chesterfield 2002 Comprehensive Plan, Draft Plan Policies and Recommendations, April 2002 (comprehensive plan), and City of Chesterfield Parks Master Plan, 1999 (park master plan), both refer to planned recreational facilities in the project area.

Both planning documents indicate that additional acreage is planned for the Chesterfield Valley Athletic Complex. The prospective acreage is located adjacent to the existing athletic complex on the riverward side of the Chesterfield-Monarch Levee. The proposed project will not impact this area.

The planning documents also refer to future development of a trail system, possibly utilizing 11 mi (17.7 km) of the Chesterfield-Monarch Levee. No other specific information was found in the document with regard to the location of trailheads or timetable for development of such a trail.

The comprehensive plan's Conceptual Land Use Plan illustration (page 31, Chesterfield 2002 Comprehensive Plan, Draft Plan Policies and Recommendations, 2002) indicates that all of the land within the city's boundary that lies riverward of the levee is proposed for "agricultural/floodplain/conservation" use. The plan's glossary defines this conceptual land use category as "*Land unprotected from Missouri River floodwaters to the northeast of the Monarch-Chesterfield Levee. This area should be retained for open space, agriculture, or recreation/education activities.*" Alternatives B3 and B4 would require approximately 9.9 ac (4.0 ha) of land within this area. Alternatives A1, A2, and A2' would not require this property for right of way.

Specifically, the park master plan indicates the location of Missouri River Park, a potential future city park consisting of about 43 ac (17 ha), located southwest of Chesterfield Airport Road and Route 40/61, with frontage along Olive Street Road and the Missouri River. No timetable is indicated for public acquisition of Missouri River Park.

Missouri Research Park

A recent facilities map of the Missouri Research Park (Loomis Associates, 2002) indicates possible future trails located on the research park property connecting to the Katy Trail. One possible trail is near Route 40/61 and the other is located near the western extremity of the property, near the Duckett Creek Plant No. 2.

There are no other known plans for future acquisition of additional public recreation or wildlife refuge lands or recreational improvements on existing public lands within the study area.

4.16.4 Environmental Consequences

Busch Memorial CA, Weldon Spring Site, and Howell Island CA

Busch Memorial CA, Weldon Spring Site, and Howell Island CA are located outside of the study area and will not be impacted by the proposed project.

Weldon Spring CA

Approximately 32 ac (13 ha) of the MDC owned and managed 8,100-ac (3,278-ha) Weldon Spring CA are within the study area for the proposed improvements. All of the build alternatives considered in the vicinity of the Weldon Spring CA lie adjacent to existing Route 40/61, on either side of the roadway. Alternatives located on the west side of the roadway [Alternatives A1, A2, and A2' (Preferred)] are identical with respect to the size of the project footprint and resulting impacts within the Weldon Spring CA. Alternatives located on the opposite side of Route 40/61 from Weldon Spring CA (Alternatives B3 and B5) would not impact the area.

The right of way needs for Alternatives A1, A2, and A2' (Preferred) are estimated to encompass approximately 1.5 ac (0.6 ha) along the eastern boundary of the Weldon Spring CA. An abandoned, partially water-filled quarry is located within this area; the Katy Trail is also located adjacent to this quarry site. MDC discourages public access to the old quarry and has erected a perimeter fence around the area on two sides to help deter pedestrians from falling from the quarry's high headwalls. One of the quarry headwalls is located adjacent to the existing Route 40/61 right of way. Both main quarry headwalls are estimated to be about 100 ft (30 m) high. The Weldon Spring CA brochure map also shows the quarry site as being a restricted area, where public access is not allowed. There are no other such notable features in the area, as the balance of the 1.5 ac (0.6 ha) exhibits forest cover. Alternatives A1, A2, and A2' (Preferred) would span the portion of the Weldon Spring CA that lies riverward of the Katy Trail by a bridge.

From a recreational standpoint, there are no features or facilities within the Weldon Spring CA that could be impacted by the proposed project that would qualify the area as a Section 4(f) resource. The Weldon Spring CA is primarily managed for dispersed, multiuse and non-wildlife refuge purposes. There are no LWCF grants or Pittman-Robertson funds in the Weldon Spring CA. Records do indicate that Dingell-Johnson Sport Fish Restoration funds have been expended in Weldon Spring CA (Federal Aid Grant No. FW-9-D); however, MDC's October 17, 2003 letter of comment on the Draft EIS noted that Dingell-Johnson funds were used to purchase a river access site that is not located near the project location and should not be impacted by the project.

Katy Trail State Park

The Katy Trail will be spanned by the bridge structures associated with all of the build alternatives. The trail will not experience long-term impact to trail use or management from the proposed project. See the discussion below under "Section 4(f) Considerations."

There are no LWCF grants for the Katy Trail State Park.

Chesterfield Valley Athletic Complex

A portion of the Chesterfield Valley Athletic Complex is located within the study area. However, no additional right of way will be required in this area for any of the build alternatives. Therefore, this recreational complex will not be impacted.

Gateway Golf Center

The Gateway Golf Center is located within the study area. However, no additional right of way will be required in this area for any of the build alternatives, and the Gateway Golf Center will not be impacted.

Missouri Research Park

Alternatives A1, A2, and A2' (Preferred) would impact a portion of the far eastern limits (adjacent to existing Route 40/61) of the Missouri Research Park property to provide an additional bridge across the Missouri River. Although publicly owned, the research park in this area is posted no trespassing. Furthermore, a high chain-link fence surrounds the potential impact area within the research park. Since public access to the property in the project area is prohibited and there are no recreational attributes present there, this portion of the Missouri Research Park property is not subject to the provisions of Section 4(f).

Planned Facilities

As discussed previously in this section, there are planned future public recreational facilities within the study area.

Missouri Research Park — Recent maps of the research park show two future recreational trail connections to the Katy Trail. The proposed project could impact the location of the trail connection nearest to Route 40/61. However, research park staff (Loomis Associates) indicate that, although matching federal funding was in place to plan and construct this trail connection, it was decided not to proceed with the trail in this location because of steep topography and the high cost of providing standard trail grades. The trail connector planned near the western edge of the research park would not be affected by the proposed improvements to Route 40/61.

City of Chesterfield — The city's planning documents indicate consideration of a future trail along the Chesterfield-Monarch Levee. The levee embankment ties into the existing roadway embankment of Route 40/61 near the Chesterfield Airport Road interchange. The planning documents do not elaborate on whether or not the planned trail will cross Route 40/61. The proposed improvements to Route 40/61 will affect the area of the existing levee tie-in, regardless of the alternative selected. However, the planned roadway improvements are not expected to improve or worsen the situation with regard to a future recreational trail on the Chesterfield-Monarch Levee.

A portion of the area identified as Missouri River Park, a proposed future park within the city of Chesterfield, is located within the study area for the proposed Route 40/61 improvements. However, the area will not be impacted by the proposed improvements.

4.16.5 Section 4(f) Considerations

Katy Trail State Park

The Katy Trail State Park is an extensive linear recreational resource that cannot be avoided by the proposed project. However, all of the bridge alternatives considered would span the Katy Trail in much the same manner as the existing Route 40/61 highway bridges. The aggregate-surfaced trail is located within the former railroad right of way, which generally averages about 60 to 100 ft (18 to 30 m) in width. No bridge piers or other bridge components will be located on land dedicated to the trail. Clearances between the former railroad bed and the bridge will be maintained so that any future ability to reestablish rail service will not be impaired, as required by the National Trails System Act (Rails to Trails). Also, both vertical and horizontal clearances related to recreational use and maintenance aspects of the trail will be established and maintained according to the direction of MDNR.

Since the Katy Trail is a publicly owned recreational facility, it is considered a Section 4(f) resource [detailed discussion of Section 4(f) at the beginning of this section]. However, preparation of a separate Section 4(f) evaluation is not considered necessary, because all the project alternatives will span the trail, resulting in no permanent taking or use of the trail. Also, aside from the possibility of brief disruptions of trail use during construction, public access and use of the trail will not be disrupted to any large extent or duration.

Trail use may be temporarily disrupted at times during construction. Trail traffic could be halted during different times of the day, when necessary, for safety reasons. Mitigating measures will include detouring trail users by providing a temporary alternate route in close proximity to the existing trail around the construction area (if practicable), timing trail closures to occur during periods of off-peak use, and using public outreach to provide advance notification of extended trail closure dates and times (if those become necessary), as well as appropriate informational signing on the trail itself and at nearby trailheads.

Any temporary impacts to the Katy Trail are anticipated to only include activities related to constructing a bridge over the trail, such as access and egress across the trail and along the trail to facilitate ease of construction. Section 4(f) does not apply to temporary actions that may result from construction of a new Missouri River bridge spanning the trail, because such temporary occupancy will be of short duration and less than the time needed for construction of the project; will result in no change of ownership or retention of long-term interests in the land for transportation purposes; will not result in any temporary or adverse change to the activities, features or attributes that are important to the purposes or functions that could qualify the resource for protection under Section 4(f); and will include only a minor amount of land.

Further coordination with MDNR will result in an intergovernmental agency agreement between MoDOT and MDNR that addresses project construction over the Katy Trail and details mitigation measures to be followed to minimize any disruptions in use of the trail.

4.17 Hazardous Waste Sites

MoDOT staff conducted a records review for potential hazardous and solid waste concerns in the project area that included a search of the following sources: Federal Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS); National Response Center Hotline database; MDNR Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri, Fiscal Year 2001; MDNR Missouri Hazardous Waste Treatment, Storage, and Disposal Facilities List; MDNR Solid Waste Facilities List; MDNR Underground Storage Tank database; and Center for Agricultural, Resource and Environmental Systems.

Based on the sources reviewed, the only site identified within the project area is associated with petroleum spills and/or releases into the Missouri River. Oil spills and/or releases have occurred on the Missouri River upstream of the Daniel Boone bridge, at approximately mile marker 44. This information was compiled from four incident reports (National Response Center Hotline database) that involved only three separate release dates (May 20, 1995; September 30, 1998; and November 30, 2001). Reports do not indicate the volume of the releases. Three of the four reports identify Shell pipeline as the point of release. Based on information from MoDOT District 6, Shell Pipeline Corporation and Texas Pipeline Company have a joint agreement with the Missouri Highway and Transportation Commission for a 22-inch (56-cm) oil transportation line. This line is located upstream of the Daniel Boone bridge.

Some limited information from MoDOT District 6 dated around 1970 also mentions a possible 24-inch (61-cm) pipeline by Explorer Pipeline Company. Sketches show the proposed 24-inch

(61-cm) pipeline on the east side of the Daniel Boone bridge. No other information was provided. The reported historical releases should not present a significant problem for the project unless the footprint of the planned construction encompasses the pipeline(s). In that case, relocation of the pipeline(s) may be necessary and a potential to encounter sediments impacted by past pipeline spills and/or releases would also exist.

The possibility of encountering wastes from sites unknown to MoDOT should always be a consideration. MoDOT personnel have found no other potential hazardous waste sites in the project area. Any unknown sites that are found during project construction will be handled in accordance with federal and state laws and regulations.

If regulated solid or hazardous wastes are found unexpectedly during construction activities, the MoDOT construction inspector will direct the contractor to cease work at the suspect site. The construction inspector will contact the appropriate environmental specialist to discuss options for remediation. The environmental specialist, the construction office, and the contractor will develop a plan for sampling, remediation if necessary, and continuing project construction. Independent consulting, analytical, and remediation services will be contracted if necessary. MoDOT has the capability to collect samples and analyze for volatile organics and heavy metals. If necessary, the MDNR will be contacted for coordination and approval of required activities. In excavations where hazardous atmospheres could reasonably be expected to exist, such as in areas where hazardous substances are stored nearby, the contractor is responsible for appropriate worker safety precautions, as required by the Occupational Safety and Health Administration (OSHA).

4.18 Visual Impacts

4.18.1 Existing Visual Quality

The project area has high visual interest and diversity; rolling, wooded upland topography, and bluffs north of the Missouri River contrast with the relatively flat, low-lying floodplain south of the river. The Missouri River provides scenes typical of a big river and is the most visually impressive natural feature of the project area. The Route 40/61 bridges over the river are visible from the east and south and are visually interesting because of their truss design.

In St. Louis County, the river valley has developed rapidly in the past 10 years, although the land nearest the bridges is mostly agricultural land. A sand plant for dredging sand from the river is on the east side of the bridge. Athletic fields lie on the north side of Route 40/61. The developing commercial area with strip malls is to the south. Spirit of St. Louis Airport is to the south of the bridge. Light industrial and commercial buildings lie between the airport and Route 40/61. This area provides broad vistas, although much of the river is not easily seen due to levees.

The St. Charles County side is sparsely developed because of the bluffs along the river. The Katy Trail State Park, a 200-mi (322-km) long Rail-to-Trail pedestrian and bicycle path, runs between the river and the bluff. To the south of Route 40/61 are the Busch Wildlife Area and the University of Missouri Research Park. The research park is an office park with a golf course. On the north is Weldon Spring, a small city that is developing with mostly residential subdivisions and commercial properties along Route 40/61 and Route 94. The bluffs limit the distance from which the bridges are visible.

4.18.2 Visual Impacts

Views of and from the facility are considered in evaluating aesthetic or visual impacts. The impacts of the proposed improvements on the view of the road would be judged by the "intactness" of the affected areas. Intactness refers to the degree to which the landscape has retained natural conditions. Generally, segments located on new right of way would create greater visual changes than segments using existing road right of way.

This study will not determine the bridge structure type. Originally, it was assumed that all of the build alternatives include building a new bridge of the same structure type immediately adjacent to the existing bridges; the visual impacts on the project-area landscape would be minimized. However, it is recognized that other structure types such as plate girder or box girder would allow for widening to adapt to transportation demands in the future. Since these bridge types will look vastly different than the existing structure, the visual view of the bridges will be impacted. However, they will provide a better view of the river. Although some of the bluff may be removed and vegetation lost, disturbed areas will be blended with the existing terrain.

The major variables of the build alternatives are whether the existing westbound bridge will be removed or retained to carry either mainline travel lanes or as an outer road and whether the new bridge will be located upstream or downstream from the existing bridges. If the existing westbound bridge remains, the three bridges become a more prominent feature in the river view for Route 40/61 users and Katy Trail users. If the bridge is removed, then the new structure and existing eastbound bridge will be less prominent than the three but somewhat more so than the existing bridges. The visual impact is dependent on the bridge type, which will not be determined by this study.

All of the alternatives would be immediately adjacent to the existing bridges. The downstream alternatives (Alternatives B3 and B5) would require the relocation of the sand plant and removal of a section of bluff. The upstream alternatives [Alternatives A1, A2, and A2' (Preferred)] would impact a small abandoned quarry adjacent to the Katy Trail but hidden from Route 40/61 by the bluff. The bridge may have to be extended past the quarry. These impacts will not adversely affect the views to or from the bridges.

4.19 Energy Impacts

Energy considerations to be taken into account when evaluating the various alternatives include the energy consumed during normal operations and maintenance. Transportation-related energy consumption has two main categories: direct consumption is the energy consumed by vehicles using the facility, and indirect consumption includes construction energy and such items as the effects of any changes in automobile usage due to the construction of the facility. Since these facility-related factors have a minor effect on direct energy consumption, they are generally considered insignificant and are omitted from the analysis.

Indirect energy consumption is generally divided into central energy use and peripheral energy change. Central energy use encompasses all the energy resources used indirectly in building and operating the transportation system. This includes energy for construction including energy consumed off-site for the production of materials and equipment and maintenance of the facility and manufacturing and maintenance of the vehicles. Energy consumed during construction also includes energy expenditures caused by vehicle delay due to construction activities, such as lane closures. Peripheral energy change recognizes energy resources other than those used in any manner by the system itself. Rather it addresses the potential effects that a transportation system may have on energy use and availability in the area it serves. For example, a project

may foster or induce a shift in population density, land use, or transportation patterns. Peripheral energy consumption is considered negligible because development may take place anyway.

Change in Fuel Consumption

An energy expenditure would be necessary for the construction of any of the build alternatives for processing materials, construction activities, and maintenance of the additional bridge lanes constructed. The amount of construction energy used is not appreciably different for any of the build alternatives. Alternatives that use the existing westbound bridge [A2, A2' (Preferred), and B5] would use less energy for bridge construction because the width of the new bridge would be less than for the other alternatives. However, these options would have slightly more roadway constructed for the three bridges.

The amount of fuel consumed by vehicles in the region is a function of the total vehicle miles traveled (VMT), the average speed the vehicles are traveling, and the ratio of automobiles, gasoline trucks, and diesel trucks. The build alternatives increase the capacity of the corridor by removing the bottleneck caused by the substandard widths and shoulders on the bridges. Although the capacity of the corridor would not be increased, the throughput would be higher than with the No Action Alternative, and travel time would be reduced. Thus more trips will be attracted to the corridor, increasing the daily and annual amount of VMT in the region. The reduction in delay should more than offset the increase in energy used for the increase in VMT.

The commitment of these resources is based on the judgment that highway users will benefit from the highway improvement. As such, improved operating costs, access, safety, and travel time are expected to offset the initial energy expenditure. The No Action Alternative would not require any additional energy expenditures for construction, but the fuel energy consumed by traffic congestion would continue to increase.

Vehicular energy consumption in the study area would increase during construction because of probable short-term traffic delays; however, this would be minimal. Implementation of any of the alignments would reduce congestion within the study area. The substandard lane and shoulder widths would be eliminated, thus reducing vehicular stopping and slowing conditions. These collectively would result in less direct and indirect vehicular operational energy consumption for the proposed action. In the long-term, post-construction operational energy usage would offset construction and maintenance energy usage, resulting in a net energy savings. There would be diminishing returns, however, as vehicular usage catches up with capacity over the life of a project.

4.20 Construction Impacts

There would be some short-term, temporary adverse impacts near the proposed action, including noise, dust, and pollutants discharged by construction equipment. Although it would be virtually impossible to totally avoid the kinds of short-term impacts typically associated with the construction phase of a highway project, generally these are among the most readily mitigated impacts.

To minimize impacts associated with the construction of any alternative, pollution control measures outlined in the Missouri Standard Specifications for Highway Construction will be used; these measures pertain to air, noise, and water pollution as well as traffic control (e.g., detours) and safety measures. All practicable measures will be employed to minimize or mitigate any potential impacts. Implementing these measures will ensure as little impact as can be realistically achieved with a highway construction project of this magnitude.

Emissions from construction equipment will be controlled in accordance with emission standards prescribed under state and federal regulations. Examples of emission controls could be engine retrofits or alternative fuels, such as bio-diesel, in both on-road and off-road diesel engine construction equipment. Materials resulting from clearing and grubbing, demolition, or other operations (except materials to be retained) will be removed from the project, burned, or otherwise disposed of by the contractor. Any burning, when permitted, will be conducted in accordance with applicable local laws and state regulations.

To reduce the impacts of construction noise, MoDOT has special provisions in the construction contract which require that all contractors comply with all applicable local, state, and federal laws and regulations relating to noise levels permissible within and adjacent to the project construction site. Construction equipment will be required to have mufflers constructed in accordance with the equipment manufacturer's specifications. Further, MoDOT will monitor project construction noise and require noise abatement in cases where the criterion is exceeded.

As discussed in detail in the earlier section on water quality, MoDOT's Pollution Prevention Plan provides for temporary erosion and sediment control measures that will be included within construction contract specifications. Erosion will be reduced by limiting the surface area of erodible material exposed during clearing and grubbing, excavation, and borrow and fill operations. Careful refueling practices will limit spills of gasoline and diesel fuels. Oil spills can be minimized by frequent checks of construction equipment.

Removal of vegetation, for construction purposes, upslope from wetland areas can cause erosion and result in sedimentation in wetlands downslope and downstream from the construction site. Steps to prevent sedimentation in wetlands adjacent to construction sites shall be taken in accordance with MoDOT's BMPs for roadway construction.

Traffic will be handled during construction by maintaining through-traffic flow on mainline Route 40/61 at all times. Temporary lane closures (several hours at a time) may be necessary to handle traffic lane shifts or to allow for a construction procedure that is best done without traffic present (e.g., the removal of a bridge). A detailed traffic control plan will be included as part of the detailed design plans. The Preferred Alternative, A2', is not expected to result in any adverse impacts to traffic during construction.

Utility Corridors

There are two utility corridors within the study area: (1) an auxiliary gas pipeline managed by Shell Oil Company, and (2) a 42-inch (107 cm) water main managed by St. Charles County Water, District #2.

The auxiliary gas pipeline is a branch of a main gas pipeline that crosses beneath the river several hundred feet upstream of the study area. The auxiliary pipeline enters the study area from the west near the Weldon Spring CA in St. Charles County. It passes under the eastbound lanes of Route 40/61 and becomes exposed under the westbound bridge. It is supported by the westbound bridge across the river and then passes back beneath the eastbound lanes of Route 40/61 and rejoins the main pipeline several hundred feet west of the study area in St. Louis County.

Alternatives A1 and B3 involve the removal of the westbound bridge, which has an impact on the auxiliary gas pipeline. The other final alternatives, including the Preferred Alternative, A2', retain the westbound bridge and would have no impact on the auxiliary gas pipeline.

The 42-inch (107 cm) water main runs from the 2 million gallon water tank and pumping station in St. Charles County, crosses beneath the river, and passes east of the St. Charles Sand Company property in St. Louis County. This water main is not impacted by any of the final alternatives.

4.21 Secondary and Cumulative Impacts

The Council on Environmental Quality defines cumulative impacts (40 CFR 1508.7) as "*The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.*" Direct effects are caused by project implementation and occur at the same time and place as the causative action. Indirect (secondary) effects are caused by project implementation and occur later in time or are beyond the immediate geographical boundaries. Cumulative effect analysis focuses on resource sustainability within expanded temporal and geographic boundaries.

The proposed action is a bridge improvement project intended to provide three through lanes and an auxiliary lane in each direction to carry Route 40/61 traffic across the Missouri River; it does not introduce a new transportation facility or corridor into the region. Although research and empirical evidence support the theory that economic development follows significant transportation and access improvements, the proposed project will not provide any substantial new access. In all likelihood, the recent past, current, and foreseeable population and economic development trends will continue in this rapidly developing part of the greater St. Louis area. This project will assist with accommodating these economic development trends and could foster economic development within the area.

The master plans for the city of Weldon Spring or St. Charles County include goals for future land use, transportation and economic growth. A corridor from Route 40/61 from just north of the Daniel Boone bridge to north of the interchange with I-70 has been designated a "High-Technology Corridor District" to preserve areas for commercial and industrial activities. Establishing a high technology corridor is anticipated to increase the number of jobs while preserving open space, greenways, scenic areas, etc. The proposed project is consistent with these land use plans and would provide better access to the designated high technology corridor. The proposed project in conjunction with upgrading Route 40/61 to interstate standards (I-64) in St. Charles County could promote additional economic development in St. Charles County, which would be consistent with the St. Charles County Master Plan (1996). Should this take place, other higher developments may occur (i.e., housing).

Likewise, the proposed project in conjunction with upgrading Route 40/61 to interstate standards (I-64) in St. Charles County could promote additional economic development in the city of Chesterfield. The master plan for the city of Chesterfield includes goals for future land use and transportation. Future land use for Chesterfield Valley would preserve floodplain areas adjacent to the Missouri River while accommodating commercial/light industrial growth south of the levee. The proposed project was identified in city of Chesterfield master plan as well as the region's 20-year Long-Range Transportation Plan.

Local planning authorities have been involved in the project development and they support the proposed Route 40/61 bridge improvement. The comprehensive plan and any future planning and zoning ordinances are the appropriate mechanisms to guide land use and development, induced or otherwise.

There would be both immediate and long-term potential economic impacts (discussed in greater detail in the section titled "Socioeconomic Impacts") to the area around the study area.

Immediate, positive economic impacts would occur during the time required for property acquisition and design and construction of the roadway. These would be generated by the work and incomes provided by the construction. In addition to the jobs supported by the direct infusion of construction dollars into the local economy, there would be the secondary effect of those dollars in the economy and the increase in tax monies received.

This project could contribute to the cumulative impacts or effects arising from other past, present, and reasonably foreseeable future activities on the natural environment of the area. The extent of this project's contribution to the cumulative impacts, although difficult to determine, is not likely to be significant. For example, despite MoDOT's efforts to control erosion (MoDOT has an approved Pollution Prevention Plan, which describes erosion control practices that will be implemented on all projects), this project will still contribute some sedimentation to the Missouri River during the construction phase. Because existing sedimentation contributions from development, agriculture, etc. in the area have not been quantified, it is difficult to determine the extent of this project's contributions to the overall, cumulative impacts. MoDOT will implement BMPs to minimize off-site transport of sediment. The implementation of these practices should afford adequate protection to sensitive aquatic resources in the Missouri River and minimize this project's contribution to any potentially negative cumulative impacts associated with sedimentation. The use of cofferdams during pier construction will further minimize sedimentation from this project.

Placing new bridge piers in the river could contribute to cumulative negative impacts on the habitat of some species of fish that live in the Missouri River. Wing dikes are rock structures in the Missouri River that were originally constructed around the turn of the century to control the flow of the river and stabilize the channel. Wing dikes were built from just south of Sioux City, Iowa, to the Missouri River's confluence with the Mississippi River. Numerous species of fish use the habitat behind these wing dikes. In an effort to improve this habitat for the fish, the USACE implemented the Missouri River Mitigation Project in 1991. This project included dike notching, which involves breaking the wing dikes and thus changing the velocity and direction of water flowing behind the dike.

Placement of the new bridge piers in the river could damage or destroy at least one of these wing dikes. Because there are hundreds of these structures within the Missouri River, it does not appear that this project's potential removal of one structure would have a significant impact on the availability of habitat they provide. However, water velocities, depth, and other characteristics of the habitat behind these wing dikes vary amongst different dikes, and therefore, at some point, the impacts of destroying even just one additional wing dike could become significant. MoDOT has provided funding for the USFWS to conduct research to determine habitat characteristics behind Missouri River wing dikes. The federally endangered pallid sturgeon was known to use the habitat behind one of the dikes studied. The studies failed to produce any conclusive data on habitat characteristics.

Bridge piers also change the flow of the river and create scouring where water swirls behind the pier; these scour areas are potential habitat for pallid sturgeon. Although scouring would also add suspended solids to the water flowing past the new pier, this would be a temporary impact and should be minimal.

Potential cumulative impacts may be associated with the numerous ongoing and proposed development projects on the floodplain of St. Charles and St. Louis counties. Significant flood control projects in the area include the Howard Bend Levee District's construction of a 500-year levee, the Monarch Chesterfield Levee District's levee upgrade to 500+3 flood protection, the investigation of a 500-year levee on the downstream side of Route 370, and the investigation of

upgrading portions of the North County Consolidated Levee District in St. Charles County. However, the proposed bridge improvement project evaluated herein would be expected to have a minimal contribution to cumulative impacts associated with these flood control projects.

4.22 The Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

The local, short-term impacts of the proposed action and the expenditure of resources it would require are consistent with the maintenance and enhancement of long-term productivity for the local area and the state. The proposed improvement is based on state and local comprehensive planning that considers how best to meet present and future transportation requirements.

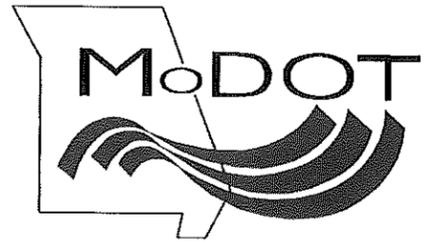
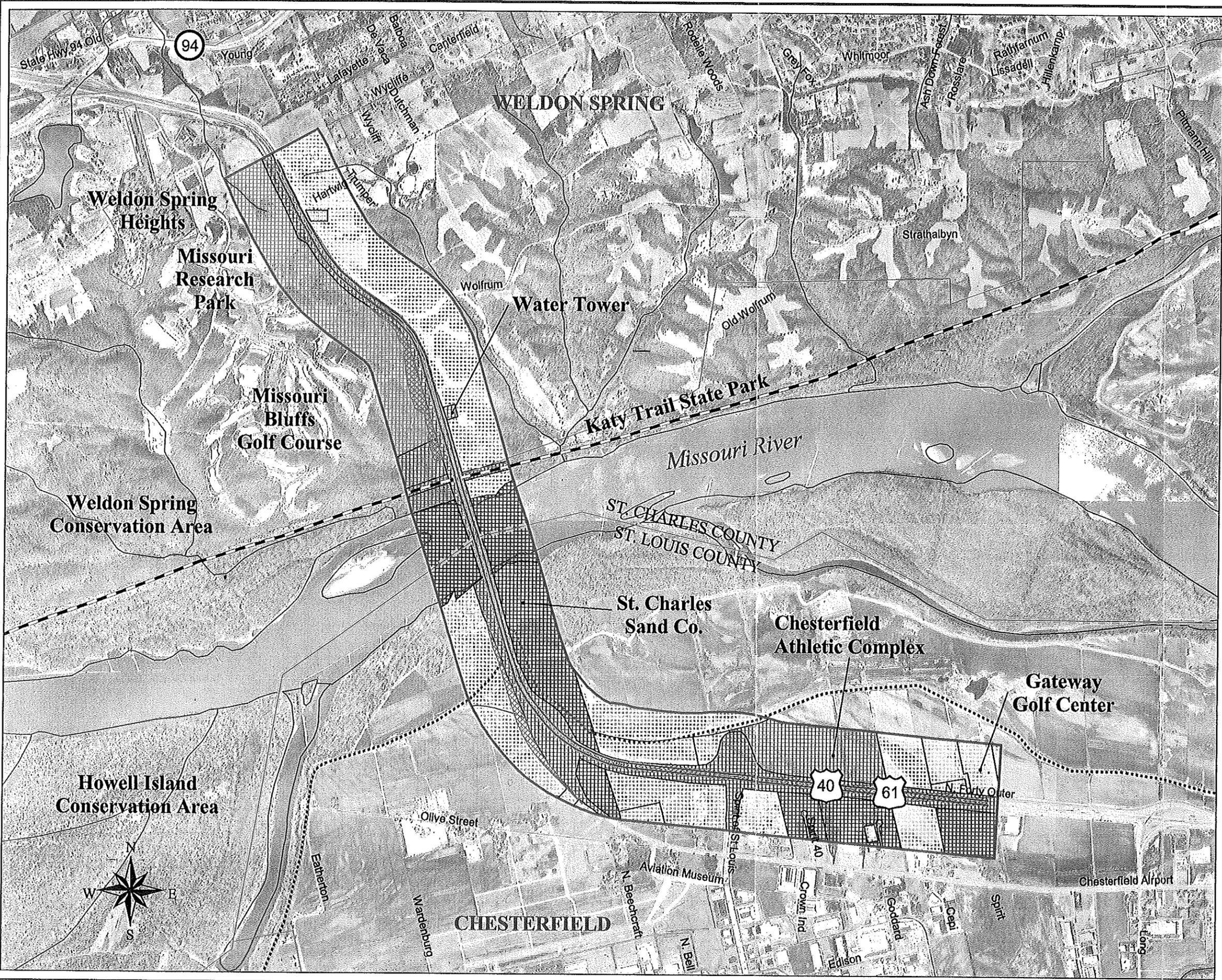
Construction of any build alternative will provide short-term employment for local residents. Suppliers will also benefit as materials are required for construction. The completion of the proposed action will enhance the potential for economic development as transportation facilities and access are improved. Short-term use of the human environment for construction of a highway facility better suited to serve the changing needs of this region and the state as a whole is necessary for the maintenance and enhancement of long-term productivity.

4.23 Any Irreversible or Irretrievable Commitments of Resources Which Would Be Involved in the Proposed Action

The proposed action would require the expenditure of natural, physical, human, and fiscal resources. The commitment of such resources would differ slightly between the different build alternatives. Personnel and fiscal expenditures for the construction of the Route 40/61 improvement are considered an irreversible commitment, as is the land used for the improvement for as long a period as the land is used for a highway.

Considerable amounts of fossil fuels, labor, and highway construction materials such as cement, aggregate, bituminous material, and steel would be expended by construction of the facility. In addition, large amounts of labor and natural resources that are generally not retrievable are used in the fabrication and preparation of construction materials. These items are not currently in short supply, however, and their use will not have an adverse effect upon the continued availability of these resources. Construction of any of the alternatives would also require a substantial and irretrievable expenditure of state and federal funds.

The commitment of these resources for Route 40/61 can be weighed against the benefit to residents of the immediate area and the St. Louis metropolitan area, in general, as well as other travelers in this region of Missouri. The benefits to be gained from improving the quality of the transportation system include increased accessibility and public safety, savings in time, and greater availability of quality services; these benefits are anticipated to outweigh the irretrievable commitment of resources.



**US ROUTE 40/61
(DANIEL BOONE
BRIDGE)**



St. Louis & St. Charles Counties

Legend

- Study Area
- New ROW for the Preferred Alternate A2'
- Municipal Boundary
- State Route 94
- US Route 40/61
- Katy Trail
- Existing Monarch-Chesterfield Levee
- Proposed Monarch-Chesterfield Levee
- County Line
- Stream

Existing Land Use

- Agricultural/Vacant
- Commercial
- Commercial/Light Industrial Mix
- Industrial
- Office
- Open Country
- Public/Semi-Public/Recreational
- Residential
- Urban
- Water

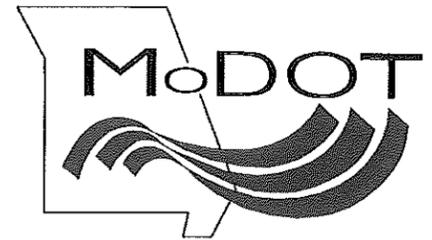
0.3 0 0.3 Miles

1:22000

UTM, NAD 83, Meter

Date: July 8, 2003

**Figure 4-1
Existing Land Use and
Community Facilities**



**US ROUTE 40/61
(DANIEL BOONE
BRIDGE)**



St. Louis & St. Charles Counties

Legend

- Study Area
- New ROW for the Preferred Alternate A2'
- Municipal Boundary
- State Route 94
- US Route 40/61
- Katy Trail
- Existing Monarch-Chesterfield Levee
- Proposed Monarch-Chesterfield Levee
- County Line
- Stream

Future Land Use

- Agriculture/Floodplain/Conservation Area
- Commercial/Light Industrial Mix
- Mixed Commercial Use
- Mixed Use (Retail/Office/Warehouse)
- Office
- Office Park
- Open Country
- Public/Semi-Public/Recreational/Park
- Urban
- Water

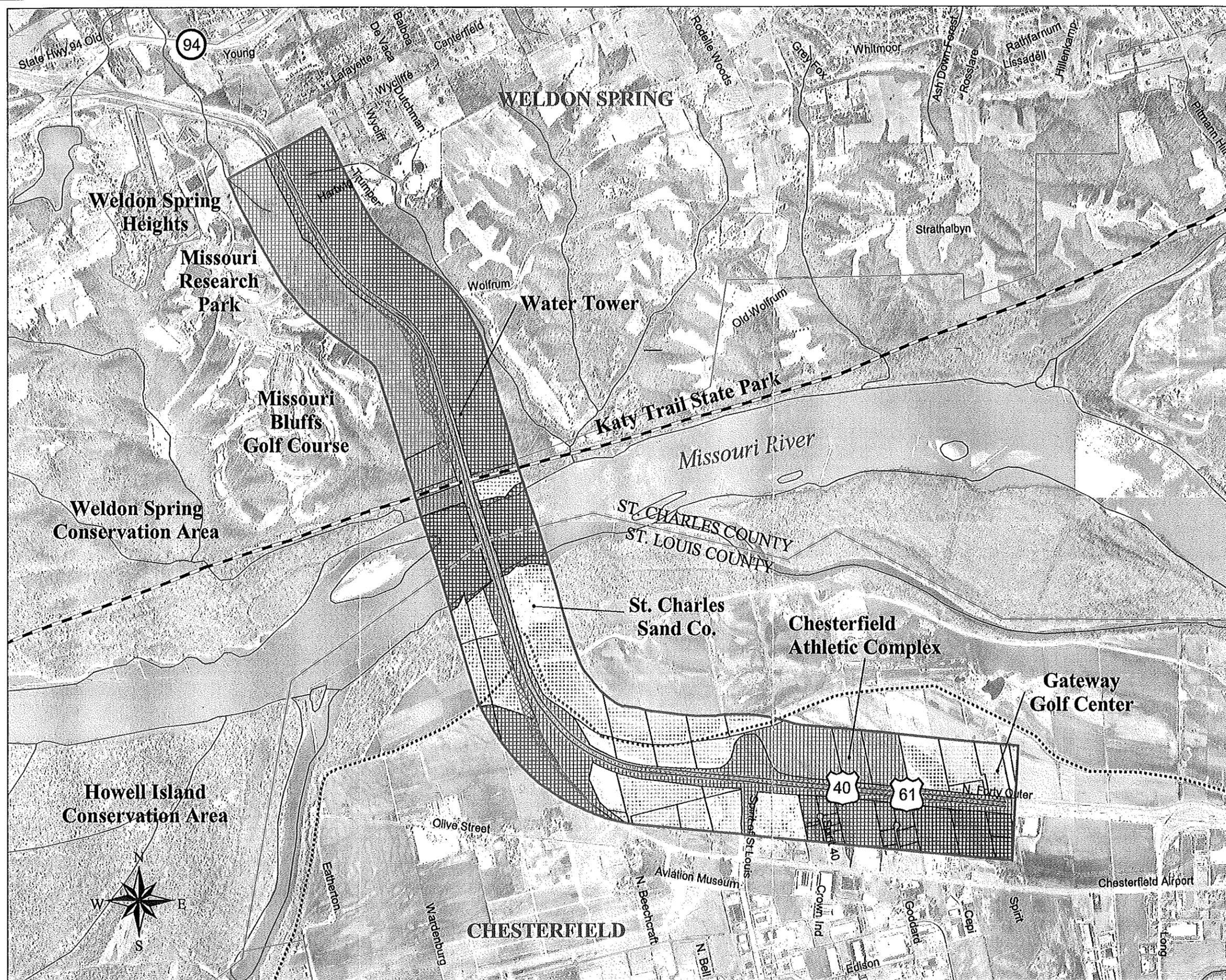
0.3 0 0.3 Miles

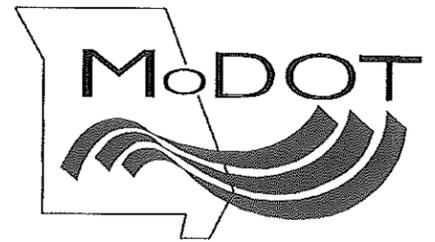
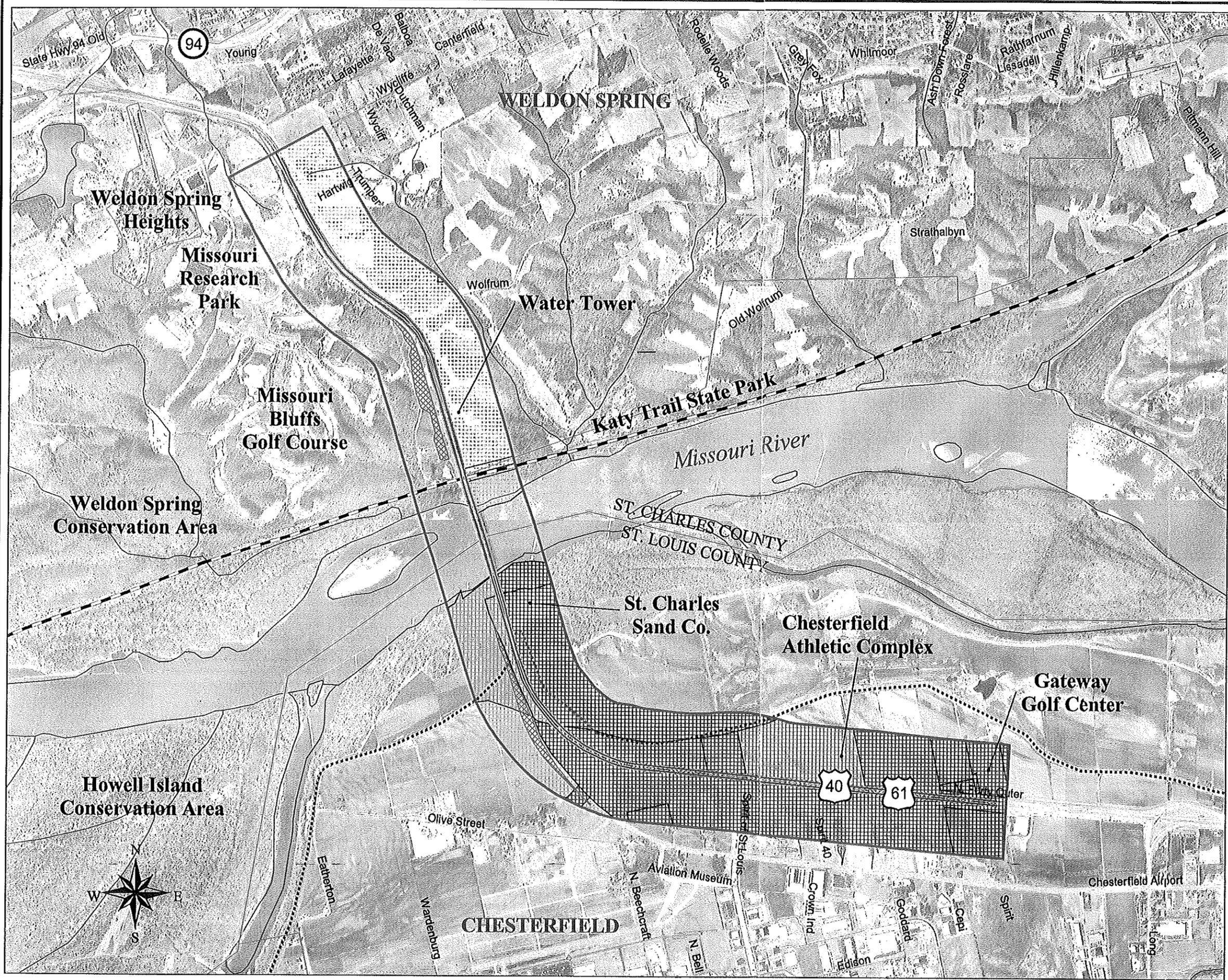
1:22000

UTM, NAD 83, Meter

Date: July 8, 2003

**Figure 4-2
Future Land Use**





**US ROUTE 40/61
(DANIEL BOONE
BRIDGE)**



St. Louis & St. Charles Counties

Legend

- Study Area
- New ROW for the Preferred Alternate A2'
- Municipal Boundary
- State Route 94
- US Route 40/61
- Katy Trail
- Existing Monarch-Chesterfield Levee
- Proposed Monarch-Chesterfield Levee
- County Line
- Stream

Existing Zoning

- Agricultural
- Agricultural/Floodplain
- Floodplain Non-Urban District
- Floodplain Industrial District
- High Tech Office
- Non-Urban District
- Park and Scenic
- Commercial/Commercial District
- Industrial District

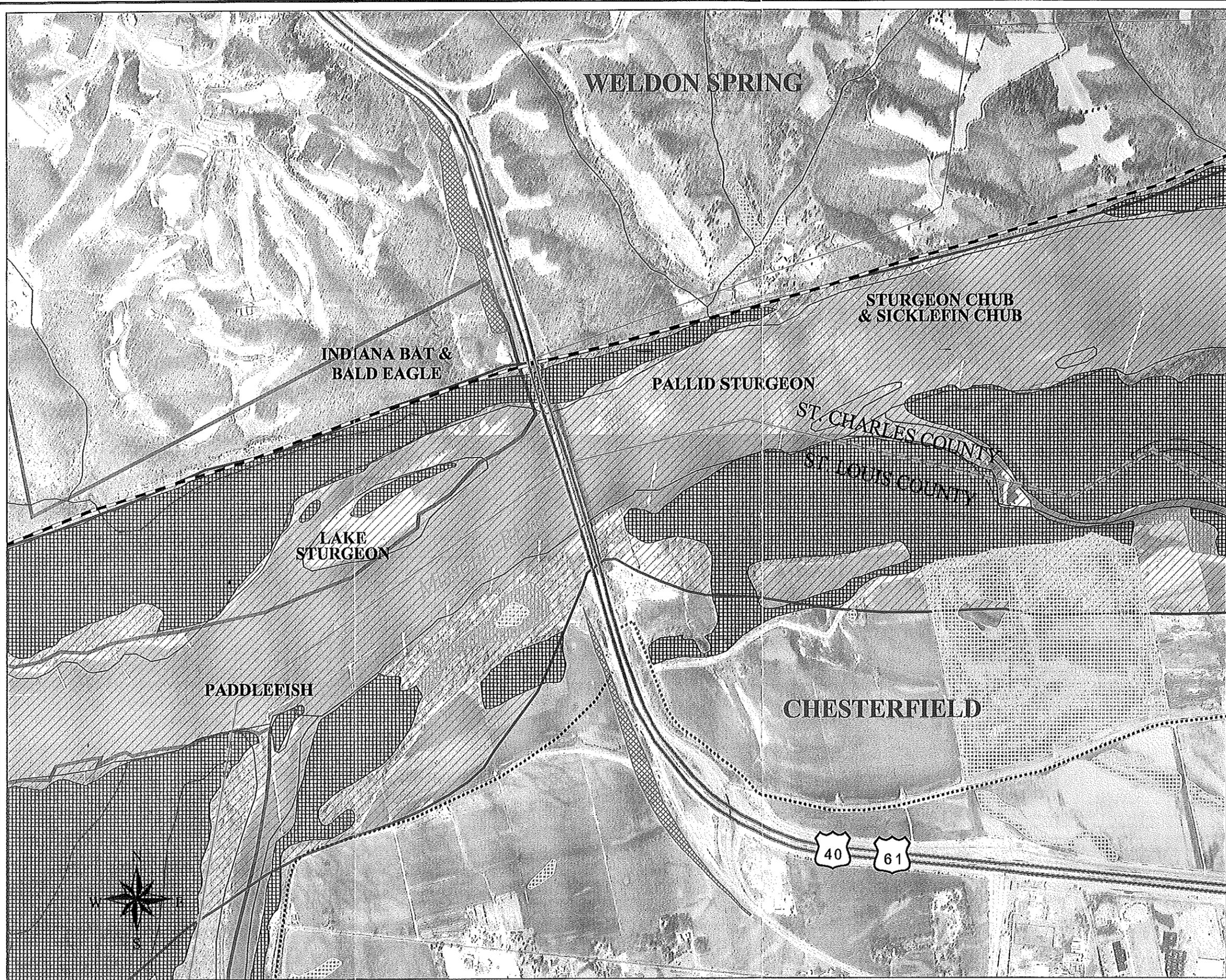


1:22000

UTM, NAD 83, Meter

Date: July 8, 2003

**Figure 4-3
Existing Zoning**



**US ROUTE 40/61
(DANIEL BOONE
BRIDGE)**



St. Louis & St. Charles Counties

Legend

- New ROW for the Preferred Alternate A2'
- Municipal Boundary
- State Route 94
- US Route 40/61
- Katy Trail
- Existing Monarch-Chesterfield Levee
- Proposed Monarch-Chesterfield Levee
- County Line
- Stream

Environmental Issues

- MDC Ownership
- Floodway
- NWI Wetlands**
- PBM
- PSS
- PFO

0.1 0 0.1 0.2 Miles

1:13000

UTM, NAD 83, Meter

Date: April 1, 2003

**Figure 4-4
Wetland, Floodplain
and Floodway Impacts**

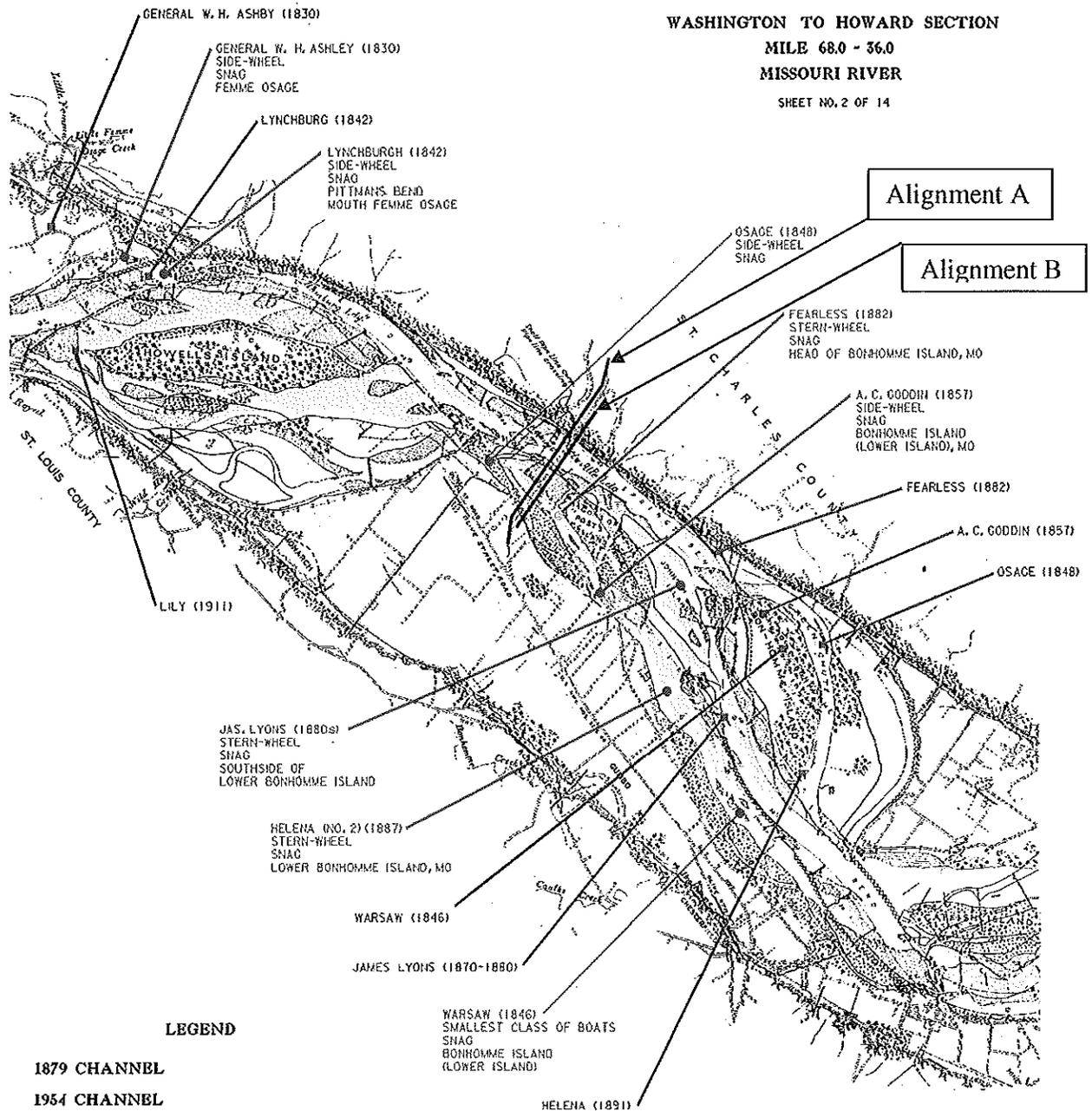
ABANDONED SHIPWRECKS ON MISSOURI RIVER CHANNEL MAPS OF 1879 AND 1954

WASHINGTON TO HOWARD SECTION

MILE 68.0 - 36.0

MISSOURI RIVER

SHEET NO. 2 OF 14



LEGEND

1879 CHANNEL

1954 CHANNEL

STEAMBOAT WRECKS

CAPT. H. M. CHITTENDEN, CORPS OF ENGINEERS
HISTORICAL INFORMATION FROM THE
ANNUAL REPORT OF THE CHIEF OF ENGINEERS,
U.S. ARMY, 1897, APPENDIX W.W.
MISSOURI RIVER COMMISSION MAP
REPORT DATED JUNE 30, 1897

STEAMBOAT WRECKS

DR. E. B. TRAIL, COLLECTION, 1858-1965
WESTERN HISTORICAL MANUSCRIPT COLLECTION,
COLUMBIA, MO

THE APPROXIMATE LOCATIONS OF SHIPWRECKS ON THIS MAP ARE TAKEN FROM SMALL-SCALE MAPS COMPILED BY CAPTAIN H. M. CHITTENDEN IN 1897, AND DR. E. B. TRAIL, PRIOR TO 1962. BOTH RESEARCHERS USED PUBLICATIONS TO COMPARE AND MAP PROJECTED WRECK LOCALITIES. CHITTENDEN ALSO OBTAINED SOME WRITTEN INFORMATION FROM MISSOURI RIVER PILOTS WHO HAD HISTORICAL KNOWLEDGE OF THE RIVER. CHITTENDEN'S MAPPED LOCATIONS OCCASIONALLY DIFFERED FROM THE HISTORICAL INFORMATION IN THE 1897 ANNUAL REPORT OF THE CHIEF OF ENGINEERS, CITED ABOVE.

THE MISSOURI RIVER CHANNEL HAS CHANGED COURSE NUMEROUS TIMES OVER THE LAST TWO CENTURIES AND THE RIVER CONTINUES TO BE DYNAMIC. THE U.S. ARMY CORPS OF ENGINEERS, KANSAS CITY DISTRICT, PREPARED THESE MAPS USING ITS MOST RECENT 19TH AND 20TH CENTURY RIVER CHANNEL COMPARISON MAPS AS A BASE TO SHOW THE HISTORIC PROGRESS OF CAPTAIN H. M. CHITTENDEN AND DR. E. B. TRAIL.

Figure 4-5
Abandoned Shipwrecks on
Missouri River Channel
Maps of 1878 and 1954

5.0 Coordination

5.1 Public Involvement

The location of the study area, a heavily traveled suburban highway, presented a unique situation with regard to public involvement. Engaging the public in the study area and soliciting their input was a key component of the location study process for the Route 40/61 project over the Missouri River. A Public Involvement Plan was prepared for the study that outlined the proposed methods of communication and use of outreach tools. A variety of methods and techniques were used to solicit input from and inform the public of the project including public meetings, small group meetings, presentations to local officials, informational handouts, comment forms, utilization of MoDOT's website, and reports in the local media. These tools were designed to engage and involve the public early and frequently in the project's decision-making process.

The Public Involvement Plan was formulated to meet the needs of citizens of St. Charles and St. Louis counties and other potentially affected interests in the corridor by tailoring outreach methods, meeting styles and locations, and frequency of interaction.

5.1.1 Summary of Public Concerns

As a result of public outreach efforts, a number of universal issues were identified by the public to be of concern:

- Traffic volume and congestion. There was a general sentiment that recent commercial and residential growth in St. Charles County is responsible for the current traffic situation.
- Safety of the traveling motorist. It was noted that commuters and other drivers faced stressful conditions on the bridges, especially during periods of peak travel and heavy congestion.
- Environmental impacts. Effects on the Chesterfield Valley and state-owned land at Weldon Spring were mentioned as areas of potential impact that should be investigated.
- Condition of existing bridge structures. Many citizens were in agreement that the current westbound bridge was capable of fulfilling a role in the corridor well into the future.
- Mass transit and bike/pedestrian improvements. The point was raised that resources should be devoted to developing mass transit infrastructure and a pedestrian/bike pathway.
- Costs associated with construction.
- General agreement that improvements to the existing river crossing are necessary.

5.1.2 Public Outreach

An integral component of public communication in this study included outreach to the public throughout the duration of the project. To facilitate the information-sharing and decision-making process between the study team and the public, a public meeting and several study updates in the form of small group meetings were held. The meetings offered public officials, residents, and other potentially affected interests an opportunity to discuss components of the study with the study team and to have their voices heard.

Public Meeting

A public meeting was held on June 26, 2002 from 6:00 to 8:00 pm at the Busch Wildlife Center in Weldon Spring, Missouri. Forty-nine people attended. The purpose of this meeting was to introduce the study to the public and provide an opportunity for citizens to examine and comment on the bridge crossing alternatives under consideration, traffic data, and condition of the existing bridge structures.

The meeting was announced to the public through a press release issued to local media outlets. Newspaper articles were printed prior to and following the meeting, and a local television station televised a report following the meeting. In addition, letters of invitation were sent to area legislators, county and municipal officials, and other potentially affected interests in the study area.

The meeting was held in an open-house format. No formal presentations were made. Meeting participants were asked to sign an attendance sheet and were given a handout which outlined the study's Purpose and Need, alternatives under consideration, and project milestones. The handout also included a not-to-scale diagram of the five river crossing options being evaluated. Comment forms, which could be filled out at the meeting or mailed back to the study team, were provided to attendees to register their opinions or concerns.

Individuals were free to examine a variety of exhibit stations that represented key components of the study, and study team members from MoDOT and the consultant were on hand to provide information, answer questions, and address concerns. Exhibits available for inspection included the following:

- Purpose and Need;
- Study timeline;
- Alternatives;
- River crossing diagrams;
- Environmental constraints;
- Existing bridges; and
- Traffic projections.

A MoDOT representative from the Gateway Guide program was also in attendance to answer questions and provide information about the intelligent transportation system (ITS) in the St. Louis area.

A project mailing list was developed from the attendance sheets in order to provide the public with future project updates and information.

Twenty-five comment forms were returned. The following illustrates a breakdown of those expressing a preference for the alternatives presented.

Alternative 1	0
Alternative 2	4
Alternative 3	1
Alternative 4	3
Alternative 5	8
Multiple preference: Alternatives 4 and 5	1

Written comments included the following:

- Many individuals were in agreement that congestion and safety were concerns.
- People preferring Alternatives 2, 4, or 5 (which would leave the 1935 structure in place) acknowledged the viability of the westbound bridge and its continued role in the corridor.
- The economics involved in the rehabilitation (or replacement) of the 1935 bridge were addressed.
- Several respondents recommended that provisions for mass transit and bicycle/pedestrian travel should be investigated and implemented.

Small Group Meetings

Small group meetings were an important component to the project's overall public outreach efforts, and served to facilitate an exchange of information, ideas, and dialogue between the study team and interested groups from the region. The study team met several times with these groups as follows:

At the onset of the project, meetings were held to discuss the goals of the study, schedule, Public Involvement Plan, and to introduce the study team members. Issues that were discussed included the existing traffic model, condition of the existing bridges, and other potential stakeholders.

St. Charles County Officials	October 30, 2001
Chesterfield City Officials	October 30, 2001
EWGCC	November 21, 2001

Prior to the public meeting, updates were given to the following groups to brief them on the progress of the study, present the five alternatives developed for evaluation, and gather feedback. Issues discussed included current and projected traffic volumes, funding and cost of construction, and condition of the existing structures.

EWGCC	April 17, 2002
St. Charles County officials	May 14, 2002
Chesterfield City Officials	June 19, 2002

On June 20, 2002 (one week before the public meeting), the study team made a presentation to St. Charles County media representatives at the St. Charles County Executive's office. Reporters from the St. Louis Post-Dispatch, St. Charles Journal, and St. Charles Business Record were in attendance. A project overview and St. Charles County's role in the study were presented, and the reporters asked the study team a variety of questions. Subsequent newspaper articles were printed.

Prior to the issuance of the Preliminary Draft EIS, the study team met once again with the small groups to provide an update of the project status. Issues discussed included the evaluation of the final study alternatives, the Preferred Alternative, traffic flow, and costs.

St. Charles County Officials	December 20, 2002
Chesterfield City Officials	January 30, 2003
St. Louis County Officials	January 30, 2003
EWGCC	January 31, 2003

Public Hearing

A public hearing was held Thursday, September 4, 2003 from 4:00 to 7:00 p.m. at the August A. Busch Memorial Conservation Area in Weldon Spring. Seventy-four people attended the hearing. The purpose of the hearing was to present the study's Preferred Alternative (A2') and the Draft EIS for public review and comment.

The hearing was announced to the public through a press release issued to local media outlets. At MoDOT's request, on August 7, 2003 Steve Coates of MACTEC was interviewed by reporters from the St. Louis Post-Dispatch and KWMU radio; subsequent news reports provided details about the upcoming hearing and the study in general. In addition, letters of invitation were sent to area legislators, local elected officials, county and municipal representatives, and other potentially affected interests.

On September 3, 2003, the study team attended a press briefing hosted by St. Charles County Executive Joe Ortwerth. Media representatives included reporters from the St. Louis Post-Dispatch and St. Charles Journal newspapers.

The public hearing was held in an open-house format. No formal presentations were made. After signing in, meeting attendees were given an information packet that included the following:

- Overview handout, which provided general information about the study and featured a diagram of the Preferred Alternative (A2');
- A handout of Frequently Asked Questions;
- Schematic diagram of all study alternatives; and
- Comment form.

Other information and displays available for public inspection included: the project purpose and need; status of existing bridges; right of way, land use, and natural/cultural resource information; and diagrams of the other roadway alternatives that were developed and evaluated in the study.

Meeting attendees were encouraged to provide their feedback and input on the comment form, which could be left at the meeting or returned by mail. A court reporter was available to take oral comments. Study team members from MoDOT, MACTEC Engineering and Consulting, Inc., and Crawford, Bunte, Brammeier were in attendance to provide information, answer questions, and address concerns. Reporters from the St. Louis Post-Dispatch, St. Charles Journal, KSDK-TV, and KMOX radio attended the hearing.

Sixteen comment forms were received at the hearing. Twelve comment forms were received in the mail (two from the same person), as were four individual letters of correspondence. Comments were submitted by area residents, business owners, and chamber of commerce, development agency, and St. Charles County representatives. Elected officials submitting comments included St. Charles County Executive Joe Ortwerth; Missouri State Senator Chuck Gross; and U.S. Congressman Todd Akin. One attendee submitted an oral comment.

Comments expressed overwhelmingly support for the study, the Preferred Alternative, and the DEIS; the general sentiment was that a new bridge crossing is necessary and overdue. Respondents cited the tremendous residential and commercial growth in St. Charles and St. Louis counties, and consistently heavy traffic volumes as reasons why an additional bridge crossing is needed. Safety, particularly on the existing westbound bridge, was also a concern. Many respondents felt that the Preferred Alternative and associated improvements will provide significant regional benefits; not improving the river crossing would as a result be detrimental to St. Charles and St. Louis counties and the entire St. Louis region.

One individual expressed opposition to the proposed improvements. This respondent felt that existing roadway facilities and bridges (including the Page Avenue Extension) are sufficient to handle future traffic needs, a new crossing on Route 40 will induce additional traffic volume, and the estimated cost of the improvements should be spent on maintenance and repair.

Other general comments included:

- Access for pedestrian/bicycle traffic should be provided;
- Westbound merge from Chesterfield Airport Road should be as long as possible;
- Westbound merge from Chesterfield Airport Road should have two lanes; and
- Construction staging and existing bridge rehabilitation should be carefully phased and coordinated.

5.1.3 Other Public Outreach

A toll-free number, 1-888-ASK-MODOT (1-888-275-6636), was available throughout the study for public questions and comments. Information pertinent to the study and diagrams of the bridge crossing alternatives were posted on MoDOT's website for examination and download by the public, and interested citizens could register their comments electronically submit comments through the email link on the website. Telephone numbers of MoDOT study team members were printed on handouts, informational literature, and the project website. MoDOT project members provided study information to the media throughout the duration of the project, which resulted in subsequent news reports.

5.2 Agency Coordination (Prior to the Draft EIS)

As part of MoDOT's early coordination process, letters requesting comments on the project were sent to the USACE, USCG, USEPA, FTA, USFWS, NPS, MDC, MDNR, and SEMA (see example letter dated December 4, 2001 in Appendix C). The agencies were also invited to attend an initial agency coordination meeting on the project.

The agency scoping meeting was held on January 9, 2002, at the Robert Young Federal Building in St. Louis. The meeting was used to introduce the proposed U.S. Route 40/61 bridge improvement project to participating regulatory and resource agencies and to hear agency concerns and gather information for the location study. The USACE, USCG, MDC, MDNR, MoDOT, and FHWA attended the meeting. Agency comments or issues that were discussed at the meeting were:

- The USCG prefers a design in which there are no piers in the river. Additionally, the USCG would like to supply MoDOT an example write-up of how they have handled navigation issues between the bridge abutments.
- The FAA should be included in the planning process due to the close proximity of Spirit Airport to the project study area.
- MDC prefers a downstream location for the new bridge.

In Sections 5.2 and 5.3, all correspondence with a date reference is included in Appendix C.

5.2.1 Federal Transit Administration

The FTA did not attend the agency coordination meeting but responded to the request for comments with a letter of January 2, 2002. The letter commended efforts to include the MPO and transit agencies in the early coordination process. In a letter dated March 10, 2003, the FTA determined that all projects in the St. Louis Region's 2025 Transportation Plan, Legacy 2025, as developed by the EWGCC, conform with the requirements of the CAAA and the relevant

sections of the Final Conformity Rule 40 CFR Part 93. The Route 40/61 bridge over the Missouri River is part of the Legacy 2025 Plan.

5.2.2 U.S. Fish and Wildlife Service

The USFWS did not attend the agency coordination meeting but provided comments on the project in a letter of March 12, 2002. The letter indicated that three federally listed threatened or endangered species (the bald eagle, Indiana bat, and the pallid sturgeon) could occur in the project area. The USFWS stated that bridge design should incorporate appropriate environmental features and avoid contributing to flooding problems in this portion of the Missouri River floodplain. The USFWS also voiced concern about cumulative impacts of numerous development projects on the floodplain of St. Charles and St. Louis counties, citing the Howard Bend Levee District's construction of a 500-year levee, the Monarch Chesterfield Levee District's levee upgrade to 500+3 flood protection, the investigation of a 500-year levee on the downstream side of Route 370, and the investigation of upgrading portions of the North County Consolidated Levee District in St. Charles County, and recommended that FHWA and MoDOT thoroughly evaluate the cumulative impacts of these flood control projects.

5.2.3 Missouri Department of Conservation

The MDC attended the agency scoping meeting and also offered comments in a letter of July 12, 2002. After attending the project public information meeting held on June 26, 2002, MDC staff members reviewed and discussed plans and issues from the meeting with other MDC personnel. The MDC stated a preference for Alternatives 4 and 5, citing that their location downstream from Weldon Spring CA would avoid direct impact to that property. These alternatives also retain the existing bridge, avoiding potential disturbance to the river that could result from demolition of the bridge.

5.2.4 U.S. Coast Guard

Several faxes and emails were sent to Mr. Roger Wiebusch of the USCG from March 2002 to November 2002 to keep the USCG aware of the project and to obtain navigation information. No face-to-face meetings were conducted with the USCG other than the agency scoping meeting on January 9, 2002. The USCG agreed to act as a cooperating agency in a letter dated March 18, 2002. The USCG completed their review of and approved the Draft EIS in a letter dated May 2, 2003.

5.2.5 U.S. Army Corps of Engineers

In a letter dated March 20, 2003, the USACE agreed to participate as a cooperating agency on the project. In a follow up letter on July 1, 2003, the USACE provided their comments on the review of the Draft EIS. The primary comment was that the document should reference Section 10 of the Rivers and Harbors Act of 1899. This was addressed in the Draft EIS.

5.2.6 Municipal and Public Coordination

A letter dated December 30, 2002, was received from Joe Ortwerth, St. Charles County Executive. Mr. Ortwerth expressed thanks for a recent project briefing and appreciation to MoDOT and the project team for advancing the study effort. He requested continued communication with St. Charles County on scheduling a public hearing in the spring, and requested to be advised on the progress of the EIS and securing a Record of Decision (ROD).

A letter dated February 7, 2003 was received from Mayor John Nations, city of Chesterfield. Mayor Nations expressed thanks for the project briefing held on January 30, 2003. The Mayor

emphasized in his letter the appeal of using the westbound bridge as a possible bicycle trail connection between planned bike trails in Chesterfield and the Katy Trail. He requested to be notified of the scheduling of the public hearing and the completion of the EIS.

5.3 Agency Coordination (After the Draft EIS and Prior to the Final EIS)

5.3.1 Native American Tribal Consultation

On November 17, 2003, copies of the Draft EIS were sent to the following Indian Tribes:

- Choctaw Nation of Oklahoma;
- Iowa Tribe of Kansas and Nebraska;
- Iowa Tribe of Oklahoma;
- Kaw Nation of Oklahoma;
- Osage Tribe of Oklahoma;
- Peoria Tribe of Indians of Oklahoma;
- Quapaw Tribe of Indians of Oklahoma;
- Sac and Fox Nation of Oklahoma;
- Sac and Fox Nation of Missouri in Kansas and Nebraska;
- Sac and Fox Tribe of the Mississippi in Iowa; and
- United Band of Cherokee Indians in Oklahoma.

These tribes have historic connections to the area or may attach traditional religious or cultural significance to archaeological sites in the project area. Along with the Draft EIS, these Indian Tribes were also provided with a summary description of the known archaeological resources in the study area.

The Peoria Tribe of Indians of Oklahoma submitted a December 5, 2003, letter of response stating that they are unaware of any religious sites in the study area and had no objections to the proposed construction. The Peoria commented that if any skeletal remains or objects falling under the Native American Graves Protection and Repatriation Act (NAGPRA) are uncovered during construction, the work should stop immediately and appropriate state and tribal representatives should be contacted.

5.3.2 U.S. Army Corps of Engineers

The USACE submitted a letter dated September 25, 2003, requesting a change in the USACE's address as listed in the Draft EIS; the change has been made. The USACE had no further comments on the Draft EIS.

5.3.3 U.S. Department of the Interior

The DOI offered comments on the Draft EIS in a September 26, 2003, letter. The DOI letter indicated a tendency to agree with the FHWA and MoDOT that impacts to Weldon Spring CA would not constitute a use as defined under Section 4(f) but reserved a determination until the agency reviews results of consultation with MDC. The DOI agreed with FHWA that temporary disturbance to the recreational use of the Katy Trail State Park during project construction is not a 4(f) use of the trail. The agency also indicated general support for the location of the preferred alternate.

The Draft EIS noted a need for future consultation with the MDC regarding the Dingell-Johnson monies expended within the Weldon Spring CA. As indicated later in this section, the MDC commented on the Draft EIS, noting that Dingell-Johnson funds were used to purchase a river

access site that is not located near the project location and should not be impacted by the project. MDC also stated that the preferred alternative is acceptable and that the agency understands discussions on mitigating this impact will occur later.

DOI expressed concern about the cumulative impacts of numerous development projects on the Missouri River floodplain in St. Charles and St. Louis counties. The agency also stated that the Final EIS should provide a more thorough evaluation of the project's contribution to induced development in the floodplain and the secondary and cumulative impacts to fish and wildlife resources from such development. As discussed in Section 4.21, the project area is protected by a 500-year levee and similar protection is under construction or proposed downstream. Thus, the natural and beneficial values normally provided by floodplains have already been lost to this area and the proposed bridge improvement project evaluated herein is expected to contribute minimally to cumulative floodplain development impacts in the project area.

Other entities (e.g., USACE, city of Chesterfield, city of Maryland Heights, Spirit Airport) have conducted various studies of the induced development in the floodplain and its impact on area resources such as wetlands, fish and wildlife, etc. This project, which will provide a river crossing commensurate with the mainline, is expected to contribute minimally if at all to further induced development in the area.

The DOI commented on the incompleteness of the effects analysis on the bald eagle, Indiana bat, and pallid sturgeon, recommending completion of a biological assessment for the listed species. Section 4.14 has been revised to address DOI's comments regarding endangered species.

5.3.4 U.S. Environmental Protection Agency

The USEPA provided comments on the Draft EIS in a letter of September 23, 2003. The USEPA rated the Draft EIS as EC-2 (Environmental Concerns-Insufficient Information) and indicated that the agency's concerns are based on the expected design year LOS D. USEPA stated concern that an additional re-upgrade of the river crossing would be required that would create secondary disturbance with accompanying environmental impacts. The letter also indicated that the Draft EIS presents insufficient information regarding the bridge approaches and roadway modifications needed to connect the existing roadway to the new bridge configuration and the extent of floodplain impacts. The detailed comments requested including a discussion of the extent of roadway modification and ensuing effect on PEM wetlands shown in Figure 3-1 near the eastern project terminus. An attachment to the letter contained several additional comments generally requesting clarification on discussions of several topics, including hazardous waste sites, farmland protection, wetlands, air quality, and threatened or endangered species.

Section 3.0 has been modified in response to the recommendation for further information on four potential hazardous waste sites depicted in Figure 3-1.

Section 4.3.8 (Environmental Justice) has been moved to Section 4.5 to provide more clarity to the reader. Section 4.3.9 (Community Cohesion) has been renumbered Sections 4.3.8.

Section 4.6.2 has been updated with a concluding paragraph discussing the issue of level of service. This project is in an urban/suburban area and in the design year during peak periods, the level of service on the facility is expected to be an LOS D. This is considered acceptable in an urban/suburban environment as it reflects the realities of highly populated areas and the infeasibility of over-building the infrastructure system to achieve a better LOS.

Section 4.12 has been modified in response to the comment on insufficient information regarding the extent of floodplain impacts. The comment also questioned whether the floodplain impacts include wetland impacts. It is assumed that the preferred alternative, Alternative A2', will be approved. Any unanticipated permanent wetland impacts would most likely occur on the river side of the levee and, therefore, could only be associated with the new pier placements. Such impacts, if any, would be extremely minimal and would be quantified when the exact alignment is staked. Any such impacts would be mitigated in the manner prescribed by the associated Section 404 Clean Water Act Permit.

Section 4.12.1 has been updated with two new paragraphs at the end of the section to further address impacts to floodplain and the relationship of the project with the Monarch-Chesterfield levee.

Section 4.14.2 has been modified to address the question regarding trees used by bald eagles.

5.3.5 Missouri Legislature

A letter dated September 23, 2003, was received from Senators Jon Dolan and Chuck Gross, and Representatives Sherman Parker, Scott T. Rupp, Joe Smith, Thomas S. Green, Carl Bearden, Vicki Schneider, Tom Dempsey, Cynthia Davis, and Kevin Threlkeld. The signatory legislators expressed staunch support for upgrading the major highway and bridge system in and around St. Charles County. The letter requested the FHWA to approve the EIS and ROD at the earliest possible date, indicating that priority consideration must be given to the bridge crossing to address safety and congestion and accommodate the explosive growth on Route 40.

5.3.6 Missouri Department of Conservation

The MDC offered comments on the Draft EIS in a letter of October 17, 2003. The MDC letter iterated the preference for Alternatives B4 and B5 that was previously expressed in July 2002, during preliminary project planning. Although the preferred alternative, A2', will impact about 1.6 ac (0.6 ha) of the MDC's Weldon Spring CA, the agency indicated that this alternative is acceptable and that it is understood discussions on compensating the MDC for this impact will occur later. The Draft EIS indicated a need for future consultation with the MDC regarding Dingell-Johnson monies expended in the Weldon Spring CA. MDC's letter noted that Dingell-Johnson funds were used to purchase a river access site that is not located near the project location and should not be impacted by the project.

5.3.7 Missouri Department of Natural Resources

The MDNR commented on the Draft EIS in a September 25, 2003, letter, stating support for retaining the existing westbound bridge. MDNR's Division of State Parks commended MoDOT for considering a bicycle/pedestrian lane on the westbound bridge and for continued coordination with stakeholders regarding the incorporation of existing and proposed bicycle/pedestrian trails and corridors. The Division indicated concern about inconvenience to Katy Trail users during temporary closure of the trail and potential physical impacts to trail users during construction and further noted that it is vital the trail be kept open during the Lewis and Clark Bicentennial Commemoration. An additional comment confirmed that the project does not impact LWCF-funded lands.

Anticipated impacts to the Katy Trail resulting from construction of this project will be cooperatively addressed through a two-party agreement between MoDOT and MDNR. The

agreement will address impacts such as trail closure, user inconvenience, and user safety within project construction limits. Impacts to the trail from other transportation projects have been successfully mitigated or lessened by implementing provisions contained in similar agreements between the agencies. The Katy Trail will not incur trail closures or other construction impacts from this project during the Lewis and Clark Bicentennial Celebration, since further project development and commencement of construction activities will not occur within that timeframe.

MDNR's letter mentioned the potential for karst features in the project area and stated that this issue should be addressed. Section 3.0 indicates that portions of the project area lie within the Missouri River Section of the Ozark Border Natural Division and caves and sinkholes are features of this section. Section 4.9 has been revised to address this topic further.

MDNR suggested MoDOT and FHWA may consider giving additional thought to future rapid transit needs and potential flooding of the eastern approach to the bridge. Considering future rapid transit needs between St. Louis and St. Charles counties is outside the scope of this EIS.

Two additional paragraphs have been added to Section 4.12.1 that pertains to the Missouri River floodplain. Basically, it would not be feasible to reconstruct the eastern approach of the Route 40/61 Bridge as it would result in the complete reconstruction of Route 40/61 through Chesterfield Valley.

5.3.8 State of Missouri Emergency Management Agency

The SEMA submitted comments on the Draft EIS in a September 9, 2003, letter. The letter indicated the need to comply with Missouri Executive Order 98-03 by acquiring a floodplain development permit from SEMA before construction. SEMA also pointed out that development within a regulatory floodway requires a "no-rise" certificate/statement before the development can be permitted.

5.3.9 Municipal and Public Coordination

The mayor of the city of O'Fallon sent an October 22, 2003 letter supporting approval of the EIS and ROD for the project. He cited the documented need for a new bridge and discussed job growth in the St. Charles portion of the Route 40/61 corridor and the importance of a safe river crossing to accommodate local commuters.

A letter dated September 30, 2003, was received from the St. Charles Chamber of Commerce. The letter expressed a crucial need for this project and urged FHWA approval of the EIS and ROD for a new U.S. Route 40/61 bridge over the Missouri River.

The O'Fallon Chamber of Commerce provided comments in a September 19, 2003, letter. The letter cited explosive increases in population and traffic in St. Charles County and the city of O'Fallon. The Chamber stated the need for additional bridge lanes to accommodate increased traffic and provide safer conditions for area commuters and the traveling public. The Chamber's Board of Directors urged FHWA to expedite approval of the EIS and issue a favorable ROD for the project.

A letter of September 17, 2003, from the St. Peters Chamber of Commerce cited support for Route 40/61 corridor improvements, including a new river crossing. The letter points out the importance of adequate transportation for economic development activities and states that this project is vital to St. Charles County's continued growth. The letter urged the FHWA to grant expedited approval of the EIS and encouraged issuance of a favorable ROD.

Joe Ortwerth, St. Charles County Executive, submitted a letter dated September 9, 2003. Mr. Ortwerth cited his long-time advocacy for a new river crossing along the Route 40/61 corridor and noted both the need and benefits of the project. He urged the FHWA to grant expedited approval of the EIS and encouraged issuance of a favorable ROD.

The Chesterfield Community Development Corporation provided comments in a letter dated September 22, 2003. The letter expressed their support of the project and the rapid growth occurring in St. Charles County. They also cite Chesterfield Commons as one of the nations largest retail power centers.

On September 29, 2003, the Missouri Research Park provided a letter of support for the project citing increasing traffic volumes.

The Chesterfield Chamber of Commerce sent a letter dated November 10, 2003 citing support for the Preferred Alternative. They also stated their excitement of a possible bicycle/pedestrian connection from Chesterfield to the Katy Trail.

6.0 List of Preparers

Name	Qualifications	Primary Responsibilities
Federal Highway Administration Reviewers/Preparers		
Peggy Casey	BS Civil Engineering; 28 years of professional experience with FHWA.	Environmental Coordinator Engineer
Don Neumann	BS Civil Engineering, 33 years experience with FHWA	Programs Engineer
Missouri Department of Transportation		
Matt Burcham	BS Agriculture; 10 years of professional experience with MoDOT, Central Office	Senior Environmental Specialist
Randall Dawdy	MA History, BA Anthropology; 20 years professional experience with MoDOT, Central Office	Historic Bridge Coordinator
Bill Graham	BS Environmental Science; 25 years experience with MoDOT, Central Office	Senior Environmental Specialist (Public Lands)
Carole Hopkins	MS Agricultural Chemistry, BS Chemistry; 9 years experience with MoDOT, Central Office	Senior Environmental Specialist
Macey Jett	MBA Management, BS Business and Economics; 19 years experience with MoDOT, Central Office	Senior Environmental Specialist (Air Quality and Noise)
Mark Kross	MA Social Sciences, BA Interdisciplinary Archaeology; 25 years of professional experience with MoDOT, Central Office	Environmental Process and Policy Assistant
Alan Leary	MS Biology, BS Wildlife Management; 2 years experience with MoDOT, Central Office	Intermediate Environmental Specialist (Sensitive Species and Wildlife)
Jeff Leftwich	BS Civil Engineering; 17 years experience with MoDOT, Central Office	Liaison Engineer
Lance Livesay	BS Wildlife Conservation and Management; 3 years experience with MoDOT, Central Office	Intermediate Environmental Specialist (Hazardous Waste)
Kevin Mchugh	MA Architectural History, BGS Art History; 8 years experience with MoDOT, Central Office	Intermediate Environmental Specialist (Agricultural/Land Use and Floodplain)

Name	Qualifications	Primary Responsibilities
Rob Meade	MS Avian Ecology, BS Biology and Public Relations; 4 years experience with MoDOT, Central Office	Senior Environmental Specialist (Wetland, Water Quality)
Bob Reeder	PhD Anthropology, MA Anthropology, BS Biology; 12 years of professional experience with MoDOT, Central Office	Cultural Resources Coordinator
Gayle Unruh	BA Environmental Science, MS Biology; 10 years experience with MoDOT, Central Office	Wetland Coordinator
Rusty Weisman	MA Anthropology, BA Anthropology; 4 years experience with MoDOT, Central Office	Archaeologist
Larry Welty	BS Civil Engineering;	MoDOT Project Manager
Terry Wren	BS Soil and Atmospheric Science; 7 years experience with MoDOT, Central Office	Senior Cartographer

MACTEC Engineering and Consulting, Inc.

Stephen Coates	BS Civil Engineering; 16 years of professional experience in the field of roadway design and transportation planning, and 9 years of experience in NEPA and EIS documentation.	Location Study and Engineering Manager, Lead Document Coordinator
Kathy Conley	BS Biology; 10 years of professional experience in ecology, GIS and impact analysis.	GIS Specialist, Document Support
Christine DuMey	BS Biology; 4 years of professional experience in aquatic ecology, GIS, and socioeconomics.	Environmental Specialist (Socioeconomics)
Lois DuMey	MS Environmental Science; 6 years of professional experience in NEPA, 4(f) evaluations, socioeconomics, EIS documentation, and document review.	Environmental Task Manager (Socioeconomics), Document Coordination
Scott George	BS Geology; 23 years of professional experience in environmental investigations including wetland delineation and geological assessments.	Wetlands, Water Quality and Geology
Linda Hart	BS Business/Biology; 18 years of professional experience with professional responsibility in technical writing, editing, document production, and socioeconomics for environmental documents.	Technical Editor and Lead Document Coordinator

Name	Qualifications	Primary Responsibilities
Richard Hart	AAS Drafting and Design; 9 years of professional experience in civil engineering and land development applications and noise analysis.	CAD Manager/System Administrator, Noise Impact Assessment
Brian Mueller	BS Fisheries/Limnology; 16 years of professional experience in fisheries, GIS, and impact analysis.	GIS Coordinator
Raymond Steege	MBA Business Administration, BS Civil Engineering; 21 years of professional experience managing engineering investigations, flood plain studies, hydrologic analyses, roadway design, and commercial development.	Project Manager
Jeff Strickland	BA Communications; 19 years of professional experience in communications with responsibility for managing public participation programs and coordinating stakeholder involvement activities for major transportation studies.	Public Involvement Coordinator
Eric Westhus	MS Biology, BS Biology; 2 years of professional experience in Ecology and GIS.	GIS Support
Crawford Bunte Brammeier		
Doug Shatto	BS Civil Engineering; 18 years of professional experience in the field of traffic engineering and transportation planning.	Task Manager, Traffic and Transportation Planning Studies
HNTB		
Brian Carlson	MS Civil Engineering, BS Civil Engineering; 17 years of professional experience as bridge designer	Existing Bridge Condition Report
Mark Grossenbacher	BS Civil Engineering; 15 years of professional experience in project management of bridge analysis.	Project Manager, Bridge Analysis
Pete Jarchow	BS Civil Engineering; 25 years of professional experience in hydraulic assessment	Manager – Water Resources
Robert Lyon	MS Civil Engineering, BS Civil Engineering; 25 years of professional experience in bridge design	Senior Bridge Designer – Existing Bridge Condition Report

Name	Qualifications	Primary Responsibilities
Valerie McCaw	MS Civil Engineering, BS Civil Engineering; 21 years professional experience in hydraulic assessment	Section Manager – Municipal Infrastructure
Dan VanPetton	MUP Urban Planning, BS Forestry; 28 years professional experience as an urban/environmental planner	Navigation Impact Analysis
Steve Steib	BS Civil Engineering; 28 years professional experience in bridge design	Existing Bridge Condition Report
Martinez Corporation		
Rigo Cisneros		Aerial Photography, Digital Elevation Modeling

7.0 Agencies, Organizations, and Persons Who Received the Final EIS

Federal

U.S. Environmental Protection Agency
Attn: Office of Federal Activities
NEPA Compliance Div, EIS Filing Section
Arel Rios Building (South Oval Lobby)
Mail Code 2252-A, Room 7241
1200 Pennsylvania Avenue, NW
Washington, D.C. 20044

Dr. Willie R. Taylor, Director
Department of Interior
Office of Environmental Policy and Compliance
Main Interior Building, MS 2340
1845 C Street N.W.
Washington, D.C. 20240

Mr. Joe Cothorn, NEPA Program Manager
Environmental Review Branch
U.S. Environmental Protection Agency
901 North 5th Street, ENSV-10
Kansas City, Kansas 66101

Mr. Nick Chevances
Environmental Review
Great Plains Support Office
National Park Service
1709 Jackson Street
Omaha, Nebraska 68102-2571

Mr. Danny McClendon
ATTN: Craig Litteken, Regulatory Project
Manager
Regulatory Branch DA
St. Louis District, USACE
ATTN: CEMVS-CO-F
1222 Spruce Street
St. Louis, Missouri 63103-2833

Mr. Roger Weibusch
U.S. Coast Guard
Eighth Coast Guard District
1222 Spruce Street
St. Louis, Missouri 63103

Mr. Ken Sessa
Regional Environmental Specialist
Federal Emergency Management Agency
Region VII
2323 Grand Boulevard, Suite 900
Kansas City, Missouri 64108-2670

Mr. Charles Scott
Field Supervisor
U.S. Fish and Wildlife Service
608 East Cherry Street, Room 200
Columbia, Missouri 65201

Mr. Raymond Homer
Environmental Coordinator
U.S. Department of Agriculture
Rural Development
601 Business Loop 70 West
Parkade Center, Suite 235
Columbia, Missouri 65203

Ms. Sandy Freeman
Environmental Officer
U.S. Dept. of Housing and Urban Dev.
St. Louis Field Office, Region VII
1222 Spruce Street
St. Louis, Missouri 63103-2836

Mr. Paul Mohr, Field Environmental Officer
U.S. Dept. of Housing and Urban Dev.
Kansas City Regional Office, Region VII
400 State Avenue
Kansas City, Kansas 66101

Senator Jim Talent
1031 Executive Parkway, Suite 100
St. Louis, Missouri 63141

Senator Christopher S. Bond
7700 Bonhomme #615
St. Louis, Missouri 63105

Representative Todd Akin
301 Sovereign Court, Suite 201
St. Louis, Missouri 63011

State

Ms. Jane Epperson, Policy Supervisor
Policy and Coordination
Missouri Department of Conservation
P.O. Box 180, 2901 West Truman Boulevard
Jefferson City, Missouri 65102

Mr. Dennis Potter, Soil Scientist, Liaison
Natural Resources Conservation Service
Parkade Center, Suite 250
601 Business Loop 70 West
Columbia, Missouri 65203

Ms. Jane Beetem, Transportation Coordinator
Missouri Department of Natural Resources
P.O. Box 176, 205 Jefferson Street
Jefferson City, Missouri 65102

Mr. George Reidel,
Floodplain Management Manager
State Emergency Management Agency
P.O. Box 116
Jefferson City, Missouri 65102

Ms. Erica Dobreff
Missouri Housing and Development Comm.
3435 Broadway
Kansas City, Missouri 64111

Missouri Federal Assistance Clearinghouse
Office of Administration
P.O. Box 809, Truman Building, Room 840
Jefferson City, Missouri 65102

Governor Bob Holden
Missouri Capitol Building, Room 216
P.O. Box 720
Jefferson City, Missouri 65102-0720

Senator Jon Dolan
District 2
State Capitol Building, Room 428
Jefferson City, Missouri 65101

Senator John Griesheimer
District 26
State Capitol Building, Room 226
Jefferson City, Missouri 65101

Representative Jack Jackson
District 89
Missouri House of Representatives
201 West Capitol Avenue, Room 201CA
Jefferson City, Missouri 65101

Representative Scott T. Rupp
District 13
Missouri House of Representatives
201 West Capitol Avenue
Room 304B
Jefferson City, Missouri 65101

Local

The Honorable Joe Ortworth
County Executive
St. Charles County
Historic Courthouse
100 North Third Street
St. Charles, Missouri 63301

The Honorable George "Buzz" Westfall
County Executive
St. Louis County
41 South Central Avenue
Clayton, Missouri 63105

Mayor John Nations
Chesterfield City Hall
690 Chesterfield Parkway West
Chesterfield, Missouri 63017

Mayor Donald Lickliger
Weldon Spring City Hall
5401 Independence Road
Weldon Spring, Missouri 63304

Pat Oldcroft, City Administrative Assistant
Weldon Spring City Hall
5401 Independence Road
Weldon spring, Missouri 63304

Mr. Les Sterman
Executive Director
East-West Gateway Coordinating Council
10 Stadium Plaza
St. Louis, Missouri 63102

Ms. Marsha Ramey, Branch Manager
St. Louis County Library
Sachs Branch
16400 Burkhardt Place
Chesterfield, Missouri 63017

8.0 References

- Bennitt, Rudolf, and Werner O. Nagel. 1937. A survey of the resident game and furbearers of Missouri. The University of Missouri Studies Vol. 12, No. 2. Columbia, Mo. 214 pp.
- Chittenden, Hiram M. 1897. List of Steamboat Wrecks on the Missouri River from the Beginning to the Present. Appendix WW, in Annual Report of the Chief of Engineers, U.S. Army 1897, US Government Printing Office, Washington.
- City of Chesterfield Planning Commission. 2002. Chesterfield 2002 Comprehensive Plan, Draft Plan Policies and Recommendations.
- City of Chesterfield Planning Commission. 1999. Chesterfield Valley Master Plan.
- City of Weldon Spring, Planning and Zoning Commission of the City of Weldon Spring. 2000. City of Weldon Spring Comprehensive Plan, December 2000.
- East-West Gateway Coordinating Council (EWGCC). 2002. Legacy 2025, The Transportation Plan for the Gateway Region.
- East-West Gateway Coordinating Council (EWGCC). 2000. Generalized Land Use Patterns. <http://www.ewgateway.org/ourregion/trendicators/stiregdata/landuse/landuse.htm>
- Fenneman, Nevin M. 1938. Physiography of eastern United States. McGraw-Hill Book Company, Inc., New York. 662 pp.
- Haas, Daniel. 1978. An Archaeological Survey of the Little Femme Osage/River Hills area and the Loutre River Valley: a multivariate approach to environment and site distributions in the Lower Missouri Valley II locality. Report on file Department of Natural Resources, Outreach and Assistance Center, State Historic Preservation Office, Missouri Cultural Resources Inventory.
- Harl Joseph M. 1995. Master Plan for the Management of Archaeological Cultural Resources Within St. Louis City and County, Missouri. Archaeological Services, University of Missouri St. Louis Research Report No. 203. Report on file Department of Natural Resources, Outreach and Assistance Center, State Historic Preservation Office, Missouri Cultural Resources Inventory.
- Harl. Joseph L., Dennis Naglich and Timothy Baumann. 1994a. Cultural Resource Survey of the Proposed Improvements to the Monarch 100 Year Flood Levee, Chesterfield Valley, St. Louis County, Missouri. Archaeological Research Center of St. Louis Research Report No. 3. Report on file Department of Natural Resources, Outreach and Assistance Center, State Historic Preservation Office, Missouri Cultural Resources Inventory.
- Harl, Joseph L., Dennis Naglich and Timothy Baumann. 1994b. Records and Literature Search of the Proposed Monarch-Chesterfield 500 Year Flood Levee, Chesterfield Valley, St. Louis County, Missouri. Archaeological Research Center of St. Louis Research Report

- No. 7. Report on file Department of Natural Resources, Outreach and Assistance Center, State Historic Preservation Office, Missouri Cultural Resources Inventory.
- Harl Joseph L., Dennis Naglich, Patti Wright, and Joseph Nixon. 1989. Reconnaissance Level Cultural Resources Study of Accessible Portions of the Missouri River Basin in St. Louis, St. Charles, Franklin, Warren, Gasconade and Montgomery Counties, Missouri. Archaeological Survey, University of Missouri-St. Louis, Research Report No. 119. Report on file Department of Natural Resources, Outreach and Assistance Center, State Historic Preservation Office, Missouri Cultural Resources Inventory. pgs. 80-86.
- Levy, Janet E. 1978. A Report of an Intensive Archaeological Survey of the Proposed Extension of the Spirit of St. Louis Airport, St. Louis County, Missouri. Anthropology Department, University of Missouri-St. Louis. Report on file Department of Natural Resources, Outreach and Assistance Center, State Historic Preservation Office, Missouri Cultural Resources Inventory.
- Missouri Department of Transportation (MoDOT). 1997. Major Transportation Investment Analysis (MTIA), Daniel Boone Study Area.
- Missouri Highway and Transportation Department (MHTD), District 6 Office. 1996. Major Transportation Investment Analysis Management Group. Notice of MTIA Approval.
- Parsons Brinckerhoff Quade & Douglas, Inc. 2000. Major Transportation Investment Analysis, Daniel Boone Study Area, Final Evaluation Report.
- Pflieger, W.L. 1975. The Fishes of Missouri. Missouri Department of Conservation.
- Plazza, Theresa J. 1995. Phase I Cultural Resources Survey of the Proposed Route 40-61 Improvements from I-70 to the Missouri River, St. Charles County, Missouri. Vol. I. Missouri Highway and Transportation Department, Cultural Resources Section, MHTD Job Nos. J6P0672 and J6P0672B. Report on file Department of Natural Resources, Outreach and Assistance Center, State Historic Preservation Office, Missouri Cultural Resources Inventory.
- St. Charles County Planning Department. 1996. St. Charles County Master Plan-Target 2010: Prosperity through Planning, December 1996, St. Charles, Missouri.
- St. Louis County Government, Department of Planning. 2002. 2002 St. Louis County Fact Book.
- St. Louis County Planning Department. 1998. 2000-2004 St. Louis County Strategic Plan.
- Sauer, Carl O. 1920. The geography of the Ozark highland of Missouri. The Geographic Society of Chicago Bulletin No. 7. University of Chicago Press, Chicago, Ill. 187 pp.
- Shopland, John. 1979. Phase I Cultural Resources Survey Job No. 6-P-40-298, Route 40 St. Charles – St. Louis Counties, Missouri. Missouri Highway and Transportation Department, Cultural Resources Section. Report on file Department of Natural Resources, Outreach and Assistance Center, State Historic Preservation Office, Missouri Cultural Resources Inventory.

- Songer, Julie, E., Bradley M. Mueller and Charles W. Markman. 1993. Phase I Cultural Resources Survey of the Spirit of St. Louis Airport Facility in Chesterfield, St. Louis County, Missouri. Markman and Associates Research Report No. 4. Report on file Department of Natural Resources, Outreach and Assistance Center, State Historic Preservation Office, Missouri Cultural Resources Inventory.
- Thom, Richard H. and James H. Wilson. 1996. The Natural Divisions of Missouri. Nat. His. Sec. Mo. Dept. of Cons., Jefferson City, MO. www.conservation.state.mo.us/nathis/natcom/natdiv/
- Transportation Research Board, National Research Council. 2000. Highway Capacity Manual, Special Report 209. Washington D.C.
- U.S. Army Corps of Engineers (USACE). 2000. Abandoned Shipwrecks on Missouri River Channel Maps 1879 and 1954, Rulo Nebraska to Mouth, Sheets 1-14. U.S. Army Corps of Engineers, Kansas City District.
- United States Department of Commerce, U.S. Bureau of the Census. 1980. Census of Population, www.census.gov
- United States Department of Commerce, U.S. Bureau of the Census. 1990. Census of Population, www.census.gov
- United States Department of Commerce, U.S. Bureau of the Census. 2000. Census of Population, www.census.gov
- Weldon Spring Planning and Zoning Commission. 2002. The City of Weldon Spring Comprehensive Plan.

9.0 Index

A

Age Characteristics, 4-8
Agency Coordination, 2-4, 4-32, 5-5
Air Quality, ES-3, ES-5, 2-11, 4-23
Archaeology, ES-5, 2-11, 4-33
Architecture, ES-5, 2-11, 4-40

B

Bicycling, 1-2, 1-3, 1-5, 3-2, 4-20
Bridges, ES-2, 1-4, 1-2, 2-2, 2-5, 4-37,
Appendix B

C

Construction Impacts, ES-5, 2-11, 4-51
Costs, ES-4, ES-5, 2-7, 2-11, 4-11, Appendix B
Cultural Resources, ES-3, ES-5, 2-4, 2-11,
4-35, 4-41

D

Displacements, ES-5, 2-2, 2-11, 4-10

E

Engineering Constraints, 2-3
Environmental Constraints, 2-3, 3-2, 5-2
Environmental Justice, ES-5, 2-11, 4-15, 5-8

F

Farmland, ES-5, 2-11, 4-5
Floodplains, ES-3, ES-4, ES-5, 2-11, 4-5, 4-29,
4-31, Figure 4-4

G

Geologic Features, ES-5, 2-11, 3-1

H

Hazardous Waste, ES-4, ES-5, 2-11, 4-48
Hiking, 1-2, 1-5, 4-20, 4-43, 4-44

K

Katy Trail, ES-4, ES-5, 1-2, 1-3, 1-5, 2-11, 3-2,
4-6, 4-20, 4-40, 4-43 through 4-50, 5-7, 5-9,
5-10, 5-11

L

Land Use, ES-2, 4-1 through 4-5, Table 4-3

M

Missouri Research Park, ES-1, ES-4, 1-2, 1-3,
1-9, 3-2, 4-11, 4-43, 4-44
Missouri River Floodplain, ES-5, 2-11, 4-31,
5-4

N

Noise, ES-3, ES-5, 2-11, 4-25

P

Permits, ES-4, ES-5, 2-11, 4-28 to 4-31
Public Lands, ES-3, ES-5, 2-11, 4-42 through
4-47

R

Right of Way, ES-4, ES-5, 2-11, 4-4, 4-10,
4-11, 4-15, 4-45

S

Safety, ES-1, ES-4, 1-8, 4-15, 4-19
Socioeconomics, ES-2, 2-7, 4-1, 4-6

T

Threatened and Endangered Species, ES-5,
2-3, 2-4, 2-11, 4-32

W

Water Quality, ES-3, ES-4, ES-5, 2-11, 4-26
Wetlands, ES-3, ES-5, 2-11, 4-28,
Figure 4-4
Wild/Scenic Rivers, ES-5, 2-11, 4-31

Appendix A

Tort Liability Statement Traffic Accident and Safety Data

Tort Liability Statement Traffic Accident and Safety Data

The National Environmental Policy Act (NEPA), 42 United States Code (USC) §§ 4321-4370f, requires that this analysis of the proposed project must consider and discuss its effects and impacts on mankind, and its effects and impacts on plants, animals, resources, and the natural world in general. One of the key elements to be discussed in any NEPA analysis of a proposed highway project is its effects and impacts on the safety of those who use those highways. However, Congress has recognized that even while this document summarizes and presents traffic accident and safety information for the general information and benefit of the public, pursuant to federal law, some people may attempt to use the information to establish federal, state or local liability in lawsuits arising from highway accidents. Congress has enacted a law, 23 USC Section 409, which prohibits the discovery or use of highway accident and safety data, developed under federal law to make highway safety improvements, in litigation seeking damages for accidents and occurrences on these highways. Congress's rationale is obvious – the safety data was compiled and collected at their request, to help prevent future accidents, injuries and death on our nation's highways. If that information can be used in expensive damage suits, then the millions of dollars that litigation may cost the Missouri Department of Transportation (MoDOT) and local governments will not be available for their use to make Missouri's highways safer.

Traffic accident statistics and safety data are compiled, presented and summarized in portions of this Draft Environmental Impact Statement (Draft EIS). Where noted in this document, the discussion, reports, lists, tables, diagrams and data presented throughout that chapter, unit, section or subsection was compiled or collected for the purpose of identifying, evaluating or planning the safety enhancement of potential accident sites or hazardous roadway conditions pursuant to federal law. Thus, that information and its supporting reports, schedules, lists, tables, diagrams and data are not subject to discovery, and they are prohibited by federal law (23 USC § 409) from being admitted into evidence in a federal or state court proceeding, or from being considered for other purposes, in any action for damages arising from an occurrence on the highways, intersections or interchanges discussed in this document.

Appendix B

Bridge Analysis and Evaluation

Appendix B Table of Contents

<u>Section</u>	<u>Page</u>
B1 Introduction	B1
B2 Existing Structures	B1
B2.1 Description.....	B1
B2.1.1 Route 40 Eastbound Over the Missouri River – Bridge A4017	B1
B2.1.2 Route 40 Westbound over the Missouri River – Bridge J1000R	B2
B2.2 Current Condition.....	B3
B2.2.1 Route 40 Eastbound over the Missouri River – Bridge A4017	B3
B2.2.2 Route 40 Westbound over the Missouri River – Bridge J1000R	B4
B2.3 Estimate of Remaining Structure Life.....	B6
B2.3.1 Route 40 Eastbound over the Missouri River – Bridge A4017	B6
B2.3.2 Route 40 Westbound over the Missouri River – Bridge J1000R	B7
B2.4 Rehabilitation Options.....	B7
B2.4.1 Route 40 Eastbound over the Missouri River – Bridge A4017	B8
B2.4.2 Route 40 Westbound over the Missouri River – Bridge J1000R	B8
B2.5 Light Rail Transit Option	B9
B3 Build Alternatives.....	B9
B3.1 Alternative A1	B10
B3.2 Alternative A2	B10
B3.3 Alternative A2'	B10
B3.4 Alternative B3	B10
B3.5 Alternative B5	B10
B4 Hydraulic Considerations.....	B11
B4.1 Existing Bridges.....	B11
B4.2 Flood Information.....	B11
B4.3 Missouri River Flood Model.....	B11
B4.4 New Bridge Locations	B12
B4.5 Discussion	B12
B5 Geotechnical Considerations.....	B13
B6 Cost Summaries.....	B13
B6.1 Basic Data	B13
B6.2 Present Value Cost Comparison of Alternatives:.....	B14
B6.2.1 Alternative A1.....	B14
B6.2.2 Alternative A2 and A2'	B14
B6.2.3 Alternative B3.....	B15
B6.2.4 Alternative B5.....	B15

B1 Introduction

This section documents the studies conducted to evaluate both bridge rehabilitation and replacement options for the Route 40/61 Missouri River bridges connecting St. Louis and St. Charles counties.

B2 Existing Structures

B2.1 Description

B2.1.1 Route 40 Eastbound Over the Missouri – Bridge A4017

Superstructure

The eastbound, Route 40/61 structure over the Missouri River was opened to traffic in 1990 and is made up of four units, totaling approximately 2,600 feet. The 51'-4" deck has a 48'-0" roadway with 1'-4" barrier curbs on each side.

Both the west and east approach span units are made up of two-span continuous composite plate girders with an 8½" cast-in-place concrete deck including, as stated in the plans, a 1¼" latex overlay. Field inspections dispute the depth of the latex overlay. Refer to the "Current Condition of the Existing Structures" section following. The west approach span unit consists of two 161-foot spans, utilizing six girders, with 72" web depth, on 9'-0" spacing. The east approach span unit consists of a 130'-6" and a 101'-9" span also utilizing six girders on 9'-0" spacing. However, the girders of the east approach have a 60" web depth.

The two main river crossing units are each made up of a two span continuous, variable depth, Warren through truss. Each span is made up of sixteen 32'-0" panels, resulting in 512'-0" span lengths. The trusses are 54'-0" center to center, with a height varying from 40'-0" to 75'-0". Similar to the approach spans, the deck is an 8½" cast-in-place concrete slab. The floor framing of the truss is made up of four, 4 panel continuous stringer units. The stringers themselves are W27x94 beams. Similar to the approach span units, there are six stringers on 9'-0" spacing.

Substructure

The substructure of the main river crossing truss units (Piers 4 through 6) can be divided into two types. Piers 5 and 6 are two-column piers whose columns extend down to solid shafts that start at approximately the Standard High Water elevation (Elevation 452.20) and extend down to footings. The footings are founded on either a solid rectangular shaft, or two circular shafts that extend down to rock. Pier 4 is also a two-column pier whose columns extend down to a solid shaft that starts at the Standard High Water elevation. However, this shaft extends down to a footing that is founded directly on rock.

The transition pier, between the west approach spans and the main truss spans (Pier 3), is a simple two column pier. The columns extend down to a spread footing on rock. The transition pier, between the east approach spans and the main truss spans (Pier 7), is also a simple two-column pier. However, the columns of Pier 7 extend down to a pile-supported footing. The steel H-piles extend down to rock.

The substructure of the west approach unit consists of a non-integral concrete stub bent (End Bent 1) founded directly on rock. Rock at this location is very shallow, approximately 13 feet from the roadway surface. Bent 2 is similar to Pier 3 in that it is a simple two-column bent whose columns extend down to a spread footing on rock.

The substructure of the east approach unit consists of a non-integral open concrete end bent (End Bent 9) with two columns founded on pile-supported footings. The steel H-piles of the footings extend to rock. Bent 8 is similar to Pier 7 in that it is a simple two-column bent whose columns extend down to a pile supported footing. The steel H-piles of Bent 8 also extend down to rock.

B2.1.2 Route 40 Westbound Over the Missouri River – Bridge J1000R

Superstructure

The westbound, Route 40/61 structure over the Missouri River was opened to traffic in 1935 and is made up of four units, totaling approximately 2,600 feet. The overall deck width is 33'-0" with a 32'-0" roadway and 6" wide tubular steel rails on each side. The tubular steel rails are bolted to W8x24 rail posts that are bolted to the exterior stringers and the deck.

Both the west and east approach spans are made up of two simple span Warren deck truss spans. The west approach span trusses are made up of six 24'-2" panels, resulting in 145'-0" span lengths. The trusses are 20'-0" center to center, with a centerline to centerline chord height of 18'-0". The east approach span trusses are made up of six 21'-8" panels, resulting in 130'-0" span lengths. As with the west approach, the east approach trusses are 20'-0" center to center, however they have a centerline to centerline chord height of 15'-0". The deck of both of the approaches is a 4¼" thick concrete filled steel grid with a ¾" polymer concrete wearing surface. The floor framing of the approach trusses is made up of a series of simply-supported stringers spanning between truss panels. The stringers of the west approaches are W16x45 and W21x59, exterior and interior, respectively. The stringers of the east approaches are W16x40 and W18x45, exterior and interior, respectively. In each case there are eight stringers on 4'-7" spacing supporting the deck.

The two main river crossing units are each made up of a two span continuous, variable depth, Warren through truss. Each span is made up of sixteen 32'-0" panels, resulting in a 512'-0" span length. The trusses are 36'-9" center to center, with a height varying from 40'-0" to 75'-0". Similar to the approach spans, the deck is a 4¼" thick concrete filled steel grid with a ¾" polymer concrete wearing surface. The floor framing of the truss is made up of a series of simply supported stringers spanning between truss panels. The stringers are W21x59 and W24x74, exterior and interior, respectively. Similar to the approach span framing, there are eight stringers on 4'-7" spacing.

Substructure

The substructure of the main river crossing truss units (Piers 4 through 6) can be divided into two types. Pier 5 is a two column pier whose columns extend down to a footing whose top elevation is approximately the Standard High Water elevation and is 15'-0" thick. This footing is founded on two 22'-0" circular shafts which extend down to rock. Piers 4 and 6 are also two column piers whose columns extend down to a footing whose top elevation is approximately the Standard High Water elevation. However, this footing is founded on a rectangular shaft that extends down to rock.

The transition pier, between the west approach spans and the main truss spans (Pier 3) is nearly identical to Piers 4 and 6. The only differences being the dimensions of the individual piers. Likewise the transition pier, between the east approach spans and the main truss spans (Pier 7) is nearly identical to Pier 5. Again, the only differences being the dimensions of the individual piers.

The substructure of the west approach unit consists of a non-integral concrete stub bent (End Bent 1) founded directly on rock. Rock at this location is very shallow, approximately 15 feet from the roadway surface. Pier 2 is a simple two-column bent whose columns extend down to two individual spread footings that are founded on rock.

The substructure of the east approach unit consists of a non-integral open concrete end bent (End Bent 9) with two columns founded on pile supported footings. The steel H-piles of the footings extend to rock. Pier 8 is unique in that it has a footing founded on steel H-piles. Above the H-pile footing, it is similar to the other piers in that it is a simple two-column pier.

B2.2 Current Condition

B2.2.1 Route 40 Eastbound over the Missouri River – Bridge A4017

This structure was opened to traffic in 1990. This bridge is not eligible for the National Register of Historic Places (NRHP). It was designed for an HS20 modified live load. It is currently open with no restrictions or posting. Posting is not required since the maximum legal load does not exceed the operating rating capacity. The operating gross load rating was reported in the most recent in-depth bridge inspection report (refer to inspection dates addressed in the next paragraph) to be 73 tons, based on an HS load type. The inventory gross load rating, also based on an HS load type was reported to be 49 tons. The 1999 average daily traffic (ADT), also listed in the most recent in-depth inspection report, was 39,969. Of this total, it was estimated that 10 percent of the ADT was truck traffic, making the average daily truck traffic (ADTT) approximately 4,000.

From available information, the date of the most recent routine maintenance inspection of the Route 40/61 Eastbound Bridge over the Missouri River was August 19, 2003. A MoDOT inspection crew performed this inspection. MoDOT recently issued a directive to inspect all of the major river crossings (Missouri and Mississippi Rivers) effective February 5, 2003. FHWA requires maintenance inspections every 24 months. A MoDOT inspection crew did an in-depth and fracture critical inspection of the bridge on March 19, 2003. The last underwater inspection was done in June 1999. The next underwater inspection should take place in June 2004 since the designated interval for underwater inspections is noted to be 60 months.

The following information is based on both the in-depth inspection performed on March 19, 2003 and the routine maintenance inspection performed on August 19, 2003 by MoDOT crews. For this and all following text, the MoDOT, "Bridge Inspection Rating Manual" will be referred to as the "Bridge Inspection Manual." The in-depth inspection noted that no future improvements are proposed at this time.

Superstructure

The deck was most recently rated a "7", which, according to the Bridge Inspection Manual, denotes "GOOD CONDITION – some minor problems". The latex overlay wearing surface which is noted as being 2¼" thick, conflicting with the 1¾" noted on the plans, has wheel line wear and minimal random cracking. Other minor problems noted include:

- a few of the metal SIP deck forms are missing;
- there is cracking/efflorescence under the deck cantilevers;
- a deck haunch is spalled near Pier 7; and
- there is minor spalling along the edges of the armor at compression seals within the truss spans.

The superstructure was most recently rated an "8", which, according to the Bridge Inspection Manual, denotes "VERY GOOD CONDITION – no problems noted". Despite the "no problems noted" rating there were some minor defects noted with the diaphragm stiffeners. There are small cracks in the bottom welds of those diaphragm stiffeners. Otherwise there is no significant deterioration evident within the superstructure.

It was also noted in the routine maintenance inspection that the Ironmaster modular expansion devices at bent 3 and pier 6 were replaced in 2001 with finger devices. This work consists of replacing the Ironmaster modular expansion devices that were installed during the original construction.

Some of the bearings were noted as having some light rust. The overall paint condition on the bridge superstructure is rated "good", but there is minor peeling in many areas.

It was noted in the most recent in-depth inspection report that the approach guardrail ends as well as the transitions from the approach guardrail to the bridge railing do not meet currently acceptable standards or a safety feature is required and none is provided. In the case of the guardrail ends, they should be flared, buried, made breakaway, or shielded. In the case of the transitions, the approach guardrail should be gradually stiffened as it comes closer to the bridge railing and should be firmly attached to the bridge railing.

Substructure

The substructure was most recently rated a "7", denoting "GOOD CONDITION – some minor problems". The "minor problems" noted in the most recent inspection were very few. Specifically they were:

- minor cracking occurring in the step cap at Pier 6; and
- minor scrapes on the side of Pier 5.

It was also noted that the abutment cap bearings and river pier bearing seats were resealed.

Channel and Waterway

The channel and channel protection were most recently rated a "6", denoting "*Bank is beginning to slump. River control devices and embankment protection have widespread minor damage. There is minor streambed movement evident. Debris is restricting the waterway slightly.*"

The waterway was most recently rated an "8", denoting "*Bridge deck above roadway approaches. Slight chance of overtopping roadway approaches.*"

The bridge's vulnerability to scour was most recently rated a "6", denoting "*Scour calculation/evaluation has not been made*". Therefore this structure has not yet been evaluated for scour potential.

B2.2.2 Route 40 Westbound over the Missouri River – Bridge J1000R

This structure was originally opened to traffic in 1935. This bridge is eligible for the NRHP. It was originally designed for an H20 live load in accordance with the American Association of State Highway and Transportation Officials (AASHTO), 1931. It is currently open with no restrictions or posting. Posting is not required since the maximum legal load does not exceed the operating rating capacity. The operating gross load rating was reported in the most recent in-depth bridge inspection report (refer to inspection dates addressed in the next paragraph) to

be 37 tons, based on an HS load type. The inventory gross load rating, also based on an HS load type was reported to be 23 tons. The 1999 ADT, also listed in the most recent in-depth inspection report, was 39,463. Of this total, it was estimated that 10 percent of the ADT was truck traffic, making the ADTT approximately 3,950.

From available information, the date of the most recent routine maintenance inspection of the Route 40 Westbound Bridge over the Missouri River was August 19, 2003. A MoDOT inspection crew performed this inspection. MoDOT recently issued a directive to inspect all of the major river crossings (Missouri and Mississippi Rivers) effective February 5, 2003. FHWA requires maintenance inspections every 24 months. A MoDOT inspection crew did an in-depth and fracture critical inspection of the bridge on March 17 and 18, 2003. The bridge is currently on a 24-month inspection cycle to check for cracks found in a fracture critical member. The last underwater inspection was performed in June of 1999. The next underwater inspection should take place in June of 2004 since the designated interval for underwater inspections is noted to be 60 months.

The structure was rehabilitated in 1990. This rehabilitation included:

- sandblasting and repainting of the superstructure;
- removal and replacement of the concrete filled steel grid deck;
- placement of a $\frac{3}{8}$ " polymer concrete wearing surface;
- replacement of the barrier rail post and rail;
- repair of cracks in floor system stringers;
- miscellaneous floor beam repairs;
- placement of a preformed compression joint seal at Bents 2 and 8;
- replacement of the finger joint expansion devices at Bents 3, 5, and 7;
- replacement of navigation lighting system; and
- miscellaneous substructure concrete repairs including formed concrete repair, unformed concrete repair, pressure epoxy grouting, and placement of a vertical drain systems behind the end bents.

The following information regarding the condition of the superstructure, substructure, and the channel and waterway of this structure is based on the inspection performed in August 2001. That inspection noted that at this time a proposed improvement includes "*Replacement of bridge... because of substandard load carrying capacity or substandard bridge roadway geometry.*" This work considers the replacement of the entire structure including the main river crossing spans as well as the approach spans on either side. The estimated 1997 project cost includes \$30.60 million for the bridge replacement and \$3.06 million for the roadway improvements. The 1997 estimate for the total project cost is \$45.9 million.

Superstructure

The deck was most recently rated a "7", which, according to the Bridge Inspection Manual, denotes "*GOOD CONDITION – some minor problems*". The polymer overlay wearing surface is showing signs of wear. Other minor problems noted include:

- rust is bleeding through the overlay along the grid lines;
- cover aggregate is worn off sporadically throughout the deck;
- spalling of the epoxy is widespread, especially on the west approach; and
- random cracking of the overlay.

It was noted in the text of the report that "An evaluation of the existing overlay, combined with the life expectancy of the bridge, was made by the district, and it was determined to leave the wearing surface in place as is and not repair it, since it presents no traffic problems".

The superstructure was most recently rated a "6", which, according to the Bridge Inspection Manual, denotes "*SATISFACTORY CONDITION – structural elements show some minor deterioration*". Items that were noted in the last inspection report were:

- small cracks in the floor beams of deck truss members on both the west and east sides at the abutment areas;
- the rocker at Pier 7 for the deck truss is tipped to the maximum with the most likely cause being shoving of the abutment;
- the north bearing at the east abutment is bouncing under traffic loads;
- generally the pins of the rockers are beginning to rust;
- there is general rusting of the truss overall;
- there is rusting along the chord lattice of the truss; and
- there is pack rusting in gusset areas of the truss.

Although the truss is noted as having general rusting, and specific locations are noted as having more significant rusting, the paint condition is noted as being rated 'fair' overall.

Substructure

The substructure was most recently rated a "6", denoting "*SATISFACTORY CONDITION – structural elements show some minor deterioration*". The substructure units generally exhibit cracking and leaching. More specific problems noted are:

- minor spalling at the north side of the End Bent 9 backwall;
- cracking and delamination of the End Bent 1 cap;
- the cap seals are in poor shape; and
- some isolated deterioration around a few of the truss bearing areas.

The approach joints on each side of the bridge have been sealed with Dow Corning 902-RCS.

Channel and Waterway

The channel and channel protection was most recently rated a "6", denoting "*Bank is beginning to slump. River control devices and embankment protection have widespread minor damage. There is minor streambed movement evident. Debris is restricting the waterway slightly.*"

The waterway was most recently rated an "8", denoting "*Bridge deck above roadway approaches. Slight chance of overtopping roadway approaches.*"

The bridge's vulnerability to scour was most recently rated a "6", denoting "*Scour calculation/evaluation has not been made.*" Therefore this structure has not yet been evaluated for scour potential.

B2.3 Estimate of Remaining Structure Life

B2.3.1 Route 40 Eastbound over the Missouri River – Bridge A4017

Structure life is greatly affected by many things including, but not limited to, frequency and level of maintenance; past, current and future traffic; changes (typically increases) in the magnitude of live loads, etc. Estimates of future structure life are more difficult early in a structure's life since these variables are unknown. As a structure gets older, its frequency and level of

maintenance, traffic counts, live loads, etc., can be better quantified and considered. However, in a relatively new structure, one can only estimate these factors.

AASHTO typically considers the life of a new structure to be 75 years. This value is used in the AASHTO Load Resistance Factor Design (LRFD) Manual to compute Fatigue Resistance. If a design life other than 75 years is sought, it must be accounted for in the Fatigue Resistance equation. Considering this, a best estimate for a new structure's life is approximately 75 years. Consequently a structure that was opened in 1990, as is the case here, could be expected to have approximately 65 years of service life remaining.

B2.3.2 Route 40 Westbound Over the Missouri River – Bridge J1000R

Fatigue considerations are important in the estimate of the remaining life of a relatively old structure. Although "fatigue" has only been a design consideration since the early 1960s, fatigue maintenance problems in older structures are often a determining factor in a structure's remaining life. While some repairs are certainly economically viable to keep a structure in service, others are of too large a magnitude to be economically feasible. In addition, the functionality of a structure (i.e., its width, position, alignment, etc.) must all be considered in the decision of whether any major retrofit scheme is economical.

In the case of this structure, the 1990 rehabilitation had already identified and repaired apparent fatigue problems in the stringers in spans 1-2, 2-3, 7-8, and 8-9. Additionally, the August 2001 routine maintenance inspection noted other possible fatigue related problems with small cracks noted in the floor beams of the deck truss members on both the west and east sides. Several elements of this structure are apparently approaching the end of their useful fatigue life. When these fatigue considerations are combined with the age of the bridge, approximately 65 years, and the relatively narrow deck width, only 32 feet, it could be assumed that another major retrofit would not be economically prudent. Although structural elements could be replaced and the structure's service life extended, there is no feasible way to widen the structure and increase its functional utility. The use of three traffic lanes on the structure may or may not have a significant effect on its remaining fatigue life. Considering a typical deck life of approximately 30 years, and considering the fact that the existing deck was replaced in the 1990 retrofit, it would be reasonable to assume that this structure has approximately 20 years of remaining service life.

For purposes of developing a lower first-cost alternative, however, consideration was given to an extensive rehabilitation of the westbound bridge in Year 2020, which could feasibly extend the service life of the structure an additional 30 years. The following section details the assumptions made with regards to this rehabilitation, and the associated costs.

B2.4 Rehabilitation Options

One consideration of this study included the evaluation of both the existing bridges being utilized indefinitely for the Route 40/61 corridor. Consideration was given to what repairs would need to be made to the bridges to ensure their viability as functional structures. The following is a summary of that review.

Few options exist for widening truss-type bridges. Because the main structural steel supporting members of a through truss are located immediately adjacent to, and above the roadway, this type of bridge cannot be easily widened to provide additional traffic lanes or shoulders.

B2.4.1 Route 40 Eastbound Over the Missouri River – Bridge A4017

The useful life of a bridge deck is dependent on many things. Among these are the type of deck, the original construction materials and techniques, the frequency and type of de-icing chemicals used, the use and maintenance of a wearing surface, and the environmental conditions to which it is exposed. While some of these variables may be known, others are difficult or impossible to predict. A typical general estimate of the life of a bridge deck varies from 25 to 35 years.

For the purpose of this study, it is assumed that the deck of this structure will need replacement when it reaches the age of 30 years. Since the deck on the structure was originally constructed in 1988, the next projected deck replacement will be in the year 2018.

Due to the relative young age of the structure, it is assumed that the rehabilitation will consist of only a deck replacement. Along with the replacement of the deck, the safety barrier curbs and the expansion joints will also be replaced. Using MoDOT's ESTIMATE 2000 program for unit prices, and the appropriate quantities from the original construction plans for the bridge, the following cost for a deck replacement was computed.

Item	Quantity	Units	Unit Price	Item Cost
Removal of Existing Bridge Deck	135,000	lin. ft.	\$16.00	\$2,160,000
Safety Barrier Curb	5,300	lin. ft.	\$80.00	\$424,000
Concrete Wearing Surface	14,000	sq. yd	\$50.00	\$700,000
Prefomed Compression Jt. Seal (2.5")	50	lin. ft.	\$200.00	\$10,000
Prefomed Compression Jt. Seal (3")	700	lin. ft.	\$200.00	\$140,000
Prefomed Compression Jt. Seal (4")	50	lin. ft.	\$200.00	\$10,000
Expansion Device (Finger Plate)	150	lin. ft.	\$700.00	\$105,000
Slab on Steel	15,000	sq. yd.	\$250.00	\$3,750,000
Total Project Cost				\$7,299,000

The total project cost shown above shows the present-day cost of the project. To project it to the assumed date of the rehabilitation, that is, 2018, an annual inflation factor of 4 percent is assumed.

B2.4.2 Route 40 Westbound Over the Missouri River – Bridge J1000R

It is estimated that the rehabilitation of the westbound bridge performed in 1990 will economically extend the structure's service life an additional 30 years, to the year 2020. Extending the service life much beyond this point could require significant expenditures involving redecking, structural steel painting, and anticipated structural steel and substructure concrete repairs. At best, the structure would still be functionally obsolete and would not rate at HS20 loading.

In addition, the westbound bridge was built during a time when little or no consideration of the effect of a seismic event was included in the design. Neither has the structure been retrofitted to accommodate for this lack of design. Retrofitting a bridge of this type and age would require significant expenditures and would add no additional service life to the structure.

It is estimated that the following items and costs would be minimally required to extend the life of the westbound structure an additional 30 years beyond the Year 2020.

Item	Quantity	Units	Unit Price	Item Cost
Removal of Existing Bridge Deck	89,000	sq. ft.	\$16.00	\$1,424,000
Concrete Wearing Surface	9,250	sq. yd.	\$50.00	\$462,500
Preformed Compression Jt. Seal	2,050	lin. ft.	\$200.00	\$410,000
Expansion Device (Finger Plate)	100	lin. ft.	\$700.00	\$70,000
Slab on Steel	9,900	sq. yd.	\$250.00	\$2,475,000
Structural Steel Painting	4,200	tons	\$1,000.00	\$4,200,000
Structural Steel Repair	1,500,000	lbs	\$6.00	\$9,000,000
Pier Repair and Strengthening		Lump Sum		\$1,000,000
Miscellaneous		Lump Sum		\$1,000,000
Total Project Cost				\$20,041,500

The total project cost shown above shows the present-day cost of the project. To project it to the assumed date of the rehabilitation, that is, 2020, an annual inflation factor of 4 percent is assumed.

B2.5 Light Rail Transit Option

The potential use of the Route 40 westbound bridge for light rail transit is dependent on several things. First, assuming dual tracks for the light rail service, the bridge would have to be used exclusively for light rail. Shared light rail/roadway use is not feasible due to the relatively narrow roadway width. Even a single light rail track would leave only adequate room for one roadway traffic lane. Widening the truss for shared light rail and roadway traffic would also not be feasible economically since it would essentially require replacement of the entire truss and its flooring system. A new structure for westbound roadway traffic would have to be constructed. Second, extensive deck framing modifications may be required. While it is likely that the truss itself and the floor beams could adequately carry the light rail loading, it is unlikely that the floor system stringers could safely carry a light rail maintenance vehicle load. Third, extensive approach roadway work would be required to either direct westbound roadway traffic to a new structure, or eastbound roadway traffic to the new structure and westbound roadway traffic to the existing eastbound bridge.

In summary, the Route 40 westbound bridge has the potential, with modifications, to carry light rail traffic. However, it would require extensive structural and approach roadway modifications to make it possible, and would not appear to be economically justifiable.

B3 Build Alternatives

A replacement bridge over the Missouri River must meet the navigational clearance requirements of the U.S. Coast Guard (USCG). Early in the location study phase, the study team requested information from the USCG seeking preliminary clearance requirements for a new bridge. The USCG responded that the horizontal and vertical clearance in the navigation span must meet or exceed the existing clearance. In addition, the navigation span piers must align with the existing piers.

The navigation clearance for the existing bridges is listed at 447 feet in the U.S. Army Corps of Engineers (USACE) Missouri River Navigation Charts. According to the USCG Bridge Clearance Guide, bridges in this reach of the Missouri River must have 52 feet of vertical clearance above the 2 percent flow line elevation (Elevation 455.20).

The five final study alternatives consist of either a four- or six-lane new structure constructed immediately upstream or downstream of the existing bridges. The four-lane structure is coupled with a rehabilitation of the existing westbound bridge, and the six-lane structure is coupled with the removal of the existing westbound bridge.

The Coast Guard has stipulated that existing clearances over the Missouri River be maintained and hydraulic considerations dictate matching the alignment of the piers in the floodway. The new structure is anticipated to consist of four 512-foot spans over the Missouri River.

For purposes of alternative evaluation, the new structure is assumed to be either a four- or six-lane matching through truss structure. Whereas alternative structure types may be considered in a later preliminary design phase, architectural conformity and river span requirements result in a through truss structure as the anticipated structure type. Square foot costs and preliminary bridge layouts are developed on the basis of a through truss structure.

B3.1 Alternative A1

Alternative A1 consists of the construction of a new six-lane bridge immediately upstream of the existing eastbound bridge. This assumes a matching through truss structure with four 512-foot spans across the Missouri River. The new bridge would carry four lanes of eastbound traffic and two lanes of westbound traffic. The existing eastbound bridge would become the westbound bridge and carry three lanes of traffic. The existing westbound bridge would be removed.

B3.2 Alternative A2

Alternative A2 consists of the construction of a new four-lane bridge immediately upstream of the existing eastbound bridge. This assumes a matching through truss structure with four 512-foot spans across the Missouri River. The new bridge would carry four lanes of eastbound traffic. The existing eastbound bridge would become the westbound bridge and carry three lanes of traffic. The existing westbound bridge would remain and carry two lanes of westbound traffic.

B3.3 Alternative A2'

Alternative A2' consists in the construction of a new four-lane bridge immediately upstream of the existing eastbound bridge. This assumes a matching through truss structure with four 512-foot spans across the Missouri River. The new bridge would carry four lanes of eastbound traffic. The existing eastbound bridge would become the westbound bridge and carry three lanes of traffic. The existing westbound bridge would remain and carry two lanes of westbound traffic.

B3.4 Alternative B3

Alternative B3 consists in the construction of a new six-lane bridge immediately downstream of the existing westbound bridge. This assumes a matching through truss structure with four 512-foot spans across the Missouri River. The new bridge would carry four lanes of westbound traffic and two lanes of eastbound traffic. The existing eastbound bridge would remain and carry three lanes of eastbound traffic. The existing westbound bridge would be removed.

B3.5 Alternative B5

Alternative B5 consists in the construction of a new four-lane bridge immediately downstream of the existing westbound bridge. This assumes a matching through truss structure with four 512-foot spans across the Missouri River. The new bridge would carry four lanes of westbound traffic. The existing eastbound bridge would remain as eastbound and carry three lanes of

traffic. The existing westbound bridge would remain, become eastbound, and carry two lanes of traffic.

B4 Hydraulic Considerations

B4.1 Existing Bridges

The Route 40/61 bridges are twin existing truss bridges located at River Mile 43.9 (westbound) and Mile 44.0 (eastbound) on the Monarch Bend of the Missouri River. The bridges are located generally west of St. Louis, Missouri. The north abutments are located in St. Charles County and the south abutments are located in St. Louis County.

The eastbound bridge is the upstream bridge. The bridge substructure is perpendicular to the bridge and slightly skewed to the direction of flow. This bridge has eight spans ranging from 104 to 513 feet with a total length of 2,613 feet. The current bridge clearance is 447.0 feet horizontal, 66 feet vertical for normal navigation flow, and 54 feet vertical during flood stage. According to the record drawings, the 2 percent flow line is Elevation 455.20, and the low chord elevation is 508.3.

The westbound bridge is approximately 40 feet downstream of the eastbound bridge. The bridge substructure is perpendicular to the bridge and slightly skewed to the direction of flow. This bridge has spans matching the locations of the newer bridge, but offset slightly to the north to allow for the skew of the river channel to the bridge. The current bridge clearance is also 447.0 feet horizontal, 66 feet vertical for normal navigation flow, and 54 feet vertical during flood stage.

B4.2 Flood Information

Review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) indicate the 100-year floodplain on the Missouri River at this location is bounded by a levee on the south side and by high ground just north of the abandoned MKT Railroad embankment on the north side. The floodway limit is the abandoned MKT Railroad embankment on the north side; upstream of the bridge, the floodway extends southward to the levee, then narrows gradually to the bridge opening before widening out again, although it does not extend completely to the levee in the reach downstream of the bridge. The top of levee elevation in this location is approximately Elevation 470 and the top of the bluff is approximately Elevation 530. The width of the floodway is approximately 2,400 ft (732 m) at the bridge locations and is confined between the bridge abutment on the south and the abandoned railroad embankment on the north. The 100-year flood elevation (Zone AE) is 467 on the upstream side of the bridge. The map states that the levees protect the area from the 100-year flood.

B4.3 Missouri River Flood Model

The existing FEMA model is on order from FEMA. The existing model is likely in HEC-2 format, but is probably a translation from the Kansas City District USACE old KC Backwater computer program. The Kansas City District is currently preparing a new hydraulic model using UNET, a one-dimensional, unsteady flow model. The Kansas City District recently revised the predicted flood discharges for the Missouri River, based upon a flow frequency analysis performed for the upper Mississippi River. The revised discharges have not officially been submitted to nor accepted by FEMA; the magnitude of change is probably less than 10 percent of the existing flood discharges. The USACE will not complete their UNET analysis until late 2003. FEMA Flood Insurance Studies and FIRMS are not presently scheduled to be updated, although

discussions are ongoing between FEMA and the USACE. Such updates would probably not be complete until 2008 to 2010.

B4.4 New Bridge Locations

Several bridge alternatives are being evaluated. All bridge alternatives have the common traits listed below.

- The new bridge will have the same alignment as the existing bridges; the piers will be perpendicular to the bridge and located with a slight offset to account for the flow skew, just upstream or downstream of the existing bridge.
- The new bridge will have the same low chord elevation as the existing bridge.
- The new bridge will span over the abandoned MKT embankment.
- The new south bridge abutment will tie into the levee in the same location as the existing bridge.

Build alternatives evaluated include:

- Alternative A1 – This includes a new bridge located upstream of the existing bridges and the removal of the existing WB bridge.
- Alternative A2 and A2'- This includes a new bridge located upstream of the existing bridges and the existing bridges remain.
- Alternative B3 - This includes a new bridge located downstream of the existing bridges and the removal of the existing WB bridge.
- Alternative B5 - This includes a new bridge located downstream of the existing bridges and the existing bridges remain.

B4.5 Discussion

From the data collected and evaluated to date the following observations are drawn. The new bridge will have the effect of adding bridge length along the river, increasing the length of the hydraulic constriction. This, and additional pier hydraulic losses, is anticipated to result in a minor increase in flood profile for both the base flood and the encroached to floodway base flood conditions. The existing floodway stays narrow for a short distance upstream of the existing bridges, but expands almost immediately downstream of the existing bridges. Therefore, a new bridge upstream of the existing should have no impact on the floodway. A downstream location for a new bridge may require a longer bridge or a change to the mapped floodway. When the computer model is received and is changed with the proposed new bridge data, a negligible change in floodway and flood elevation of the Missouri River is anticipated. Minor increases in flood elevations resulting from a longer constriction, additional pier losses, or encroachment to the floodway can probably be compensated for with grading in the floodplain, to open up more area for flood flows under the spans of the bridge away from the channel. If this is not feasible, it may be necessary to add one or two short spans to the existing bridge(s) and size the new bridge accordingly to match.

The 1987 and 1994 hydrographic surveys of the river channel show a significant scour hole near one of the northern channel piers. This hole extends further downstream in the 1994 surveys. Because the bridge type requires that the substructure be perpendicular to the bridge, scour potential is significant. If the existing bridge substructures are vulnerable to scour, it may be desirable to locate the new bridge downstream of the existing, where it is less likely to impact the existing structure.

B5 Geotechnical Considerations

The plans from the existing bridge indicate a typical Missouri River alluvial sequence (sand) above carbonate limestone. Bedrock is very near the surface or exposed on the north bluff of the river at this location.

The north abutment located in the bluff, is founded in the limestone bedrock very near the ground surface. At the base of the bluff, approximately 20 ft (6 m) of silty clay overlies the limestone. The silty clay wedge thickens from the bluff toward the north river bank to nearly 30 ft (9 m). The silty clay is relatively soft (N values of 2 to 5) and reported to have thin sand lenses.

From the north bank of the river, the subsurface consists mostly of sand overlying limestone bedrock. The bedrock surface slopes deeper from north to south. Bedrock is at Elevation 410 at the north bank, Elevation 370 at midchannel, Elevation 360 at the south bank, and Elevation 350 at the existing south abutment.

Given an average ground surface of Elevation 450, this creates a wedge of alluvial sand from 40 ft (12 m) thick on the north bank to 100 ft (30 m) thick at the south abutment.

The bedrock is likely Mississippian Age, Keokuk-Burlington Formation, a cherty, thin to thick bedded limestone. As in nearly all carbonate rocks such as limestone, rock discontinuities such as moderate to severe weathering, voids or cavities, widened joints, fracturing are possible and should be investigated.

The bridge plans stated allowable bearing values for H-piles of 9 kips per square inch (ksi) times the cross-sectional area. Spread footings on rock in the bluff were given an allowable bearing value of 12 tsf. Drilled shafts were given an allowable bearing value of 50 tons per square foot (tsf) end bearing and 5 tsf in side friction. These values may be used to cost the proposed bridge foundations, although, a comprehensive geotechnical exploration program and analysis should be undertaken during the design phase.

Seismically, the location is in the Category A area according to the MoDOT Bridge Design Manual.

B6 Cost Summaries

The bridge construction costs were evaluated using typical square foot costs for structures of this type. No detailed span studies and foundation analyses were conducted, but similar bridges were evaluated for steel weight, concrete volume, reinforcing steel quantity, and substructure cost. It is recommended that more detailed studies be performed prior to bridge type selection.

B6.1 Basic Data

Four-Lane Bridge

Truss Spans (2048 x 74.67 x \$400) = \$61.2 million

Approach Spans (560 x 74.67 x \$100) = \$4.2 million

Total = \$ 65.4 million

Six-Lane Bridge

Truss Spans (2048 x 112.67 x \$400) = \$92.3 million

Approach Spans (560 x 112.67 x \$100) = \$6.3 million

Total = \$ 98.6 million

Rehabilitation of Existing Eastbound Bridge

Total = \$7.3 million

Rehabilitation of Existing Westbound Bridge

Total = \$20.0 million

Demolition of Existing Westbound Bridge

Total = \$1.5 million

B6.2 Present Value Cost Comparison of Alternatives:

B6.2.1 Alternative A1

New Six-Lane Bridge in 10 years

Present Cost:	\$98.6 million
4% Inflation for 10 years:	\$145.9 million
Present Cost at 7% Interest:	\$74.2 million

Rehabilitate Eastbound Bridge in 16 years

Present Cost:	\$ 7.3 million
4% Inflation for 16 years:	\$ 13.7 million
Present Cost at 7% Interest:	\$ 4.6 million

Demolish Existing Westbound Bridge in 10 years:

Present Cost:	\$ 1.5 million
4% Inflation for 10 years:	\$ 2.2 million
Present Cost at 7% Interest:	\$1.1 million

Total Present Value Cost: \$79.9 million

B6.2.2 Alternative A2 and A2'

New 4-Lane Bridge in 10 years:

Present Cost:	\$65.4 million
4% Inflation for 10 years:	\$96.8 million
Present Cost at 7% Interest:	\$49.2 million

Rehabilitate Eastbound Bridge in 16 years:

Present Cost:	\$ 7.3 million
4% Inflation for 16 years:	\$13.7 million
Present Cost at 7% Interest:	\$ 4.6 million

Rehabilitate Westbound Bridge in 18 years:

Present Cost:	\$20.0 million
4% Inflation for 18 years:	\$40.5 million
Present Cost at 7% Interest:	\$12.0 million

Total Present Value Cost: \$65.8 million

B6.2.3 Alternative B3

New 6-Lane Bridge in 10 years:

Present Cost:	\$98.6 million
4% Inflation for 10 years:	\$145.9 million
Present Cost at 7% Interest:	\$74.2 million

Rehabilitate Eastbound Bridge in 16 years:

Present Cost:	\$ 7.3 million
4% Inflation for 16 years:	\$13.7 million
Present Cost at 7% Interest:	\$ 4.6 million

Demolish Existing Westbound Bridge in 10 years:

Present Cost:	\$ 1.5 million
4% Inflation for 10 years:	\$ 2.2 million
Present Cost at 7% Interest:	\$ 1.1 million

Total Present Value Cost: \$79.9 million

B6.2.4 Alternative B5

New 4-Lane Bridge in 10 years:

Present Cost:	\$65.4 million
4% Inflation for 10 years:	\$96.8 million
Present Cost at 7% Interest:	\$49.2 million

Rehabilitate Eastbound Bridge in 16 years:

Present Cost:	\$ 7.3 million
4% Inflation for 16 years:	\$13.7 million
Present Cost at 7% Interest:	\$ 4.6 million

Rehabilitate Existing Westbound Bridge in 18 years:

Present Cost:	\$20.0 million
4% Inflation for 18 years:	\$40.5 million
Present Cost at 7% Interest:	\$12.0 million

Total Present Value Cost: \$65.8 million

For the Preferred Alternative, A2', the present value cost of \$65.8 million projected to 2007 dollars is \$80 million.

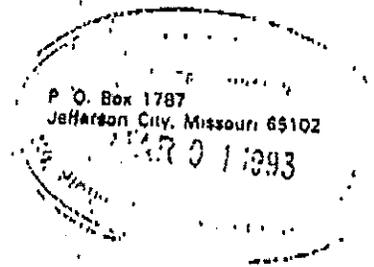
Appendix C

Correspondence



U.S. Department of Transportation
Federal Highway Administration

Region 7
Iowa, Kansas
Missouri, Nebraska



February 25, 1993

DESIGN / BRIDGE
Highway Bridge Replacement and
Rehabilitation Program (HBRRP)
Proper Use of Funds

Mr. Wayne Muri, Chief Engineer
Missouri Highway and Transportation Department
Jefferson City, Missouri

Dear Mr. Muri:

We have received several PS&E's recently that have had estimates indicating improper usage of HBRRP funds. Since this was not an isolated case, we feel it is necessary to again explain the criteria for use of these funds.

The following steps outline the eligibility determination for use of HBRRP funds for bridge replacement or rehabilitation:

1. In order to qualify for HBRRP funds, the existing bridge must be on the list of eligible bridges. This list is compiled by our Washington Office each year and is based on the bridge inventory data submitted by the State. A copy of the updated list of bridges is provided to the State each year.
2. In order to qualify for the eligibility list, the existing bridge must *first* be deficient. A deficient bridge is either structurally deficient or functionally obsolete. These are defined as follows:

To be *structurally deficient* (SD) the bridge must have:

- a. a condition rating of 4 or less for:
 - Item 58, deck; or
 - Item 59, superstructure; or
 - Item 60, substructure; or
 - Item 62, culverts; or

- CHIEF ENGR
- DESIGN
- CONST
- DESIGN
- FISCAL
- IRAS
- LEGAL
- M&T
- M&R
- PLANNING
- RW
- TRANSP
- _____

- b. an appraisal rating of 2 or less for:
 - Item 67, structural condition; or
 - Item 71, waterway adequacy.

To be *functionally obsolete* (FO) the bridge must have:

- a. an appraisal rating of 3 or less for:
 - Item 68, deck geometry; or
 - Item 69, underclearances; or
 - Item 72, approach roadway alignment; or
- b. an appraisal rating of 3 for:
 - Item 67, structural condition; or
 - Item 71, waterway adequacy.

Any bridge classified as structurally deficient is excluded from the functionally obsolete category.

3. After the deficiency status of a bridge is established, a check is made to determine whether any construction or reconstruction of the bridge occurred in the past ten years. If either Item 27, Year Built, or Item 106, Year Reconstructed, indicate a date within the past ten years, the bridge is not eligible for HBRRP funding.
3. After the eligibility of the bridge is established, the sufficiency rating (SR) of the bridge is used to determine whether it is eligible for replacement or rehabilitation. To be *eligible for replacement*, the SR must be less than 50, and to be *eligible for rehabilitation* the SR must be 80 or less. The SR is only used to determine eligibility, it should not be used to dictate what the appropriate corrective strategy is for a particular structure. This should be done with cost analyses that account for the potential life of the bridge under each alternative. A bridge with a SR between 50 and 80 could qualify for replacement, if it is documented that replacement is more cost-effective than rehabilitation. Likewise, replacement is not always the appropriate strategy for a bridge with a SR less than 50.
4. Once the eligibility and appropriate strategy are determined, the scope of work must address the deficiencies of the bridge. When the proposed work does not bring the deficiencies up to current standards, the bridge work is not eligible for HBRRP funds. State standards approved by FHWA are to be used for National Highway System (NHS) projects. For non-NHS projects, State standards are to be used. A bridge that is deficient due to its narrow roadway width is not eligible for HBRRP funding unless the project widens the bridge to current standards. Providing only an overlay of the bridge deck would not qualify for HBRRP funding, because it does not address the deficiency.

The Intermodal Surface Transportation Efficiency Act (ISTEA) did make an exception to this requirement for painting, seismic retrofitting, and calcium magnesium acetate application. HBRRP funds may be used for each of these three items of work on a deficient bridge without addressing the deficiencies of the bridge. For example, a narrow bridge could be painted with HBRRP funds without widening the bridge as part of the project.

The above criteria should be used for bridges on and off the NHS. For non-NHS projects, which are now exempt from Federal Highway Administration oversight, the State is responsible for monitoring the proper use of HBRRP funds. This information should be provided to those individuals responsible for project development and for preparation of estimates.

If there are any questions on the eligibility policy for HBRRP funds, please let us know.

Sincerely yours,


Gerald J. Reihsen, P.E.
for Division Administrator

Missouri
Department
of Transportation



Henry Hungerbeeler, Director

105 West Capitol Avenue
P.O. Box 270
Jefferson City, MO 65102
(573) 751-2551
Fax (573) 751-6555
www.modot.state.mo.us

EXAMPLE AGENCY SCOPING LETTER

December 4, 2001

ADDRESS

Dear _____:

Subject: Design, U.S. Routes 40 and 61, St. Charles and St. Louis Counties, 0.5 mile east of the Route 94 interchange in St. Charles County to 0.6 mile east of the Chesterfield Airport Road interchange in St. Louis County, Job No. J6P1436, Environmental Coordination

The Missouri Department of Transportation (MoDOT) is initiating the preparation of an Environmental Impact Statement (EIS) on a proposal to replace the existing westbound U.S. Routes 40 and 61 bridge over the Missouri River with a new bridge and appurtenant roadways/structures in St. Charles and St. Louis Counties, Missouri. The existing westbound bridge was completed in 1935. Please find enclosed two (2) plates illustrating the study area for the subject improvement, which would provide a 3- or 4-lane crossing of the Missouri River. The proposed project begins 0.5 mile east of the Route 94 interchange in St. Charles County and continues easterly to 0.6 mile east of the Chesterfield Airport Road interchange in St. Louis County, a distance of approximately 1.9 miles.

MoDOT and its consultant, Harding ESE, are soliciting comments from your agency as part of our early environmental coordination process. Please address your concerns by January 31 to:

Mr. Steve Coates
Harding ESE
3199 Riverport Tech Center Drive
St. Louis, MO 63043

You are also invited to attend and participate in an agency coordination/scoping meeting to discuss the proposed improvement. The meeting is scheduled for 10:00 a.m. on Wednesday, January 9, 2002, in the EOC Conference Room of the Robert A. Young Building (Mart Building) at the corner of Tucker (12th) Street and Spruce Street, St. Louis. Please advise Matt Burcham,

Our mission is to preserve and improve Missouri's transportation system to enhance safety and encourage prosperity.

Colonel Morrow
December 4, 2001
Page 2

Senior Environmental Specialist, by fax or E-mail if you plan to attend this meeting. The fax number is (573) 522-1973 and E-mail is burchm@mail.modot.state.mo.us. We look forward to seeing you at the meeting.

Sincerely,

Dave Nichols
Director of Project Development

dn/ch

Enclosures

Copies: Mr. Ed Hassinger -- 6
 Mr. Mark Kross -- pd

Bob Holden
Governor

STATE OF MISSOURI

Jerry B. Uhlmann
Director

EMERGENCY MANAGEMENT AGENCY



DEPARTMENT OF PUBLIC SAFETY
OFFICE OF THE ADJUTANT GENERAL



P.O. Box 116, Jefferson City, Missouri 65102
Phone: 573/526-9100 Fax: 573/634-7966
E-mail: mosema@mail.state.mo.us

December 14, 2001

Mr. Steve Coates
Harding ESE
3199 Riverport Tech Center Drive
St. Louis, MO 63043

Re: Comments for the Preparation of the EIS on the Route 40/61 Proposed Missouri River Bridge Replacement in St. Charles County & St. Louis County, Missouri. MoDOT Job Number J6P1436

Dear Mr. Coates:

We very much appreciate your notice for an opportunity to make comments for the Environmental Impact Statement (EIS) for the proposed Route 40/61 Missouri River bridge replacement project in both St. Charles and St. Louis Counties, Missouri. Please accept this letter as comment for the EIS, as requested in the letter, sent by Mr. Dave Nichols, Director of Project Development, Missouri Department of Transportation.

The State of Missouri is a participant in the National Flood Insurance Program (NFIP). Any development associated with this project located within a Special Flood Hazard Area (SFHA), as identified by the Federal Emergency Management Agency (FEMA), must meet the requirements of the State of Missouri Executive Order 98-03. This would require obtaining a floodplain development permit for the proposed project. This permit must be obtained prior to the commencement of any construction/development activities. This permit would be obtained from this agency.

If the proposed development is located within a regulatory floodway, a "No-Rise" certificate and statement as to the effects of possible flooding, is required before the development can be permitted. This analysis must be performed by a licensed engineer and to current FEMA mapping standards.

If you have any questions concerning this letter, or the requirements of Executive Order 98-03, please feel free to give me a call at (573) 526-9119.

Sincerely,

A handwritten signature in black ink that reads "L. Scott Samuels".

L. Scott Samuels, P.E.
Floodplain Management Engineer

cc: Kay Carder, Mitigation Specialist, FEMA R-VII
Dave Nichols, Missouri Department of Transportation
Steven Lauer, Floodplain Administrator, St. Charles County
J. Michael Dooley, Floodplain Administrator, St. Louis County
St. Charles County Community File
St. Louis County Community File
MoDOT File



U.S. Department
of Transportation
**Federal Transit
Administration**

REGION VII
Iowa, Kansas,
Missouri, Nebraska

901 Locust Street
Suite 404
Kansas City, MO 64106
816-329-3920
816-329-3921 (fax)

January 2, 2002

Mr. Dave Nichols
Director of Project Development
Missouri Department of Transportation
105 West Capitol Avenue
P.O. Box 270
Jefferson City, Missouri 65102

Dear Mr. Nichols:

Subject: Design, U.S. Routes 40 and 61, St. Charles and St. Louis Counties, 0.5 mile east of Route 94 interchange in St. Charles County to 0.6 mile east of the Chesterfield Airport Road interchange in St. Louis County, Job No. J6P1436, Environmental Coordination

Thank you for your letter dated December 4, 2001 informing us that the Missouri Department of Transportation (MoDOT) is beginning environmental coordination for an Environmental Impact Statement (EIS) on a proposal to replace the westbound U.S. Routes 40 and 61 bridge over the Missouri River with a new bridge. We very much appreciate receiving information and being kept apprised of this important transportation project.

It is understood that the MPO for the St. Louis metropolitan area, the East West Gateway Coordinating Council, has been included as part of the early coordination process and has been invited to participate at the agency coordination/scoping meeting scheduled for January 9, 2002. In addition, we understand that the local public transit agencies, Bi-State Development Agency and St. Charles County will also be invited to this meeting. We commend your efforts for including the MPO and the transit agencies in the early coordination process for this project.

If you have any questions, please call Ms. Joan Roeseler, Director of Planning and Program Development, FTA-Region VII, at (816) 329-3936.

Sincerely,

Mokhtee Ahmad
Regional Administrator

cc: Steve Coates, Harding ESE
Matt Burcham, MoDOT



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

JAN 14 2002

Steve Coates
Harding ESE
3199 Riverport Tech Center Drive
St. Louis, MO 63043

SUBJECT: U.S Routes 40 and 61, Job No J6P1436

Dear Mr. Coates:

This is to inform you that EPA has received your letter dated December 4, 2001 concerning the road development project mentioned above.

We appreciate the opportunity to participate in the planning of this project, and in particular in the preparation of the EIS. We do not intend to attend the agency coordination/scoping meeting mentioned in the letter, but look forward to reviewing any preliminary draft components of the Environmental Impact Statement that you prepare for distribution.

Thank you for the opportunity to comment on this project. If you have any questions or require technical assistance you may contact Stephen Smith of my staff at 913-551-7656.

Sincerely,

A handwritten signature in cursive script that reads "Joseph E. Cothorn".

Joseph E. Cothorn
NEPA Team Leader
U.S. EPA, Region VII



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Missouri Ecological Services Field Office
608 East Cherry Street, Room 200
Columbia, Missouri 65201
Phone: (573) 876-1911 Fax: (573) 876-1914

March 12, 2002

Ms. Peggy Casey
Environmental Projects Engineer
FHWA Division Office
209 Adams Street
Jefferson City, Missouri 65101

Dear Ms. Casey:

Please refer to the November 20, 2001, Federal Register Notice of Intent to prepare an Environmental Impact Statement (EIS) for a proposed new bridge location for U.S. Route 40 and Interstate Highway 64 over the Missouri River in St. Charles and St. Louis Counties, Missouri. The Fish and Wildlife Service (Service) submits the following comments pursuant to the National Environmental Policy Act (NEPA) and the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

NEPA Comments

The Service is concerned about the cumulative impacts of the numerous development projects on the floodplain of St. Charles and St. Louis Counties. There are 500-year levees protecting the Riverport and Earth City areas downstream of the proposed project. The Howard Bend Levee District, immediately downstream of the proposed project, is constructing a 500-year protection levee. We understand that the City of Hazelwood is investigating a 500-year protection levee on the downstream side of Highway 370 on the Missouri River floodplain. The St. Louis District, Army Corps of Engineers (Corps) is assisting the Monarch Chesterfield Levee District in upgrading their levee from 80-year flood protection to 500+3, flood protection. During the reconnaissance phase of the Corps' project involving the Chesterfield- Monarch levee, the Corps evaluated three alternatives involving three 500-year levee alignments. In a 12 April 1995 memorandum, Gary Dyhouse, Chief, Hydrological Engineering stated that "the existing levee alignment, raised to a 500-year level of protection (levee alignments 1 and 2), increased the 500-year [water surface] profile by 3.4 feet upstream of U.S. Highway 40. The [water] velocities around the bridge for this levee alignment increased from 15.4 ft/sec (base condition) to 19.1 ft/sec. The effects of upstream water surface increases and channel scouring velocities are concerns for this levee alignment."

The Corps is also investigating the feasibility of upgrading portions of the North County Consolidated Levee District in St. Charles County. There is a potential that upwards of 25 miles of floodplain land may be protected with 500-year levees (river mile 46.3 to mile 21.3) in St. Louis County alone. Coupled with the construction of Page Avenue, the various floodplain

projects likely would contribute to a serious bottleneck in flood flow conveyance in this portion of the Missouri River floodplain.

In preparing the EIS and planning for this bridge project, we strongly recommend that the Federal Highway Administration and the Missouri Department of Transportation thoroughly evaluate the cumulative impacts of these flood control projects. Bridge design should incorporate appropriate environmental features and avoid contributing to flooding problems in this portion of the Missouri River floodplain.

Endangered Species Act Comments

The pallid sturgeon (*Scaphirhynchus albus*) occurs adjacent to the project area in the Missouri River. Limited data is available concerning preferred habitats, but the species has been captured in tributary mouths, over sandbars, along main channel borders, side channels and in deep holes. Small sturgeon have been captured in off-channel backwaters. Any modifications to these habitats associated with the project could have an adverse effect on the pallid sturgeon.

The bald eagle (*Haliaeetus leucocephalus*) is a common migrant and winter resident throughout the state and are uncommon breeders along some of the major rivers and larger reservoirs in the state. During winter, they congregate near rivers and reservoirs with open water and often near large concentrations of waterfowl. Wintering eagles usually occupy river habitats between November 15 and March 1, and use large diameter riparian tree species as daytime perches and night roosts. They usually perch within a riparian corridor or along lake shores and prefer areas with limited human activity. At night, wintering bald eagles may congregate at communal roosts and will travel as much as 12 miles from feeding areas to a roost site. The period January 1 to March 1 is important for initiating nesting activity; March 1 to May 15 is the most critical time for incubation and rearing of young.

Bald eagles are known to prefer trees greater than 11 inches dbh and within 100 to 600 feet of water for perching sites. Eagles also tend to roost on the tallest trees (greater than 63 feet above ground level). Cottonwood (*Populus deltoides*) and sycamore (*Platanus occidentalis*) are often selected over other trees for perching and roosting. We recommend the project be designed to avoid the loss of trees matching these criteria.

The Indiana bat (*Myotis sodalis*) may also occur in the project area. From late fall through winter Indiana bats in Missouri hibernate in caves in the Ozarks and Ozark Border Natural Divisions. During the spring and summer, Indiana bats utilize living, injured (e.g. split trunks and broken limbs from lightning strikes or wind), dead or dying trees for roosting throughout the state. Indiana bat roost trees tend to be greater than 9 inches diameter at breast height (dbh) (optimally greater than 20 inches dbh) with loose or exfoliating bark. Most important are structural characteristics that provide adequate space for bats to roost.

Preferred roost sites are located in forest openings, at the forest edge, or where the overstory canopy allows some sunlight exposure to the roost tree, which is usually within 0.6 mi. of water. Indiana bats forage for flying insects (particularly moths) in and around the tree canopy of floodplain, riparian, and upland forests.

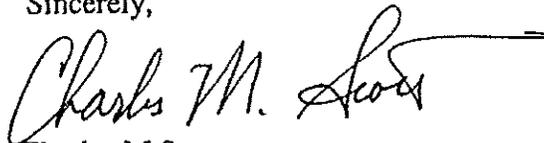
If trees are to be removed for the proposed project, they must be removed between October 1st and March 30th to avoid the potential injury or death to roosting individuals and maternity colonies. If it is not feasible to schedule tree removal during this period, the Service requires that a survey, to determine the presence or absence of Indiana bats, be conducted by a qualified biologist. Survey efforts should include using a combination of mist nets and bat detection devices [e.g., "Anabat" (© Titley Electronics, Ballina, New South Wales, Australia)]. If it is determined that a survey for Indiana bats is needed, please contact the Missouri Ecological Services Field Office to obtain specific information regarding survey protocol. If surveys indicate that Indiana bats are using trees proposed to be removed during their breeding season (April 1 to September 30) further consultation with the Service under section 7 of the Act will be required.

The proposed project is a major Federal action. Thus, section 7(c) of the ESA, as amended, requires preparation of a biological assessment to determine the effects of the proposed work on the above-listed species. Biological assessments should include: a scientifically sound on-site inspection of the study area to determine if the listed species are present; interviews with recognized experts on the listed species, including the Service, state conservation agencies, universities, etc.; literature reviews or other scientific information to determine species distribution, habitat needs, and other biological requirements; an analysis of the effects (including cumulative impacts) of the proposed work would have on listed species and their habitats. If you determine that the proposed work may affect any of the listed species, you must request, in writing, formal consultation from this office pursuant to section 7(a) of the Endangered Species Act. A request to initiate formal consultation can accompany submission of the biological assessment to the Service.

If you have not already done so, please contact the MDC (Planning Division, P.O. Box 180, Jefferson City, Missouri 65102-0180) for information concerning Missouri Species of Conservation Concern.

We appreciate the opportunity to comment on the project and look forward to working with your agency as the project progresses. If you have any questions regarding our comments, please contact Rick Hansen at (573) 876-1911, extension 106.

Sincerely,



Charles M Scott
Field Supervisor

cc: MDC, Jefferson City, MO (Ziehmer)
FWS, Ft. Snelling, MN (MacLean)

JML:jml:20020387

U.S. Department of Transportation

United States Coast Guard



Commander Eighth Coast Guard District

1222 Spruce Street St. Louis, MO: 63103-2832 Staff Symbol: ohr Phone: (314) 539-3600x379 FAX: (314) 539-3755

16591.1/43.8 MOR March 18, 2002

Ms. Peggy J. Casey, P.E. Environmental Programs Engineer Federal Highway Administration Missouri Division 209 Adams Street Jefferson City, MO 65101

*St. Louis / St. Charles
Rt. 40/66
56P1436*

Subj: DANIEL BOONE HIGHWAY BRIDGE REPLACEMENT, MILE 43.8, MISSOURI RIVER

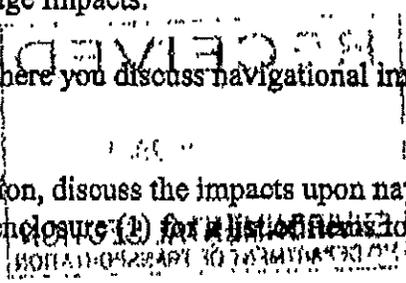
Dear Ms. Casey:

This is in reply to your February 28, 2002, letter inviting the Coast Guard to act as a Cooperating Agency for the National Environmental Policy Act (NEPA) process on the subject project. We agree to serve as a Cooperating Agency for the project from the navigational standpoint. We should be given the opportunity to review the Draft Environmental Impact Statement. Our review and recommendations on the vertical and horizontal clearance requirements for river traffic will be coordinated with your bridge designers.

Looking forward to acting as a Cooperating Agency, the following comments are offered:

- a. The title page for the document should show the U.S. Coast Guard as a Cooperating Agency.
- b. Table of Contents, (in the area where you list impacts):
 - (1) Include a Section entitled Navigational Impacts.
 - (2) Include a Section entitled Bridge Impacts.
- c. Document Text (in the sections where you discuss navigational impacts and bridge impacts):

(1) In the navigation impacts section, discuss the impacts upon navigation caused by the new bridge for the Missouri River. Use enclosure (1) for a list of items to be considered in the discussion.



MODOT-38 1A 11/11/02 11:00 AM

16591.1/43:8 MOR
March 18, 2002

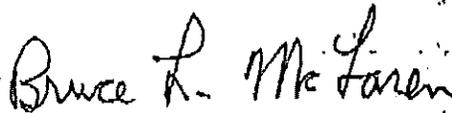
Subj: DANIEL BOONE HIGHWAY BRIDGE REPLACEMENT, MILE 43:8, MISSOURI RIVER

(2) In the bridge impacts section, discuss the impacts the bridge will have upon the items listed in enclosure (2). Limit your discussion to only those impacts between the two bridge abutments. The list is provided as a guide only; it is not intended that you complete the form and return it.

d. Enclosure (3) is an example of a navigational and bridge impacts discussion.

Please contact me at the above telephone number if you have questions regarding our comments or requirements.

Sincerely,



BRUCE L. MCLAREN

Project Manager

By direction of the District Commander

Encl: (1) Navigation Evaluation
(2) Environmental Assessment
(3) Sample Navigational and Bridge Impacts discussion

Copy: \MODOT/Environmental Studies/Carole Hopkins



MISSOURI DEPARTMENT OF CONSERVATION

Headquarters

2901 West Truman Boulevard, P.O. Box 180, Jefferson City, Missouri 65102-0180

Telephone: 573/751-4115 ▲ Missouri Relay Center: 1-800-735-2966 (TDD)

JOHN D. HOSKINS, Director

July 12, 2002

Larry Welty, P.E.
Transportation Planning Coordinator
Route 40/Daniel Boone Bridge Study Team
1590 Woodlake Drive
Chesterfield, MO 63017

Dear Mr. Welty:

This letter is in response to the Route 40/Daniel Boone Bridge Public Information Meeting that was held on June 26, 2002. Staff members from the St. Louis Regional Office were in attendance, and subsequently briefed the St. Louis Regional Coordination Team on the plans and issues discussed at the meeting. After some review and further discussion, The Missouri Department of Conservation (MDC) offers the following comments.

Alternatives 4 and 5 (see attached page) are our preferred alternatives. Either of these alternatives places the new bridge downstream of Weldon Springs Conservation Area, thereby avoiding direct impact to that property and its habitats, which include forested wetlands just above the existing bridge complex and dry-mesic forest on the slopes and uplands.

Furthermore, two side channels and a large sandbar located in the river just upstream of the existing bridge provide valuable spawning, nursery, and overwintering habitat for large river fishes. Channel habitats such as these have been greatly reduced over the last century through channelization of the river, and additional impacts would add to the cumulative detriment of aquatic communities in the Missouri River. Alternatives 4 and 5 also retain the existing bridge, avoiding another potential disturbance to the river that could result from demolition.

Thank you for allowing the Missouri Department of Conservation to provide input on this project.

Sincerely,

Mike Arduser
Chair, St. Louis Regional Coordination Team
Missouri Department of Conservation

COMMISSION

STEPHEN C. BRADFORD
Cape Girardeau

ANITA B. GORMAN
Kansas City

CYNTHIA METCALFE
St. Louis

HOWARD L. WOOD
Bonne Terre

U.S. Department
of Transportation

United States
Coast Guard



Commander
Eighth Coast Guard District

1222 Spruce Street
St. Louis, MO 63103-2832
Staff Symbol: obr
Phone: (314) 539-3900x2379
FAX: (314) 539-3755

16591.1/43.8 MOR
November 18, 2002

Mr. Mark Grossenbacher, P.E.
HNTB
10 South Broadway, Suite 400
St. Louis, MO 63102

Subj: PROPOSED BOONE HIGHWAY BRIDGE REPLACEMENT, MILE 43.8, MISSOURI
RIVER

Dear Mr. Grossenbacher:

Regarding the subject project, we have determined that the horizontal and vertical clearances in the navigation span must be at least the same as the existing bridge. Navigation span piers must also be placed to correspond with those of the existing bridge.

If you have any questions or need further assistance please call Mr. Bruce McLaren at the above telephone number.

Sincerely,

A handwritten signature in cursive script that reads "William F. Knutson".

WILLIAM F. KNUTSON
Acting Bridge Administrator
By direction of the District Commander

RECEIVED
NOV 19 2002
HNTB-STL



Office of the County Executive

St. Charles County

Joe Ortwerth
County Executive

December 30, 2002

cc - LARRY WORTH
DEBBIE ALLEN

Mr. Greg Horn, P.E.
Assistant District Engineer
Project Development
Missouri Department of Transportation
District 6
1590 Woodlake Drive
Chesterfield, MO 63017-5712

DEBBIE
LET'S MAKE SURE WE GET A
QUOTE FROM SOE WITHIN
ADVIS-TRAV FOR PUBLIC MEET
JH

Dear Mr. Horn:

Thank you for the briefing recently provided by you and the MACTEC Engineering and Consulting team on the status of the U.S. 40 Bridge Location, Cost, and Needs Study.

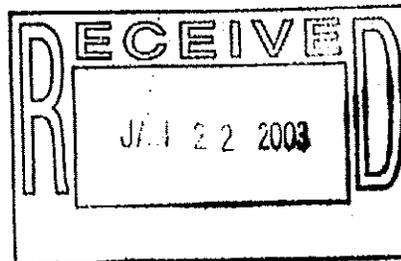
I continue to appreciate the hard work of the Department and the team on behalf of advancing the study effort to this juncture. I look forward to being advised of the scheduling of a public meeting this spring, thus allowing the public the opportunity to view the recommendation forthcoming.

Greg, kindly continue to communicate with Gary Elmestad as you work with the consultant team on the scheduling of a public meeting, and the release of the findings of the study to the public with regard to a new Missouri River bridge crossing. Thereafter, kindly advise on progress being made by the Department on completing the required Environmental Impact Statement (EIS) and securing a ROD (Record of Decision) by the close of 2003. Also, kindly advise on the inquiry that you offered to initiate during our meeting concerning attainment issues related to lane capacity expansion projects.

Again, many thanks for the hard work of those involved with this project initiative and for the excellent briefing once again provided during your visit to my office.

Sincerely,

Joseph R. Ortwerth
St. Charles County Executive

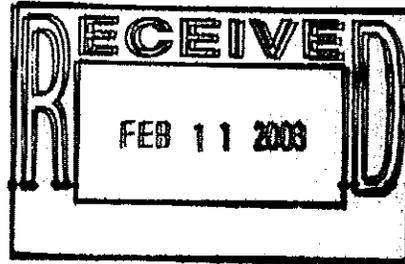




690 Chesterfield Pkwy W • Chesterfield MO 63017-0760
Phone: 636-537-4000 • Fax 636-537-4798 • www.chesterfield.mo.us

February 7, 2003

Mr. Greg Horn, P.E.
Assistant District Engineer
Project Development
Missouri Department of Transportation
1590 Woodlake Drive
Chesterfield, Missouri 63017-5712



Dear Mr. Horn:

Thank you for affording our City Administrator the opportunity to attend a briefing provided by the Missouri Department of Transportation and MACTEC Engineering and Consulting team on January 30, 2003, regarding the Route 40/61 Bridge Location Study. Although I was unable to attend, Mr. Herring has thoroughly updated me with regard to the information that was provided at that meeting.

With this in mind and having reviewed the material presented at the briefing, the City of Chesterfield is in agreement with the study team that the preferred alternative for this bridge study is Alternative A2'. The City is especially appreciative of the fact that this alternative lends itself to a possible bicycle/pedestrian connection from proposed bikeways in Chesterfield to the Katy Trail. The City is also in favor of the connection from westbound Chesterfield Airport Road to the collector-distributor road system and the connection of that system to the existing westbound bridge.

Please continue to keep us informed regarding progress being made on completion of the Environmental Impact Statement, and the scheduling of a public hearing for this project.

Thank you again for the work of those involved with this project.

Sincerely,


John M. Nations
Mayor

CC: Michael G. Herring, City Administrator
Ray Steege, MACTEC
Steve Coates, MACTEC

Jim



U.S. Department of Transportation

Federal Transit Administration
901 Locust Street, Room 404
Kansas City, MO 64108
816-329-3920
816-329-3921 (fax)

Federal Highway Administration
209 Adams St
Jefferson City, MO 65101
573-636-7104
573-636-9283 (fax)

March 10, 2003

Mr. Les Sterman, Executive Director
East-West Gateway Coordinating Council
10 Stadium Plaza
St. Louis, Missouri 63102-1714

Re: St. Louis Metropolitan Area Air Quality
Conformity Determination

Dear Mr. Sterman:

The Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA) concur in the East-West Gateway Coordinating Council's January 29, 2003 Air Quality Conformity Determination. This determination concluded that the projects and programs included in the St. Louis Region's 2025 Transportation Plan, *Legacy 2025*, as amended through the St. Louis FY 2003-2005 Transportation Improvement Program are in conformity with the requirements of the Clean Air Act Amendments of 1990 and the relevant sections of the Final Conformity Rule 40 CFR Part 93.

Sincerely,

Mokhtee Ahmad
Regional Administrator
Federal Transit Administration

Allen Masuda
Division Administrator
Federal Highway Administration

- cc: EPA Region 7
- EPA Region 5
- FTA Region 7
- FTA Region 5
- FHWA HQ-HENE
- FHWA MRC
- FHWA Missouri Division
- FHWA Illinois Division
- Missouri DOT
- Illinois DOT
- Missouri Dept. of Natural Resources
- Illinois EPA
- Bi-State Development Agency



DEPARTMENT OF THE ARMY

ST. LOUIS DISTRICT, CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

March 20, 2003

REPLY TO
ATTENTION OF:

Regulatory Branch
File Number: 200200230

Ms. Peggy J. Casey
Federal Highway Administration
Environmental Programs Engineer
209 Adams Street
Jefferson City, Missouri 65101

Dear Ms. Casey:

This letter is in response to your request (fax dated March 3, 2003) for the U.S. Army Corps of Engineers to be a cooperating agency by reviewing project documents and providing comments related to our jurisdiction and expertise regarding the Route 40/61 bridge over the Missouri River. The project extends from 0.5 miles east of Route 94 to 0.6 miles east of Chesterfield Airport Road, and is located in the northeast one-quarter of Section 34, Township 46 North, Range 3 East, at approximate Missouri River mile 43.9.

The Corps of Engineers, St. Louis District, Regulatory Branch will participate as a cooperating agency by reviewing project documents, attending meetings and site visits, and providing comments related to our jurisdiction and expertise. In addition, if any fill material is to be placed in wetlands or below the ordinary high water elevation of the Missouri River, a Section 404 of the Clean Water Act permit (and possibly a Section 10 of the Rivers and Harbors Act of 1899 permit) must be issued by this office prior to project construction.

If you have any questions concerning this matter, please feel free to contact me at (314) 331-8579. I will be the point-of-contact for this project. Please include the following identification number with any future inquiries regarding this project: 200200230.

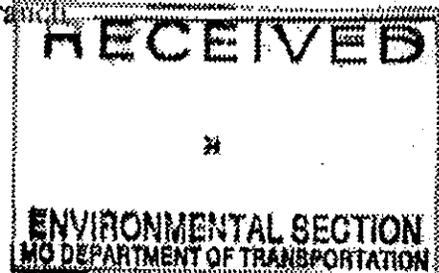
Sincerely,

Craig J. Litteken
Rivers Project Manager
Regulatory Branch

FHWA
MO DIV
RECEIVED

MAR 24 2003

DA	
ADA	
PE	
EC	<input checked="" type="checkbox"/>
SFTY	
ADM	
P&R	
OE	
BR	
ROW	
OMCS	
ESCLK	



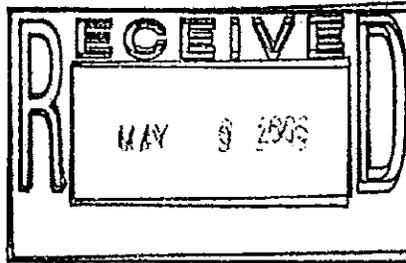
U.S. Department of
Homeland Security

United States
Coast Guard



Commander
Eighth Coast Guard District

1222 Spruce Street
St. Louis, MO 63103-2832
Staff Symbol: obr
Phone: (314)539-3900 Ext 2379
Fax: (314)539-3755
Email: bmclaren@cgstl.uscg.mil



16591.1/43.8 MOR
May 2, 2003

Mr. Steve Coates
MACTEC
3199 Riverfront Tech Center Drive
St. Louis, MO 63043

Subj: PROPOSED BOONE HIGHWAY BRIDGE REPLACEMENT, MILE 43.8, MISSOURI RIVER

Dear Mr. Coates:

We have completed our review of the Draft Environmental Impact Statement (DEIS), dated April 18, 2003, on the Boone Highway Bridge replacement project. It meets the needs of the Coast Guard and will support an application for a Coast Guard Bridge Permit. If you have any questions, please contact Mr. Bruce McLaren at the above telephone number.

Sincerely,

A handwritten signature in black ink, appearing to read "Roger K. Wiebusch".

ROGER K. WIEBUSCH
Bridge Administrator
By direction of the District Commander

Copy: Mr. Donald Neumann, P.E., FHWA
Mr. Kevin Kieth, Chief Engineer, MODOT



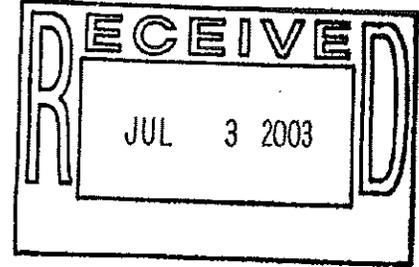
DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

July 1, 2003

REPLY TO
ATTENTION OF:

Regulatory Branch
File Number: 200200230

Mr. Steve Coates
MACTEC
3199 Riverport Tech Center Drive
St. Louis, Missouri 63043



Dear Mr. Coates:

This letter is in response to your request for the U.S. Army Corps of Engineers to review and comment on the draft Environmental Impact Statement (EIS) prepared for the Route 40/61 bridge over the Missouri River. The project proposal involves construction of a new four-lane bridge, and extends from the Missouri Research Park overpass to Chesterfield Airport Road. It is located in the northeast one-quarter of Section 34, Township 46 North, Range 3 East, at approximate Missouri River mile 43.9.

The Corps of Engineers, St. Louis District, Regulatory Branch has reviewed the draft EIS and has developed the following comments:

1. Section 10 of the Rivers and Harbors Act of 1899 was not mentioned in the draft EIS. Section 10 should be mentioned, as it will be one of the required permits from this office. Section 10 of the Rivers and Harbors Act assigns responsibility to the Secretary of the Army to regulate virtually any construction, excavation, or deposition of materials in, over, or under navigable waters of the United States (Missouri River), or any work that could affect the course, location, condition, or capacity of those waters. This ensures that no activity shall impede or interrupt commercial navigation. A Section 10 permit will be required for approachway work that is over the Missouri River, and may be required for work associated with the main bridge structure if temporary docking, dredging, or other various activities are proposed as part of the bridge construction.
2. The draft EIS references forested, scrub-shrub, and emergent wetlands within the study corridor. At this time, these wetlands are considered jurisdictional and any impacts to these wetlands will require a Section 404 of the Clean Water Act permit and/or a Section 10 of the Rivers and Harbors Act of 1899 permit.
3. The draft EIS topographical maps show blue-line streams within the study corridor. At this time, these streams are considered jurisdictional and any impacts to these streams will require a Section 404 of the Clean Water Act permit and/or a Section 10 of the Rivers and Harbors Act of 1899 permit.

If you have any questions concerning these comments, please feel free to contact me at (314) 331-8579. Please include the following identification number with any future inquiries regarding this project: 200200230.

Sincerely,

A handwritten signature in black ink, appearing to read "Craig J. Litteken". The signature is fluid and cursive, with the first name "Craig" being the most prominent.

Craig J. Litteken
Rivers Project Manager
Regulatory Branch

Copy furnished:

Ms. Lois Dumey
MACTEC
3199 Riverport Tech Center Drive
St. Louis, Missouri 63043

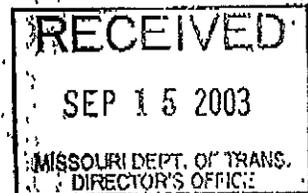


Office of the County Executive

St. Charles County

Joe Ortwerth
County Executive

September 9, 2003



Mr. Donald Neumann, Programs Engineer
Federal Highway Administration
209 Adams Street
Jefferson City, MO 65101-3203

Dear Mr. Neumann:

On behalf of the 300,000 plus St. Charles Countians who are my constituents, I am writing in response to the posting in the Federal Register dated Friday, August 8, 2003, in support of the approval of an Environmental Impact Statement (EIS) and Record of Decision (ROD) for a new U.S. Route 40-61 Bridge over the Missouri River (St. Charles and St. Louis Counties, Missouri).

As you may know, I have been a long time advocate of building a new river crossing between St. Charles and St. Louis Counties along the Highway 40-61 corridor. When the Federal Highway Administration agreed to issue a design exception to the Missouri Department of Transportation (MoDOT) allowing for three lanes of traffic on the 1935 substandard bridge, I pledged to continue pursuing the construction of a new bridge. In fact, when it was learned that MoDOT did not have the resources to fund a Location, Cost, and Needs Study, St. Charles County provided the necessary funds allowing the study initiative to commence.

I have attached articles that have recently appeared in local newspapers along with correspondence. These articles demonstrate the growing public interest and concern about this project. The new bridge project has been endorsed by the St. Charles County Journal, the local chambers of Commerce, and the St. Charles County Economic Development Council. In addition, the recent Public Hearing/Open House was well attended by the public and by their Federal, State, and local elected officials in support of building a new bridge.

In the late 1990's, I began pushing for this study because I recognized the need for additional bridge lanes to handle the traffic volume, which grew from 62,000 trips per day across the Daniel Boone Bridge in 1999, to 82,000 last year. This is a 33 percent increase within just a 3-year period of time! This bridge, with wider lanes and full

shoulders, will provide for safer passage over the Missouri River. Furthermore, the new bridge will serve the traveling public along the future I-64 High Tech Corridor, an area that is increasingly serving as the economic engine of the Greater St. Louis area, with MasterCard, Citi Mortgage, Enterprise Leasing, the Missouri Research Park, and other major employers locating their facilities, and in some instances, their world headquarters on the corridor. This bridge will also be a vital link in the Avenue of the Saints.

I urge the Federal Highway Administration to grant expedited approval to the Environmental Impact Statement for this project, and encourage the issuance of a favorable Record of Decision for this project. Thank you for your efforts to improve the performance of our transportation system in the Midwest.

Sincerely,



Joe Ortwerth
County Executive

cc: The Honorable Christopher "Kit" Bond
United States Senate

The Honorable James Talent
United States Senate

The Honorable Todd Akin
Member of Congress

St. Charles County Legislative Delegation

Mr. Kevin Keith, Chief Engineer
Missouri Department of Transportation

Mr. Ed Hassinger, District Engineer
Missouri Department of Transportation
District 6

Bob Holden
Governor



EMERGENCY MANAGEMENT AGENCY

DEPARTMENT OF PUBLIC SAFETY
OFFICE OF THE ADJUTANT GENERAL

PO Box 116, Jefferson City, Missouri 65102
Phone: 573/526-9100 Fax: 573/634-7966
E-mail: mosema@mail.state.mo.us



September 9, 2003

Mr. Kevin Keith, Chief Engineer
Missouri Department of Transportation
P.O. Box 270
Jefferson City, Missouri 65102-0270

RE: U.S. Route 40/61 Bridge, Job Number J6P1436

Dear Mr. Keith:

We very much appreciate the opportunity to comment regarding the draft environmental impact statement for the above referenced project. Please accept this letter as comment on the proposed project.

The State of Missouri is a participant in the National Flood Insurance Program (NFIP). Any development associated with this project located within a special flood hazard area as identified by the Federal Emergency Management Agency (FEMA) must meet the requirements of the State of Missouri Executive Order 98-03. This would require obtaining a floodplain development permit for the project. This permit must be obtained prior to the commencement of the construction/development activity. The permit would be obtained from this agency.

If the development is located within a regulatory floodway, a "no-rise" certificate/statement as to the effects of possible flooding is required before the development can be permitted. This analysis must be performed by a licensed engineer.

If you have any questions concerning Executive Order 98-03 requirements, please contact me at (573) 526-9141.

Sincerely,

George Riedel
Floodplain Management Manager

GR:psh

cc Connie Wisniewski, Mitigation Specialist, FEMA Region VII
MODOT File,
Community File - St. Charles and St. Louis County

11/11/03 11:34 AM



O'Fallon Chamber of Commerce

2897 Hwy K., Suite 200 St. Johns Bank Building O'Fallon, Missouri 63366

September 19, 2003

Mr. Donald Neumann, Programs Engineer
Federal Highway Administration
209 Adams Street
Jefferson City, MO 65101-3203

Dear Mr. Neumann:

For the past twenty years, St. Charles County has seen phenomenal growth in the number of residential, commercial, and retail developments. During the past decade, these developments, low crime and a good quality of life have contributed to explosive population increases and traffic in our county and city.

The Chamber recognizes the need for additional bridge lanes to handle the traffic volume, which has grown from 62,000 trips per day across the Daniel Boone Bridge in 1999, to 82,000 in 2002. A bridge, with wider lanes and full shoulders, will provide for safer drives to and from work for commuters on both sides of the Missouri River as growth, development, and traffic along the U.S. Route 40-61 and future I-64 High Tech Corridor increases. On a broader scale, a new bridge will also provide for safer travel for the taxpaying traveling public.

The O'Fallon Chamber of Commerce Board of Directors urges the Federal Highway Administration to grant expedited approval to the Environmental Impact Statement for the new Missouri River Bridge Project and encourages the issuance of a favorable Record of Decision.

Thank you for your consideration and your efforts in making highway travel safer in O'Fallon and the Midwest.

Sincerely,

Sue Proost
Chairman

Scott Tate
President / CEO

Cc: Joe Ortwerth, St. Charles County Executive
Gary Elmestad, Gary Elmestad & Associates



CHESTERFIELD COMMUNITY DEVELOPMENT CORPORATION

(The Industrial Development Authority of the City of Chesterfield, Missouri)

Officers

Dennis Riggs
President

Rodney Falgout
Vice President

William Schweikert
Secretary

Eric Winschel
Treasurer

Directors

Ashok Agrawal

Glenn Borgard

Steve Domahidy

Douglas Elliott

Alan Politte

Rudy Stinnett

Wendy Wells

Thomas Sandifer

Executive Director

Joel A. Smiley

September 22, 2003

Mr. Donald Neumann, Programs Engineer
Federal Highway Administration
209 Adams Street
Jefferson City, Missouri 65101-3203

Dear Mr. Neumann:

On behalf of the Chesterfield Community Development Corporation (CCDC) and an active business/civic organization known as the Chesterfield Valley Coalition, I want to voice our support of MoDOT's preferred Alternative A2 plan that calls for making improvements to the existing Daniel Boone bridges on U.S. Route 40/61 and adding a new one over the Missouri River. We also favor the approval of the Environmental Impact Statement (EIS) for this expansion project, and encourage the issuance of a positive Record of Decision (ROD).

We join our colleagues in St. Charles County who feel that this bridge expansion is vital to reducing traffic congestion that is getting out of control due to widespread development on both sides of the river. More vehicles are traveling back and forth over the existing bridges because more people are living in newer subdivisions and apartment complexes in St. Charles and commuting to jobs in the City of St. Louis and St. Louis County, and vice versa. Evidence of this phenomenon can be seen in the increase of traffic volume, which is well documented. Between 1999 and 2002, the number of trips per day across the Daniel Boone Bridge grew from 62,000 to 82,000, up 33-percent within a 3-year period of time.

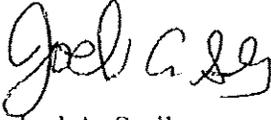
Access to Chesterfield Commons in the Valley, which is considered one of the nation's largest retail power centers, and to major employers (i.e. MasterCard, Citi Mortgage, Enterprise Leasing and Missouri Research Park) in St. Charles County offering high-tech jobs is crucial to the economies on both sides of the river. The number of businesses now operating in Chesterfield Valley is close to 500. This is quite a turnaround from the total of 240 businesses that existed in the Valley prior to the flood of '93. If we want them to grow and prosper, thus stimulating job growth, then we need to do all we can to make sure nothing impedes the flow of consumer traffic to their establishments. The same holds true for major companies along the I-64 High Tech Corridor that can't find highly qualified job candidates because no one wants to spend four hours a day commuting to and from work.

We urge the Federal Highway Administration to grant expedited approval of this Daniel Boone Bridge expansion project because its vital to the economic survival of

-more-

communities on both sides of the river and increases driver/passenger safety with wider lanes and full shoulders. Thank you for your efforts to improve the performance of our transportation system in the Midwest.

Sincerely,



Joel A. Smiley
Executive Director
Chesterfield Community Development Corporation (CCDC)/
Chesterfield Valley Coalition

cc: The Honorable Christopher "Kit" Bond
United States Senate

The Honorable James Talent
United States Senate

The Honorable Todd Akin
U.S. Congressman, Second District

St. Charles County Legislative Delegation

Mr. Kevin Keith, Chief Engineer
Missouri Department of Transportation

Mr. Ed Hassinger, District Engineer
Missouri Department of Transportation
District 6



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

RECEIVED
SEP 25 2003
MISSOURI DEPT. OF TRANSPORTATION
DIRECTOR'S OFFICE

SEP 23 2003

Mr. Don Neumann
Programs Engineer
Federal Highway Administration
209 Adams Street
Jefferson City, MO 65101-3203

Dear Mr. Neumann:

RE: Draft Environmental Impact Statement for U.S. Route 40/61 Bridge Location Study over the Missouri River, St. Charles and St. Louis Counties, Missouri

The Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the U.S. Route 40/61 Bridge Location Study over the Missouri River. Our review is provided pursuant to the National Environmental Policy Act (NEPA) 42 U.S.C. 4231, Council on Environmental Quality (CEQ) regulations 40 C.F.R. Parts 1500-1508, and Section 309 of the Clean Air Act (CAA). The DEIS was assigned the Council on Environmental Quality (CEQ) number 030354.

Based on our overall review and the level of our comments, the EPA rated the Draft Environmental Impact Statement for this project EC-2 (Environmental Concerns-Insufficient Information). Please refer to the attached "*Summary of Rating Definitions*" for further details on EPA's rating system.

EPA's environmental concerns are based on the fact that Level of Service (LOS) for all of the build alternatives is "D" - which has the characteristics of "approaching unstable flow, lower speeds". Given this expected level of service at the design year, we are concerned that an additional project will be required shortly after the project is built to re-upgrade the river crossing to provide an adequate traffic flow. An additional project would create secondary disturbance with accompanying environmental impacts.

The Draft EIS also presents insufficient information regarding the approaches and roadway modification to connect the existing traffic way to the new bridge configuration and the extent of the environmental impacts to the floodplain (which are identified but not explained).



Additional comments related to our review of the DEIS are attached. These comments generally request clarification on several environmental discussions including hazardous waste sites, farmland protection, wetlands, air quality, and threatened or endangered species, along with general comments related to mitigation and implementation of the project.

EPA appreciates the opportunity to review and comment on the DEIS. Please send a single copy of the Final EIS to the address indicated on the letterhead above (Mail Routing: ENSV/IO) when it is filed with EPA's Washington, D.C. office. If you have any questions, please contact Ms. Kim Johnson, NEPA Reviewer at (913) 551-7975.

Sincerely,



U. Gale Hutton, Director
Environmental Services Division

cc: Mr. Kevin Keith, MODOT

DETAILED COMMENTS
U.S Route 40/61 Bridge Location Study over the Missouri River
St. Charles and St. Louis Counties

3.0 Affected Environment

Figure 3-1 shows four (4) potential hazardous waste sites in the project area and Section 3.0 states that these sites are unconfirmed database sites obtained from a nonspecific search of related facilities. Later in the document, Section 4.17 states that the only hazardous waste site identified within the project area is associated with petroleum spills and/or releases into the Missouri River, but the four potential sites are not discussed. We recommend including a discussion of further investigation, or site analysis that determines if the four potential sites exist, and if so, do they present any project-relevant environmental issues.

Section 3.0 states that, "(T)he Missouri River valley in St. Louis County has developed rapidly in the past decade, although the land nearest the bridges is used mostly for agriculture". Section 4.1.4 states that 146.8 acres will be used for agriculture/floodplain/conservation. Section 4.2 states that "(L)and associated with the proposed project is either within the Chesterfield or Weldon Spring city limits or has otherwise been set aside for specific uses. Therefore, it meets the definition of "land committed to other uses" as contained in the Farmland Protection Policy Act (FPPA), and farmland impact will not be further evaluated". These statements seem to be contradictory. Please clarify the farmland /agricultural use issue and explain if farmland within a city limit would or would not be subject to the FPPA.

Figure 3-1 shows palustrine emergent (PEM) wetlands located near the existing roadway on the east end of the project area, but the document does not specifically discuss the approaches and roadway modification that will be required to connect the existing roadway to the new bridge configuration. Please include a discussion of the extent of the roadway modification and its effects on these wetlands and any other environmental impacts associated with the new alignment.

4.0 Environmental Consequences

Section 4.3.8 Environmental Justice states that the study area does not contain high populations of minorities or low-income groups when compared with the State of Missouri and the counties, with a reference to Tables 4-5 and 4-8. Table 4-5 shows the demographic characteristics and table 4-8 lists the racial characteristics, but the income and economic discussion is included in Section 4.5. For clarification, we would suggest revising the reference to identify the correct section to justify this statement.

Section 4.6.2 Traffic Volume Forecasts (2034) states that all of the build alternatives produce level of service (LOS) D conditions, which has the characteristics of approaching unstable flow; lower speeds. Please address whether this LOS D condition is adequate to maintain traffic flow along US40/61, what it would take to raise the LOS to a higher value of C or above, and why the

alternatives do not include an upgrade to a higher LOS. Please also include a discussion of what the projected LOS conditions are for the roadway on each side of the bridge during the design year and how this compares with the build alternative.

Section 4.7 Air Quality Impacts states that no tests are required to establish conformity for carbon monoxide (CO) in the limited CO maintenance area. The CO maintenance area in the St. Louis area is encompassed by I-270 and the Mississippi River. Since this project is not located in the CO maintenance area, we would recommend deleting this reference to reduce confusion.

In addition, the PM fine and 8-hour ozone national air quality standards are currently being implemented. Designations for attainment and nonattainment areas for the 8-hour ozone are scheduled to be published on April 15, 2004, and the PM fine designations are scheduled to be published in December 2004. Based on monitoring, St. Louis is projected to be nonattainment for both standards. If designated nonattainment, all transportation projects in the area will be subject to transportation conformity analysis one year after the publication date of nonattainment areas. Recognizing that construction is scheduled to begin in 2014, this project may be subject to conformity analysis for both 8-Hour Ozone and PM fine.

Section 4.12 Floodplain Impacts states that Alternatives A1, A2 and A2' (preferred) would each potentially impact approximately 7.2 ac of 100-year floodplain while B3 and B5 would each potentially impact 9.0 ac of 100-year floodplain. Please explain what impact is expected, how it will be addressed and mitigated, and if the floodplain impacts also impact the wetlands in the project area.

Section 4.12.1 Hydrologic Analysis states that additionally, the preferred alternative impacts 4,100 ft of the Missouri River floodplain. However, approximately 2,800 feet of this total is levee-protected by the Monarch Levee system leaving approximately 1,300 feet of impact to floodplain that is not levee-protected. Again, please explain what impact is expected and how it will be addressed and mitigated.

Section 4.14.1 Resources in the Project Area states that bald eagles prefer trees greater than 11 inches in diameter at breast height and within 100 to 600 ft of water for perching sites. Section 4.14.2 Environmental Consequences states that some tree clearing will be done for clearing of right of way, and that MoDOT's tree planting policy of planting more trees than are removed could actually result in a long-term benefit because of the overall increase in the total number of trees. Since the tree planting policy does not address trees used by bald eagles, please explain what, if anything, will be done to identify and protect these trees.

Section 4.20 Construction Impacts - Air monitoring stations in the St. Louis area are currently measuring ambient concentrations above the 8-hour ozone and PM fine air quality standards, therefore, additional mitigation to reduce air quality impact during construction should be considered for this project. For example, reduction of Ozone and PM fine precursors could be accomplished by requiring engine retrofits or alternative fuels such as bio-diesel in both on-road and off-road diesel engine construction equipment.

Draft Environmental Impact Statement Rating Definitions

Environmental Impact of the Action

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative. EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

"Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.



MISSOURI SENATE
JEFFERSON CITY

RECEIVED

OCT 14 2003

MISSOURI DEPT. OF TRANSPORTATION
DIRECTOR'S OFFICE

September 23, 2003

Mr. Donald Neumann, Programs Engineer
Federal Highway Administration
209 Adams Street
Jefferson City, MO 65101-3203

Dear Mr. Neumann:

We are taking this opportunity to respond to the Federal Register dated Friday, August 8, 2003, in support of the approval of an Environmental Impact Statement (EIS) and a Record of Decision (ROD) for the proposed U.S. 40 Missouri River Bridge crossing between St. Charles and St. Louis Counties, Missouri.

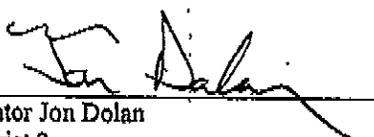
Several members of the legislature had an opportunity to attend the recent Open House/Public Meeting, while some were not able to attend due to the need to prepare for the recent veto session and special session of the Missouri General Assembly. We are all familiar with the need to address the substandard bridge condition that presently exists. Future traffic counts for the U.S. 40 corridor are projected to be astronomical. Furthermore, the safety of the taxpaying traveling public is of paramount concern.

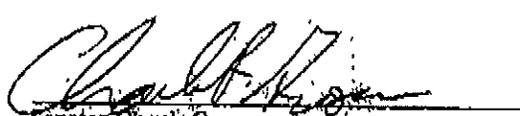
We are staunch supporters of the need to upgrade the major Federal-aid highway and bridge system in and around St. Charles County, Missouri. We are anxious for the Federal Highway Administration and the cooperating agencies to issue the documentation sought, which thereafter, will allow the initiative to commence to identify the necessary resources to advance this project initiative into a design phase.

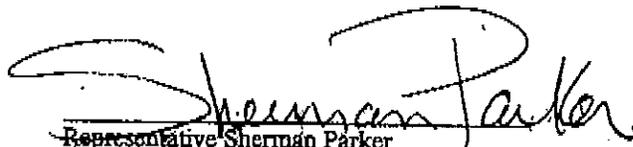
Priority consideration must be given to this bridge crossing not only to address safety and congestion, but also to accommodate the explosive growth on U.S. 40, with many major corporations having chosen to locate along the corridor. A new bridge will also serve the important corridor known as the Avenue of the Saints (St. Louis, Missouri, to St. Paul, Minnesota).

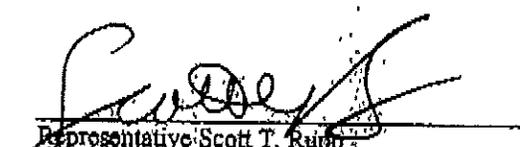
We are requesting that the Federal Highway Administration approve the EIS and ROD for the new U.S. 40 bridge at the earliest possible date, and want to thank officials of FHWA for past actions that have greatly benefited the motoring public.

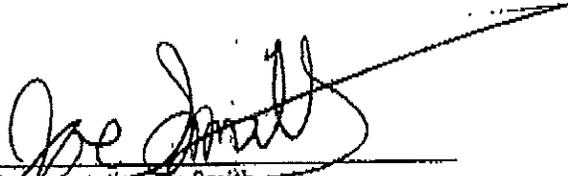
Sincerely,


Senator Jon Dolan
District 2

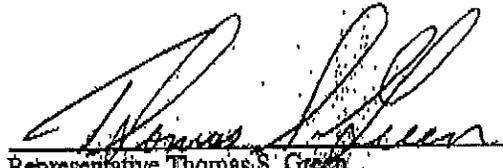

Senator Chuck Gross
District 23


Representative Sherman Parker
District 12


Representative Scott T. Rupp
District 13



Representative Joe Smith
District 14



Representative Thomas S. Green
District 15



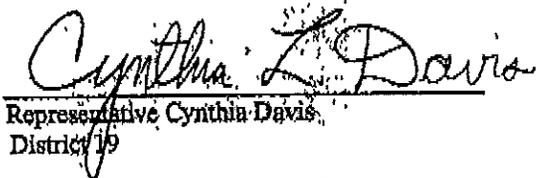
Representative Carl Beards
District 16



Representative Vicki Schneider
District 17



Representative Tom Deppsey
District 18



Representative Cynthia Davis
District 19



Representative Kevin Threlkeld
District 109

cc: The Honorable Christopher "Kit" Bond
United States Senate

The Honorable James Talent
United States Senate

The Honorable Todd Akin
Member of Congress

Mr. Kevin Keith, Chief Engineer
Missouri Department of Transportation

Mr. Ed Hassinger, District Engineer
Missouri Department of Transportation
District 6



DEPARTMENT OF THE ARMY

ST. LOUIS DISTRICT, CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

September 25, 2003

REPLY TO
ATTENTION OF:

Regulatory Branch
File Number: 200200230

Mr. Raymond M. Steege
MACTEC
3199 Riverport Tech Center Drive
St. Louis, Missouri 63043

Dear Mr. Steege:

This letter is in response to your request for the U.S. Army Corps of Engineers to review and comment on the revised draft Environmental Impact Statement (EIS) prepared for the Route 40/61 bridge over the Missouri River. The project proposal involves construction of a new four-lane bridge, and extends from the Missouri Research Park overpass to Chesterfield Airport Road. It is located in the northeast one-quarter of Section 34, Township 46 North, Range 3 East, at approximate Missouri River mile 43.9.

The Corps of Engineers, St. Louis District, Regulatory Branch has reviewed the revised draft EIS and has developed the following comment:

1. The office symbol in the address block for the Corps of Engineers, St. Louis District, Regulatory Branch (page 7-1 of the EIS) should be changed from "CELMS-CO-F" to "CEMVS-CO-F."

At this time, we have no further comments regarding the revised draft EIS. If you have any questions, please feel free to contact me at (314) 331-8579. Please include the following identification number with any future inquiries regarding this project: 200200230.

Sincerely,

CRAIG J. LITTEKEN

Craig J. Litteken
Rivers Project Manager
Regulatory Branch

Copy furnished:

✓ Mr. Steve Coates
MACTEC
3199 Riverport Tech Center Drive
St. Louis, Missouri 63043

Ms. Lois Dumey
MACTEC
3199 Riverport Tech Center Drive
St. Louis, Missouri 63043

RECEIVED
SEP 30 2003
MISSOURI DEPT. OF TRANS.
DIRECTOR'S OFFICE

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Bob Holden, Governor • Stephen M. Mahfood, Director

www.dnr.state.mo.us

SEP 25 2003

Mr. Don Neumann
Programs Engineer
Federal Highways Administration
209 Adams Street
Jefferson City, MO 65101

Mr. Kevin Keith ✓
Chief Engineer
Missouri Department of Transportation
P.O. Box 270
Jefferson City, MO 65102

Re: U.S. Route 40/61 Bridge Location Study, St. Louis and St. Charles Counties, Missouri,
Draft Environmental Impact Statement

Dear Messrs. Neumann and Keith:

Thank you for the opportunity to review and respond to the Draft Environmental Impact Statement (DEIS) for the U.S. Route 40/61 Bridge Location Study.

The department's comments on this DEIS are enclosed. We appreciate the opportunity to provide comments on this transportation project. We ask that these comments be included as part of the Final EIS, in order to better formalize the comment process. If you have any questions or need clarification, please contact me or Ms. Jane Beetem, phone number 573-522-2401. Her address for correspondence is Department of Natural Resources, P.O. Box 176, Jefferson City, MO 65102.

Two issues that are not addressed in the attached comments, but that MoDOT and FHWA may wish to give additional thought, are future rapid transit needs and potential flooding of the eastern approach to the bridge. First, the department supports the recommendation in the DEIS to retain the existing westbound bridge. Should rapid transit between St. Louis and St. Charles Counties ever be reconsidered, this bridge may prove an invaluable resource. Second, both the natural and the altered floodplain in the vicinity of the existing and planned bridge structures are greatly constricted. In 1993 the levee was breached upstream of this location and water flowed



MISSOURI DEPARTMENT OF NATURAL RESOURCES
ADULTS ONLY

Integrity and excellence in everything we do



Page 2

across the existing highway, closing down a vital transportation route. Although Plates 14 & 15 in Appendix E show no new constriction of the river due to the new bridge, and improvements to the Monarch-Chesterfield Levee have been completed, flood heights have been documented as increasing along the Missouri River. Therefore MoDOT may wish to evaluate the roadway elevation at the eastern approach and the possible use of structure to allow water to flow under rather than over the bridge approach. Appropriate design will assure that the approach does not contribute to flooding in this area, and that future inundation of the roadway is unlikely if another disastrous flood such as the Flood of 1993 should occur.

Thank you for your consideration of these matters.

Sincerely,

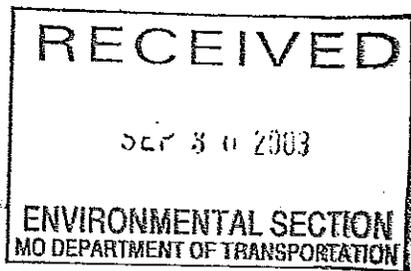
DEPARTMENT OF NATURAL RESOURCES



Stephen Mahfood
Director

/jb

Attachment



**COMMENTS OF THE
MISSOURI DEPARTMENT OF NATURAL RESOURCES
SEPTEMBER 23, 2003**

**DRAFT ENVIRONMENTAL IMPACT STATEMENT
U.S. ROUTE 40 BRIDGE LOCATION STUDY
ST. LOUIS AND ST. CHARLES COUNTIES**

Parks and Recreation

The Division of State Parks commends MoDOT for the consideration given to providing a bicycle and pedestrian lane on the westbound bridge, as proposed in Preferred Alternative A2'. The Division also applauds MoDOT's continued coordination with local and regional stakeholders regarding the incorporation of existing and proposed bicycle/pedestrian trails and corridors.

Pertaining to temporary closure of the Katy Trail State Park, the Division is concerned that closing for even a short duration will inconvenience trail users to an unacceptable degree, particularly in this high use area. The Division suggests halting trail traffic during different times of the day when necessary, or providing a temporary alternate route in close proximity to the existing route to avoid trail traffic/construction conflicts. Additionally, it is vital the Katy Trail remain open during the Lewis and Clark Bicentennial Commemoration. The portion of the trail that runs from Machens to Boonville has been designated a segment of the Lewis and Clark National Historic Trail and will host a great influx of users who will be retracing the route during the bicentennial and participating in commemoration activities. The Division is also concerned with potential physical impacts to trail users and asks that the trail be covered during construction.

A review of records within the Division of State Parks indicates that the project does not impact lands funded by the Land and Water Conservation Fund (LWCF).

Geology

About half of the project overlies the Missouri River alluvial aquifer. This is a shallow, unconfined aquifer with a water table that is relatively close to land surface. Fluids and soluble substances can affect groundwater quality if they are spilled and not contained. Normal construction activities should not adversely affect groundwater quality in this area unless spills occur. If abandoned wells are discovered in the project area they should be plugged to prevent them from causing groundwater degradation. The northern part of the project area is underlain by mostly Mississippian age bedrock, specifically the Burlington-Keokuk formations, with the potential for small remnant outliers of the Mississippian Warsaw Formation. These formations are dominantly limestone, and as such there is considerable potential for karst features in the area. The report should address the potential for karst features in the project area, how interception of karst features could potentially affect water quality, and how these features would be addressed during construction.

The Route 40/61 Bridge, being partially built in the floodplain, could be severely affected by a large earthquake in the New Madrid Seismic Zone. Possible impacts due to earthquakes should be addressed in the report and during design of the bridge.

Hazardous Wastes

The Budget and Planning Section of the department's Hazardous Waste Program maintains a database of registered Missouri hazardous waste generators. Missouri hazardous waste generators are required to report all hazardous waste they generate. The section conducted a database search for generators in the areas of the projects and identified 27 sites registered as hazardous waste generators in the project area. A list of these sites is attached.

The Tanks Section maintains a database of active underground storage tanks and release sites. The Tanks Section requires notification of release, abatement, and corrective action at tank release sites. A database search was conducted for registered tank sites in the areas of the projects, and three sites were found in the project area. A list of these sites is attached.

The Superfund Section maintains a database of active Superfund sites. The Superfund Section conducted a search and found one site near the project area: Hellwig Fruit Stand, 17800 Chesterfield Airport Road, Chesterfield, Missouri 63005-1216.

The project planners will need to determine whether these sites are located within the actual areas of concern. The program recommends additional investigation of any sites or facilities identified within the area of concern be undertaken. The planners should review the department's files and the Environmental Protection Agency (EPA) Region VII files as part of their investigation for additional information on facilities or sites named. Based on current information, the Federal Facilities, Permits, Enforcement and Voluntary Cleanup Sections did not identify any additional sites or impacts in the project area.

We cannot guarantee that there are no other facilities or sites in the area. It is possible that unreported facilities or contaminated sites, of which the program is either not aware or with which they are not actively involved, may exist in this vicinity.

Further research may be pursued through the EPA's tracking record, Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), which lists all sites suspected of having had a release of a hazardous substance. To request information regarding the EPA's CERCLIS record, please contact Karen Flournoy of the U.S. EPA Region VII at (913) 551-7003.

Paper files regarding complaints, spills, and closed investigations may be available in the central file facility. If the planners wish to review files in person, they may contact the file manager, Rhonda Loveall, at (573) 751-3176.

Any waste or debris produced or encountered during construction should be properly characterized, managed, and disposed of during the construction process. In the event that waste suspected to be hazardous is encountered, construction activities should be stopped and the Hazardous Waste Program should be notified.

Active Hazardous Waste Generators for the St. Louis and St. Charles Counties

Missouri ID	Epa ID	Facility Status	Facility Name	Facility Address	Facility City	Facility Zip	County	Latitude	Longitude	Geo Method
011451	MOD981728744	Small Quantity Generator	HOWARD PRICE TURF	18155 EDISON AVE	CHESTERFIELD	63005	St.Louis County	38.66414	-90.64035	A3
017053	MOD985821610	Exempt Small Quantity	ST LOUIS HELICOPTER AIRWAYS INC	18004 EDISON AVE	CHESTERFIELD	63005	St.Louis County	38.66482	-90.63673	A3
014607	MOD985795921	Small Quantity Generator	INSITUFORM TECHNOLOGIES	17988 EDISON AVE	CHESTERFIELD	63005	St.Louis County	38.66489	-90.63634	A3
034231	MOR000022095	Exempt Small Quantity	FINDLAY IND ST LOUIS DIV	18036 EADS AVE	CHESTERFIELD	63005	St.Louis County	38.66776	-90.63711	A3
012342	MOD985770585	Small Quantity Generator	PORTA FAB CORP	18080 CHESTERFIELD AIRPORT	CHESTERFIELD	63005	St.Louis County	38.66964	-90.63949	A3
032292	MOR000010280	Small Quantity Generator	B & G PAINTING CO	129 CHESTERFIELD IND BLVD	CHESTERFIELD	63005	St.Louis County	38.66171	-90.62229	A3
004648	MOD981496854	Exempt Small Quantity	SPIRIT OF ST LOUIS AIRPORT MAINT DEPT	531 BEECHCRAFT AVE	CHESTERFIELD	63005	St.Louis County	38.66282	-90.65084	A3
021561	MOD985816792	Small Quantity Generator	MILLION AIR ST LOUIS	549A BELL AVE	CHESTERFIELD	63005	St.Louis County	38.66329	-90.64849	A3
027771	MO0000886325	Small Quantity Generator	DALLAS AIRMOTIVE INC	567 BELL AVE SUITE 100	CHESTERFIELD	63005	St.Louis County	38.66338	-90.64852	A3
022224	MOD985820745	Small Quantity Generator	AVIATION MATERIAL & TECH SUPPORT	750 N BEECHCRAFT AVE	CHESTERFIELD	63005	St.Louis County	38.66352	-90.65105	A3
033841	MOR000019927	Exempt Small Quantity	WEDGE, THE	18423 OLIVE ST RD	CHESTERFIELD	63005	St.Louis County	38.6375	-90.65185	Z1
026588	MO0000192583	Small Quantity Generator	VALLEY CLEANERS	111 LONG RD.	CHESTERFIELD	63005	St.Louis County	38.6375	-90.65185	Z1
003275	MOD006322655	Large Quantity Generator	MIDCO PRODUCTS CO INC	620 SPIRIT OF ST LOUIS BLVD	CHESTERFIELD	63005	St.Louis County	38.6375	-90.65185	Z1
012183	MOR000023788	Large Quantity Generator	WELDON SPRING CHEMICAL PLANT SITE	7295 HWY 94 S	ST CHARLES	63304	St.Charles	38.72446	-90.65664	Z1
034472	MOR000023788	Small Quantity Generator	HUSTLER CONVEYOR	4101 CRUISER DR	ST CHARLES	63304	St.Charles	38.72446	-90.65664	Z1
034405	MOR000022525	Small Quantity Generator	ZOLTEK	11 MISSOURI RESEARCH PARK	ST CHARLES	63304	St.Charles	38.72446	-90.65664	Z1
022582	MOD985822295	Small Quantity Generator	NOVUS INTERNATL INC	20 RESEARCH PK DR	ST CHARLES	63304	St.Charles	38.72446	-90.65664	Z1
028387	MO0001016389	Small Quantity Generator	DIAGRAM MARKETING & CODING	#1 RESEARCH PARK DR - DOCK 4	ST CHARLES	63304	St.Charles	38.72446	-90.65664	Z1
033994	MOR00020180	Small Quantity Generator	COMPONENT BAR PRODUCTS INC.	3858 CORPORATE CENTRE DR	ST CHARLES	63304	St.Charles	38.72446	-90.65664	Z1
029363	MOR000023286	Exempt Small Quantity	NIKE IHM, INC-ST LOUIS	7301-A S HWY 94	ST CHARLES	63304	St.Charles	38.72446	-90.65664	Z1
033273	MOR000015651	Large Quantity Generator	WELDON SPRING ORDNANCE WORKS	8 RESEARCH PARK DR	ST CHARLES	63304	St.Charles	38.72446	-90.65664	Z1
032685	MOR00012443	Exempt Small Quantity	NATOLI ENGINEERING CO INC	28 RESEARCH PARK CIRCLE	ST CHARLES	63304	St.Charles	38.72446	-90.65664	Z1
034058	MOR000020230	Small Quantity Generator	AMBASSADOR ENVELOPE CO	8705 KEATON CORPORATE PKWY	ST CHARLES	63304	St.Charles	38.72446	-90.65664	Z1
021072	MOD985812130	Small Quantity Generator	BRANDYS AUTO BODY	2500 TECHNOLOGY DR	DARDENNE PRAIRIE	63366	St.Charles	38.72716	-90.65664	Z1
003285	MOD095486312	Large Quantity Generator	SAFETY KLEEN INC	4526 TOWNE CT LOT #22	ST CHARLES	63303	St.Charles	38.7394	-90.60782	A3
010194	MOD981720873	Small Quantity Generator	MARBLE TECH INDUSTRIES INC	4548 PARKTOWNE DR	ST CHARLES	63303	St.Charles	38.74099	-90.60962	A3
000373	MOD134444421	Small Quantity Generator	HARVESTOWNE AUTO BODY	4532 PARKTOWN DR	ST CHARLES	63303	St.Charles	38.7412	-90.60914	A3



United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, D.C. 20240

RECEIVED

OCT 3 2003

MISSOURI DEPT. OF TRANS.
DIRECTOR'S OFFICE

ER-03/648

SEP 26 2003

Mr. Allen Masuda
Division Administrator
Federal Highway Administration
209 Adams Street
Jefferson City, Missouri 65101.

Dear Mr. Masuda:

As requested, the Department of the Interior (Department) has reviewed the July draft environmental impact statement (EIS) for the **US-40/61 Bridge Location Study over the Missouri River, St. Charles and St. Louis Counties, Missouri**, prepared by the Federal Highway Administration (FHWA) and the Missouri Department of Transportation (MoDOT). The Department offers the following comments and recommendations for your consideration:

SECTION 4(f) EVALUATION COMMENTS

There are several potential section 4(f) properties within the study area for this project but apparently, the proposed project will affect only two of these properties. These properties are the Weldon Spring Conservation Area and a portion of the Katy Trail State Park (Park). Alternatives A1, A2, and A2' (the preferred alternative) will use approximately 1.5 acres of forested lands within the Weldon Spring Conservation Area, a portion that currently does not have recreational uses and lies adjacent to a quarry area that is fenced and restricts public access for safety reasons. All build alternatives will span the Trail, resulting in limited and temporary restrictions on the continued recreational use of the Trail, but no direct use of the Trail. The Park was established under the National Trail Systems Act (Rails to Trails), providing temporary use of railroad corridors for recreational trails. These corridors, no longer needed for active rail service, are reserved for future transportation. The National Park Service, in 1995, designated a portion of the Park as an official segment of the Lewis and Clark National Historic Trail, now a part of the National Trails System.

The Department, based upon the information provided in the draft EIS, would tend to agree with the FHWA and MoDOT that the impacts to the Weldon Spring Conservation Area would not constitute a use as defined under section 4(f). The entire property is clearly eligible for consideration as a 4(f) property since FHWA has indicated there are strong provisions for public access and recreation within the property. However, the area directly affected by the project does not appear to have recreational use, and because of the dangerous conditions of the abandoned quarry site, the public is prohibited from accessing most of this area. It is unfortunate FHWA and MoDOT have decided to consult with the Missouri Department of Conservation after the preparation of the draft EIS so the Department does not have benefit of that

consultation. It would have been preferable to have that information included in this draft. Therefore, the Department reserves the right to make a determination on the section 4(f) use of the Weldon Spring Conservation Area until it reviews the results of the consultation with the Department of Conservation.

The Department would agree the temporary disturbances to the recreational use of the Park caused by the construction of any of the build alternatives would not constitute a 4(f) use of the Trail. The Department would strongly encourage the FHWA and MoDOT to develop a plan to inform trail users of disruption of trail access during construction and to minimize the disruption to times of low recreational use.

ENVIRONMENTAL IMPACT STATEMENT COMMENTS

The draft EIS provides a summary of effects from a selected group of alternative roadway corridors for the proposed project. We generally support the location of the preferred alternative (A2'), which is just upstream of the existing eastbound bridge. It is difficult to provide specific comments since only general design criteria are included in the draft EIS.

We are concerned about the cumulative impacts of the numerous development projects on the floodplain in St. Charles and St. Louis Counties. In its letter of March 12, 2002, to the FHWA (included in appendix C), the U.S. Fish and Wildlife Service (FWS) noted a number of 500-year protection projects (levees) along the Missouri River in St. Louis County have been either completed, are in the construction phase, or are in the planning phase. There is a potential that floodplain lands along more than a 25-mile-long reach of the river in St. Louis County may be protected with 500-year levees. Coupled with the construction of Page Avenue and Highway 370 bridge projects, the various projects will likely contribute to a bottleneck in flood-flow conveyance in this portion of the Missouri River floodplain. We do not believe these issues have been adequately addressed in the Draft EIS. We recommend that the FHWA and MoDOT thoroughly evaluate the cumulative impacts of these projects on flood flows and stages and ensure the bridge is designed to avoid contributing to flooding problems. The final EIS should also provide a more thorough evaluation of the contribution of the proposed project to induced development in the floodplain and the secondary and cumulative impacts to fish and wildlife resources from such development.

ENDANGERED SPECIES ACT COMMENTS

In its letter of March 12, 2002, the FWS indicated the bald eagle (*Haliaeetus leucocephalus*), Indiana bat (*Myotis sodalis*), and the pallid sturgeon (*Scaphirhynchus albus*) may occur in the project area. The FWS considers the proposed project a major Federal construction activity for purposes of consultation under section 7 of the Endangered Species Act. Given the scope of the project and the time that will likely elapse before project construction, detailed analysis is difficult. Although there are references in the draft EIS to limits on construction activity both geographically and seasonally to "minimize or significantly minimize potential impact of construction activities" on federally listed species, the effects analysis on those species is incomplete. We recommend a biological assessment be completed that would more clearly describe project impacts on the listed species.

The biological assessment should include a description of the potential temporary and permanent impacts to the Missouri River channel and the schedule and method for removing all temporary in-stream structures. The correct overwintering period for pallid sturgeons is November 1 - May 31, not December 1 - April 1 as indicated on page 4-32 in the draft EIS. Regardless of the alternative ultimately chosen, the project should include bald eagle surveys of all suitable habitat within and immediately adjacent to the project right-of way.

The March 12, 2002, letter from the FWS provided recommendations pertaining to the Indiana bat. The FWS no longer recommends seasonal tree cutting restrictions as an adequate measure to ensure a project is not likely to adversely affect the Indiana bat. Therefore, it will be necessary for the MoDOT to evaluate the number and quality of Indiana bat roost trees that would be removed by the project. This information should be used to determine effects on the Indiana bat, in accordance with the procedures discussed between the FWS and the MoDOT during the last year. The FWS is available for further discussion of the requirements of the biological assessment.

The Department has a continuing interest in working with the FHWA and the MoDOT to ensure impacts to resources of concern to the Department are adequately addressed. For continued coordination on section 4(f) matters in Missouri, please contact the Regional Environmental Coordinator, National Park Service, Midwest Regional Office, 1709 Jackson, Omaha, Nebraska 68102, telephone 402-221-7286. For continued consultation and coordination with the FWS on fish and wildlife matters in Missouri, please contact the Field Supervisor, U.S. Fish and Wildlife Service, Ecological Services, 608 E. Cherry St., Room 200, Columbia, Missouri 65201, telephone 573-876-1911.

We appreciate the opportunity to provide these comments.

Sincerely,



Willie R. Taylor
Director, Office of Environmental
Policy and Compliance

cc:

✓ Mr. Kevin Keith, Chief Engineer
Missouri Department of Transportation
P.O. Box 270
Jefferson City, Missouri 65102-0270



14 Research Park Drive, Suite 200
St. Charles, MO 63304
(636) 441-7701
Fax # (636) 441-7761

September 29, 2003

Mr. Donald Neumann, Programs Engineer
Federal Highway Administration
209 Adams Street
Jefferson City, MO 65101-3203

Dear Mr. Neumann:

On behalf of the Missouri Research Park, located along the U.S. 40/61 corridor in St. Charles County, Missouri, I am writing to respond to the Federal Register notice dated Friday, August 8, 2003, in support of the approval of the issuance of a Record of Decision, and Environmental Impact Statement, which would allow for the consideration of a new U.S. 40 Missouri River bridge between St. Louis and St. Charles Counties.

It is imperative that a new bridge crossing be advanced further into a design phase, particularly with the economic activity thriving on the corridor, and to also assure the safe travel of the commuters presently utilizing a substandard bridge, along with the motoring public traveling the corridor known as the Avenue of the Saints.

The Missouri Research Park will be affected by the right of way needed for this important Missouri River Bridge crossing and, in partnership with officials of the Missouri Department of Transportation, the University of Missouri is coordinating the necessary set-a-side for the bridge project and the St. Charles County approach.

Traffic volumes on the U.S. 40/61 corridor have grown beyond all projections, and Average Daily Traffic (ADT) is projected to continue to grow. Any delay on behalf of commencing further design initiatives will result in a breakdown of traffic movements on the U.S. 40/61 corridor, and particularly on the existing substandard bridge. In my opinion, a new bridge crossing must be built without delay so as to avoid future gridlock traffic conditions.

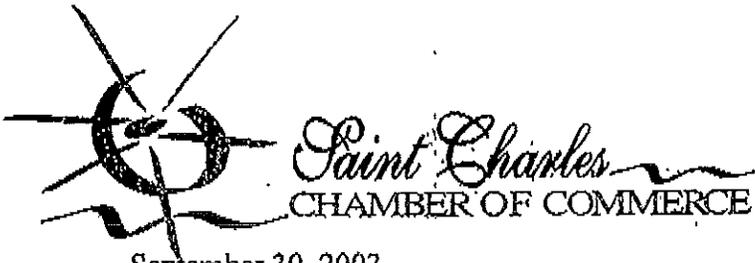
Mr. Neumann, many thanks for your consideration of the need to build a new Missouri River bridge, along with this urgent request for the Federal Highway Administration to issue an EIS and ROD.

Sincerely,

A handwritten signature in black ink, appearing to read "Rick Finholt", written over a white background.

Rick Finholt
Executive Director

Cc: Nikki Krawitz, Vice President Finance and Administration, University of Missouri System
The Honorable Joseph R. Ortwerth, St. Charles County Executive



September 30, 2003

Mr. Donald Neumann, Programs Engineer
Federal Highway Administration
209 Adams Street
Jefferson City, MO 65101-3203

Dear Mr. Neumann,

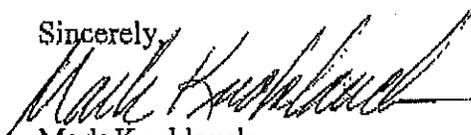
As representatives of the more than 700 business members of the St. Charles Chamber of Commerce, and on behalf of regionalism, we are writing to urge Federal Highway Administration (FHWA) approval of the Environmental Impact Statement and the Record of Decision for a new U.S. Route 40-61 Bridge over the Missouri River.

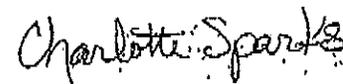
During the past two decades, St. Charles County has seen phenomenal growth in the number of residential, commercial, and retail developments. Safe and efficient transportation is vital to the entire region, thus the need for this project is crucial to St. Louis and St. Charles counties, as well as to the entire St. Louis metropolitan region.

Also, very vital to our region is funding for the reconstruction of the I-70 corridor in St. Charles County, and particularly the reconstruction of the I-70/Missouri Route 94 interchange and approaches. In addition, the Chamber supports the construction of Phase II and III of the Page Avenue Extension, and the upgrade to the U.S. 40/64 corridor. The St. Charles Chamber of Commerce Board of Directors seeks your support and urges that FHWA prioritize these projects working in partnership with the Missouri Department of Transportation and the East-West Gateway Coordinating Council, the St. Louis Metropolitan Planning Organization.

Thank you for your consideration of these regionally important transportation needs. Your support is greatly appreciated.

Sincerely,


Mark Knoblauch
Chairman

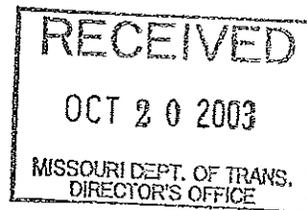

Charlotte Sparks
President / CEO

Cc: The Honorable Christopher "Kit" Bond, U.S. Senate
The Honorable James Talent, U.S. Senate
The Honorable Todd Akin, Member of Congress
The Honorable Joseph R. Ortwerth, St. Charles County Executive
Mr. Kevin Keith, Chief Engineer, Missouri Department of Transportation
Mr. Les Sterman, Executive Director, East-West Gateway Coordinating Council

2201 First Capitol Drive - St. Charles, Missouri 63301 - 636-946-0633 - Fax 636-946-0301

www.stcharleschamber.org

Bob Holden
Governor



Jacquelyn D. White
Commissioner

State of Missouri
OFFICE OF ADMINISTRATION
Intergovernmental Relations
Post Office Box 809
Jefferson City, 65102
573/751-4834

October 15, 2003

Kevin Keith, Chief Engineer
Missouri Department of Transportation
PO Box 270
Jefferson City, MO 65102

Dear Mr. Keith:

Subject: 0308008 - Missouri Department of Transportation
EA Assistance
US 40/61 Bridge Location Study over Missouri River –
Draft Environmental Impact Statement Job No. J6P1436

The Missouri Federal Assistance Clearinghouse, in cooperation with state and local agencies interested or possibly affected, has completed the review on the above project application.

None of the agencies involved in the review had comments or recommendations to offer at this time. This concludes the Clearinghouse's review.

A copy of this letter is to be attached to the application as evidence of compliance with the State Clearinghouse requirements.

Sincerely,

A handwritten signature in cursive script, appearing to read "Ewell Lawson".

Ewell Lawson, Director
Intergovernmental Relations

EL:ab

cc: East-West Gateway Coordinating Council



U.S. Department
of Transportation
**Federal Highway
Administration**
Missouri Division

FHWA VISION:
"To Create the Best Transportation
System in the World."

209 Adams Street
Jefferson City, Missouri 65101
(573) 636-7104
Fax (573) 636-9283
Missouri.FHWA@fhwa.dot.gov

Allen Masuda, Division Administrator



November 17, 2003

Alex Walker, Chairman
Sac and Fox Tribe of the Mississippi in Iowa
349 Meskwaki Road
Tama, IA 52339-9629

Subject: U.S. Route. 40/61, St. Charles and St. Louis Counties, Missouri
MoDOT Job No. J6P1436
Location Study

Dear Chairman Walker:

The Federal Highway Administration (FHWA) and the Missouri Department of Transportation (MoDOT) are conducting a study of possible improvements to the Daniel Boone Bridge across the Missouri River between St. Charles and St. Louis counties, Missouri. The study area for this project is 2.1 miles long and 1000 feet out from either side of the existing Route 40/61 highway and Missouri River Bridge. As part of a Draft Environmental Impact Statement (DEIS), MoDOT and their consultants have conducted initial environmental and cultural resources screening of areas that might be impacted. The results of the environmental and cultural resources screening along with engineering and other project data are discussed in the DEIS contained on the enclosed CD. This project is in an early stage of planning and it is anticipated that construction of this project will not begin for at least several years.

A review of the known archaeological sites in the study area indicates that three previously reported archaeological sites (prehistoric sites 23SC89 and 23SC886, and historic site 23SC219) are located in areas that could be impacted by the alternatives being considered. The preferred corridor identified in the DEIS will impact site 23SC89, might impact site 23SC219, and will avoid site 23SC886. Previous, limited investigations at prehistoric sites 23SC89 and 23SC886 found only chipped stone tools and debitage with these remains being in the uppermost soil. Both sites are interpreted as habitation sites and there is no indication of human remains or associated funerary objects being present. MoDOT will conduct an archaeological survey of the preferred corridor to locate any previously unreported archaeological sites that may be present. As funding is secured for the project and project plans are finalized, MoDOT may conduct additional investigations at certain sites contained in the final corridor. We will provide the results of these additional studies to your tribe as they become available. We will consult with your tribe after we have surveyed the proposed corridor and as the project plans are finalized.

We are forwarding to you the enclosed CD version of the DEIS for this study for your review. If you have any comments or questions regarding the study or its results, please contact me at (573)

638-2620 or at Peggy.Casey@fhwa.dot.gov or Bob Reeder, MoDOT Cultural Resources Coordinator, at (573) 751-0473 or at reeder1@mail.modot.state.mo.us.

Sincerely yours,

Peggy J. Casey, P.E.
Environmental Projects Engineer

Enclosure

cc: MoDOT/Cultural Resources/Bob Reeder
DNR/Outreach/SHPO/Brant Vollman
Advisory Council On Historic Preservation
pjc/djs



U.S. Department
of Transportation
**Federal Highway
Administration**
Missouri Division

FHWA VISION:
"To Create the Best Transportation
System in the World."

209 Adams Street
Jefferson City, Missouri 65101
(573) 636-7104
Fax (573) 636-9283
Missouri.FHWA@fhwa.dot.gov

Allen Masuda, Division Administrator



November 17, 2003

Mr. Jim Gray, Principal Chief
Osage Tribe, Oklahoma
627 Grandview Ave.,
Pawhuska, OK 74056

Subject: U.S. Route. 40/61, St. Charles and St. Louis Counties, Missouri
MoDOT Job No. J6P1436
Location Study

Dear Chief Gray:

The Federal Highway Administration (FHWA) and the Missouri Department of Transportation (MoDOT) are conducting a study of possible improvements to the Daniel Boone Bridge across the Missouri River between St. Charles and St. Louis counties, Missouri. The study area for this project is 2.1 miles long and 1000 feet out from either side of the existing Route 40/61 highway and Missouri River Bridge. As part of a Draft Environmental Impact Statement (DEIS), MoDOT and their consultants have conducted initial environmental and cultural resources screening of areas that might be impacted. The results of the environmental and cultural resources screening along with engineering and other project data are discussed in the DEIS contained on the enclosed CD. This project is in an early stage of planning and it is anticipated that construction of this project will not begin for at least several years.

A review of the known archaeological sites in the study area indicates that three previously reported archaeological sites (prehistoric sites 23SC89 and 23SC886, and historic site 23SC219) are located in areas that could be impacted by the alternatives being considered. The preferred corridor identified in the DEIS will impact site 23SC89, might impact site 23SC219, and will avoid site 23SC886. Previous, limited investigations at prehistoric sites 23SC89 and 23SC886 found only chipped stone tools and debitage with these remains being in the uppermost soil. Both sites are interpreted as habitation sites and there is no indication of human remains or associated funerary objects being present. MoDOT will conduct an archaeological survey of the preferred corridor to locate any previously unreported archaeological sites that may be present. As funding is secured for the project and project plans are finalized, MoDOT may conduct additional investigations at certain sites contained in the final corridor. We will provide the results of these additional studies to your tribe as they become available. We will consult with your tribe after we have surveyed the proposed corridor and as the project plans are finalized.

We are forwarding to you the enclosed CD version of the DEIS for this study for your review. If you have any comments or questions regarding the study or its results, please contact me at (573)

638-2620 or at Peggy.Casey@fhwa.dot.gov or Bob Reeder, MoDOT Cultural Resources Coordinator, at (573) 751-0473 or at reeder1@mail.modot.state.mo.us.

Sincerely yours,

PEGGY J. CASEY

Peggy J. Casey, P.E.
Environmental Projects Engineer

Enclosure

cc: MoDOT/Cultural Resources/Bob Reeder
DNR/Outreach/SHPO/Brant Vollman
Advisory Council On Historic Preservation

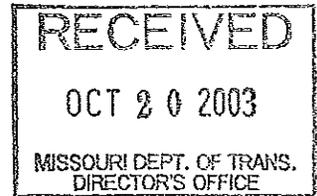


MISSOURI DEPARTMENT OF CONSERVATION

Headquarters

2901 West Truman Boulevard, P.O. Box 180, Jefferson City, Missouri 65102-0180
Telephone: 573/751-4115 ▲ Missouri Relay Center: 1-800-735-2966 (TDD)

JOHN D. HOSKINS, Director



October 17, 2003

Mr. Kevin Keith
Chief Engineer
Missouri Department of Transportation
P.O. Box 270
Jefferson City, Missouri 65102-0270

Mr. Donald Neumann
Programs Engineer
Federal Highway Administration
209 Adams Street
Jefferson City, Missouri 65101-3203

Dear Mr. Keith and Mr. Neumann:

RE: U.S. Route 40/61 Bridge Location Study over the Missouri River
St. Charles and St. Louis Counties, Missouri
Draft Environmental Impact Statement, MoDOT Job No. J6P1436

Missouri Department of Conservation (Department) staff reviewed the Draft Environmental Impact Statement (DEIS) for the above-referenced project and we offer the following comments.

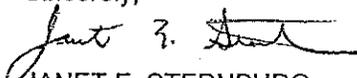
As stated in our response of 12 July 2002, the Department prefers Alternatives B4 and B5 as noted in the preliminary planning of the project. These alternatives place the new bridge downstream of Weldon Springs Conservation Area thereby avoiding direct impact to our property and its habitats. Placing the bridge downstream of the existing bridge would also minimize disturbance associated with the construction of the new bridge to the upstream aquatic habitat. This upstream area consists of two side channels and a large sandbar—habitat types that have been greatly reduced on the Missouri River over the last century due to channelization—and provides valuable spawning, nursery, and winter habitat for large river fishes. In-stream construction activities should follow best management practices, as noted in the DEIS, that will minimize impacts to the aquatic resources.

The preferred alternative noted in the DEIS will impact a small portion of the Weldon Spring Conservation Area. Since Alternative B4 was dropped from consideration, and Alternative B5 may not be considered feasible, Alternative A2', which will impact approximately 1.6 acres, is acceptable. We understand that discussions to compensate the Department for its loss of this acreage will occur at a later date.

Section 4.16.4, Environmental Consequences, Weldon Spring Conservation Area, discusses use of federal funds in the area. Our realty documents note that Dingle-Johnson funds were used to purchase a river access site on the area. The access site is not located near the project location and it should not be impacted by this project.

Thank you for the opportunity to review and comment. I apologize for the delay in responding to your request. If you have questions concerning this response, please contact me at (573) 522-4115, Extension 3372 or by e-mail at Janet.Sternburg@mdc.mo.gov.

Sincerely,


JANET E. STERNBURG
POLICY COORDINATOR

JES:dcl

c: Joël Porath, Missouri Department of Conservation

COMMISSION

STEPHEN C. BRADFORD
Cape Girardeau

ANITA B. GORMAN
Kansas City

CYNTHIA METCALFE
St. Louis

LOWELL MOHLER
Jefferson City

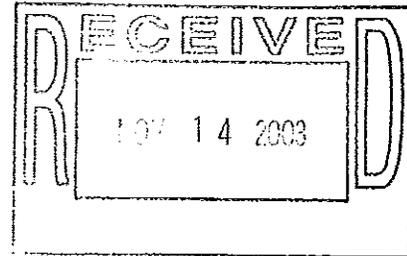


OFFICE OF THE MAYOR
PAUL F. RENAUD

100 NORTH MAIN ST. E1
O'FALLON, MISSOURI 633
636.379.5500
FACSIMILE 636.978.41

October 22, 2003

Mr. Donald Neumann, Programs Engineer
Federal Highway Administration
209 Adams Street
Jefferson City, MO 65101-3203



Dear Mr. Neumann:

I am writing on behalf of the 60,000 plus residents of the City of O'Fallon, my constituents, in response to the posting in the Federal Register dated Friday, August 8, 2003, in support of the approval of an Environmental Impact Statement (EIS) and Record of Decision (ROD) for a new U.S. Highway 40/61 Bridge over the Missouri River between St. Louis and St. Charles Counties, Missouri.

The recently completed Location, Cost, and Needs Study clearly documents the need for a new bridge, with traffic volume having increased from 62,000 trips per day across the Daniel Boone Bridge in 1999, to 82,000 last year.

With our City's success in attracting and retaining large employers such as CitiMortgage, MasterCard, and others, the St. Charles County segment of the Highway 40/61 corridor has become the home of nearly 10,000 jobs. A safe river crossing is essential to accommodate local commutes, along with accommodating the volume of traffic generated by those traveling the "Avenue of the Saints." This High Tech Corridor is serving as the economic engine of the Greater St. Louis region, and is expected to do so into the foreseeable future.

Thank you for your consideration of my comments, and your hard work to improve our highway system. I will look forward to Federal Highway Administration approval of the EIS and ROD sought, which will allow this important bridge recommendation to be further advanced into a design phase.

Sincerely,

Paul F. Renaud
Mayor

cc: The Honorable Christopher "Kit" Bond
United States Senate

The Honorable James Talent
United States Senate

The Honorable Todd Akin
Member of Congress

The Honorable Kenny C. Hulshof
Member of Congress

The Honorable Joseph R. Ortwerth
St. Charles County Executive

St. Charles County Legislators

Mr. Kevin Keith, Chief Engineer
Missouri Department of Transportation

Mr. Ed Hassinger, District Engineer
Missouri Department of Transportation
District 6

City of O'Fallon Executive Team

City of O'Fallon Board of Alderman



101 Chesterfield Business Parkway
Chesterfield, MO 63005
(636) 532-3399
Fax (636) 532-7446

November 10, 2003

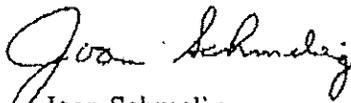
Mr. Greg Horn, P.E.
Assistant District Engineer
Project Development
Missouri Department of Transportation
1590 Woodlake Drive
Chesterfield, MO 63017

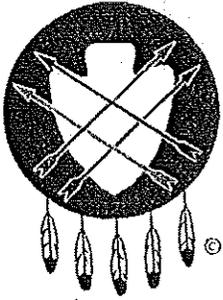
Dear Mr. Horn:

The Chesterfield Chamber of Commerce Board of Directors recently voted to support the Route 40/61 Bridge preferred Alternative A2. We are also very excited that this alternative makes possible a bicycle/pedestrian connection from proposed bikeways in Chesterfield to the Katy Trail.

The Chesterfield Chamber of Commerce is also in favor of the connection from westbound Chesterfield Airport Road to the collector-distributor road system and the connection of that system to the existing westbound bridge.

Sincerely,


Joan Schmelig
President



PEORIA TRIBE OF INDIANS OF OKLAHOMA

118 S. Eight Tribes Trail (918) 540-2535 FAX (918) 540-2538

P.O. Box 1527

MIAMI, OKLAHOMA 74355

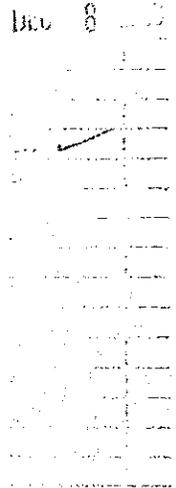
CHIEF

John P. Froman

SECOND CHIEF

Joe Golorth

December 5, 2003



U.S. Department of Transportation
Missouri Division
Attn: Peggy J. Casey, P.E.
Environmental Projects Engineer
209 Adams Street
Jefferson City, Missouri 65101

RE: U.S. Route. 40/61, St. Charles and St. Louis Counties, Missouri
MoDot Job No. J6P1436
Location Study

Thank you for notice of the referenced projects. The Peoria Tribe of Indians of Oklahoma is currently unaware of any documentation directly linking Indian Religious Sites to the proposed construction. In the event any items falling under the Native American Graves Protection and Repatriation Act (NAGPRA) are discovered during construction, the Peoria Tribe request notification and further consultation.

The Peoria Tribe has no objection to the proposed construction. However, if any human skeletal remains and/or any objects falling under NAGPRA are uncovered during construction, the construction should stop immediately, and the appropriate persons, including state and tribal NAGPRA representatives contacted.

John P. Froman
Chief

xc: Bud Ellis, Repatriation/NAGPRA Committee Chairman

TREASURER
LeAnne Reeves

SECRETARY
Hank Downum

FIRST COUNCILMAN
Claude Landers

SECOND COUNCILMAN
Jenny Rampoy

THIRD COUNCILMAN
Jason Dollahide

Appendix D

Traffic Analysis and Travel Demands

Appendix D Table of Contents

<u>Section</u>	<u>Page</u>
D1 Introduction	D-1
D2 Evaluation of Existing Traffic Conditions	D-2
D2.1 Existing Traffic Volumes	D-2
D2.2 Existing Operating Conditions	D-3
D2.3 Capacity Threshold of the Existing Westbound Bridge.....	D-4
D3 Evaluation of Forecasted Traffic Volumes.....	D-5
D3.1 Reconciling Other Studies	D-5
D3.2 Evaluation of Land Uses Within the Route 40/61 Corridor	D-6
D3.3 Revised River Crossing Forecasts	D-7
D3.4 Lane Requirements Based on Forecasted River Crossings.....	D-8
D4 Alternative Bridge Configurations.....	D-10
D4.1 Elimination of the Existing Westbound Bridge	D-10
D4.2 Creation of a C-D Road to Supplement the Existing Westbound Bridge.....	D-10
D4.3 Utilization of the Existing Westbound Bridge as Reversible Lanes	D-10
D4.4 Summary of Alternative Bridge Configurations.....	D-11
D5 Evaluation of Traffic and Operations – Final Study Alternatives Route 40/61 Bridge	D-12

List of Tables

Table D2-1 Existing Traffic Counts, Route 40/61 at Missouri River	D-2
Table D3-1 Comparison of Forecasts, Route 40/61 at Missouri River	D-6
Table D3-2 Projected Daily Traffic Volumes, Route 40/61 at Missouri River	D-8
Table D3-3 Projected Design Year (2034) DHVs and LOS, Route 40/61 at Missouri River	D-9
Table D4-1 Proposed Lane Configurations Alternative Bridge Configurations, Route 40/61 at Missouri River	D-11

D1 Introduction

The following is an evaluation of existing and forecasted traffic data for the Route 40/61 crossing of the Missouri River at the Route 40/61 bridge. This effort focused on the confirmation of existing traffic conditions, calculation of bridge capacity thresholds, validation of forecasted volumes, and the identification of future lane requirements with consideration of collector-distributor lanes or reversible lanes.

Forecasts for Route 40/61 at the Missouri River were assembled in an effort to identify long-range needs and to estimate when the existing westbound bridge, which can accommodate no more than three lanes and was opened in 1935, would reach the limits of its capacity. The westbound bridge was used as the control bridge because of its age and dimensions. The existing eastbound bridge, opened in 1990, is in better condition and is wider (currently striped with four lanes) than the westbound bridge.

As a major step in the process to identify the long-range needs of the westbound bridge, traffic data was gathered from a number of sources and previous efforts including:

1. Corridor studies for Eatherton Road / Route 109;
2. A planning study of Route 40/61 in St. Charles County prepared by Parsons Transportation Group;
3. The 1996 Major Transportation Investment Analysis (MTIA);
4. The 1997 Environmental Assessment (EA) for the Route 40/61 corridor; and
5. Forecasts recently prepared by the East-West Gateway Coordinating Council (EWGCC).

Additionally, the Missouri Department of Transportation (MoDOT) supplied current traffic data collected in Chesterfield Valley that was supplemented by counts performed by the firm Crawford Bunte Brammeier (CBB). These sources produced a wide range of volumes for the Missouri River crossing that were attributed to the use of different construction/design horizons, inconsistent considerations of the Page Avenue Extension (Route 364), and ongoing adjustments to the region's travel demand model. An attempt was made to reconcile these differences and is summarized in Section D3.1.

The most verifiable and consistent of these sources were identified and used to develop a summary of existing and projected traffic levels for the study area. These volumes and the relative significance of the corresponding traffic levels are discussed in more detail in the following sections.

D2 Evaluation of Existing Traffic Conditions

Traffic counts, spot speed studies, and field observations were conducted in March 2002 to reflect conditions on Route 40/61 after it was widened to three lanes in each direction through Chesterfield Valley and the bridges were restriped to three lanes in each direction. Specifically, an effort was made to establish existing operating conditions as a baseline for the evaluation of forecasted conditions. It should be noted that none of the previous traffic data sources listed in Section D1 considered the re-striping of these bridges.

D2.1 Existing Traffic Volumes

Road tubes were placed on Route 40/61 in the vicinity of the Spirit of St. Louis overpass, and manual peak period counts were performed on Route 40/61, Chesterfield Airport Road, and Research Park Circle. These counts indicated that approximately 81,700 daily trips cross the Missouri River on Route 40/61. Current peak hour volumes represent approximately 8.35 percent of the daily volume with a 2:1 directional split (approximately 66 percent eastbound in the morning and westbound in the afternoon).

As compared to previous estimates provided by MoDOT, bridge volumes have increased significantly (32 percent) since 1999. The results of the current and prior traffic counts are compared in Table D2-1.

Table D2-1. Existing Traffic Counts, Route 40/61 at Missouri River

	Eastbound	Westbound	Total
1999 Counts (2 Lanes Each Direction)			
A.M. Peak Hour	4400	1500	5900
P.M. Peak Hour	1800	3400	5200
Daily			61,800
2002 Counts (3 Lanes Each Direction)			
A.M. Peak Hour	4600	2300	6900
P.M. Peak Hour	2200	4600	6800
Daily			81,700

Source: Crawford Bunte Brammeier, 2003.

These significant increases in peak hour and daily traffic volumes may be attributed, in part, to the addition of a third lane in each direction. The third lane has eliminated much of the congestion that previously occurred along this section of Route 40/61, thereby allowing it to attract additional trips. Moreover, there would appear to be less "peak hour spreading" than previously occurred.

In fact, existing volumes could be expected to increase even more after improvements in the vicinity of Clarkson Road/Chesterfield Parkway and Routes 94/K are completed (thereby providing a minimum of three continuous lanes in each direction). The elimination of existing constraints associated with highway construction will lessen the metering of traffic that now occurs, and significant latent demands will be added to the corridor.

Finally, an increase in traffic across the Route 40/61 bridges may also be attributed to significant development that has occurred in Chesterfield Valley and St. Charles County during the last few years. For example, Chesterfield Commons generates approximately 3,300 daily shopping trips

across the river. Furthermore, over 3,000 office jobs have recently been added along the Route 40/61 corridor in O'Fallon, which could account for another 3,000 trips per day (or more) across the river.

These recent development trends are expected to continue throughout the next 5 years, so river crossing volumes may continue to rise dramatically. In total, the level of reserve capacity currently available on the existing three-lane bridges will quickly be consumed.

D2.2 Existing Operating Conditions

Recent field observations indicate that peak period conditions have improved substantially since the bridges were striped with a minimum of three lanes in each direction and backups have been greatly reduced. While there is still relatively minor peak period congestion (some of which may be attributed to construction and lane changes to the west of the river), existing conditions are commensurate with level of service (LOS) C or D.

An effort was made to determine when the existing westbound bridge, striped with three lanes, would reach its functional capacity. Freeway segment analyses were performed using Highway Capacity Software (HCS2000, Release 4.1a) methodologies to calculate existing and projected levels of service.

It is important to recognize the constraints associated with the restricted cross-section of the westbound bridge (10-foot lanes and no shoulders). These factors, combined with the number of lanes and the proximity of adjacent interchanges, cause free-flow speeds on the bridge to be lowered, thereby reducing the functional capacity of the third lane.

Capacity analyses were conducted using an ideal, "base" free-flow speed of 70 miles per hour (mph) in accordance with practices recommended by the Highway Capacity Manual. Adjusting for the substandard cross-section lowers the free-flow speed to less than 56 mph, which represents a significant speed differential and a source of congestion during peak periods.

It should be noted that actual speeds may be lower (the corridor is posted with a 60 mph speed limit) and that a "base" free-flow speed of 65 mph (5 mph over the speed limit) may be more appropriate. However, a lower base speed would result in an "adjusted" free-flow speed of only 51 mph, which is not supported by Highway Capacity Manual methodologies and would, therefore, calculate to LOS F. Freeway conditions are typically based upon traffic density, but this LOS F calculation would just represent a limitation of the equations and is not necessarily representative of actual conditions.

Recent field observations indicate that, while there is some congestion and slowing during the p.m. peak period, existing conditions are not commensurate with LOS F. In fact, conditions appear to have improved since the bridge was restriped to three lanes, and backups have been greatly reduced. Therefore, it would be necessary to use a more liberal base free-flow speed of 70 mph for these analyses.

Sample travel speed measurements were collected to validate these observations. Upstream from the bridge, peak period speeds typically range between 57 and 80 mph with an estimated mean of 64 mph. On the bridge approaches, peak period speeds are more consistent, but constrained by the narrow lanes, typically ranging from 51 to 64 mph with an estimated mean of 57 mph. Consequently, it appears that travel speeds drop by roughly 7 mph as motorists make the transition into the reduced cross-section of the bridge.

Using the current traffic volumes, the existing conditions were calculated using HCS. An ideal free-flow speed of 70 mph was assumed in accordance with standard HCS procedures and the above-noted spot-speed measurements. Based on these calculations, it was determined that the existing bridges operate at LOS D or better during the peak periods, which corroborates the observations.

D2.3 Capacity Threshold of the Existing Westbound Bridge

As noted above, capacity analyses of the westbound bridge segment were performed in accordance with practices recommended by the Highway Capacity Manual. Using an existing design hour volume (DHV) of 4,600 vehicles per hour (vph), p.m. peak period operating conditions were calculated at LOS D with a traffic density of 29.8 passenger cars per mile per lane (pc/mi/ln). This value was used as a base to quantify when traffic densities will exceed the bridge's functional capacity.

- Conditions will degrade to LOS E when westbound DHVs reach 5,380 vph with a density of more than 35 pc/hr/ln. This density would be associated with daily river crossing volumes of 97,500 to 105,500 vehicles per day (vpd), depending upon anticipated changes in Route 40/61 peaking characteristics. Allowing for diversions to the Page Avenue Extension, these volumes should be achieved between 2014 and 2018.
- The westbound segment across the river will fail (LOS F) when DHVs reach 6,300 vph, resulting in densities in excess of 45 pc/mi/ln. This density is commensurate with daily river crossings of 114,000 to 123,500, which should be achieved between 2027 and 2034 (the selected design year), depending upon what level of growth the surrounding area is able to sustain.

It may be concluded that, though substandard, the three-lane cross-section on the existing westbound bridge represents an improvement over the previous configuration. The bridge is currently capable of operating at LOS D and, as long as phase one of the Page Avenue Extension is completed, has adequate capacity to accommodate 12 to 16 years of growth before degrading to LOS E or 25 to 32 years of growth before failing (LOS F).

It should be noted that these thresholds may occur sooner depending upon the ultimate location and configuration of ramps to or from Missouri Research Park, Chesterfield Airport Road and/or a potential future interchange at Eatherton Road or Spirit of St. Louis Boulevard. These ramps produce increased weaving or merging movements and cause lower speeds, thereby worsening operating conditions. As a result, the final configuration and location of those interchanges could dictate the provision of additional lanes or, as a possible alternative, a collector-distributor (C-D) road.

If three-lanes are maintained on each bridge (i.e., auxiliary and/or C-D lanes are not provided), the proximity of the adjacent ramps will be of critical importance. Conversely, if auxiliary lanes or a C-D road are provided across the river, the influence of these ramps will largely be mitigated.

D3 Evaluation of Forecasted Traffic Volumes

D3.1 Reconciling Other Studies

Various forecasts for the Missouri Bridge crossing have been produced for a number of different analyses during the last 6 years. An attempt was made to validate the content of each forecast in order to measure their consistency and applicability. As best as could be determined, all of the forecasts considered a total of six lanes crossing the river. Summaries of the findings from each forecast are provided below:

1. An internal MoDOT memorandum dated June 2001 provided additional traffic forecasting information for the Eatherton Road/Route 109 corridor, including its terminus with Route 40/61. The memorandum referenced forecasts that were originally prepared by EWGCC in 1999 for an improved north-south corridor, but those projections reflected significant traffic increases along Route 40/61 which suggest that the Page Avenue Extension was not considered (it should be noted that this omission could have unwittingly constrained attractions to Eatherton Road). Consequently, it would be inappropriate to utilize these forecasts for the current effort.
2. A March 2000 study performed by Parsons Transportation for MoDOT (as part of an evaluation of Route 40/61 in St. Charles County) forecasted river crossings of 66,400 vpd in the construction year (2000) and 100,400 vpd in the design year (2020). No specific information was available to identify if the Page Avenue Extension was reflected or what types of land use changes were considered, but the significantly higher projected volumes would suggest that Page Avenue was not included in those projections. Therefore, these forecasts were not deemed valid for the current effort.
3. The 1996 MTIA report supported widening to six lanes based on the then-current and projected volumes. That report was based upon traffic forecasts of 51,500 vpd in a 1995 construction year and 82,500 vpd in a 2015 design year (growth of 2.4 percent annually). The report explicitly considered the Page Avenue Extension in the design year projections. Using HCS (Release 2.3) methodologies, it was calculated that a six-lane bridge would operate at LOS E or F by the design year and that the existing westbound bridge would be adequate only until 2005. It was noted that projected peak period demands could be reduced by as much as 150 vph and 120 vph with express bus service and car pooling, respectively.
4. The 1997 EA for the Route 40/61 corridor cited forecasts that reflected river crossing of 55,300 vpd in the construction year (1998) and 88,500 vpd in the design year (2018), growth of approximately 2.4 percent annually. That study also concluded that six lanes were needed across the Missouri River (as opposed to four). In fact, even a six-lane bridge was expected to operate at LOS F by the design year (based on a K-factor or design hour percentage of 15 percent). Car pooling and express bus service were suggested as possible alternatives for providing further relief.
5. Finally, forecasts were obtained from EWGCC at the outset of the current study which indicated that 68,400 vpd are expected to cross the river on Route 40/61 in 2004 and that this volume would increase to 76,300 vpd by 2020. The 2004 projection is consistent with current estimated crossing of 66,000 vpd. Furthermore, each of these forecasts explicitly reflects the completion of the Page Avenue Extension. Given the revised forecast years, inclusion of the Page Avenue Extension and, presumably, updated land uses assumptions in St. Charles County, these forecasts were deemed to be the most appropriate for incorporation into the current efforts.

The projected river crossing volume from each forecast is summarized in Table D3-1.

Table D3-1. Comparison of Forecasts Route 40/61 at the Missouri River

Source of Forecast	Construction Year Forecast		Design Year Forecast	
	Year	Volume	Year	Volume
2001 Eatherton Road Evaluation	n/a	n/a	2020	104,000
2000 Parson's Forecast for Route K	2000	66,400	2020	100,400
1996 MTIA for Route 40/61	1995	51,500	2015	82,500
1997 EA for Route 40/61	1998a	55,300	2018	88,500
2001 EWGCC Forecasts	2004	68,400	2020	76,300

Source: Crawford Bunte Brammeier, 2003.

As can be seen, there is loose correlation in the construction year forecasts despite the use of different horizon years. However, the divergence between forecasts is amplified in the design year due, in part, to the different years chosen.

For the purposes of this analysis, the construction year and design year for the Route 40/61 bridge complex would be extended to 2014 and 2034, respectively, though the design year for a major river crossing could arguably be extended out over 30 to 40 years instead of just 20. While it is acknowledged that the regional travel demand model is based on land use changes, there is no projected land use information available beyond the Year 2020. Therefore, it was necessary to evaluate equivalent growth rates based on modeled land use trends.

Initially, it was suspected that the two highest sets of forecasts may have omitted the Page Avenue Extension, thereby inflating volumes. However, given the fact that these forecasts were all generated within the last 6 years, it can be assumed that the Page Avenue Extension was included in each of the forecasts. Furthermore, all of the forecasts were reportedly based upon files from EWGCC's regional travel demand model which, ultimately, includes committed projects such as the Page Avenue Extension.

Upon further review, it now appears that the most recent forecasts provided by EWGCC may be understated. These "low" projections may be attributed to inconsistencies in future land use assumptions, as discussed below.

D3.2 Evaluation of Land Uses Within the Route 40/61 Corridor

An attempt was made to validate the land use assumptions for the Route 40/61 corridor in St. Charles County based on approved, completed, or identified developments and to verify future growth potential. Land use data provided by EWGCC indicates that substantial levels of development were considered, but those projections (which were based on the 1990 Census) may not have adequately reflected recent development trends.

Specifically, based on the recent platting of several large subdivisions in the Wentzville area (south of I-70 and west of Route 40/61), it appears that EWGCC has underestimated the number of new households in the Route 40/61 corridor. This discrepancy was likely based upon a perceived lack of services, but utilities were recently extended in that area, and development is accelerating. It is estimated that there could be an additional 2,500 homes in this area (beyond that considered by EWGCC) by 2020.

There has also been an appreciable increase in "other commercial" employment (predominantly offices) in the corridor during the last 5 years. It is estimated that the number of office employees in the corridor could exceed EWGCC's projections by over 11,000 people based on the addition of the MasterCard, CitiGroup, and MCI/WorldCom facilities alone. Conversely, there could be approximately 1,500 fewer retail employees in recognition of land use shifts that occurred in the vicinity of the WingHaven interchange. Overall, additional land uses in St. Charles County could generate 27,000 vpd (net), of which as many as 8,000 vpd could be added to Route 40/61 at the Missouri River Bridge (assuming the Page Avenue Extension is completed to Route 40/61 and that the corridor is upgraded to freeway status from the Missouri River to I-70).

Development in Chesterfield Valley could also exceed that inferred by EWGCC's projections, thereby increasing volumes to the east of the river crossing. Up to 6.3 million square feet of commercial development has been proposed in that area, with the potential to generate a gross total of 75,000 vpd. Though it will likely take more than 20 years for that much development to be "absorbed", it could speculatively add another 10,000 to 15,000 vpd to the Missouri River crossing.

In fact, existing development may have already exceeded development reflected by the EWGCC model. EWGCC's 2004 "projections" for the Chesterfield Airport Road ramps (to/from the west) are comparable to existing traffic levels (approximately 15,000 to 16,500 vpd) without consideration of traffic using the new Boone's Crossing interchange, which is not reflected by the EWGCC model.

D3.3 Revised River Crossing Forecasts

With the exception of the latest forecasts provided by EWGCC, the previous projections reflect annualized growth rates of 2.1 to 2.4 percent. Given the recent development trends in the corridor, these rates seem more viable than the 0.7 percent reflected by EWGCC's most recent forecasts.

Based on the information presented above, as well as the current counts showing existing volumes of nearly 82,000 vpd on the bridge, the projections from the two previous efforts were accepted as reasonable estimates for the Year 2020 (with consideration for the impacts of the Page Avenue Extension). Those forecasts were therefore used as a milestone to estimate future demands and traffic fluctuations on the Daniel Boone Bridge, as follows:

- Aggressive growth (conservatively estimated at 3 percent per year) is expected to continue for the next 5 years as high density employment centers are developed along the Route 40/61 corridor in St. Charles County. This growth will be offset by the opening of Phase I of the Page Avenue Extension in 2003-2004. Speculatively, Page Avenue (which is expected to carry 40,000 to 60,000 vpd initially) should relieve approximately 15,000 to 20,000 vpd from Route 40/61, but some of that will be offset by the addition of latent demands. As a result, the Route 40/61 bridge complex is estimated to carry nearly 84,000 vpd in 2007.
- Growth will continue, though for the purposes of this analysis, a more conservative rate of 2.1 percent annually (as predicted by previous modeling efforts) was assumed. At that rate, the river crossing will carry nearly 97,000 vpd in the construction year of 2014. It should be noted that this volume represents the lower threshold of LOS E for the existing westbound bridge.

- Growth will continue at a comparable rate, but it was speculated that Phases II and III of the Page Avenue Extension (to Lake St. Louis) would be completed by 2018. The completion of that freeway would once again be expected to divert 10,000 to 15,000 vpd from Route 40/61, though some regional through trips would also be attracted to the new I-64. As a result, it is estimated that there will be 95,000 river crossings in 2018.
- Assuming that the 2.1 percent growth rate (less diversions to Page Avenue) could be sustained until the year 2020, river crossings would reach nearly 100,000 vpd. This volume is comparable to the forecasts prepared by Parsons Transportation in 2000, thereby providing a level of validation.
- At 2.1 percent annually, the river crossing would carry 134,000 vpd by the design year of 2034. However, unless the greater St. Louis region is able to attract new growth in contrast to recent trends, long-term growth within this corridor would be expected to eventually subside. A more conservative rate of 1 percent annually would result in 115,000 vpd crossing the river on Route 40/61 in 2034.

The forecasted fluctuations in Route 40/61 river crossings are summarized in Table D3-2. The final calculations reflect the appropriate limits for a range of forecasted design year volumes.

Table D3-2. Projected Average Daily Traffic (ADT) Volumes Route 40/61 at Missouri River

Year	Bridge Volume (ADT)	Comments
2002	81,700	Current count w/ 3 lanes each way (CBB).
2004	76,700	Aggressive (3%) growth offset by diversion (10,000 vpd net) to Page
2007	83,800	Aggressive growth ends.
2014*	96,900	Assumes continuous growth (2.1%) – CONSTRUCTION YEAR.
2018	95,300	Growth offset by diversions (10,000 net) to Phases II and III of Page.
2020	99,300	Consistent growth.
	100,400	Per Parsons Transportation in 2000 (using EWGCC model).
2034†	115,400	Suppressed growth (1%) – DESIGN YEAR.
	134,300	Continuous growth (2.1%) – DESIGN YEAR.

* Westbound bridge at LOS E.

† Westbound bridge at LOS F.

Source: Crawford Bunte Brammeier, 2003.

As can be seen, the Route 40/61 bridge complex would be expected to carry 115,000 to 134,000 vpd by 2034 (these volumes would increase by 10,000 to 15,000 vpd if, for some reason, the Page Avenue Extension is not completed). Ironically, the lower end of this range coincides with the threshold for LOS F conditions on the existing westbound (1935) bridge. It is therefore clear that a new bridge will be required before this time.

D3.4 Lane Requirements Based on Forecasted River Crossings

The forecasted ADTs described above were used to project DHVs for the bridge complex based upon Route 40/61's existing and anticipated peaking characteristics. The peak hour currently represents approximately 8.3 percent of the ADT, but percentages may increase as constraints are removed along the remainder of the corridor. For the purposes of this analysis, a peak hour percentage of 8.5 percent was assumed.

Likewise, directional splits currently favor the peak direction of flow at a 2:1 ratio (66 percent in the peak direction). These splits will normalize as more employment is moved to St. Charles County, so a 60 percent peak directional split was assumed for future conditions. As a result, both the eastbound and westbound bridges would be expected to carry peak directional flows of 5,900 to 6,800 vph in the design year (eastbound in the morning and westbound in the afternoon).

Based upon these DHVs, the number of lanes needed to serve design year traffic was calculated using HCM methodologies, as shown in Table D3-3. It should be reiterated that the existing westbound bridge would be expected to fail prior to the design year, so these calculations reflected lanes on a new bridge with 12-foot lanes and full-width shoulders.

Table D3-3. Projected Design Year (2034) DHVs and LOS Route 40/61 at Missouri River

Direction of Flow	DHV		# Lanes	LOS (pc/mi/ln)	
	Low Projection	High Projection		Low Projection	High Projection
Peak	5,900	6,850	3	E (36.0)	F (*)
			4	C (24.1)	D (28.7)
Non-Peak	3,900	4,600	3	C (22.0)	C (25.7)

Source: Crawford Bunte Brammeier, 2003.

A summary of these projections results in the following:

- In order to maintain acceptable operating conditions, design year volumes will require four lanes in the peak direction of flow. With three lanes, conditions in the peak direction would range from LOS E (low projection) to significant failure (high projection). If four lanes are provided, the peak direction of flow could be accommodated at LOS D or better.
- Non-peak directional flows require only three lanes. LOS C could be maintained in the non-peak direction regardless of which projection is used.

In conclusion, it is apparent that a minimum of four lanes must be provided in the peak direction of travel, effectively suggesting that it will be necessary to provide four lanes in each direction. However, the number of new lanes that must be constructed would obviously be dependent upon whether the westbound bridge could be retained. Alternative configurations for the river crossing are discussed below.

D4.0 Alternative Bridge Configurations

The possible retention of the existing westbound bridge facilitates a number of different alternatives for accommodating design year traffic, including the possibility of reversible lanes. These concepts are discussed in more detail below along with their corresponding traffic characteristics.

D4.1 Elimination of the Existing Westbound Bridge

If the existing westbound bridge is not available for mainline traffic, it would be necessary to construct a six-lane bridge in order to provide a minimum of four lanes in each direction.

Under this configuration, the new bridge could be located either upstream or downstream of the existing eastbound bridge. The existing westbound bridge could also be maintained as an outer road, but that configuration would not serve a significant volume of traffic (predominantly motorists traveling between Chesterfield Valley and Missouri Research Park, estimated at less than 2,000 vpd). In fact, an outer road across the river would not eliminate the need for a fourth lane in the peak direction unless it could be configured as a C-D road with slip ramps.

D4.2 Creation of a C-D Road to Supplement the Existing Westbound Bridge

A C-D road would potentially attract a significant amount of traffic based on the volume of traffic currently accessing Route 40/61 at Chesterfield Airport Road and Missouri Research Park (Hartwig Road). Current counts indicate that the Chesterfield Airport Road ramps carry 15,000 vpd, and Hartwig Road is expected to attract 8,600 vpd when the westbound off-ramp is constructed. These volumes would conservatively be expected to grow to a minimum of 20,600 and 11,800 vpd, respectively, though the improvement of the Eatherton Road/Route 109 corridor could increase the volume of ramp traffic to/from the west even higher.

Potential merge/weave movements between the ramps to/from the east at Hartwig and the ramps to/from the west at Chesterfield Airport Road would range from over 900 vph in the non-peak direction of flow and nearly 1,900 vph in the peak direction of flow. These volumes represent roughly 30 percent of the forecasted bridge volumes, so a C-D road and/or auxiliary lane will clearly have the potential to carry a proportionate share of traffic across the river.

Under this configuration, a new four-lane bridge would be constructed in one direction and both existing bridges would be used in combination to provide five lanes in the opposite direction. One of the older bridges would effectively be designated for through traffic while the other would be used as a C-D road to accommodate merging or weaving between interchanges. The new bridge could be constructed upstream of the existing eastbound bridge or downstream of the existing westbound bridge.

D4.3 Utilization of the Existing Westbound Bridge as Reversible Lanes

As a final alternative, the existing westbound bridge could be retained as reversible lanes to serve the peak direction of flow (eastbound in the morning and westbound in the afternoon). Despite the continuing normalization of directional movements on Route 40/61, it is anticipated that peak period flows would still be nearly 50 percent heavier in the peak direction of travel (60:40). Therefore, the existing westbound bridge could be used to supplement the other two structures (the existing eastbound bridge and the new bridge) with three lanes fixed in each direction. In this configuration, the new bridge would have to be located downstream of the existing westbound facility.

D4.4 Summary of Alternative Bridge Configurations

The alternative bridge configurations are summarized on Table D4-1. Each of these configurations would provide at least one auxiliary lane (in addition to three lanes on the mainline) or a C-D road in each direction. Therefore, the influence of the ramps at the adjacent intersections would be minimized. Furthermore, each configuration would accommodate the ultimate cross-section proposed through Chesterfield Valley, which consists of three mainline lanes and a two-lane C-D road in each direction.

Table D4-1. Proposed Lane Configurations Alternative Bridge Configurations, Route 40/61 at the Missouri River

Existing Eastbound Bridge	Existing Westbound Bridge	"2014" Bridge Configuration	"2014" Bridge Location
3 - EB or WB	n/a	6 - 4 EB or WB + 2 Opposing	Upstream or Downstream
3 - EB C-D	2 - EB Thru	4 - WB incl. 1 Auxiliary Lane	Downstream
3 - WB Thru	2 - WB C-D	4 - EB incl. 1 Auxiliary Lane	Upstream
3 - EB	2 - Reversible	3 - WB	Downstream

Source: Crawford Bunte Brammeier, 2003.

D5.0 Evaluation of Traffic and Operations – Final Study Alternatives, Route 40/61 Bridge

The following summary was prepared to document the evaluation of traffic and operations on the final study alternatives and the development of an additional alternative for the above-noted project. In general, the alternatives consisted of the No Action, two upstream alignments and two downstream alignments. The upstream and downstream alignments each included an alternative retaining the existing westbound bridge.

During the evaluation process, a new option was developed from Alternative A2 (upstream with the existing westbound bridge). In this adaptation, entitled Alternative A2', the westbound lane configurations were changed from two lanes each on the existing eastbound and existing westbound bridges to three lanes on the existing eastbound bridge and one lane on the existing westbound bridge. The existing westbound bridge would act as a collector-distributor road carrying traffic from the future North Outer Road and the Chesterfield Airport Road ramp across the river before allowing it to merge with westbound Route 40/61. The revised alternative eliminated a major lane split in the westbound direction, eliminated a weaving section that extended across the river, and eliminated the need for advance exiting of westbound traffic destined for Missouri Research Park.

In order to facilitate the evaluation of the final study alternatives, traffic and operation criterion were developed that provided some level of differentiation between the various build and No Action scenarios. These criteria are defined below:

- **Physical Safety Implications** – Evaluated as increased potential for accidents due to substandard lateral clearances, narrow lanes, and/or the presence of directional splits. This criterion isolated the No Action alternative due to the narrow lanes and lack of shoulders. In addition, most of the build alternatives included a major directional split, which was deemed potentially hazardous. Alternative A2' was the only option not having any of these undesirable features.
- **Operational Safety Implications** – An inference of increased potential for accidents due to increased weaving activity on the mainline. Shorter weaving sections [less than 4,500 feet (1,372 m)] were deemed to have greater accident potential, while those in excess of 9,000 feet (2,743 m) were considered of less consequence. Alternatives A1 and A2 each contained three weaving sections, while all of the other build alternatives had only two (one in each direction). However, Alternatives B3 and B5 each had weaves of less than 4,500 feet (1,372 m), while both of the weaves in Alternative A2' were in excess of 9,000 feet (2,743 m).
- **Operational Constraints** – A reflection of increased potential for lane violations due to unconventional lane configurations, short weaving sections or the intensification of (major) weaving with the Route 94 interchange. Due to the introduction of weaves between the bridge and Route 94, all of the build alternatives were scored poorly, though Alternatives B3 and B5 also had increased potential for lane violations at the eastbound exit for Chesterfield Airport Road/South Outer Road.
- **Operating Conditions** – A reflection of forecasted levels of service for the proposed bridge cross-sections (as calculated for the peak direction of travel during the peak periods in the design year). Based on the initial provision of four lanes in each direction, all of the build alternatives would produce LOS D conditions, while the No Action Alternative would yield failing operating conditions.

- **Complexity of Operations** - An inference of increased motorist confusion associated with requirements for advance exits. Exits placed greater than 1 mi (1.6 km) in advance of the cross street were deemed to have the greatest potential for confusion. Alternatives A1 and A2 required westbound exits more than 7,500 feet (2,286 m) in advance of Missouri Research Park, but there was no such requirement for Alternative A2'. Alternatives B3 and B5 required eastbound exits approximately 5,000 feet (1,524 m) in advance of Chesterfield Airport Road/South Outer Road.

As a final step in this process, the utilization of the existing westbound bridge in Alternative A2' was revisited. As previously noted, the existing westbound bridge would act as a C-D road in this scenario, carrying westbound traffic from the future North Outer Road and Chesterfield Airport Road. Based on current counts, the Chesterfield Airport Road entrance ramp carries approximately 7,500 vpd. This volume would be expected to grow to approximately 10,600 vpd by the design year. In addition, another 7,400 vpd could be added from the North Outer Road.

Consequently, the C-D road would be expected to carry, collectively, approximately 18,000 vpd, or 25 to 30 percent of the 58,000 to 67,000 westbound vpd crossing the river in the design year. This distribution of traffic would be appropriate based on the proposed lane configuration, which includes three lanes on the mainline (existing eastbound bridge) and one lane on the C-D road (existing westbound bridge). However, it must be acknowledged that it may ultimately be desirable to restripe the existing westbound bridge for two westbound lanes in order to better accommodate those forecasted traffic levels.

Appendix E

Preliminary Plan and Profile Plates and Preliminary Cost Estimate

MISSOURI
BLUFFS

PROPOSED
CENTERLINE

PC STA 91+82.48

POT STA 111+45.56
PT STA 110+46.47



WOLFRUM ROAD

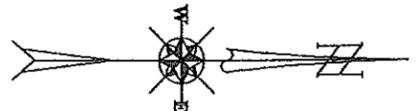
95

100

110

90

85



200' 0 200' 400'



SCALE: 1" = 200'

Route 40/61 Bridge
Job No. J6P1436

Alternative A2' (4 of 4)
Plate 12



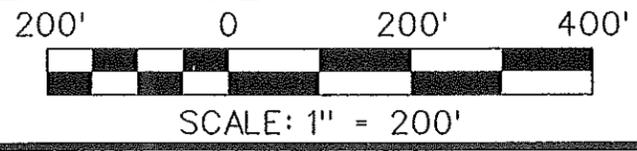
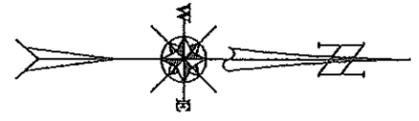
PROPOSED CENTERLINE

40 61

85 WATER TANK

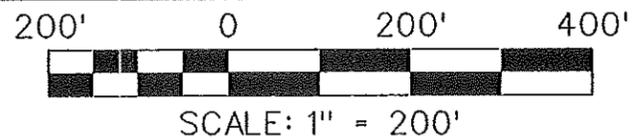
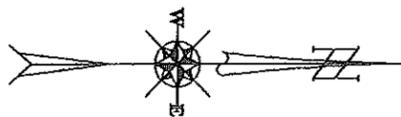
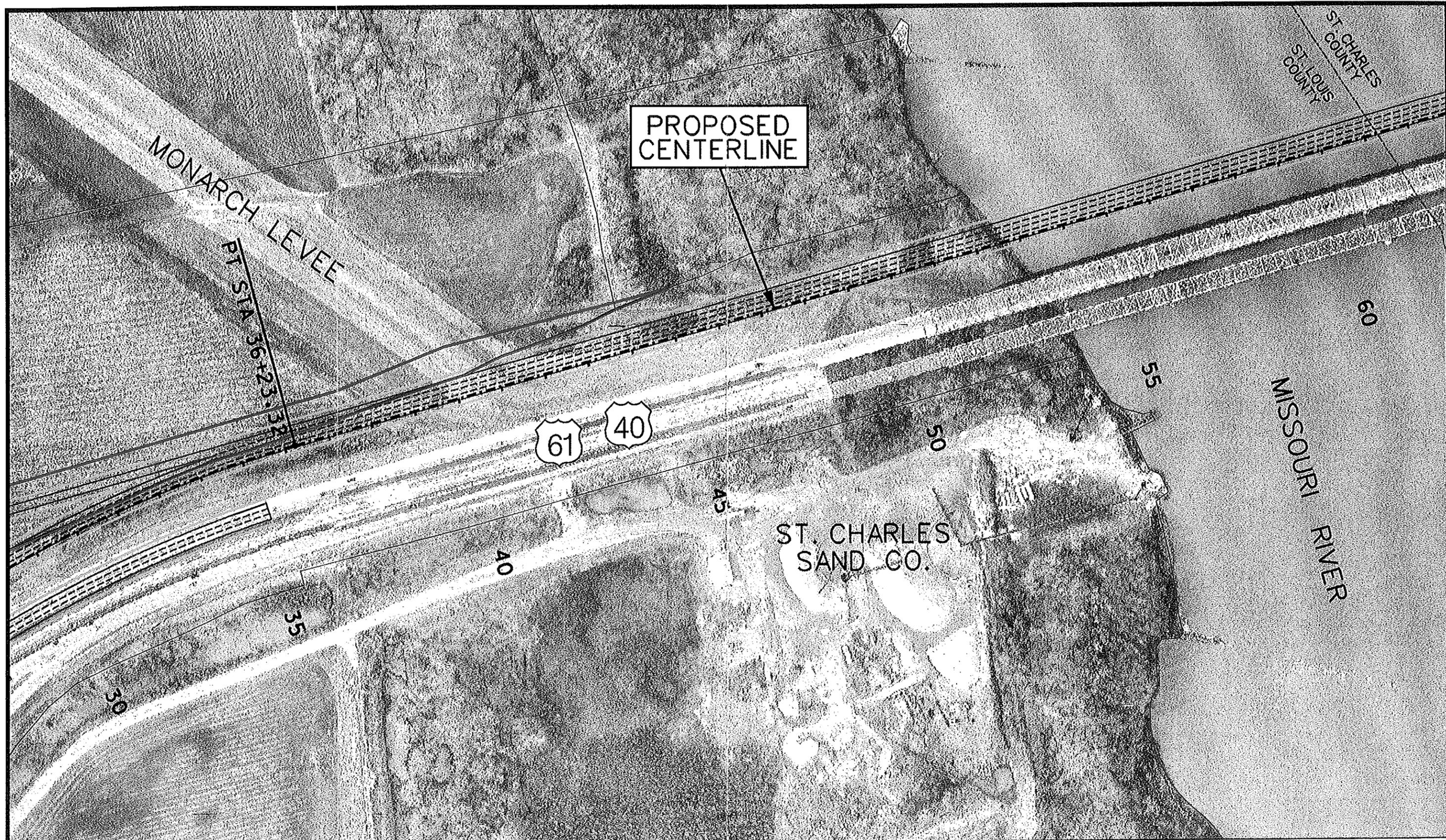
09 ST. LOUIS COUNTY

ST. CHARLES COUNTY



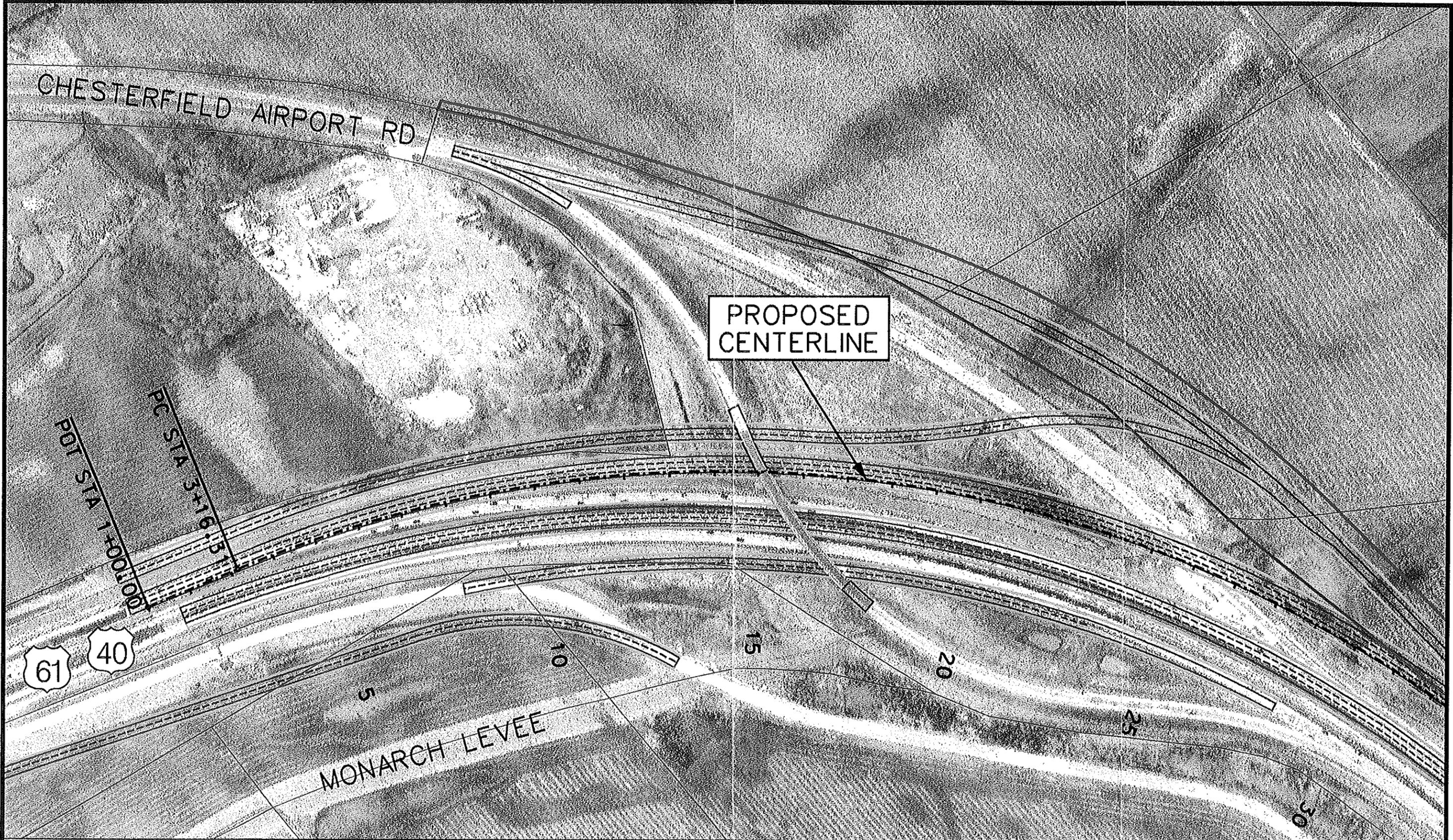
Route 40/61 Bridge
Job No. J6P1436

Alternative A2' (3 of 4)
Plate 11



Route 40/61 Bridge
Job No. J6P1436

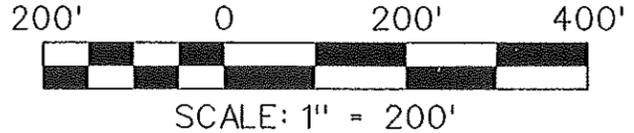
Alternative A2' (2 of 4)
Plate 10



PROPOSED
CENTERLINE

61 40

MONARCH LEVEE



Route 40/61 Bridge
Job No. J6P1436

Alternative A2' (1 of 4)
Plate 9

MISSOURI
BLUFFS

PROPOSED
CENTERLINE

PC STA 97+82.45

POT STA 111+45.56
PT STA 110+46.47



WOLFRUM ROAD

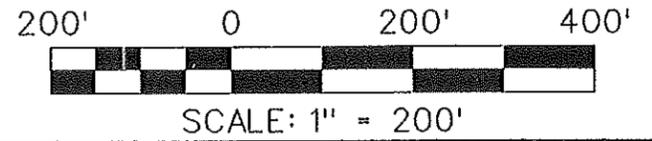
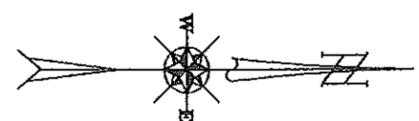
95

100

110

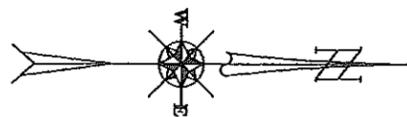
90

85



Route 40/61 Bridge
Job No. J6P1436

Alternative A2 (4 of 4)
Plate 8



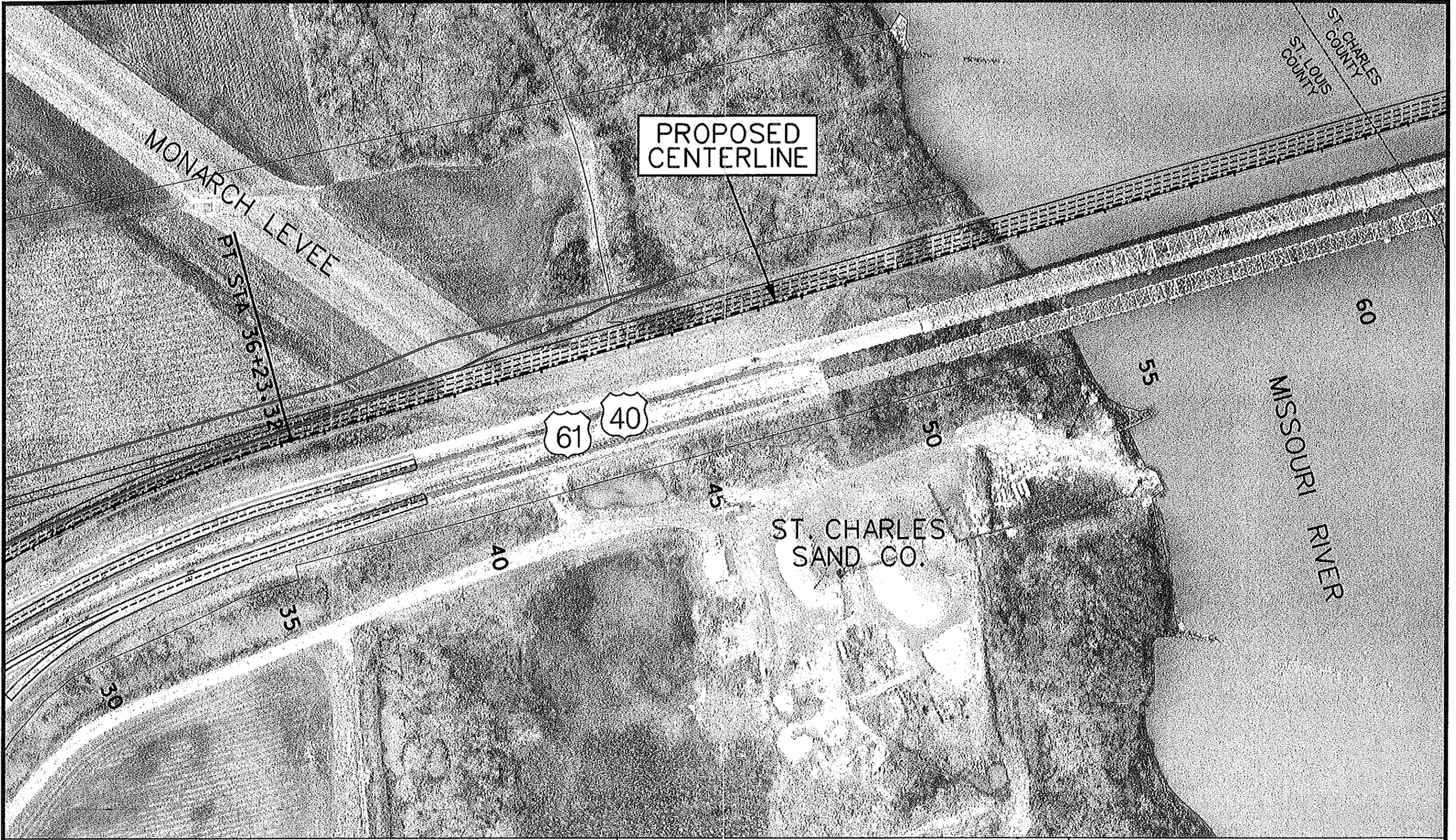
200' 0 200' 400'



SCALE: 1" = 200'

Route 40/61 Bridge
Job No. J6P1436

Alternative A2 (3 of 4)
Plate 7



PROPOSED CENTERLINE

MONARCH LEVEE

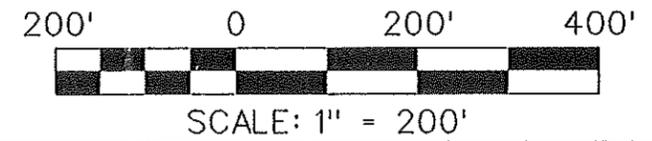
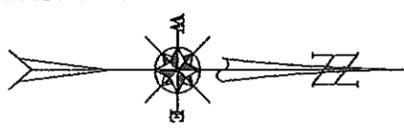
PT STA 36+23.32

61 40

ST. CHARLES SAND CO.

MISSOURI RIVER

ST. CHARLES COUNTY
ST. LOUIS COUNTY



Route 40/61 Bridge
Job No. J6P1436

Alternative A2 (2 of 4)
Plate 6

CHESTERFIELD AIRPORT RD

PROPOSED
CENTERLINE

POT STA 1+00.00

PC STA 5+16.3

61 40

MONARCH LEVEE

5

10

15

20

25

30



SCALE: 1" = 200'

Route 40/61 Bridge
Job No. J6P1436

Alternative A2 (1 of 4)
Plate 5

MISSOURI
BLUFFS

PROPOSED
CENTERLINE

PC STA 97+82.45

POT STA 111+45.56
PT STA 110+46.47

40
61

110

105

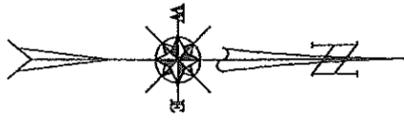
WOLFRUM ROAD

100

95

90

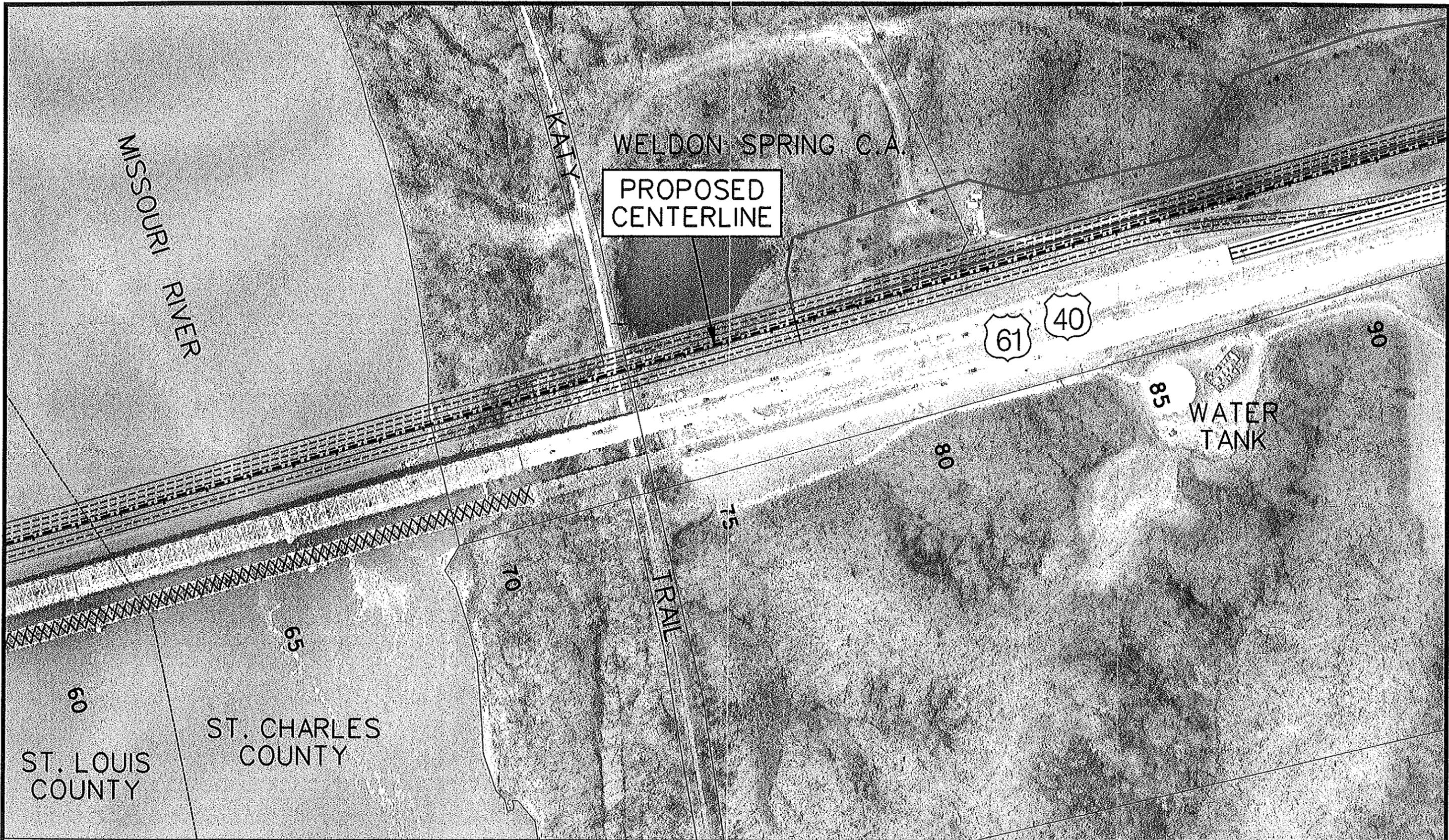
85



SCALE: 1" = 200'

Route 40/61 Bridge
Job No. J6P1436

Alternative A1 (4 of 4)
Plate 4



PROPOSED
CENTERLINE

MISSOURI
RIVER

WELDON SPRING C.A.

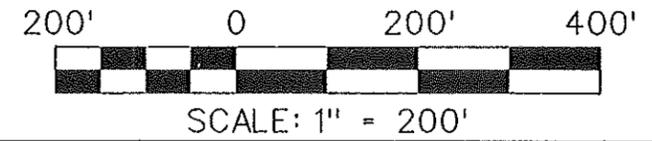
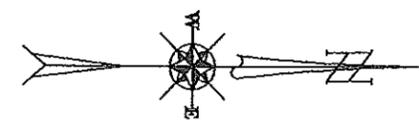
61 40

85
WATER
TANK

60
ST. LOUIS
COUNTY

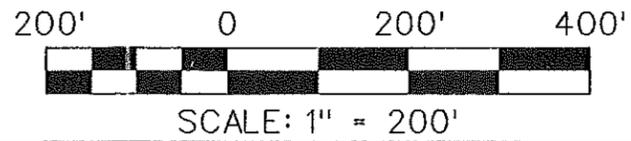
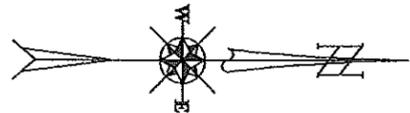
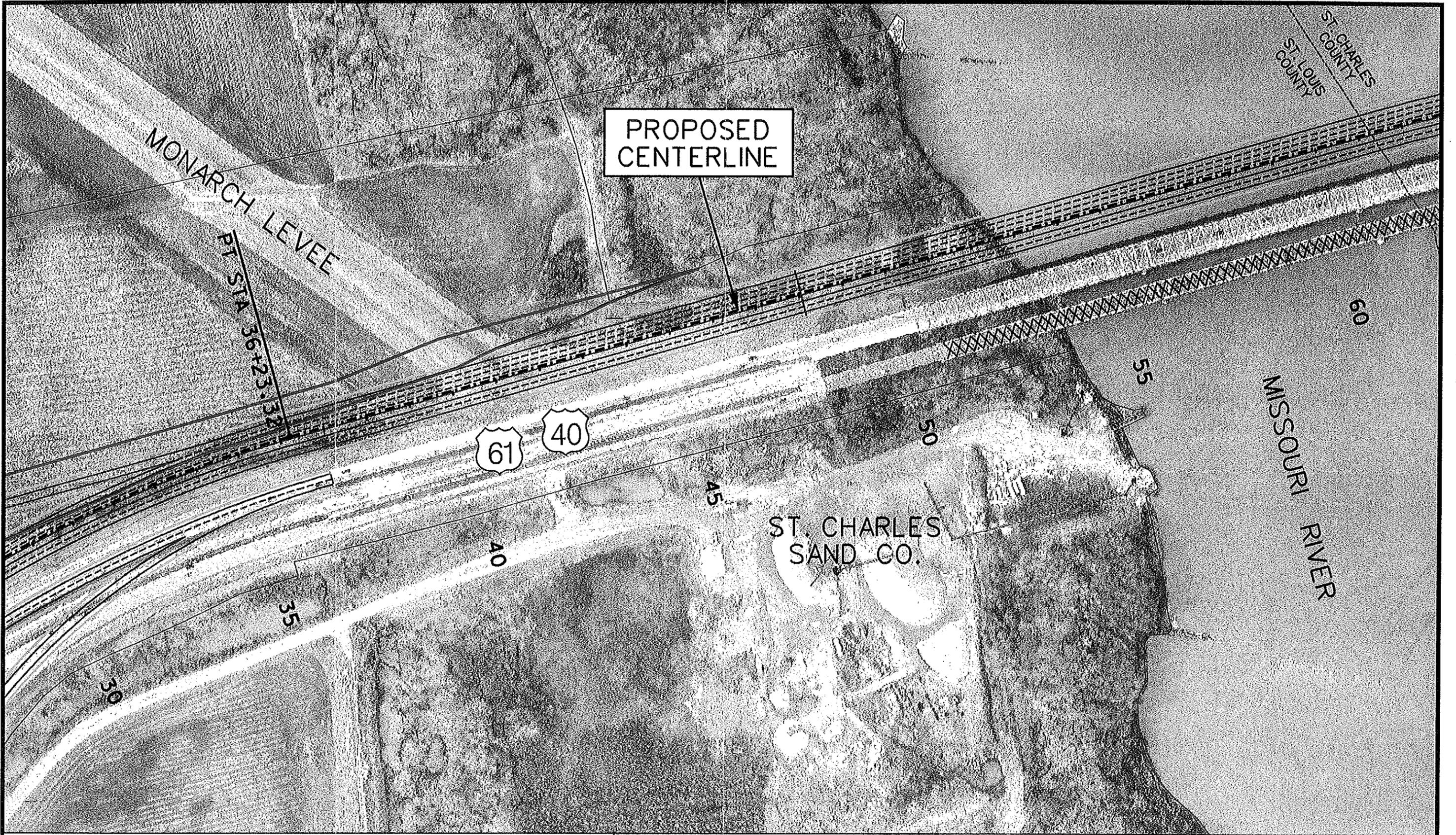
65
ST. CHARLES
COUNTY

TRAIL



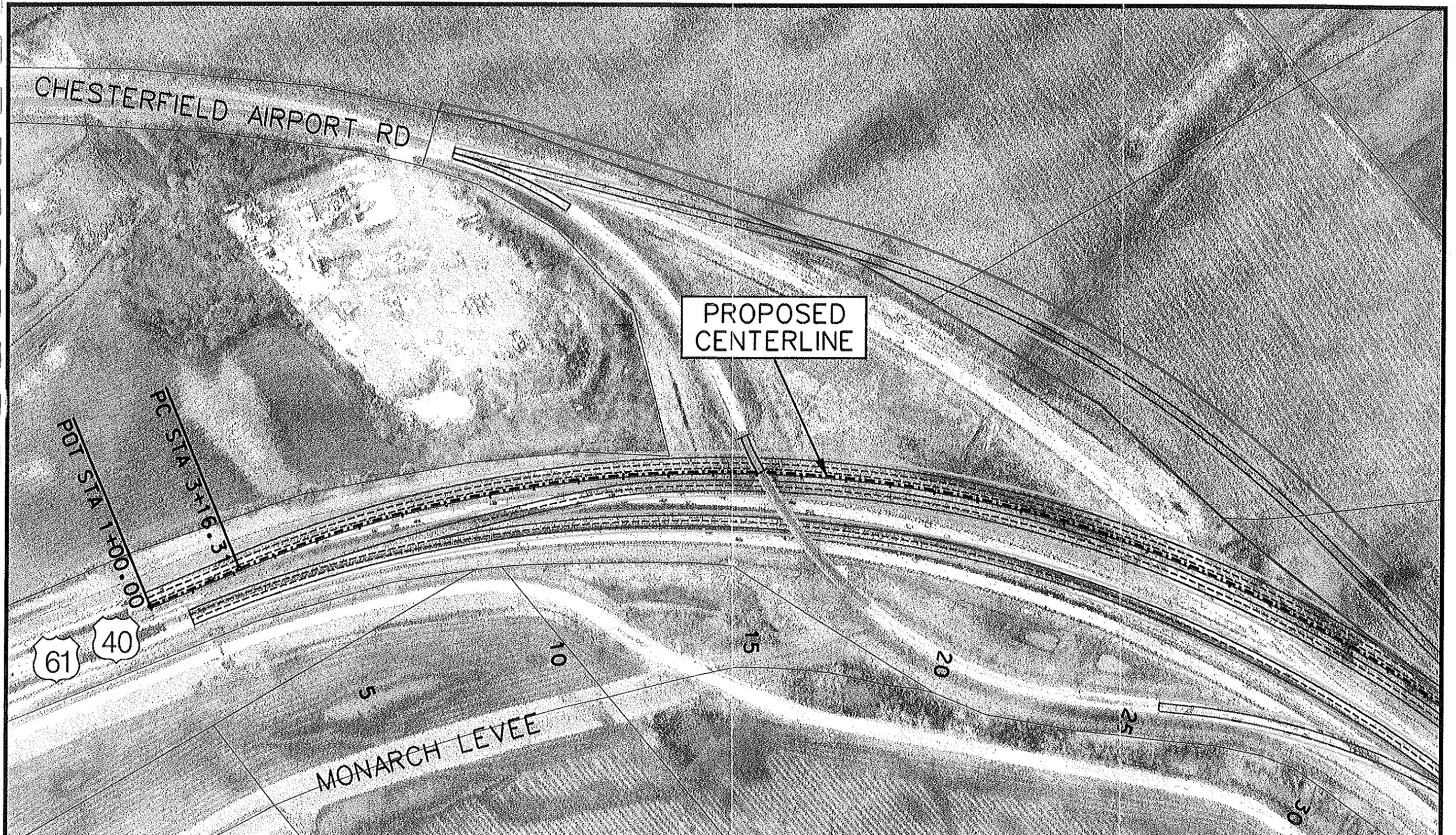
Route 40/61 Bridge
Job No. J6P1436

Alternative A1 (3 of 4)
Plate 3



Route 40/61 Bridge
Job No. J6P1436

Alternative A1 (2 of 4)
Plate 2



PROPOSED
CENTERLINE

61 40

MONARCH LEVEE

200' 0 200' 400'

SCALE: 1" = 200'

Route 40/61 Bridge
Job No. J6P1436

Alternative A1 (1 of 4)
Plate 1

April 18, 2003

**Preliminary Cost Estimate
Route 40/61 Bridge at the Missouri River**

St. Charles and St. Louis Counties, Missouri
Job J6P1436

**Summary of Preliminary Costs
All Costs are in 2007 Dollars**

Alternate	Construction			Right of Way	Other	Total
	Roadway	Bridge	Total			
A1	\$9,169,709	\$132,168,046	\$141,337,756	\$1,249,303	\$50,881,592	\$193,468,650
A2	\$8,657,010	\$114,283,249	\$122,940,259	\$1,249,303	\$44,258,493	\$168,448,054
A2'	\$8,442,085	\$114,283,249	\$122,725,333	\$1,249,303	\$44,233,607	\$168,208,243
B3	\$6,449,483	\$132,767,856	\$139,217,339	\$924,613	\$50,118,242	\$190,260,194
B5	\$5,838,235	\$114,883,059	\$120,721,294	\$924,613	\$43,459,666	\$165,105,572
Averages	\$7,711,304	\$121,677,092	\$129,388,396	\$1,119,427	\$46,590,320	\$177,098,143

Present Value and Future Value estimates of construction and maintenance costs assumptions:

- New bridge structure constructed in 2012
- Current E.B. Bridge to be rehabilitated in 2018
- Current W. B. Bridge (if used) to be rehabilitated in 2020.

2002 Dollars will be projected to 2007 for construction with an inflation rate of 4%
Maintenance and rehabilitation scheduled for 2018 and 2020 are shown in 2007 dollars

**Preliminary Cost Estimate
Route 40/61 Bridge at the Missouri River**

April 18, 2003

St. Charles and St. Louis Counties, Missouri
Job J6P1436

**Summary of Preliminary Costs
All Costs are in Current Dollars (2002)**

Alternate	Construction		Right of Way	Other	Total
	Roadway	Bridge			
A1	\$7,536,833	\$108,632,500	\$1,026,836	\$41,820,960	\$159,017,128
A2	\$7,115,431	\$93,932,500	\$1,026,836	\$36,377,255	\$138,452,022
A2'	\$7,058,613	\$93,932,500	\$1,026,836	\$36,356,801	\$138,374,749
B3	\$5,301,005	\$109,125,500	\$759,964	\$41,193,542	\$156,380,011
B5	\$4,798,603	\$94,425,500	\$759,964	\$35,720,677	\$135,704,745
Averages	\$6,362,097	\$100,009,700	\$920,087	\$38,293,847	\$145,585,731

Present Value and Future Value estimates of construction and maintenance costs assumptions:

- New bridge structure constructed in 2012
- Current E.B. Bridge to be rehabilitated in 2018
- Current W. B. Bridge (if used) to be rehabilitated in 2020.

Maintenance and rehabilitation projected for 2018 and 2020 are shown in 2002 dollars

Preliminary Cost Estimate
Route 40/61 Bridge at the Missouri River
 St. Charles and St. Louis Counties
 Job No. J6P1436

January 28, 2003

ITEM	SUB-ITEMS	UNIT COST	QUANTITY	TOTAL COST 2002 Dollars	TOTAL COST 2007 Dollars	TOTAL COST 2012 Dollars	
ROADWAY CONSTRUCTION COSTS							
Grading	Clearing & Grubbing (assume 300-foot width)	\$3,000 per acre	40 acres	\$119,835	\$145,797	\$177,385	
	Total Excavation						
	Class A Excavation (70% total)	\$2 per cu yd	208,690 cu yd	\$292,166	\$355,465	\$432,477	
	Class C Excavation (30% total)	\$5 per cu yd	146,083 cu yd	\$313,035	\$380,855	\$463,368	
	Compacting Embankment	\$0.40 per cu yd	62,607 cu yd	\$817,198	\$994,247	\$1,209,653	
	Erosion Control	\$5 per foot	2,042,996 cu yd	\$41,500	\$50,491	\$61,430	
	Drainage	\$15 per foot	8,300 feet	\$124,500	\$151,473	\$184,290	
		Subtotal Grading and Drainage Costs			\$1,708,234	\$2,078,328	\$2,528,604
	Surfacing	New Concrete Pavement Local/Service Road(s)	\$500,000 per lane mile	11.7 lane miles	\$5,828,598	\$7,091,381	\$8,627,750
		A.	\$480,000 per mile	miles	\$0	\$0	\$0
B.		\$480,000 per mile	miles	\$0	\$0	\$0	
C.		\$480,000 per mile	miles	\$0	\$0	\$0	
D.		\$480,000 per mile	miles	\$0	\$0	\$0	
	Subtotal Surfacing Costs			\$5,828,598	\$7,091,381	\$8,627,750	
Subtotal Roadway Construction Costs				\$7,536,833	\$9,169,709	\$11,156,353	
BRIDGE CONSTRUCTION COSTS							
New Missouri River Bridge	Remove westbound bridge	Lump Sum		\$98,600,000	\$119,961,976	\$145,952,086	
	Rehabilitate eastbound bridge (2018)	Lump Sum		\$1,500,000	\$1,824,979	\$2,220,366	
	Chesterfield Airport Road	Lump Sum		\$7,300,000	\$8,881,566	\$10,805,783	
	Bridge over...	\$85 per sq ft	14,500 sq ft	\$1,232,500	\$1,499,525	\$1,824,401	
	Bridge over...	\$85 per sq ft	sq ft	\$0	\$0	\$0	
	Bridge over...	\$85 per sq ft	sq ft	\$0	\$0	\$0	
		Subtotal Bridge Construction Costs			\$108,632,500	\$132,168,046	\$160,802,637
	Subtotal Construction Costs				\$116,169,333	\$141,337,756	\$171,958,991
	OTHER COSTS						
	Right of Way - St. Louis Co.	Right of Way - St. Louis Co.	\$60,000 per acre	8.2 acres	\$483,014	\$599,827	\$729,781
Right of Way - St. Charles Co.		\$40,000 per acre	13.3 acres	\$533,822	\$649,476	\$790,187	
Subtotal Right-of-Way Costs				\$1,026,836	\$1,249,303	\$1,519,968	
Miscellaneous		20% of Construction Costs		\$23,233,867	\$28,267,551	\$34,391,798	
Engineering & Administration		16% of Construction Costs		\$18,587,093	\$22,614,041	\$27,513,439	
	Subtotal Other Costs			\$41,820,960	\$50,881,592	\$61,905,237	
Total Costs Alternative A1				\$159,017,128	\$193,468,650	\$235,384,195	

Alternative A1

**Preliminary Cost Estimate
Route 40/61 Bridge at the Missouri River**

St. Charles and St. Louis Counties
Job No. J6P1436

January 28, 2003

ITEM	SUB-ITEMS	UNIT COST	QUANTITY	TOTAL COST 2002 Dollars	TOTAL COST 2007 Dollars	TOTAL COST 2012 Dollars
ROADWAY CONSTRUCTION COSTS						
Grading	Clearing & Grubbing (assume 300-foot width)	\$3,000 per acre	40 acres	\$119,835	\$145,797	\$177,385
	Total Excavation					
	Class A Excavation (70% total)	\$2 per cu yd	208,680 cu yd	\$292,166	\$355,465	\$432,477
	Class C Excavation (30% total)	\$5 per cu yd	146,083 cu yd	\$313,035	\$380,855	\$463,368
	Compacting Embankment	\$0.40 per cu yd	62,607 cu yd	\$817,198	\$994,247	\$1,209,653
	Erosion Control	\$5 per foot	2,042,996 cu yd	\$41,500	\$50,491	\$61,430
	Drainage	\$15 per foot	8,300 feet	\$124,500	\$151,473	\$184,290
	Subtotal Grading and Drainage Costs			\$1,708,234	\$2,078,328	\$2,528,604
Surfacing	New Concrete Pavement	\$500,000 per lane mile	10.8 lane miles	\$5,407,197	\$6,578,682	\$8,003,972
	Local/Service Road(s)					
	A.	\$480,000 per mile	miles	\$0	\$0	\$0
	B.	\$480,000 per mile	miles	\$0	\$0	\$0
	C.	\$480,000 per mile	miles	\$0	\$0	\$0
	D.	\$480,000 per mile	miles	\$0	\$0	\$0
	Subtotal Surfacing Costs			\$5,407,197	\$6,578,682	\$8,003,972
	Subtotal Roadway Construction Costs			\$7,115,431	\$8,657,010	\$10,532,576
BRIDGE CONSTRUCTION COSTS						
	New Missouri River Bridge	Lump Sum		\$65,400,000	\$79,569,100	\$96,807,976
	Rehabilitate eastbound bridge (2018)	Lump Sum		\$7,300,000	\$8,881,566	\$10,805,783
	Rehabilitate westbound bridge (2020)	Lump Sum		\$20,000,000	\$24,333,058	\$29,604,886
	Chesterfield Airport Road	\$85 per sq ft	14,500 sq ft	\$1,232,500	\$1,489,525	\$1,824,401
	Bridge over...	\$85 per sq ft	sq ft	\$0	\$0	\$0
	Bridge over...	\$85 per sq ft	sq ft	\$0	\$0	\$0
	Bridge over...	\$85 per sq ft	sq ft	\$0	\$0	\$0
	Subtotal Bridge Construction Costs			\$93,932,500	\$114,283,249	\$139,043,046
	Subtotal Construction Costs			\$101,047,931	\$122,940,259	\$149,575,622
OTHER COSTS						
	RIGHT-OF-WAY COSTS					
	Right of Way - St. Louis Co.	\$60,000 per acre	8.2 acres	\$493,014	\$599,827	\$729,781
	Right of Way - St. Charles Co.	\$40,000 per acre	13.3 acres	\$533,822	\$649,476	\$790,187
	Subtotal - Right-of-Way Costs			\$1,026,836	\$1,249,303	\$1,519,968
	OTHER COSTS					
	Miscellaneous	20% of Construction Costs		\$20,209,586	\$24,588,052	\$29,915,124
	Engineering & Administration	16% of Construction Costs		\$16,167,569	\$19,670,441	\$23,932,100
	Subtotal Other Costs			\$36,377,255	\$44,258,493	\$53,847,224
	Total Costs Alternative A2			\$138,452,022	\$168,448,054	\$204,942,814

Preliminary Cost Estimate
Route 40/61 Bridge at the Missouri River
 St. Charles and St. Louis Counties
 Job No. J6P1436

January 28, 2003

ITEM	SUB-ITEMS	UNIT COST	QUANTITY	TOTAL COST 2002 Dollars	TOTAL COST 2007 Dollars	TOTAL COST 2012 Dollars	
ROADWAY CONSTRUCTION COSTS							
Grading	Clearing & Grubbing (assume 300-foot width)	\$3,000 per acre	40 acres	\$119,835		\$177,385	
	Total Excavation		208,690 cu yd			\$432,477	
	Class A Excavation (70% total)	\$2 per cu yd	146,083 cu yd	\$292,166	\$355,465	\$463,368	
	Class C Excavation (30% total)	\$5 per cu yd	62,607 cu yd	\$313,035	\$380,855	\$463,368	
	Compacting Embankment	\$0.40 per cu yd	2,042,995 cu yd	\$817,198	\$994,247	\$1,209,653	
	Erosion Control	\$5 per foot	8,300 feet	\$41,500	\$50,491	\$61,430	
	Drainage	\$15 per foot	8,300 feet	\$124,500	\$151,473	\$184,290	
		Subtotal Grading and Drainage Costs			\$1,708,234	\$1,932,531	\$2,528,604
	Surfacing	New Concrete Pavement	\$500,000 per lane mile	10.7 lane miles	\$5,350,379	\$6,509,554	\$7,919,868
		Local/Service Road(s)					
A.		\$480,000 per mile	miles	\$0	\$0	\$0	
B.		\$480,000 per mile	miles	\$0	\$0	\$0	
C.		\$480,000 per mile	miles	\$0	\$0	\$0	
D.	\$480,000 per mile	miles	\$0	\$0	\$0		
	Subtotal Surfacing Costs			\$5,350,379	\$6,509,554	\$7,919,868	
				\$7,058,613	\$8,442,085	\$10,448,471	
BRIDGE CONSTRUCTION COSTS							
	New Missouri River Bridge	Lump Sum		\$65,400,000	\$79,589,100	\$96,807,976	
	Rehabilitate eastbound bridge (2018)	Lump Sum		\$7,300,000	\$8,881,966	\$10,805,763	
	Rehabilitate westbound bridge (2020)	Lump Sum		\$20,000,000	\$24,333,058	\$29,604,886	
	Chesterfield Airport Road	\$85 per sq ft	14,500 sq ft	\$1,232,500	\$1,499,525	\$1,824,401	
	Bridge over...	\$85 per sq ft	sq ft	\$0	\$0	\$0	
	Bridge over...	\$85 per sq ft	sq ft	\$0	\$0	\$0	
	Bridge over...	\$85 per sq ft	sq ft	\$0	\$0	\$0	
		Subtotal Bridge Construction Costs			\$93,932,500	\$114,283,249	\$139,043,046
					\$100,991,113	\$122,725,333	\$149,491,518
	OTHER COSTS						
RIGHT-OF-WAY COSTS	Right of Way - St. Louis Co.	\$60,000 per acre	8.2 acres	\$493,014	\$599,827	\$729,781	
	Right of Way - St. Charles Co.	\$40,000 per acre	13.3 acres	\$533,822	\$649,476	\$790,187	
		Subtotal - Right-of-Way Costs		\$1,026,836	\$1,249,303	\$1,519,968	
OTHER COSTS	Miscellaneous	20% of Construction Costs		\$20,198,223	\$24,574,226	\$29,898,304	
	Engineering & Administration	16% of Construction Costs		\$16,158,578	\$19,659,381	\$23,918,643	
		Subtotal Other Costs		\$36,356,801	\$44,233,607	\$53,816,946	
				\$138,374,749	\$168,208,243	\$204,828,432	

Preliminary Cost Estimate
Route 40/61 Bridge at the Missouri River
 St. Charles and St. Louis Counties
 Job No. J6P1436

January 28, 2003

ITEM	SUB-ITEMS	UNIT COST	QUANTITY	TOTAL COST 2002 Dollars	TOTAL COST 2007 Dollars	TOTAL COST 2012 Dollars	
ROADWAY CONSTRUCTION COSTS							
Grading	Cleaning & Grubbing (assume 300-foot width)	\$3,000 per acre	22 acres	\$67,493	\$82,116	\$99,905	
	Total Excavation						
	Class A Excavation (70% total)	\$2 per cu yd	44,317 cu yd	\$62,044	\$75,486	\$91,840	
	Class C Excavation (30% total)	\$5 per cu yd	31,022 cu yd	\$66,476	\$80,878	\$98,400	
	Compacting Embankment	\$0.40 per cu yd	1,690,758 cu yd	\$676,303	\$822,826	\$1,001,094	
	Erosion Control	\$5 per foot	5,800 feet	\$29,000	\$35,283	\$42,927	
	Drainage	\$15 per foot	5,800 feet	\$87,000	\$105,849	\$128,781	
		Subtotal Grading and Drainage Costs			\$988,316	\$1,202,437	\$1,462,949
	Surfacing	New Concrete Pavement	\$500,000 per lane mile	7.7 lane miles	\$3,839,962	\$4,671,901	\$5,684,082
		Local/Service Road(s)					
Sand Company outer road		\$480,000 per mile	1.0 miles	\$472,727	\$575,145	\$699,752	
B.		\$480,000 per mile	miles	\$0	\$0	\$0	
C.		\$480,000 per mile	miles	\$0	\$0	\$0	
D.	\$480,000 per mile	miles	\$0	\$0	\$0		
	Subtotal Surfacing Costs			\$4,312,689	\$5,247,046	\$6,383,834	
BRIDGE CONSTRUCTION COSTS							
	New Missouri River Bridge	Lump Sum		\$98,600,000	\$119,961,976	\$145,952,086	
	Remove westbound bridge	Lump Sum		\$1,500,000	\$1,824,979	\$2,220,366	
	Rehabilitate eastbound bridge (2018)	Lump Sum		\$7,300,000	\$8,881,566	\$10,805,783	
	Chesterfield Airport Road	\$85 per sq ft	20,300 sq ft	\$1,725,500	\$2,099,335	\$2,554,162	
	Bridge over...	\$85 per sq ft	sq ft	\$0	\$0	\$0	
	Bridge over...	\$85 per sq ft	sq ft	\$0	\$0	\$0	
	Bridge over...	\$85 per sq ft	sq ft	\$0	\$0	\$0	
		Subtotal Bridge Construction Costs			\$109,125,500	\$132,767,856	\$161,532,398
		Subtotal Roadway Construction Costs			\$5,301,005	\$6,449,483	\$7,846,782
	OTHER COSTS						
	RIGHT-OF-WAY COSTS						
	Right-of-Way - St. Louis Co.	\$60,000 per acre	10.6 acres	\$634,664	\$772,166	\$939,458	
	Right-of-Way - St. Charles Co.	\$40,000 per acre	3.1 acres	\$125,500	\$152,447	\$185,475	
	Subtotal - Right-of-Way Costs			\$759,964	\$924,613	\$1,124,933	
	OTHER COSTS						
	Miscellaneous	20% of Construction Costs		\$22,885,301	\$27,843,468	\$33,875,336	
	Engineering & Administration	16% of Construction Costs		\$18,308,241	\$22,274,774	\$27,100,669	
	Subtotal Other Costs			\$41,193,542	\$50,118,242	\$60,976,505	
Total Costs Alternative B3				\$156,380,011	\$190,260,194	\$231,480,618	

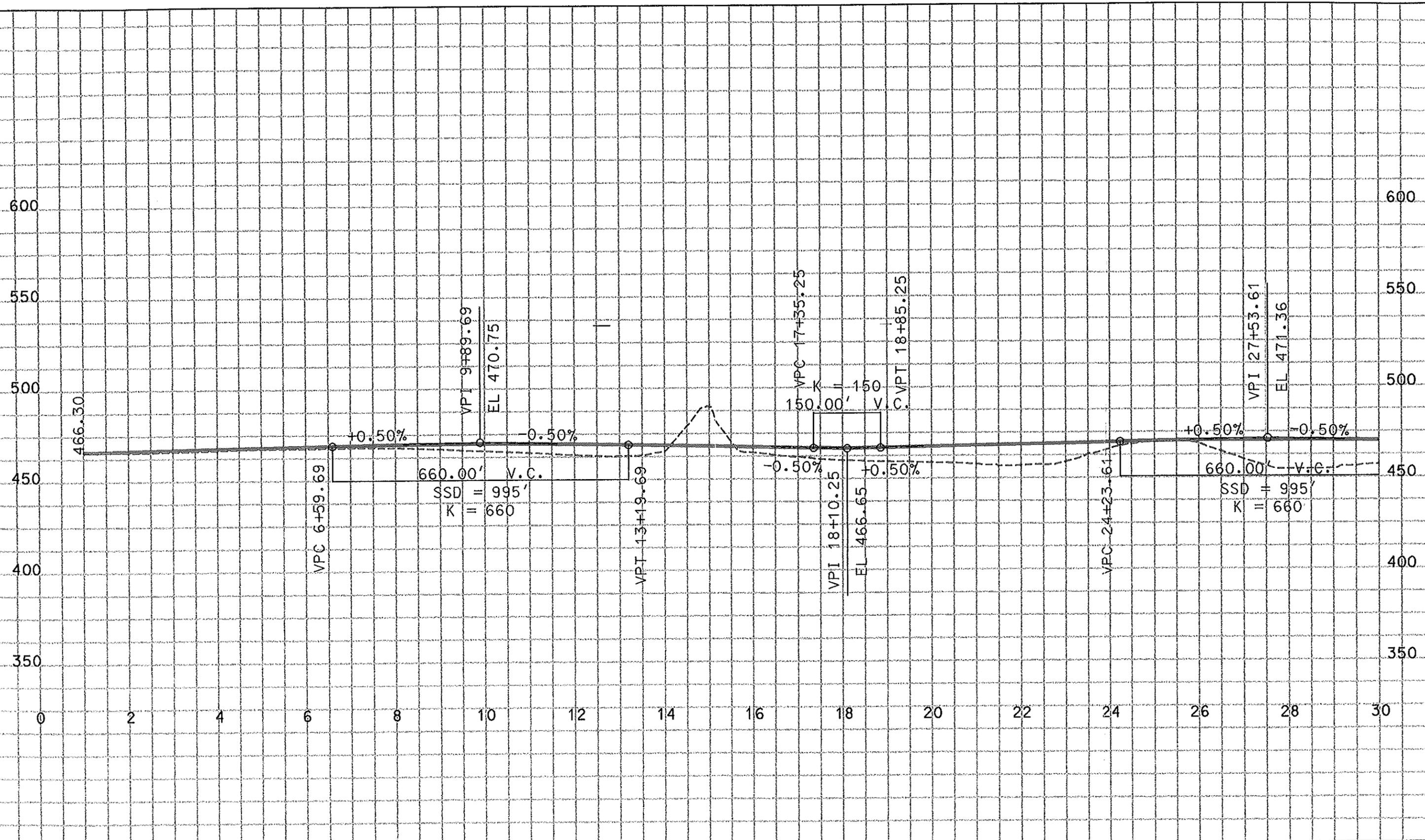
**Preliminary Cost Estimate
Route 40/61 Bridge at the Missouri River**

St. Charles and St. Louis Counties
Job No. J6P1436

January 28, 2003

ITEM	SUB-ITEMS	UNIT COST	QUANTITY	TOTAL COST 2002 Dollars	TOTAL COST 2007 Dollars	TOTAL COST 2012 Dollars
ROADWAY CONSTRUCTION COSTS						
Grading	Cleaning & Grubbing (assume 300-foot width)	\$3,000 per acre	22 acres	\$67,493	\$82,116	\$99,906
	Total Excavation		44,317 cu yd			
	Class A Excavation (70% total)	\$2 per cu yd	31,022 cu yd	\$62,044	\$75,486	\$91,840
	Class C Excavation (30% total)	\$5 per cu yd	13,295 cu yd	\$66,476	\$80,878	\$98,400
	Compacting Embankment	\$0.40 per cu yd	1,690,758 cu yd	\$676,303	\$822,826	\$1,001,094
	Erosion Control	\$5 per foot	5,500 feet	\$27,500	\$33,458	\$40,707
	Drainage	\$15 per foot	5,500 feet	\$82,500	\$100,374	\$122,120
	Subtotal Grading and Drainage Costs			\$982,316	\$1,195,137	\$1,454,067
Surfacing	New Concrete Pavement Local/Service Road(s)	\$500,000 per lane mile	7.2 lane miles	\$3,599,015	\$4,366,586	\$5,312,619
	B.	\$480,000 per mile	0.5 miles	\$227,273	\$276,512	\$336,419
	C.	\$480,000 per mile	miles	\$0	\$0	\$0
	D.	\$480,000 per mile	miles	\$0	\$0	\$0
	Subtotal Surfacing Costs			\$3,816,288	\$4,643,098	\$5,649,038
	Subtotal Roadway Construction Costs			\$4,798,603	\$5,838,235	\$7,103,105
BRIDGE CONSTRUCTION COSTS						
	New Missouri River Bridge	Lump Sum		\$65,400,000	\$79,569,100	\$96,807,976
	Rehabilitate eastbound bridge (2018)			\$7,300,000	\$8,881,566	\$10,805,783
	Rehabilitate westbound bridge (2020)			\$20,000,000	\$24,333,058	\$29,604,886
	Chesterfield Airport Road	\$85 per sq ft	20,300 sq ft	\$1,725,500	\$2,099,335	\$2,554,162
	Bridge over...	\$85 per sq ft	sq ft	\$0	\$0	\$0
	Bridge over...	\$85 per sq ft	sq ft	\$0	\$0	\$0
	Bridge over...	\$85 per sq ft	sq ft	\$0	\$0	\$0
	Subtotal Bridge Construction Costs			\$94,425,500	\$114,883,059	\$139,772,807
	Subtotal Construction Costs			\$99,224,103	\$120,721,294	\$146,875,912
RIGHT-OF-WAY COSTS						
	Right-of-Way - St. Louis Co.	\$60,000 per acre	10.6 acres	\$634,864	\$772,166	\$939,458
	Right-of-Way - St. Charles Co.	\$40,000 per acre	3.1 acres	\$125,300	\$152,447	\$185,475
	Subtotal Right-of-Way Costs		13.7 acres	\$759,964	\$924,613	\$1,124,933
OTHER COSTS						
	Miscellaneous	20% of Construction Costs		\$19,844,821	\$24,144,259	\$29,375,182
	Engineering & Administration	16% of Construction Costs		\$15,879,857	\$19,315,407	\$23,500,146
	Subtotal Other Costs			\$35,720,677	\$43,459,666	\$52,875,328
	Total Costs Alternative B5			\$135,704,745	\$165,105,572	\$200,876,173

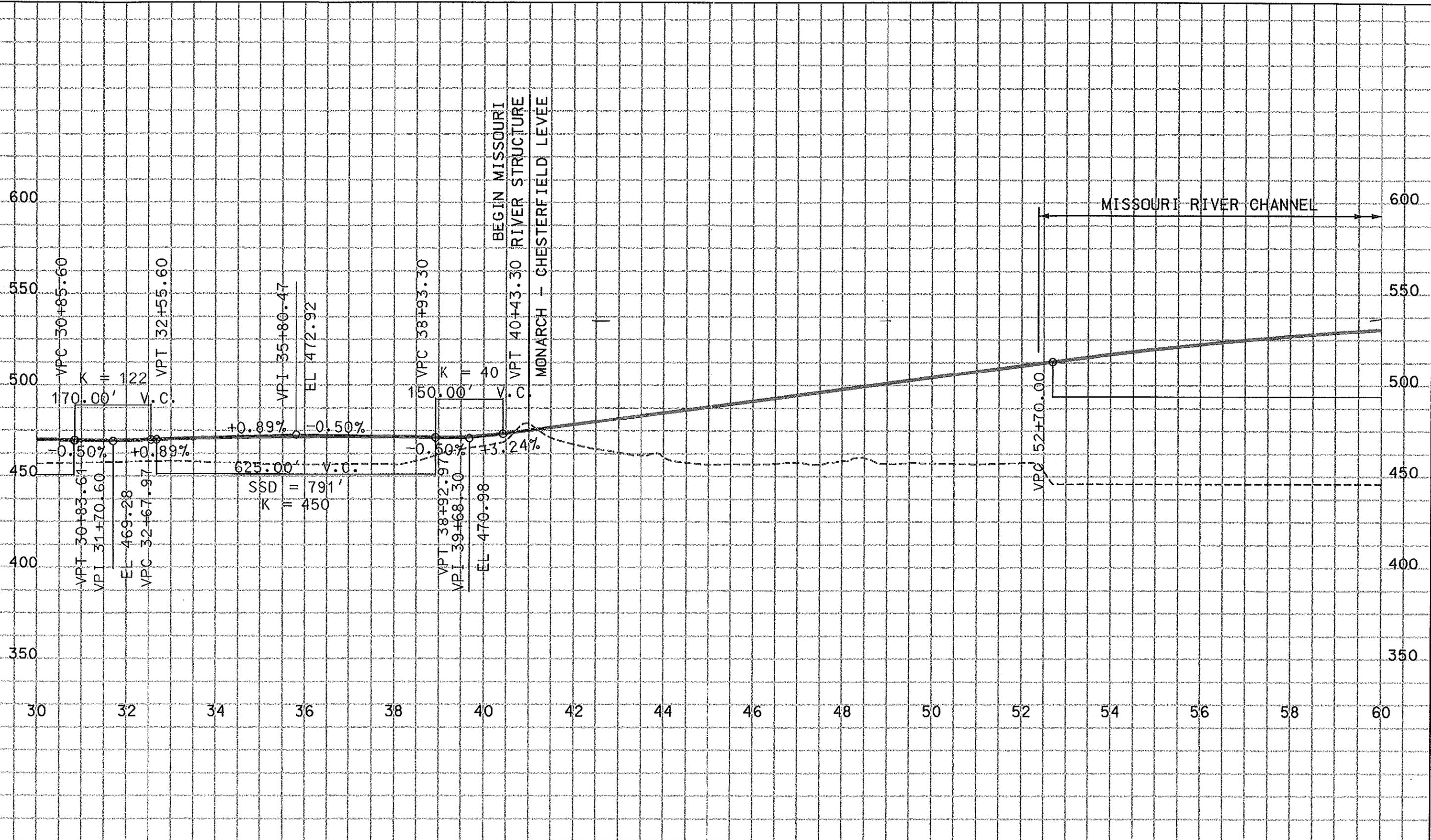
Alternative B5



SCALE: HORIZONTAL 1" = 200'
 VERTICAL 1" = 50'

Route 40/61 Bridge
 Job No. J6P1436

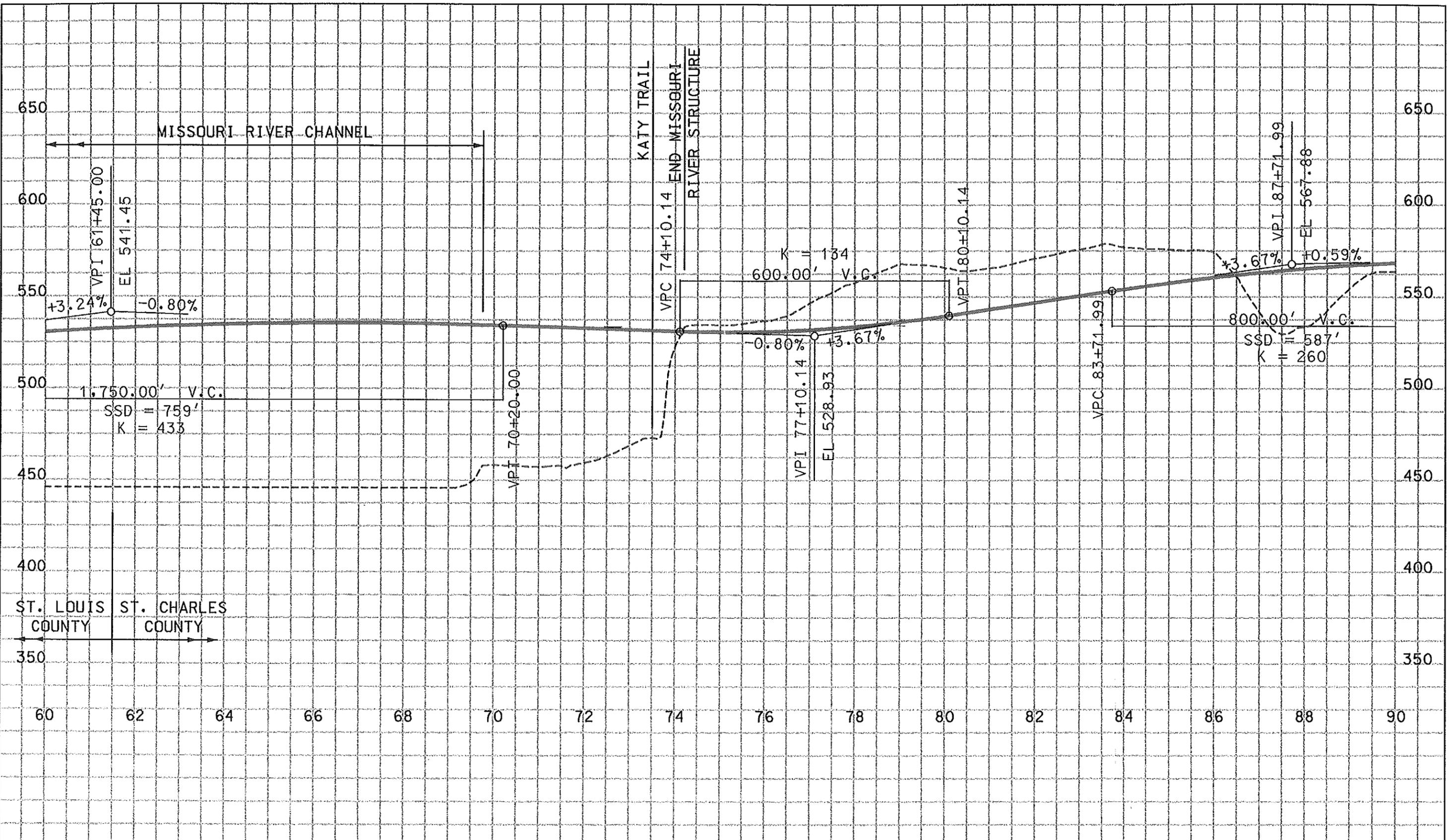
Alternatives A1, A2, A2' (1 of 4)
 Plate 13



SCALE: HORIZONTAL 1" = 200'
 VERTICAL 1" = 50'

Route 4061 Bridge
 Job No. J6P1436

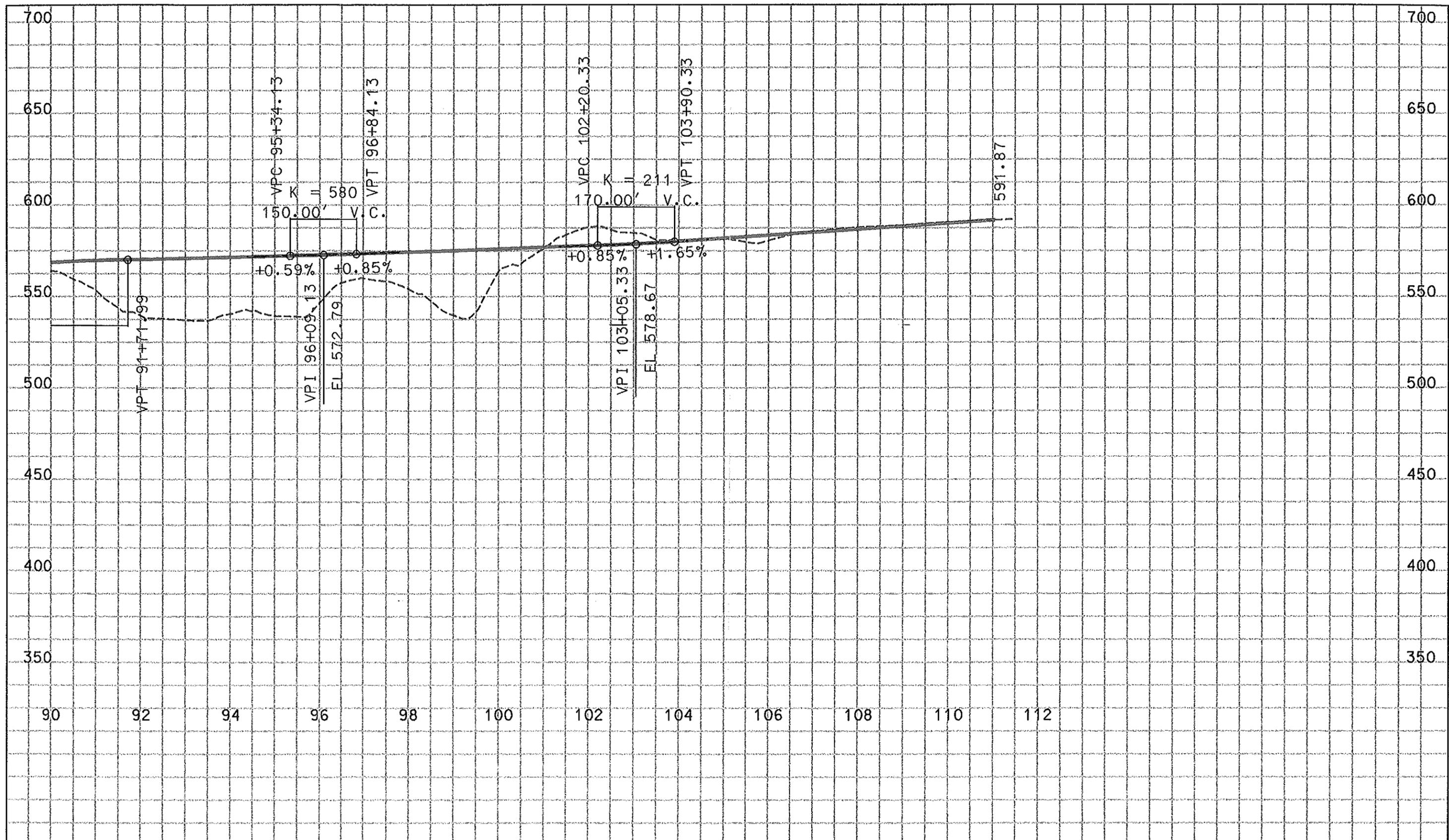
Alternatives A1, A2, A2' (2 of 4)
 Plate 14



SCALE: HORIZONTAL 1" = 200'
VERTICAL 1" = 50'

Route 4061 Bridge
Job No. J6P1436

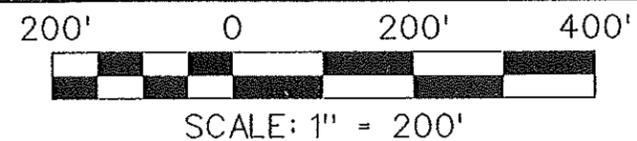
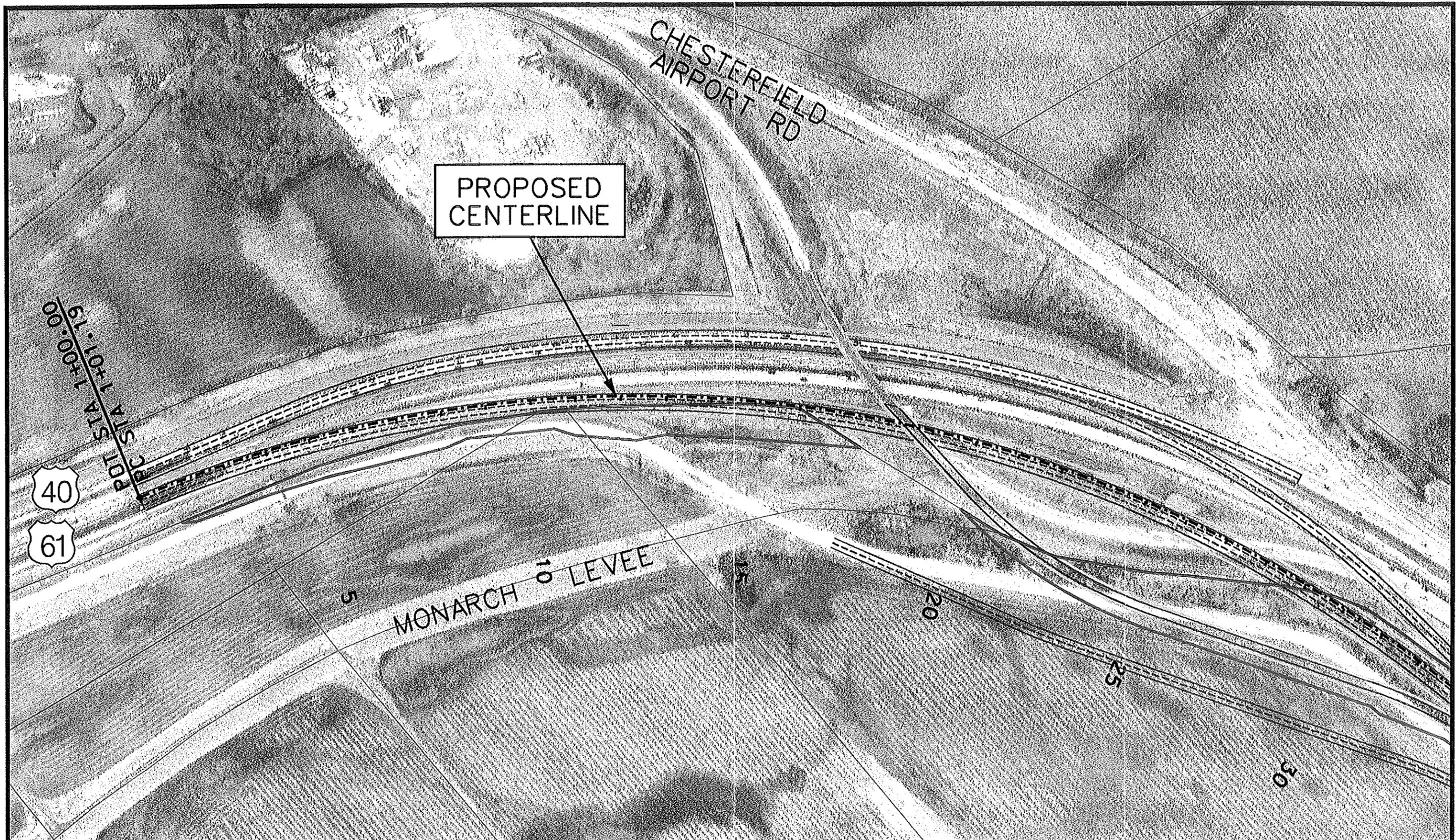
Alternatives A1, A2, A2' (3 of 4)
Plate 15



SCALE: HORIZONTAL 1" = 200'
 VERTICAL 1" = 50'

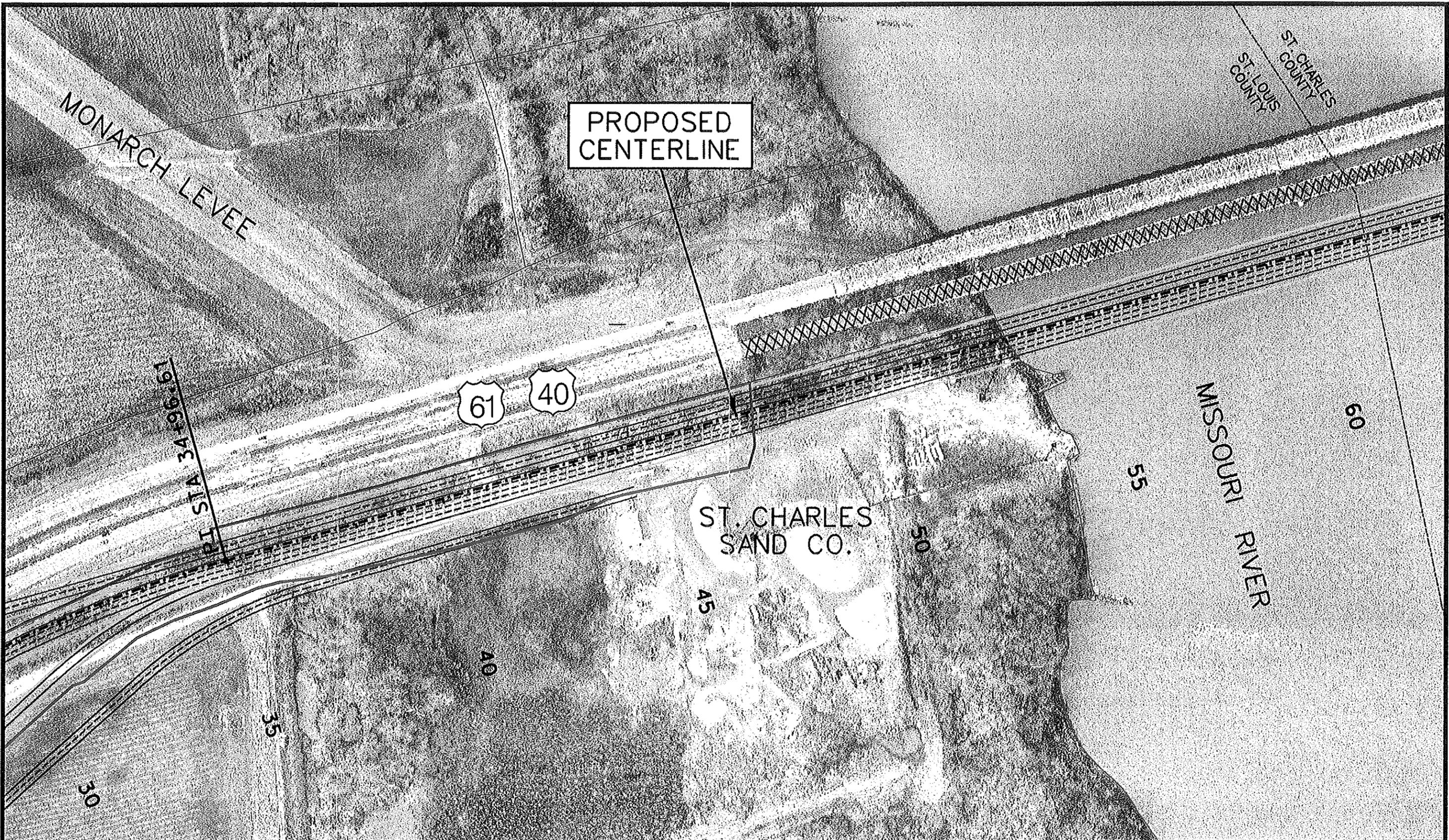
Route 40/61 Bridge
 Job No. J6P1436

Alternatives A1, A2, A2' (4 of 4)
 Plate 16



Route 40/61 Bridge
Job No. J6P1436

Alternative B3 (1 of 3)
Plate 17



PROPOSED CENTERLINE

MONARCH LEVEE

ST. CHARLES COUNTY
ST. LOUIS COUNTY

61 40

PI STA 34+96.61

ST. CHARLES SAND CO.

MISSOURI RIVER

30

35

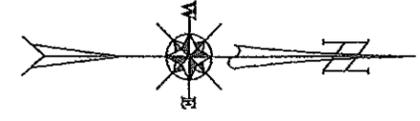
40

45

50

55

60



200' 0 200' 400'



SCALE: 1" = 200'

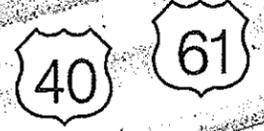
Route 40/61 Bridge
Job No. J6P1436

Alternative B3 (2 of 3)
Plate 18

MISSOURI RIVER

WELDON SPRING C.A.

KATY



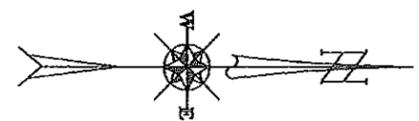
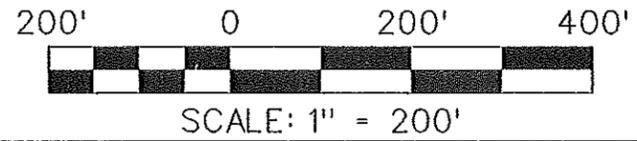
WATER TANK

PROPOSED CENTERLINE

ST. CHARLES COUNTY

ST. LOUIS COUNTY

TRAIL



Route 40/61 Bridge
Job No. J6P1436

Alternative B3 (3 of 3)
Plate 19

PC STA 73+18.02

PT STA 16+56.45

PVI STA 81+28.32
PVI STA 81+38.64

PVI STA 84+13.85
PVI STA 84+14.53

PVI STA 84+14.04

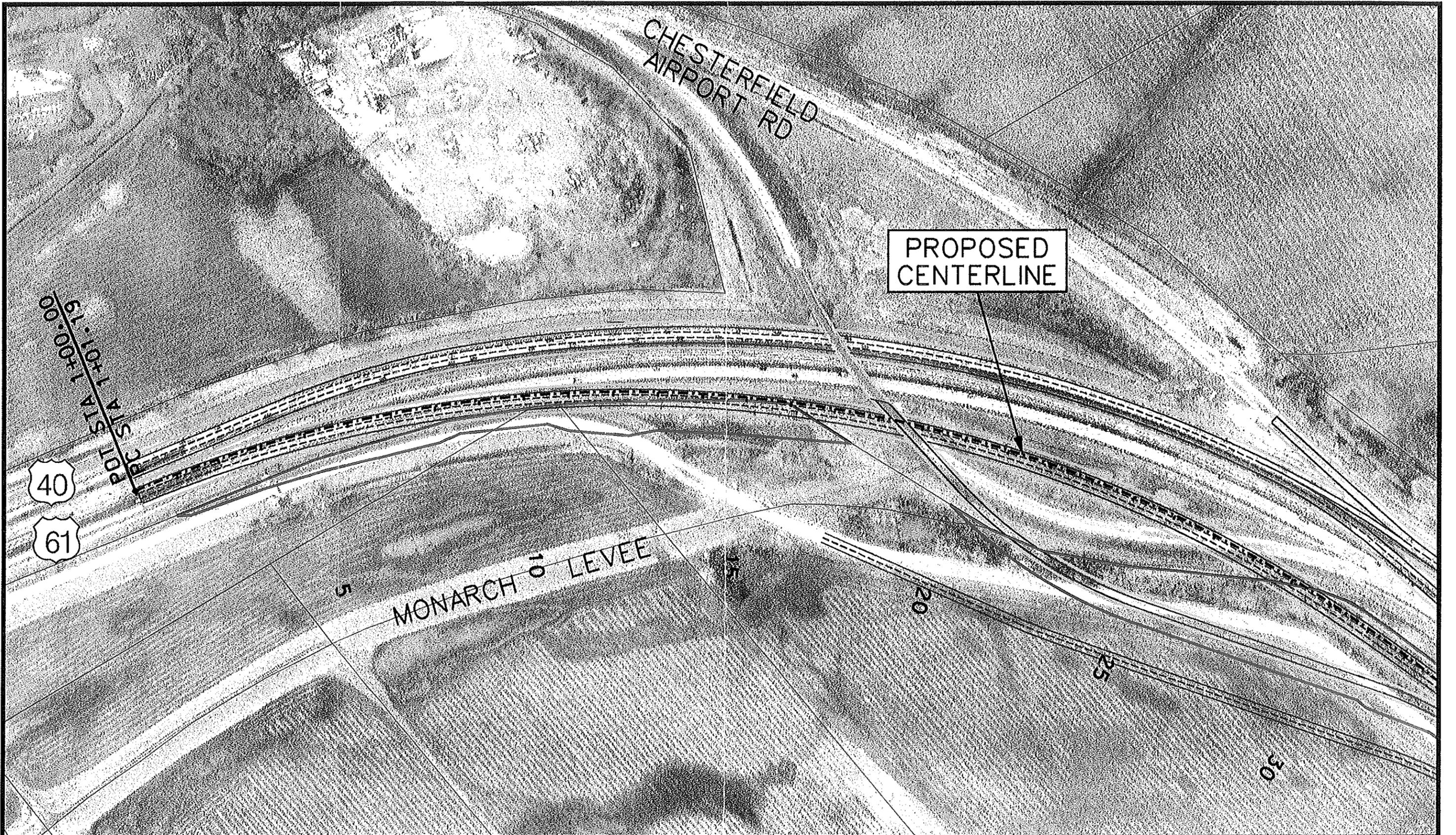
80

75

70

60

65



CHESTERFIELD
AIRPORT RD

PROPOSED
CENTERLINE

PDI STA 1+10+11.99
POC STA 1+00+00.00

40

61

MONARCH LEVEE

5

15

20

25

30



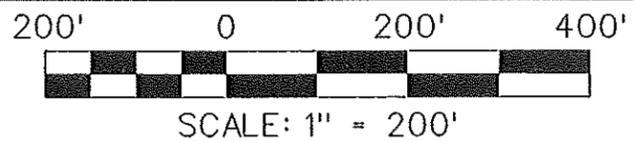
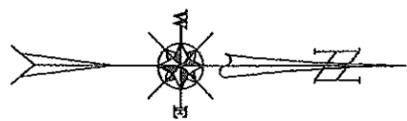
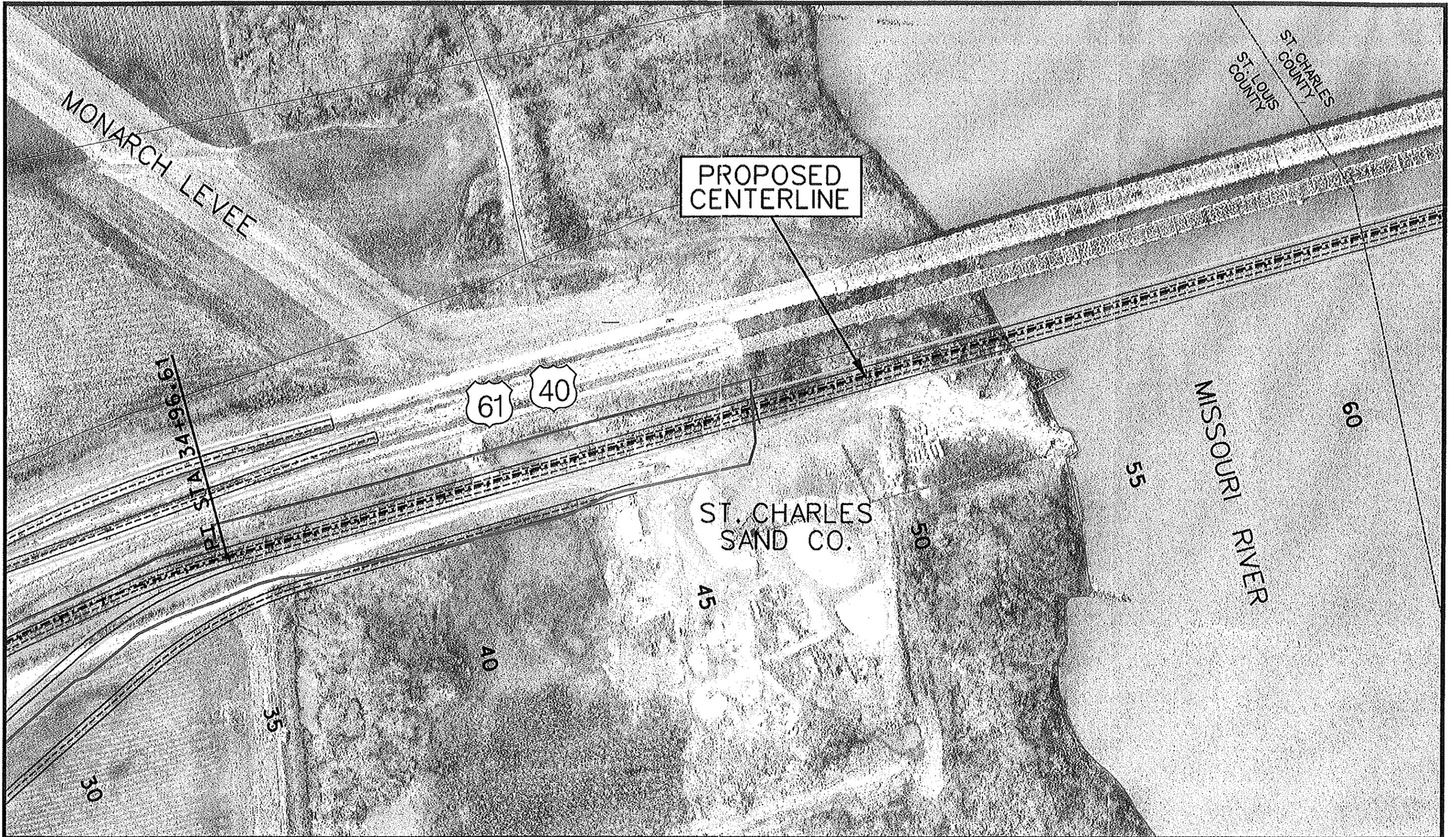
200' 0 200' 400'



SCALE: 1" = 200'

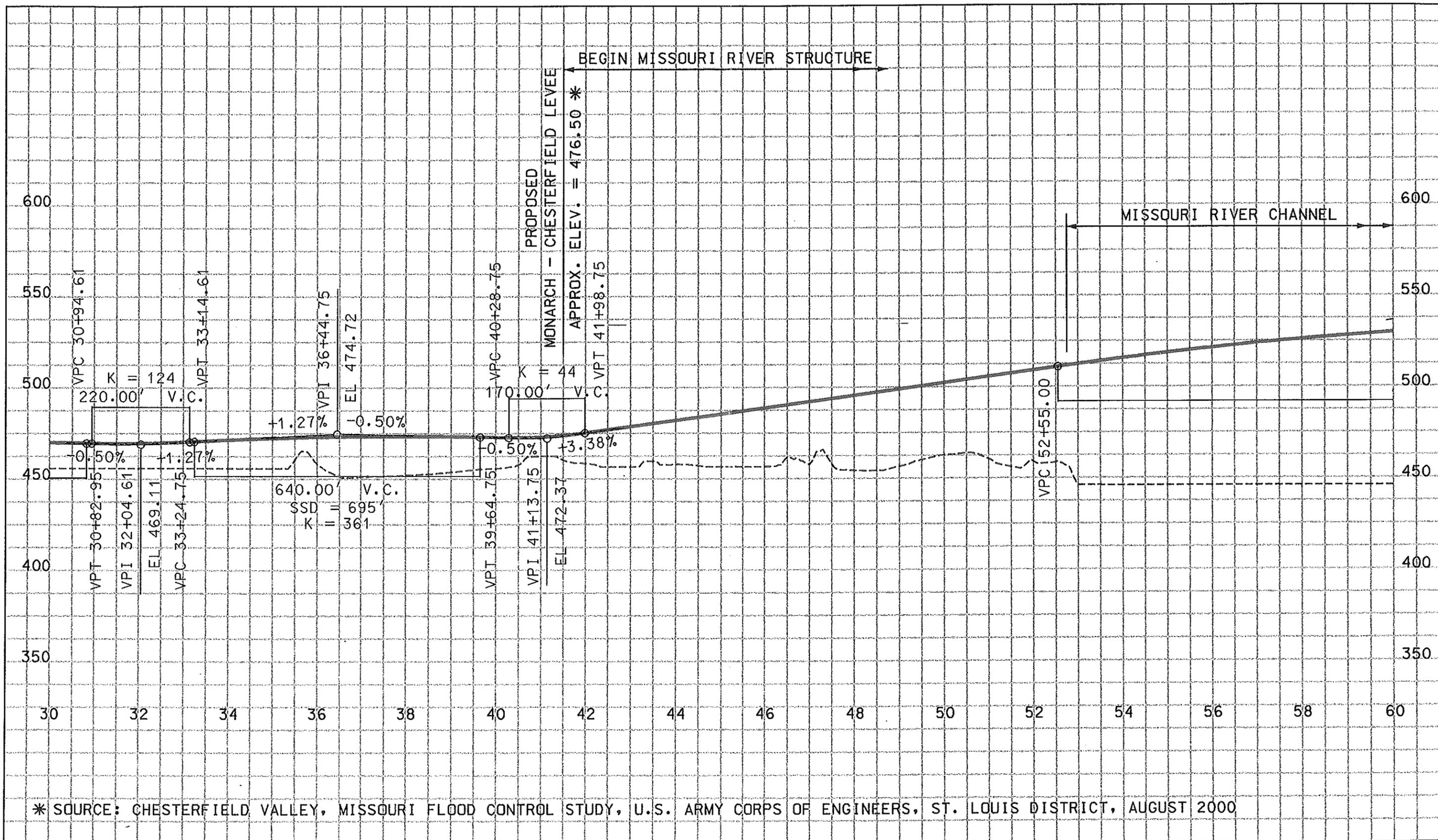
Route 40/61 Bridge
Job No. J6P1436

Alternative B5 (1 of 3)
Plate 20



Route 40/61 Bridge
Job No. J6P1436

Alternative B5 (2 of 3)
Plate 21

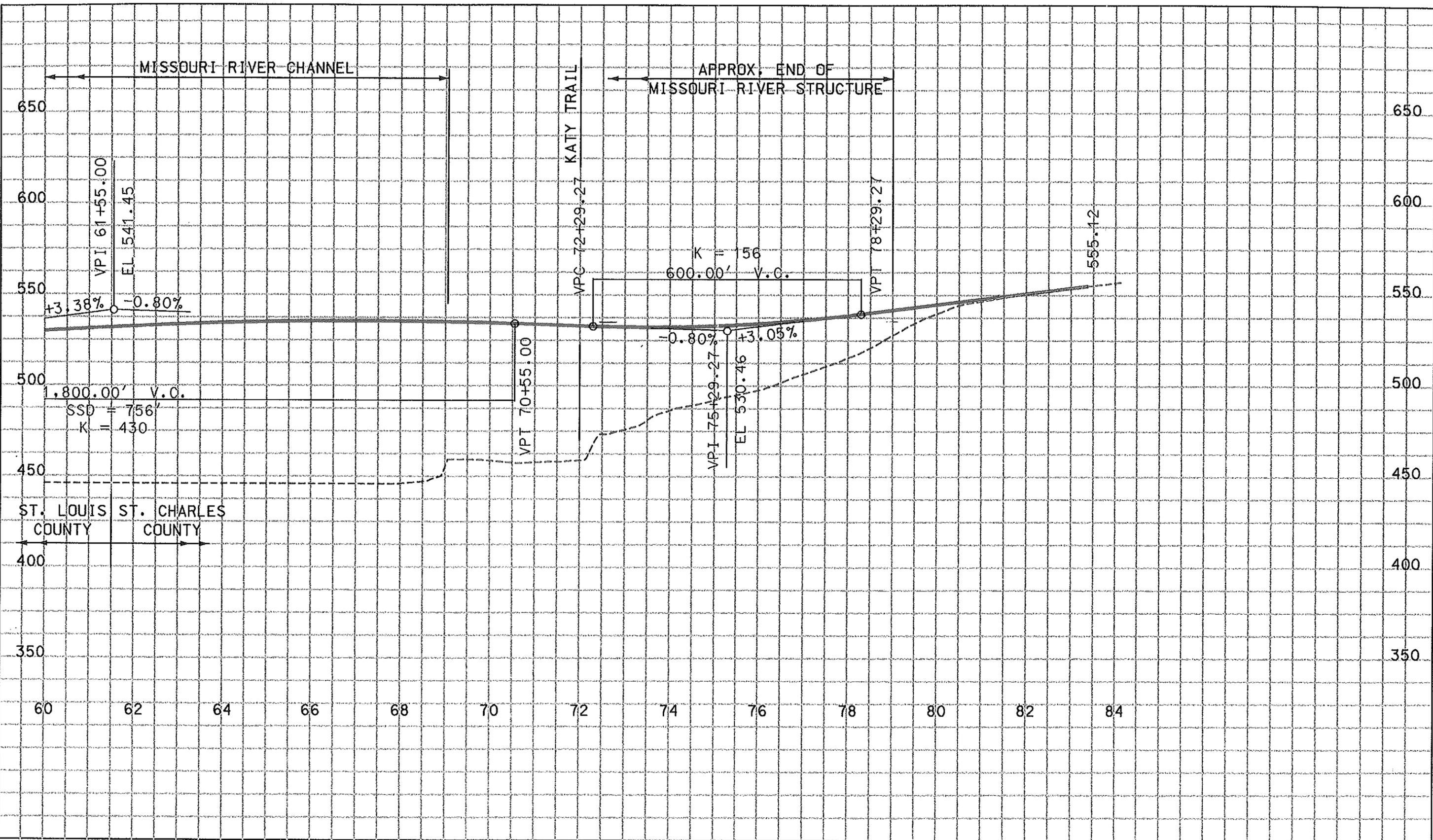


* SOURCE: CHESTERFIELD VALLEY, MISSOURI FLOOD CONTROL STUDY, U.S. ARMY CORPS OF ENGINEERS, ST. LOUIS DISTRICT, AUGUST 2000

SCALE: HORIZONTAL 1" = 200'
 VERTICAL 1" = 50'

Route 40/61 Bridge
 Job No. J6P1436

Alternatives B3 & B5 (2 of 3)
 Plate 24



SCALE: HORIZONTAL 1" = 200'
 VERTICAL 1" = 50'

Route 4061 Bridge
 Job No. J6P1436

Alternatives B3 & B5 (3 of 3)
 Plate 25

Appendix F

Missouri State Operating Permit Water Pollution Control Program

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION



MISSOURI STATE OPERATING PERMIT
WATER POLLUTION CONTROL PROGRAM

General Operating Permit

In compliance with the Missouri Clean Water Law, (chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended.

Permit No.: MO-R100007

Owner: MODOT
Address: PO Box 270
Jefferson City, MO 65102

Continuing Authority: Same
Same

Facility Name: MODOT, Road Construction Projects
Facility Address: Statewide,

Legal Description: Various throughout the state, Statewide County

Receiving Stream: Various throughout the state
First Classified Stream: Various throughout the state

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein.

FACILITY DESCRIPTION All Outfalls, SIC 1629

Construction or land disturbance activity (e.g., clearing, grubbing, excavating, grading, and other activity that results in the destruction of the root zone) that are performed by or under contract to a city, county, or other governmental jurisdiction that has a storm water control program for land disturbance activities that has been approved by the Missouri Department of Natural Resources.

This permit authorizes only wastewater, including storm waters, discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System, it does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law

April 19, 2002
Effective date

April 11, 2003
Issue date

Stephen M. Mahood, Director, Department of Natural Resources
Executive Secretary, Clean Water Commission

April 18, 2007
Expiration date
MO 780-1481 (7-94)

Jim Hull
Director of Staff, Clean Water Commission

Appendix G

Programmatic Agreement Between the Federal Highway Administration and the Missouri State Historic Preservation Officer

**PROGRAMMATIC AGREEMENT
AMONG
THE FEDERAL HIGHWAY ADMINISTRATION,
THE MISSOURI STATE HISTORIC PRESERVATION OFFICER, AND THE
ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING
MISSOURI DEPARTMENT OF TRANSPORTATION
PROJECT NUMBER J6P1436,
FUTURE CONSTRUCTION OF AN ADDITIONAL MISSOURI RIVER BRIDGE
(DANIEL BOONE BRIDGE)
ON U. S. HIGHWAY 40/61,
ST. CHARLES AND ST. LOUIS COUNTIES, MISSOURI**

Whereas, the Federal Highway Administration (FHWA) has determined that construction of a new four-lane bridge on U.S. 40/61 over the Missouri River between St. Charles and St. Louis Counties, Missouri (the Daniel Boone Bridge Project), is necessary to serve transportation needs of the region and to improve traffic flow by providing additional capacity on U.S. 40/61 across the Missouri River; and

Whereas, the FHWA has determined that construction of the Daniel Boone Bridge Project (MoDOT Job Number J6P1436) as described in the July 2003 *Draft Environmental Impact Statement U.S. Route 40/61 Bridge Location Study over the Missouri River St. Charles and St. Louis Counties, Missouri* may affect archaeological sites 23SC89, 23SC219, and 23SC886 as well as other unidentified archaeological sites; and that these sites may be eligible for inclusion on the National Register of Historic Places (NRHP); and

Whereas, the FHWA has established the area of potential effect for archaeological resources, as defined in 36 CFR 15 800.16(d), to be the limits of the preferred alternate; and

Whereas, the FHWA has consulted with the Missouri State Historic Preservation Office (SHPO) pursuant to 36 CFR Part 800, *Protection of Historic Properties*, regulations implementing Section 106 of the National Historic Preservation Act (NHPA 16 U.S.C.470f), as amended and has determined that the nearby 1935 Daniel Boone Bridge (Bridge - J1000R) and the Missouri – Kansas – Texas Railroad Corridor are NRHP eligible but will not be adversely affected by construction of the proposed Daniel Boone Bridge Project on the preferred alternate alignment; and

Whereas, Section 106 of the NHPA (16 U.S.C. §470 et seq.) provides definitions and procedures for consultation between federal agencies and Native American tribes with respect to federal undertakings; and that pursuant to NHPA Section 101(d)(6)(B) (36 CFR 800.2(c)(2)(ii)(A)) the FHWA has initiated consultation with Indian Tribes, including the Choctaw Nation of Oklahoma, Iowa Tribe of Kansas and Nebraska, Iowa Tribe of Oklahoma, Kaw Nation of Oklahoma, Osage Tribe of Oklahoma, Peoria Tribe of Indians in Oklahoma, Quapaw Tribe of Indians of Oklahoma, Sac and Fox Nation of Oklahoma, Sac & Fox Nation of Missouri in Kansas and Nebraska, and the United Band of Cherokee Indians in Oklahoma,

that may have historic ties to the area or may attach traditional religious or cultural significance to archaeological sites in the project area; and

Whereas, to the best of our knowledge and belief, no human remains, funerary objects, sacred objects, or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (25 U.S.C. 3001), are expected to be present in the preferred alternate; and

Whereas, the Missouri Department of Transportation (MoDOT) has been invited to participate in the preparation of and be a signatory to this Programmatic Agreement (PA); and

Whereas, the FHWA, in accordance with Section 800.2(d)(3) has used the agency's procedures for public involvement under the National Environmental Policy Act to inform the public of this undertaking and solicit their views on historic properties and has distributed the draft Environmental Impact Statement to appropriate state and federal agencies and the public;

Now, therefore, the FHWA shall ensure that the following terms and conditions will be implemented in a timely manner and with adequate resources in compliance with the NHPA of 1966 (16 U.S.C. 470 as amended).

STIPULATIONS

This PA sets forth the process by which the FHWA, with the assistance of MoDOT, will meet its responsibilities under Section 106 of the NHPA with respect to future construction of a bridge over the Missouri River on Route 40/61 between St. Charles and St. Louis Counties. For purposes of this PA, the definitions of terms appearing in 36 CFR 800.16 (a) through (y) inclusive shall be employed whenever applicable. The FHWA will ensure that the following stipulations are carried out prior to taking any action that could adversely affect NRHP-eligible sites.

- I. Prior to construction of project-related improvements, the following measures will be carried out in consultation with the SHPO and appropriate Indian Tribes to evaluate the effects of the proposed undertaking on archaeological sites and mitigate the adverse effects that cannot be avoided. The following measures will be carried out.
 - A. The FHWA shall ensure that an archaeological survey of the preferred alternate is carried out pursuant to this PA to identify and evaluate archaeological sites in a manner consistent with the *Secretary of the Interior's Standards and Guidelines for Identification* (48 FR 44716). The FHWA shall evaluate sites identified through the survey in accordance with 36 CFR 800.4(c). If the survey results in identification of sites that are eligible for the NRHP, the FHWA shall apply the criteria of adverse effect in consultation with the SHPO and Indian Tribes that attach religious and cultural significance to identified historic properties, taking into consideration any views concerning such effects which have been provided by other consulting parties and the public.

- B. The results of the survey and evaluation will be submitted to the SHPO for review.
 - C. The FHWA shall consult with the SHPO and other consulting parties to develop and evaluate alternatives or modifications to the undertaking that could avoid, minimize, or mitigate adverse effects on NRHP-eligible archaeological sites.
 - D. Where adverse effects cannot be avoided, the FHWA shall consult with the SHPO and other consulting parties to resolve the adverse effects, consistent with guidance provided in Section 800.6, through the development and implementation of Archaeological Data Recovery Plan(s) consistent with the Advisory Council's *Handbook on Treatment of Archaeological Properties* and the *Secretary of the Interior's Standards for Archaeological Documentation*.
 - E. The FHWA shall ensure that reports on archaeological data recovery investigations carried out pursuant to this agreement are provided to the SHPO and to other interested parties upon request.
 - F. The FHWA shall ensure that all determinations, findings, or agreements are supported by sufficient documentation to enable any reviewing parties to understand their basis.
- II. The FHWA recognizes that any human remains (other than those associated with a crime scene) that may be discovered or excavated during archaeological data recovery operations are subject to the immediate control, possession, custody, and jurisdiction of the SHPO, pursuant to the Missouri Unmarked Human Burial Sites Act, §§ 194.400 – 194.410, RSMo. The FHWA shall monitor the excavation and handling of any such human remains and, sacred objects, or objects of cultural patrimony, to ensure that these are handled, excavated, or processed in accordance with the SHPO's instructions, and that the SHPO has actual physical as well as legal custody, possession, and jurisdiction of those remains and other objects within twelve (12) months after they are excavated.
- III. If any signatory proposes that this agreement be amended, the FHWA shall consult with the other parties of this agreement. Said amendment shall be in writing, governed in accordance with 36 CFR 800.5(e), and executed by all parties to this PA.
- IV. If any signatory determines the terms of the PA cannot be carried out, the signatories shall consult to seek amendment. If the PA is not amended, any signatory may terminate it. If the PA is terminated, the FHWA shall execute a new PA or request the comments of the Council.
- V. The signatories shall resolve disputes regarding the completion of the terms of this agreement. If the signatories cannot agree regarding a dispute, any one of the signatories may request the participation of the Council to assist in resolving the dispute.
- VI. The terms of this agreement shall be five years from the date of final execution unless the parties agree there is a need to extend the term. Six months before the date on which the agreement will expire, the FHWA shall notify the other parties of the impending

expiration of the agreement. If the parties so choose, the agreement shall be extended for five additional years. If the parties do not agree, this PA shall be null and void and the FHWA shall comply with 36 CFR part 800 with regard to all remaining actions under this agreement.

Execution of this PA by the FHWA and the SHPO and implementation of its terms evidence that the FHWA has afforded the Council an opportunity to comment on the Project and its effects on historic properties and that the FHWA has taken into account the effects of the Project on historic properties.

Federal Highway Administration:

By: Donald Z Newman

Date: 5-28-04

Missouri State Historic Preservation Officer:

By: Mark R. Mule

Date: 05/25/04

Missouri Department Of Transportation:

By: Diane Hootman

Date: 05/25/04

**INFORMATION TO ACCOMPANY
PROGRAMMATIC AGREEMENT
DANIEL BOONE BRIDGE PROJECT
U.S. ROUTE 40/61, ST CHARLES and ST LOUIS COUNTIES**

HISTORIC PROPERTIES: Potential to affect archaeological sites 23SC89, 23SC219, 23SC886 as well as other as yet unidentified sites.

UNDERTAKING: Future construction of a new four-lane bridge on U.S. 40/61 over the Missouri River between St. Charles and St. Louis Counties, Missouri.

STATE: Missouri

AGENCY: Federal Highway Administration

The Daniel Boone Bridge project entails future improvements to U. S. Route 40/61 at the Missouri River crossing in St. Charles and St. Louis Counties Missouri. The project's preferred alternate (A2') plans for construction of a 4-lane bridge upstream from the two existing bridges. The new bridge will be used for eastbound mainline traffic, the younger of the two existing bridges (Bridge A4017 constructed in 1991) would handle westbound mainline traffic while the historic 1935 bridge would be retained and used for westbound outer road traffic.

A background search to identify known and potential cultural resources was conducted for a 1,000-ft wide study corridor that includes the preferred alignment. A preliminary reconnaissance of the corridor was also conducted to assess potential effects the project may have on architectural resources and other non-archaeological properties. A literature review has been conducted to determine the extent of previous cultural resources surveys in the vicinity of the project area.

On the St. Charles County side of the river, portions of the preferred alternate have been included in three previous archaeological surveys (Hass 1978; Shopland 1979; and Piazza 1995). Those surveys resulted in identification of three archaeological sites (23SC89, 23SC219, and 23SC886) located in the study corridor. The St. Louis County portion of the study area has been partially examined during two archaeological surveys (Shopland 1979 and Harl et al. 1994). While no archaeological sites have been identified within the St. Louis County portion of the study area, it is likely that historic or prehistoric sites in the Missouri River floodplain are obscured beneath modern flood deposits and therefore may not have been readily detectable by surveys that relied on surface inspection methods.

Two historic properties (the c. 1935 Daniel Boone Bridge and the Missouri Kansas Texas (MKT) Railroad Corridor) have been identified within the study corridor; however neither of these properties will be adversely affected by construction of the proposed bridge on the preferred alternate alignment. One benefit of the preferred alternate is that it includes a plan for continued use of the 1935 historic bridge in a way that will extend its useful life.

Archaeological sites

Site 23SC89 was recorded by Hass in 1978. The site was also examined by MoDOT archaeologists (Shopland 1979) prior to construction of the 1991 eastbound Route 40/61 bridge (Bridge A4017).

Site 23SC89 is located about 400 feet north of the bluff edge along a narrow ridge west of the eastbound lanes of Route 40/61. In 1979 MoDOT archaeologists defined the site limits [450' N-S by 200' E-W], excavated one 3 by 3' test unit and made a controlled surface collection in a 10' square. The 3 by 3 foot test unit resulted in recovery of 356 pieces of cultural material. Artifacts were confined to the upper 6 inches of soil. Artifact recovery from the controlled collection area consisted of 377 pieces of culturally modified stone, including a stemmed projectile point base, a distal biface fragment, 333 chert flakes and flake fragments, one utilized flake, 40 core or shatter fragments, and a piece of fire-cracked rock. The chipped stone was identified as predominately high quality Burlington Chert. The stemmed point fragment is mostly likely from the Middle to Late Archaic Period.

Although site 23SC89 had been partially disturbed (by previous highway construction, utility corridors, a two-track road, and a fence), it appears to include undisturbed areas where important archaeological information may be recoverable. In 1979 MoDOT archaeologists recommended avoiding the site during construction of bridge A4017.

Construction of the preferred alternative (A2') would require expansion of the existing roadcut resulting in impacts to site 23SC89. Phase II testing will be necessary to evaluate the significance and integrity of site 23SC89 prior to construction of the project.

Site 23SC219 is a nineteenth-century historic site recorded by Haas in 1977. Site 23SC219 is located on a ridge spur on the west side of Route 40/61 near the northern end of the preferred alternate (A2'). The 1977 survey identified two stone building foundations, two cisterns, and two circular areas of stone rubble that may represent chimney fall. The current condition of this site is not known. The bulk of site 23SC219 appears to lie outside the area of ROW needed to construct the preferred alternate and it appears that project related impacts to this site could be avoided. Archival research and archaeological testing at site 23SC219 will be conducted to evaluate the significance and integrity of this site if impacts cannot be avoided.

Site 23SC886 is an extensive low-density prehistoric lithic scatter located 1,650' north of the bluff edge along the east side of Route 40/61. MoDOT archaeologists recorded this site during a 1992 survey (Piazza 1995), conducted in advance of planned widening of Route 40/61 between the Missouri River and I-70 under MoDOT Job No. J6P0672. The site was thought to be completely outside the impact area for the J6P0672 job and consequently was not recommended for testing. The original site limits have been extended to account for observations made during the winter of 2001-2002 when the

Route 40/61 roadcut was expanded as part of the J6P0672 widening job. A continuous low-density scatter of chert flakes was observed along the edge of the roadcut in the upper 10 inches of the soil profile extending north from the previously reported location of site 23SC886 to a recently constructed public water supply tank. No diagnostic artifacts or evidence of intact deposits or cultural features were observed. Part of the ridgetop landform associated with site 23SC886 extends west of the existing highway into the alignment of the preferred alternate and it is possible that part of site 23SC886 may extend west of Route 40/61 as well. The area in question has not been previously surveyed but will be included in a planned systematic archaeological survey of the project's area of potential effect.

Tribal Consultation

The two prehistoric archaeological sites recorded in the study area are not known to include graves nor are they thought to have sacred or religious significance to Native American Tribes. MoDOT has initiated consultation with the Choctaw Nation of Oklahoma; Peoria Tribe of Indians of Oklahoma; Iowa Tribe of Oklahoma; Sac and Fox Nation, Oklahoma; Sac and Fox Tribe of the Mississippi in Iowa; Sac and Fox Nation of Missouri in Kansas and Nebraska; Quapaw Tribe of Indians, Oklahoma; Osage Tribe, Oklahoma; Kaw Nation Oklahoma; Iowa Tribe of Kansas and Nebraska; and the United Keetoowah Band of Cherokee Indians of Oklahoma.

As of March 21, 2004, only the Peoria Tribe had responded. The Peoria have no objections to the project but have asked that they be contacted in the event that any ancestral human remains are identified in the project area.

The previously reported archaeological sites in the project area do not appear to have interpretive value that would merit their preservation in place. These sites are therefore not considered to be Section 4(f) resources. Adverse effects that may result from the proposed highway improvements could be mitigated through recovery of data.

Steamboat Wrecks

Construction of the Daniel Boone Bridge Project has the potential to affect Missouri River steamboat wreck sites. Although no steamboat wreck sites have been identified in the study area, published reports of historically documented wrecks indicate several may be in the general area of the planned bridge. Wreck locations are not precisely known therefore the possibility that a steamboat wreck could be present within the project area cannot be ruled out.

In 1897, Captain H.M. Chittenden of the U. S. Army Corps of Engineers compiled a list of Missouri River steamboat wrecks along with maps showing the approximate locations of the wreck sites (Chittenden, 1897). The Kansas City District of the Corps of Engineers has recently published (2000) a set of maps showing the location of Missouri River wrecks, based on Chittenden's research (see attached map). The wrecks are plotted with

respect to the 1897 channel, which is overlaid on a modern (1954) map of the river. The resulting map illustrates the reported wreck locations with respect to historic shifts in the Missouri River channel. These maps also include a separate analysis of the riverboat wreck data compiled from published sources (prior to 1962) by Dr. E.B. Trail.

Steamboat wrecks recorded by Chittenden near the Daniel Boone bridge include the *Osage*, a side-wheeler that sank in 1848, and the *Fearless*, a deep draft stern-wheel towboat that sank in 1882. Chittenden placed the *Osage* wreck site near Howell's Landing on the south bank, just west of the Route 40/61 bridges. Chittenden recorded the wreck of the *Fearless* near the south bank of the river just east of the existing bridges.

Dr. Trail placed the wreck of the *Osage* farther downstream, in Green's Chute on the north side of Bonhomme Island (USACE, 2000; Chittenden, 1897). Trail located the *Fearless* on the north bank about 1 mi (1.6 km) farther east.

Other steamboat wrecks that may be located near the project area include the *A.C. Goddin*, a sidewheeler sunk in 1857, the *James Lyons*, a stern-wheeler sunk in 1882, the *Helena*, a sternwheeler sunk in 1887, and the *Warsaw*, sunk in 1846

Variance in the reported wreck locations may be due in part to changes in river mile distances over time because of realignment of the navigation channel and meandering of the river. Chittenden's locations for Missouri River steamboat wrecks are based in part on interviews with riverboat pilots and considered to be the most accurate available; however, Chittenden's list is not comprehensive and it is possible that other wrecks may also be present in the area.

MoDOT will conduct additional archival research to identify the locations of historic riverboat wrecks in the area prior to construction of the new bridge. If that research is inconclusive with respect to the locations of historically documented wrecks, a remote sensing survey may be conducted to assess the potential for steamboat wrecks in the area of potential effect.

Summary

The preferred alternate (A2') alignment for the Daniel Boone Bridge Project will affect one previously recorded prehistoric archaeological site (23SC89) and has the potential to affect other unidentified sites.

In consultation with the Missouri SHPO, MoDOT has determined that construction of the project on the preferred alignment (A2') will not adversely affect the NRHP eligible MKT Railroad corridor or the c. 1935 Daniel Boone Bridge (Bridge J-1000).

A project specific Programmatic Agreement (PA) between the Federal Highway Administration, the Missouri State Historic Preservation Office, and the Advisory Council on Historic Preservation has been developed for compliance with Section 106 of

the National Historic Preservation Act. The PA provides for an archaeological survey of the preferred alternative and evaluation any sites that may be present. The PA also provides a framework for mitigation of impacts to any NRHP eligible resources that cannot be avoided.

A systematic cultural resources survey of the Preferred Alternative will be conducted prior to construction of the project. Any archaeological sites that may be affected by the project will be evaluated and addressed in accordance with the regulations (36 CFR 800) implementing Section 106 of the National Historic Preservation Act [16 United States Code (USC) 470]. Identified cultural resources will be evaluated according to the Department of the Interior's "Standards and Guidelines for Archaeology and Historic Preservation," in consultation with the Missouri State Historic Preservation Officer and where appropriate with consulting Indian Tribes.

References Cited

Hass, Daniel

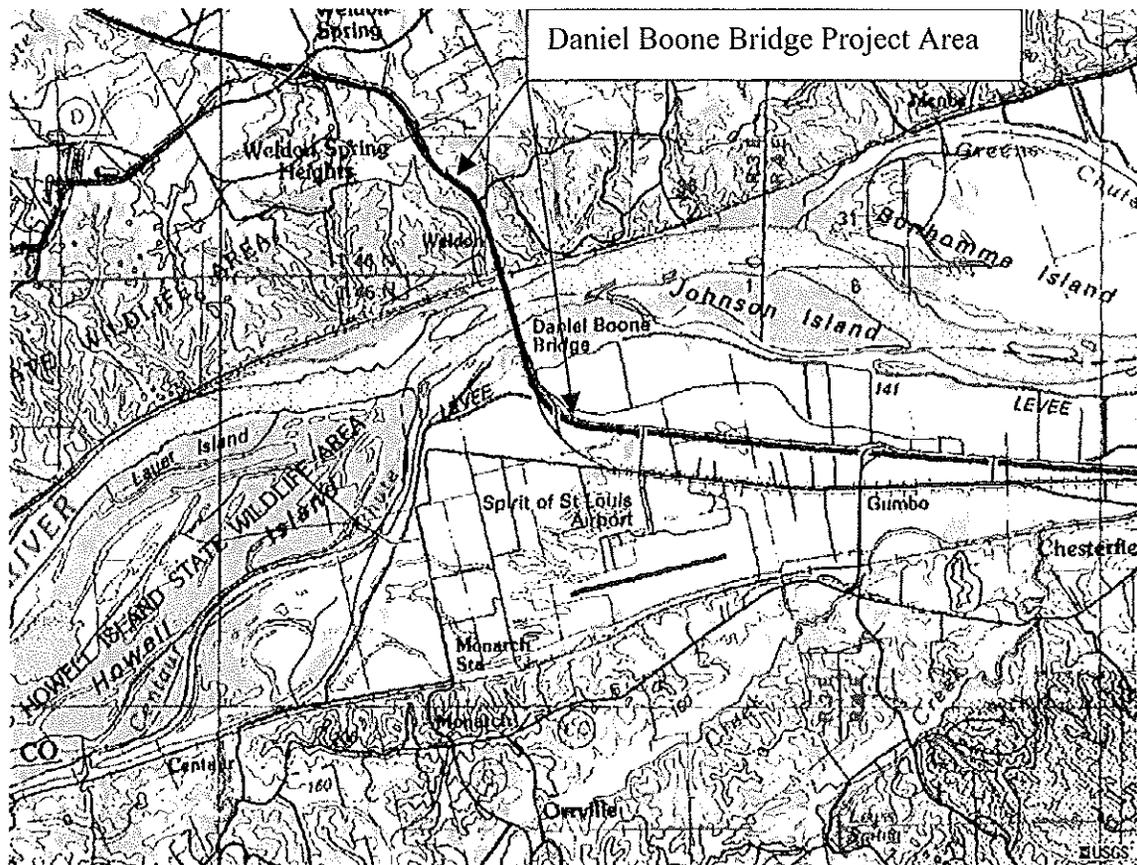
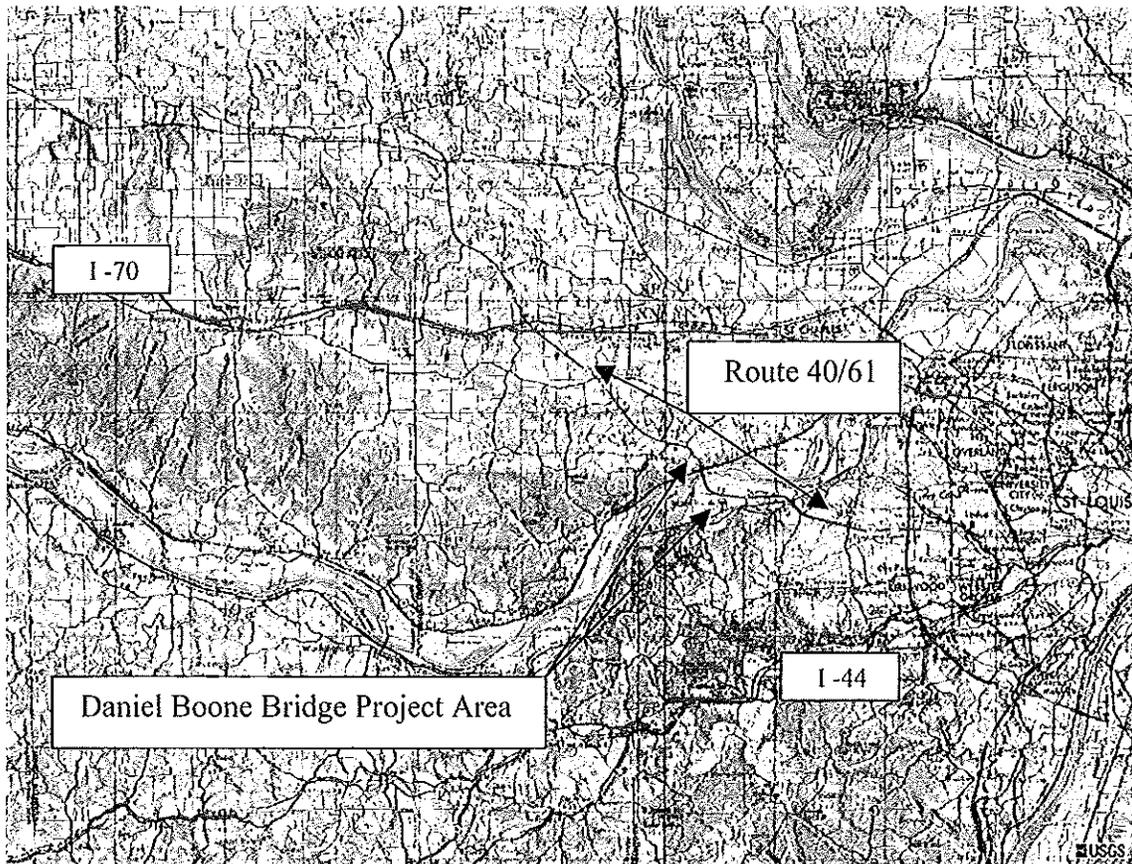
1978 *An Archaeological Survey of the Little Femme Osage/River Hills area and the Loutre River Valley: a multivariate approach to environment and site distributions in the Lower Missouri Valley II locality.* Report on file Department of Natural Resources, Outreach and Assistance Center, State Historic Preservation Office, Missouri Cultural Resources Inventory.

Piazza, Theresa J.

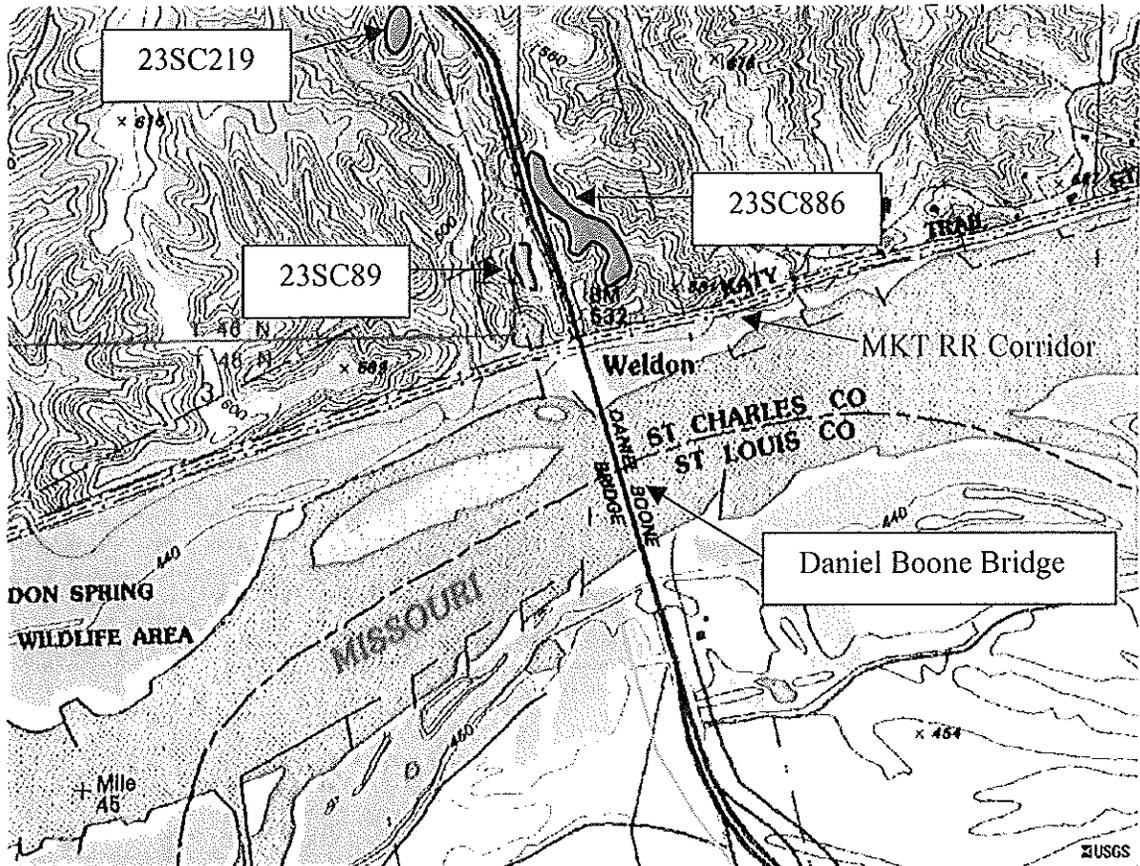
1995 *Phase I Cultural Resources Survey of the Proposed Route 40-61 Improvements From I-70 to the Missouri River, St. Charles County, Missouri.* Vol. I. Missouri Highway and Transportation Department, Cultural Resources Section, MHTD Job Nos. J6P0672 and J6P0672B. Report on file Department of Natural Resources, Outreach and Assistance Center, State Historic Preservation Office, Missouri Cultural Resources Inventory.

Shopland, John

1979 *Phase I Cultural Resources Survey Job No. 6-P-40-298, Route 40 St. Charles -- St. Louis Counties, Missouri.* Missouri Highway and Transportation Department, Cultural Resources Section. Report on file Department of Natural Resources, Outreach and Assistance Center, State Historic Preservation Office, Missouri Cultural Resources Inventory.



Maps illustrating the location of the Daniel Boone Bridge Project Area on U.S. Route 40/61 in St. Louis and St. Charles Counties, Missouri.



Part of the 1994 Weldon Spring USGS 7.5' Quad Map showing the project location and archaeological sites 23SC89, 23SC219, and 23SC886. Yellow lines mark the estimated ROW needs for the preferred alternate. A 1996 aerial view of the area is attached below.



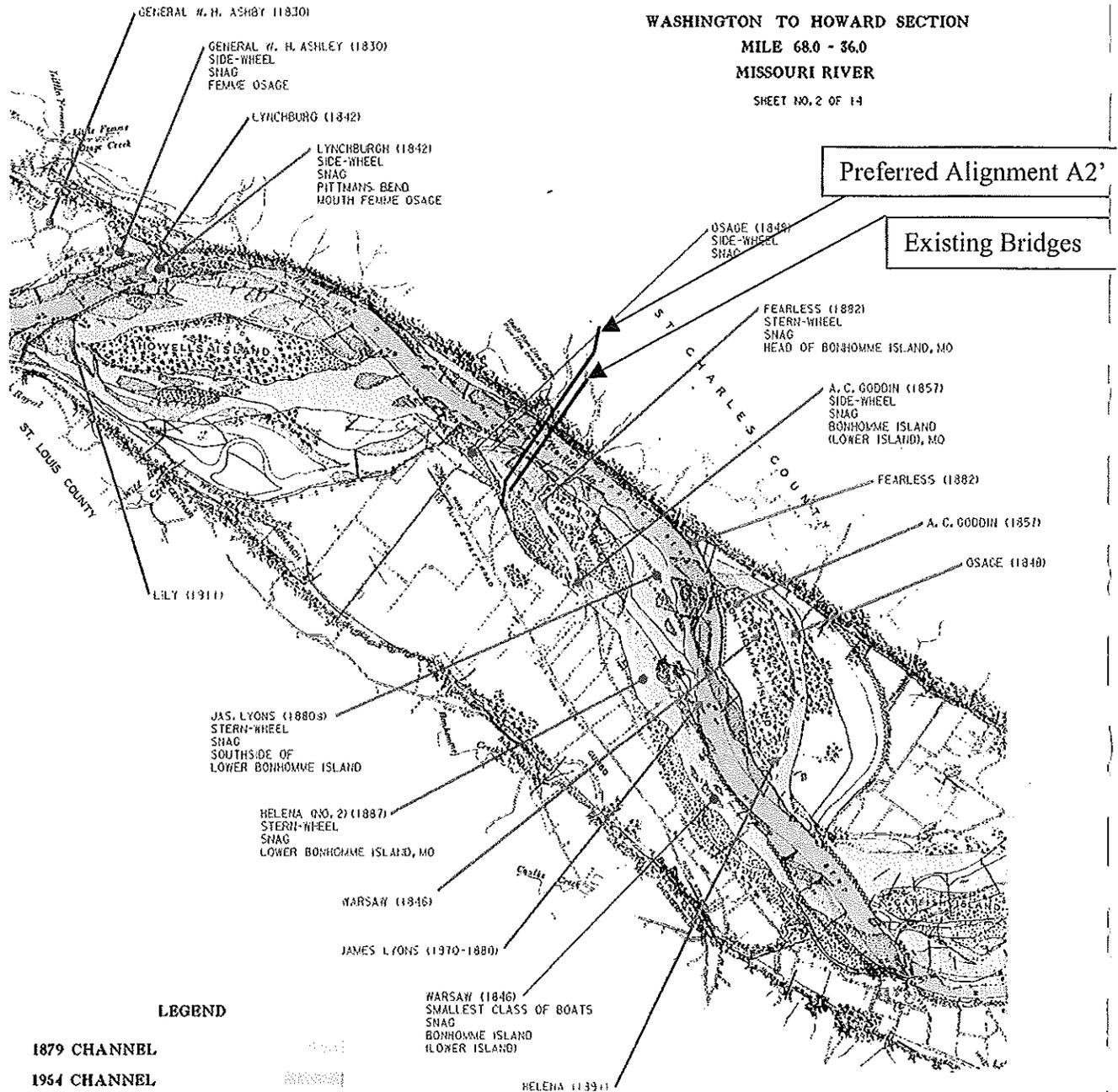
ABANDONED SHIPWRECKS ON MISSOURI RIVER CHANNEL MAPS OF 1879 AND 1954

WASHINGTON TO HOWARD SECTION

MILE 68.0 - 36.0

MISSOURI RIVER

SHEET NO. 2 OF 14



1879 CHANNEL

1954 CHANNEL

STEAMBOAT WRECKS

CAPT. H. M. CHITTENDEN, CORPS OF ENGINEERS
HISTORICAL INFORMATION FROM THE
ANNUAL REPORT OF THE CHIEF OF ENGINEERS,
U.S. ARMY, 1897, APPENDIX W.W.
MISSOURI RIVER COMMISSION MAP
REPORT DATED JUNE 30, 1897

STEAMBOAT WRECKS

DR. E. B. TRAIL COLLECTION, 1858-1965
WESTERN HISTORICAL MANUSCRIPT COLLECTION,
COLUMBIA, MO

THE APPROXIMATE LOCATIONS OF SHIPWRECKS ON THIS MAP ARE TAKEN FROM SMALL-SCALE MAPS COMPILED BY CAPTAIN H. M. CHITTENDEN IN 1897, AND DR. E. B. TRAIL, PRIOR TO 1962. BOTH RESEARCHERS USED PUBLICATIONS TO COMPARE AND MAP PROPOSED WRECK LOCALITIES. CHITTENDEN ALSO OBTAINED SOME WRITTEN INFORMATION FROM MISSOURI RIVER PILOTS WHO HAD HISTORICAL KNOWLEDGE OF THE RIVER. CHITTENDEN'S MAPPED LOCATIONS OCCASIONALLY DIFFERED FROM THE HISTORICAL INFORMATION IN THE 1897 ANNUAL REPORT OF THE CHIEF OF ENGINEERS, CITED ABOVE.

THE MISSOURI RIVER CHANNEL HAS CHANGED COURSE NUMEROUS TIMES OVER THE LAST TWO CENTURIES AND THE RIVER CONTINUES TO BE DYNAMIC. THE U.S. ARMY CORPS OF ENGINEERS, KANSAS CITY DISTRICT, PREPARED THESE MAPS USING ITS MOST RECENT 19TH AND 20TH CENTURY RIVER CHANNEL COMPARISON MAPS.