Final
Environmental Impact Statement
Page Avenue Extension

St. Charles and St. Louis Counties, Missouri
(Includes: Wetland Mitigation Plan)

Prepared for:
The Missouri Highway and Transportation Department

Prepared by:
Booker Associates, Inc.

Volume 1 of 4

November 1992

FHWA-MO-EIS-90-01-F

Route D, St. Louis - St. Charles Counties, Missouri
(Page Avenue Extension)
Bennington Place Westerly to Route 40
Job Nos. 6-U-D-803B, 6-U-D-803C and 6-U-D-803D

Final
Environmental Impact Statement

Submitted Pursuant to 42 USC 4332(2)(c) and 16 USC 460*l*-8

by the

U. S. Department of Transportation
Federal Highway Administration

and

The Missouri Highway and Transportation Department

Cooperating Agencies
U. S. Army Corps of Engineers
U. S. Coast Guard
National Park Service, U. S. Department of the Interior
U. S. Fish and Wildlife Service, U. S. Department of the Interior

11-23-92	Wayne Muri Chief Engineer
Date of Approval	For MHTD Title
Nov 24 1992	Kenneth W. Bratton Envir. Spec.
Date of Approval	For FHWA Title

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The proposed action provides for a freeway and Missouri River bridge crossing. The facility will proceed from terminus of Page Avenue at Bennington Place in St. Louis County to Route 40/61 in St. Charles County over a distance of approximately 20.5 miles. The facility will provide up to eight through lanes with auxiliary lanes in St. Louis County and St. Charles County. The Red Alignment is the selected alternative.

ONLY PRACTICABLE ALTERNATIVE FINDING

In order to provide a new westerly extension of Route D (Page Avenue) in St. Louis and St. Charles Counties, it is necessary to locate the roadway within and through floodplains of the Missouri River in St. Louis and St. Charles Counties and Dardenne Creek in St. Charles County as well as related tributaries. A total of 398 floodplain acres will be impacted by the Red Alignment, the Selected Alternate. This represents a minimal amount relative to the scope and nature of this roadway, as detailed in the attached Environmental Impact Statement.

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 implementation of this roadway. 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 Federal Emergency Management Agency and the U. S. Army Corps of Engineers to insure the absence of any encroachments upon regulatory floodways as well as avoid any adverse impacts.

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

Based upon the above considerations, and for the reasons stated in the Environmental Impact Statement, the Federal Highway Administration determines that the Selected Alternate, the Red Alignment, is the only practicable alternative.

Nov 24, 1992	Kenneth W. Bechtel	Envir. Spec.
Date	Responsible Official	Title

FEDERAL HIGHWAY ADMINISTRATION
WETLANDS FINDINGS
FOR
ROUTE D (PAGE AVENUE EXTENSION)
ST. LOUIS - ST. CHARLES COUNTIES
Bennington Place Westerly to Route 40
Job Numbers 6-U-D-803B, 6-U-D-803C and 6-U-D-803D

In accordance with Executive Order 11990, the Federal Highway Administration insures that this project "avoids to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands."

The Red Alignment, the Selected Alternate, will affect 29.64 acres of wetlands. As discussed in the attached Environmental Impact Statement, there are no practicable alternatives to the proposed action. The Missouri Highway and Transportation Department, in coordination with the U. S. Army Corps of Engineers, the U. S. Fish and Wildlife Service and the Missouri Department of Conservation, will acquire lands in the vicinity of the old Upper Creve Coeur Lake in St. Louis County, Missouri to create wetlands as well as enhance existing wetlands. All of these wetlands will be placed into public ownership.

Based upon the above considerations, it is determined that there is no practical alternative to the proposed construction in wetlands and that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.

Nov 24, 1992
Date

Kurt W. Bueltel
Responsible Official

Envir. Spec.
Title

PREFATORY NOTE

Final Environmental Impact Statement

Page Avenue Extension

An environmental impact statement on a Federally-assisted project of this magnitude, impacting a major urban park, would normally contain a lengthy analysis of the project alternatives under "Section 4(f)", a parkland preservation statute, which is now found at 49 U.S.C. Section 303. A variation of this "Section 4(f)" requirement also appears at 23 U.S.C. Section 138.

Because of the impact of the Red Alignment (and others considered) on Creve Coeur Lake Memorial Park (CCLMP) and other Section 4(f) sites, the preliminary drafts of this environmental impact statement were prepared to consider this project within the scope of the requirements of Section 4(f) laws and regulations. Some of the maps and figures appearing in this final environmental impact statement were also prepared in anticipation of Section 4(f) review.

However, in October, 1992, Congress passed and President George Bush signed into law the "Pipeline Safety Act of 1992", P.L. 102-508, which contained Section 601 relating to this Page Avenue Extension project. That excerpted Act states, in pertinent part:

One Hundred Second Congress of the United States of America

AT THE SECOND SESSION

Begun and held at the City of Washington on Friday, the third day of January, one thousand nine hundred and ninety-two

An Act

To increase the safety to humans and the environment from the transportation by pipeline of natural gas and hazardous liquids, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.-- This Act may be cited as the "Pipeline Safety Act of 1992".

(b) TABLE OF CONTENTS.--

[omitted]

* * *

TITLE VI -- MISCELLANEOUS PROVISIONS

SEC. 601. PAGE AVENUE EXTENSION.

(a) Upon submission of a request by the State of Missouri for Federal Highway Administration approval of the Page Avenue Extension project (hereinafter cited in this section as "the project"), the Secretary of the United States Department of Transportation (hereinafter cited in this section as "the Secretary") is authorized to waive the requirements of section 138 of title 23, United States Code and section 303 of title 49, United States Code, for the alignment designated by the State of Missouri as the "Red Alignment", as described in the draft environmental impact statement approved by the Federal Highway Administration on May 30, 1990, if:

(1) the Secretary determines that a final environmental impact statement has been completed by the State of Missouri and approved by the Secretary; and

(2) the State of Missouri enters into an enforceable agreement with the Secretary to implement a project mitigation plan that includes, at a minimum--

(A) expansion of the Creve Coeur Lake Memorial Park (hereinafter cited in this section as "the Park") in the vicinity of St. Louis, Missouri, by at least 50 percent, through acquisition and addition to the Park of not less than six hundred acres of land;

(B) development of a walking and bicycle path that is not less than ten feet in width and connects the Park to the KATY Trail State Park in St. Charles County, Missouri;

(C) construction of nature trails in the wooded upland portion of the additions to the Park referred to in subparagraph (A);

(D) development of a Wetland Wildlife area that includes lake areas and marshes, trails, observation points, and other environmentally compatible features in the Park or in one of the additions to the Park referred to in subparagraph (A);

(E) dredging of Creve Coeur Lake to help remedy a chronic siltation problem and to promote fish and wildlife populations;

(F) construction of a new lake in one of the additions to the Park referred to in subparagraph (A) to help alleviate the recurrence of a chronic siltation problem in a manner that minimizes, to the maximum extent practicable and in accordance with section 404 of the federal Water Pollution Control Act (33 U.S.C. 1344), the disturbance of any existing wetlands;

(G) design and construction of features to minimize the visual and physical impact of the project in the

vicinity of the Park, consistent, to the extent practicable, with recommendations of the design committee established in accordance with subsection (c), including--

(i) the use of textured concrete, as appropriate;

(ii) the minimization of bridge pier sizing in the elevated portion of the project;

(iii) the use of a bridge design that is more aesthetically pleasing than standard elevated roadway designs;

(iv) construction of bridge siderails with materials that are effective noise attenuators to reduce operational noise levels near the bridge;

(v) design and construction of a drainage system to prevent contamination of Creve Coeur Lake and Creve Coeur Creek with pollution from roadway runoff;

(vi) landscaping of the area between the elevated roadway and Creve Coeur Mill Road to enhance visual parameters without compromising road user safety; and

(vii) the placement of signs to direct road users to appropriate park entrances and facilities;

(H) such other mitigation measures as the Secretary may determine are appropriate to ensure that the environmental benefits of the project mitigation plan exceed the environmental damage associated with the project; and

(I) a monetary contribution by the State of Missouri as may be necessary to implement the entire mitigation plan, in an amount not less than $6,000,000, including the payment of not less than $250,000 for facility improvements in the Park, and all funds to develop and implement the mitigation plan shall come from non-federal sources of funding.

(b) None of the costs to develop or implement the project mitigation plan referred to in subsection (a) shall be considered expenditures pursuant to or in satisfaction of the transportation enhancement requirements of section 133 of title 23, United States Code (as amended by section 1007 of the Intermodal Surface Transportation Efficiency Act of 1991, Public Law 102.240, 105 Stat. 1927-1931).

(c) The Governor of the State of Missouri shall establish a design committee to develop recommendations concerning design and construction features to minimize the visual and physical impact of the project in the vicinity of the Park. The Committee shall include representatives of local elected officials, regional park officials, local community groups, design professionals, environmental organization, and business organizations.

(d) To the maximum extent practicable, the State of Missouri shall implement the project mitigation plan referred to in subsection (a) prior to the commencement of construction of the

Page Avenue Extension project. At a minimum, the mitigation measures specified in subsection (a)(2)(A) and (a)(2)(C) shall be completed prior to commencement of construction of the Page Avenue Extension project.

(e) If the project does not comply with all other requirements of Federal environmental law that are applicable to the project, including sections 134 and 135 of title 23, United States Code (as amended by sections 1024 and 1025 of the Intermodal Surface Transportation Efficiency Act of 1991, Public Law 102-240, 105 Stat. 1955-1962 and 105 Stat. 1962-1965) and all other requirements of the Intermodal Surface Transportation Efficiency Act of 1991 (Public Law 102-240, 105 Stat. 1914 et seq.), any waiver of the requirements of section 138 of title 23, United States Code and section 303 of title 49, United States Code, granted by the Secretary under the authority of this section shall be stayed pending a determination by the Secretary that the project has been brought into compliance with such other requirements. Any determination by the Secretary under the preceding sentence shall be subject to judicial review.

* * *

COMPLIANCE WITH SECTION 601

As a result of the Page Avenue Extension provisions contained in Section 601 of the Pipeline Safety Act of 1992, this environmental impact statement document has been revised in anticipation of the Secretary of Transportation granting the Section 4(f) waiver. That action will occur if the pertinent requirements of Section 601 are met, and at the time of the printing of this document those requirements were being met:

--- This final environmental impact statement has been prepared by the State of Missouri for the Federal Highway Administration, as the agency designated by the Secretary of Transportation for that purpose. This document is prepared pursuant to the laws and regulations governing such environmental impact statements, other than Section 4(f).

--- This document continues to utilize the alignment corridor designated by the State of Missouri as the "Red Alignment", as described at pages 2-13 to 2-14 in the draft environmental impact statement which was approved by the Federal Highway Administration on this project on May 30, 1990.

--- The State of Missouri will enter into an enforceable agreement with the Secretary of Transportation to implement a mitigation plan on this project, which includes at a minimum the required elements of Section 601, at subsection (a)(2). That enforceable agreement is to be

Page Avenue Extension project. At a minimum, the mitigation measures specified in subsection (a)(2)(A) and (a)(2)(C) shall be completed prior to commencement of construction of the Page Avenue Extension project.

(e) If the project does not comply with all other requirements of Federal environmental law that are applicable to the project, including sections 134 and 135 of title 23, United States Code (as amended by sections 1024 and 1025 of the Intermodal Surface Transportation Efficiency Act of 1991, Public Law 102-240, 105 Stat. 1955-1962 and 105 Stat. 1962-1965) and all other requirements of the Intermodal Surface Transportation Efficiency Act of 1991 (Public Law 102-240, 105 Stat. 1914 et seq.), any waiver of the requirements of section 138 of title 23, United States Code and section 303 of title 49, United States Code, granted by the Secretary under the authority of this section shall be stayed pending a determination by the Secretary that the project has been brought into compliance with such other requirements. Any determination by the Secretary under the preceding sentence shall be subject to judicial review.

* * *

COMPLIANCE WITH SECTION 601

As a result of the Page Avenue Extension provisions contained in Section 601 of the Pipeline Safety Act of 1992, this environmental impact statement document has been revised in anticipation of the Secretary of Transportation granting the Section 4(f) waiver. That action will occur if the pertinent requirements of Section 601 are met, and at the time of the printing of this document those requirements were being met:

--- This final environmental impact statement has been prepared by the State of Missouri for the Federal Highway Administration, as the agency designated by the Secretary of Transportation for that purpose. This document is prepared pursuant to the laws and regulations governing such environmental impact statements, other than Section 4(f).

--- This document continues to utilize the alignment corridor designated by the State of Missouri as the "Red Alignment", as described at pages 2-13 to 2-14 in the draft environmental impact statement which was approved by the Federal Highway Administration on this project on May 30, 1990.

--- The State of Missouri will enter into an enforceable agreement with the Secretary of Transportation to implement a mitigation plan on this project, which includes at a minimum the required elements of Section 601, at subsection (a)(2). That enforceable agreement is to be

executed by both parties prior to the State obtaining the Section 4(f) waiver on this project.

--- The State of Missouri, by a letter to the Secretary of Transportation, is requesting a waiver of Section 4(f) laws and regulations on this project pursuant to the terms of Section 601 of the Pipeline Safety Act of 1992. This letter, dated November 18, 1992, follows this prefatory note. This environmental impact statement anticipates that the Secretary of Transportation or his designate will approve the environmental impact statement, grant the waiver, and execute the record of decision on this project.

--- The State of Missouri is also complying with the other specifications in Section 601, by not seeking or obtaining federal financing of the costs of the specified project mitigation plan; by the Missouri Governor's appointment of the specified "Design Committee" in accord with the terms of Section 601, a process currently underway; and by the term of its agreement with the Secretary of Transportation to implement the project mitigation plan described in Section 601 prior to the commencement of construction of this project, to the maximum extent practicable, as mandated by Section 601.

--- The State of Missouri has developed this project, as reflected in this environmental impact statement and related documents and records, to comply with all other applicable requirements of Federal environmental law, and will continue to work with the appropriate Federal and State agencies in obtaining the necessary permits, and in the design and construction of this project. It is anticipated that the Record of Decision (ROD) will be prepared and signed on or after January 4, 1993.

--- The State of Missouri shall implement the project mitigation measures which shall be developed and suggested by the Design Committee and approved by the Secretary of Transportation, as measures to minimize the visual and physical impact of the project in the vicinity of CCLMP.

THE EFFECT OF SECTION 601 ON THIS DOCUMENT

For these reasons, and in anticipation of the Secretary of Transportation's waiver of Section 4(f) requirements on this project under Section 601, any discussion of the project "Red Alignment", and the other alignments in general, under Section 4(f) analysis, has been deleted. In a few exceptional circumstances, where the Section 601 waiver of Section 4(f) would not apply to a proposed alternative for example, Section 4(f) may be mentioned briefly as appropriate. In certain instances, maps and other figures may also cite Section 4(f) because they were prepared before the Section 601 waiver provision was enacted into law. But in all other

respects, this document was prepared to be in compliance with the federal laws and regulations which govern such highway projects and the preparation of environmental impact statements and with Section 601 of the Pipeline Safety Act of 1992.

WAYNE MURI
Chief Engineer
RICH TIEMEYER
Chief Counsel

MARI ANN WINTERS
Secretary

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION
Capitol Ave. at Jefferson St., P.O. Box 270, Jefferson City, MO 65102 Telephone (314) 751-7454 Fax (314) 526-4408

November 18, 1992

The Honorable Andrew Hill Card, Jr., Secretary
U.S. Department of Transportation
400 7th Street, S.W.
Washington, D. C. 20590

Dear Mr. Card:

Pursuant to the provisions of Section 601 of the "Pipeline Safety Act of 1992", P.L 102-508, the Missouri Highway and Transportation Department, on behalf of the State of Missouri and its Missouri Highway and Transportation Commission, requests that you or your lawful designate waive the provisions of "Section 4(f)", 23 U.S.C. 138 and 49 U.S.C. 303, with respect to the Page Avenue Extension project, Route D, Job Nos. 6-U-D-803B, 6-U-D-803C and 6-U-D-803D, in St. Louis and St. Charles Counties, Missouri.

This request is premised on the assumption that you or your lawful designate will approve the final environmental impact statement, which this agency is submitting for your review on this project; and further, that our agencies will enter into an enforceable agreement to implement that project mitigation plan required by Section 601 of the "Pipeline Safety Act of 1992", in accord with the terms of that legislation. The final environmental impact statement which is submitted for your approval is drafted on the assumption that the Section 4(f) waiver, authorized for the Page Avenue Extension project in Section 601 of the "Pipeline Safety Act of 1992", will be granted.

We appreciate your consideration in this matter.

Sincerely,

Wayne Muri

Wayne Muri
Chief Engineer

wm/gws/cb

Copies: Thomas D. Larson, Administrator, FHWA
Volmer K. Jensen, Regional Administrator, FHWA
Gerald Reihsen, Division Administrator, FHWA

gws/j1-3/waiver

Final
Environmental Impact Statement
Page Avenue Extension

St. Charles and St. Louis Counties, Missouri
(Includes: Wetland Mitigation Plan)

Prepared for:
The Missouri Highway and Transportation Department

Prepared by:
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Volume 1 of 4

PAGE AVENUE EXTENSION FINAL ENVIRONMENTAL IMPACT STATEMENT
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Volume 3	Final Environmental Impact Statement - Comments and Coordination
Volume 4	Final Environmental Impact Statement - Section 6(f) Evaluation

LIST OF TECHNICAL REPORTS
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Air Quality Technical Report

Biological Survey and Reconnaissance Technical Report

Cultural Resources: An Overview

Energy Technical Report

Noise Technical Report

Plant Community and Wetlands Technical Report

Surface Water Quality Technical Report

Traffic Operations Analysis and Level of Service Evaluation

Wetlands Mitigation Report

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Executive Summary

EXECUTIVE SUMMARY

PURPOSE

The principal purpose of the proposed Page Avenue Extension (Route D) would be to provide relief for chronic traffic congestion at Missouri River crossings between St. Louis and St. Charles Counties. The proposed action would extend Page Avenue from its present terminus at Bennington Place, immediately west of Route I-270 in St. Louis County, across the Missouri River to Route 94 in St. Charles County. It would then continue on to either Route 40/61 (future Route I-64) or Route I-70.

The basic alignments, the Red Alignment and the Green Alignment, as well as three variants of each have been evaluated. The Red Alignment would be a ten-lane, limited access highway with a 26-foot wide median from Bennington Place to its interchange with Route 94. From Hemsath Road to Route N, Route 94 would become an eight to ten-lane limited access highway with a 26-foot wide median as part of the Red Alignment. One-way outer roads would be provided as service roads along this segment. From Route 94 to Route 40/61 (future Route I-64), the Red Alignment of the Page Avenue Extension would be a four-lane limited access highway with a 70-foot wide median.

For the Green Alignment and its variants, the roadway would be an eight to ten-lane limited access highway with a 26-foot wide median from Bennington Place to the an interchange at Kisker Road and Route 94. From Route 94 to Mid Rivers Mall Drive the Green Alignment would be six-lanes wide with a 46-foot wide median. It would then continue to Route I-70 as a four-lane facility with a 70-foot wide median.

The length of the proposed facility would range from 14.4 to 20.95 miles, depending upon the alternate selected. The Missouri Highway and Transportation Department (MHTD) would construct, own and operate the Page Avenue Extension as part of its 32,000-mile system of roads.

ALTERNATES

Two basic alignments for the Page Avenue Extension have been formulated. Both the Red and Green Alignments have origins rooted in prior work. The Red Alignment's St. Louis County portion has existed, in one form or another, for at least two decades. The balance of the Red Alignment and the Green Alignment were conceptualized in 1986. Both of these alignments would directly impact Creve Coeur Lake Memorial Park (CCLMP) in St. Louis County.

Variants of the Red and Green Alignments have been devised to avoid CCLMP in St. Louis County or population/activity centers in St. Charles County. Each of these combinations physically avoids CCLMP in St. Louis County but is identical to the Red Alignment in St. Charles County:

1. the Green-Black/Red Combination
2. the Yellow-Black/Red Combination
3. the Blue/Red Combination

The Green Alignment was originally conceived to be a CCLMP-avoidance option. However, a 1989 lease expanded CCLMP so that leased parkland would be directly in the Green Alignment's path. Various combinations would utilize one or more portions of the Green Alignment but reduce or redistribute St. Charles County impacts as compared to the basic Green Alignment:

1. the Green-Black/Green Combination
2. the Green-Black/Green Dashed Combination
3. the Green-Black/Green-Blue Dashed/Red/Green Combination

All eight of these alternates have been examined.

Additionally, a No-Build Alternate, a Traffic System Management (TSM) Alternate, incorporating all current and future roadway improvements without the Page Avenue Extension, and a Mass Transit Alternate were evaluated. Although the TSM and Mass Transit Alternates would yield some benefits, neither of them would sufficiently ameliorate the bridge capacity problem within the projected timeframe. Improvements increasing Missouri River crossing capacity have been recently completed at the Route 40/61 crossing. Also, construction of a new Route 115 crossing is underway. However, the projected growth rate of St. Charles County is such that no substantial long-duration relief is possible without construction of the Page Avenue Extension in some workable form.

SELECTED ALTERNATE

On November 2, 1990 the Missouri Highway and Transportation Commission adopted the Red Alignment as the State of Missouri's Selected Alternate for the Page Avenue Extension. This action followed environmental analysis and review culminating in issuance of the Draft Environmental Impact Statement and accompanying Section 4(f) and 6(f) Evaluation in June of 1990, a combined location and design public hearing on June 28, 1990, and an extended period of written comments. The preponderance of public hearing comments and most written comments have supported the Red Alignment, with or without suggested modifications. An "Enhancement Plan" to mitigate the Red Alignment's impacts to CCLMP was incorporated into the Selected Alternate in 1991. The current "mitigation plan" mandated by Section 601 of the Pipeline Safety Act of October 1992 incorporates the former Enhancement Plan's principal features and dictates additional mitigation measures as well.

IMPACTS

The Red Alignment would produce adverse impacts relative to the use of prime agricultural lands, relocation of residences and commercial establishments, crossing the Missouri River's floodplain, wetland areas, and traversing Creve Coeur Lake Memorial Park. Beneficial impacts would be associated with the reduction of traffic congestion on the Missouri River crossings with concurrent reductions in energy costs and improvements in air quality. Additional benefits would include improved traffic flow conditions within St. Charles and St. Louis Counties on secondary roads and along Route 40/61, Route I-70 and Route I-270. Development would continue to occur throughout

St. Charles County and, along the Red Alignment, induced development likely would take place at interchanges and on its outer roads.

PLANNING

Planning for the extension for Page Avenue was initiated in the 1960s and has occurred in various forms and formats since then. The intervening decades have produced dramatic residential and related commercial development throughout those portions of St. Louis and St. Charles Counties that would benefit most from such a facility. For example, St. Charles County's population grew from 92,954 to 212,907 (a 129% gain) from 1970 to 1990. In 1986, MHTD prepared a reconnaissance report that designated the Red Alignment as its preferred alternate. All St. Louis County, St. Charles County and regional planning documents issued since this period that address Missouri River crossings have assumed that the Red Alignment would be implemented.

ISSUES

Several controversial issues have been identified through scoping meetings and ongoing coordination. Certain issues, such as the Spring Bend Estate and the Timberwood Trails Subdivision, have been addressed through adjustment of the Red Alignment to reduce or eliminate adverse impacts to the extent possible. Another issue, concerning the length of the roadway or fill material within Creve Coeur Lake Memorial Park, has been addressed by lengthening the bridge structure to measurably reduce the section on fill material. This would keep a larger area open and available for park uses. Moreover, an Enhancement Plan has been advanced as an integral element of the Red Alignment in order to mitigate other CCLMP impacts.

Secondary impacts that are controversial center around induced future development of the Missouri River floodplain. While the proposed action would be constructed on fill material in order to provide protection from 100-year flood events, it would not act as a levee. Its bridge would not impair conveyance of the floodwaters within the floodway. Moreover, the portion constructed on fill will be designed with conduits or other structures to allow existing drainageways to function.

No flood protection would result from implementation of the Red Alignment for any portion of the floodplain area.

SECTION 6(f) EVALUATION

The Red Alignment would require approval of the U. S. Department of the Interior to proceed through Creve Coeur Lake Memorial Park. A separate Section 6(f) report has been prepared which identifies the severe community disruption and costs associated with CCLMP-avoidance routes. A mitigation plan has been addressed in Section 601 of the Pipeline Safety Act of 1992 that would add at least 600 acres to CCLMP, perform maintenance dredging of the lake, provide $250,000 towards facilities and require other measures. Section 6(f) land taken would be replaced at equal or greater fair market value and have equal or greater utility.

REGULATORY COMPLIANCE

Section 404 (Clean Water Act) permits will be required from the U.S. Army Corps of Engineers (COE) for any wetland impacts and/or placing of fill material in the floodplain. A U. S. Coast Guard (USCG) Bridge Permit will be required for the Missouri River bridge. Both the COE and USCG are cooperating agencies for this proposed action. Phase I cultural resources investigations have been conducted for known archaeological sites, location of additional field sites/isolated finds and a survey of buildings to assess historic quality. Compliance with Section 106 of the National Historic Preservation Act has been completed and a copy of the Memorandum of Agreement for Historic Preservation is contained in Comments and Coordination, Volume 3. The selected alternate would encroach upon the 100-year floodplain of the Missouri River. Accordingly, coordination with the Federal Emergency Management Agency (FEMA) has been completed. Furthermore, MHTD has agreed that crossings over floodplains will not encroach on regulatory floodways and that they will be designed to avoid any adverse impacts. Also, all required local floodplain development permits will be obtained.

DRAFT EIS PUBLIC REVIEW

The Draft EIS was released for review on June 1, 1990. Subsequently, a public hearing was conducted in St. Charles on June 28, 1990 with attendance exceeding 1,000 persons and 64 persons making statements. The official comment period was originally scheduled to conclude August 1, 1990, but was extended to allow the U. S. Department of the Interior and the Missouri Department of Natural Resources additional time for review and comment. The hearing and in the written comments indicated a majority of the respondents were in favor of a new Missouri River Bridge crossing, in general, as well as the selected alternate, in particular. Opponents have cited disruption of neighborhoods, destruction of habitat and parkland, loss of wetlands and encouragement of floodplain development as the reasons for opposing the selected alternate in particular and/or the Page Avenue Extension in general.

SUMMARY OF IMPACTS

A comparison of specific impacts is included as Section 4.27, Summary of Impacts.

SECTION 601/SECTION 4(f)

An environmental impact statement on a Federally-assisted project impacting a park would normally contain a lengthy analysis of the project alternatives under "Section 4(f)," a parkland preservation statute, which is now found at 49 U.S.C. Section 303. A variation of this "Section 4(f)" requirement also appears at 23 U.S.C. Section 138.

Because of the impact of the Red Alignment (and others considered) on Creve Coeur Lake Memorial Park (CCLMP) and other Section 4(f) sites, the preliminary drafts of this environmental impact statement were prepared to consider this project within the scope of the requirements of Section 4(f) laws and regulations. Some of the maps and figures appearing in this final

environmental impact statement were also prepared in anticipation of Section 4(f) review.

However, in October 1992, Congress passed and President George Bush signed into law the "Pipeline Safety Act of 1992," P.L. 102-508, which contained Section 601 relating to this Page Avenue Extension project. Section 601 authorizes the Secretary of Transportation to waive the requirements of Section 4(f) for the designated Red Alignment if:

1. The final environmental impact statement is completed.

2. The State of Missouri enters into an enforceable agreement to implement a project mitigation plan that includes a 50 percent expansion of the park, walking/bicycle paths, nature trails, new wetland areas, dredging Creve Coeur Lake, siltation lake construction, features to minimize visual and physical impacts, other mitigation measures deemed appropriate by the Secretary of Transportation, and a monetary contribution for facility improvements.

3. The State complies with other provisions such as use of non-Federal funds, establishing a design committee, implementing project mitigation prior to construction, and compliance with all other Federal environmental law appropriate to the project.

All provisions of Section 601 will be implemented.

COORDINATION/MITIGATION

Extensive coordination has taken place on this project with federal, state and local agencies and the public including the U. S. Army Corps of Engineers, the U. S. Coast Guard, the U. S. Fish and Wildlife Service, the Missouri Department of Conservation, the Missouri Department of Natural Resources, and St. Louis County. This coordination has resulted in extensive avoidance of environmentally sensitive areas and considerable mitigation where avoidance was not practicable.

Three formal scoping meetings were held with the general public in addition to hundreds of meetings with individuals and groups. These meetings resulted in selection of the Red Alignment and commitments to noise abatement, reducing neighborhood impacts, roadway access, scenic improvements such as landscaping and various other environmental mitigation covered below.

A close working relationship was developed with federal, state and local agencies. Numerous meetings were held to address environmental concerns and to develop collective solutions. The first choice in these meetings was to seek avoidance and secondly to minimize impacts. These meetings resulted in comprehensive agreement on approaches to environmentally sensitive areas. The results of these meetings include:

1. Avoidance of wetlands
2. Creation of new wetlands along the Red Alignment
3. Enhancement of prior converted lands in upper Creve Coeur Lake

4. Avoidance of floodplain impacts by ensuring that there will be no increase in flood elevations in the regulatory floodways
5. Addressing backwater areas to enhance fish habitat
6. Extensive erosion control
7. Bridge noise barriers to reduce noise impacts to the park
8. Plantings to reduce visual impacts
9. At least a 600 acre expansion of the park
10. A walking/bicycle path along the Red Alignment
11. Nature trails
12. Dredging Creve Coeur Lake
13. Construction of a siltation lake
14. A bridge drainage system to avoid Creve Coeur Lake and Creve Coeur Creek contamination
15. Aesthetic bridge design
16. Avoidance of historic buildings by shifting the roadway alignment and changing roadway design

Purpose and Need for Action 1.0

1.0 PURPOSE AND NEED FOR ACTION

The Page Avenue Extension is intended to provide an additional route for travelers between St. Louis and St. Charles Counties. The rapid residential growth in St. Charles County and the corresponding increasing number of daily commutes to the major regional employment centers in the City of St. Louis and St. Louis County have developed to the extent that the need for both improved traffic flow through St. Charles County and between St. Louis and St. Charles Counties by an additional Missouri River crossing has become increasingly apparent.

Improved traffic flow between St. Louis and St. Charles Counties has continually been one of the foremost concerns of regional transportation planning as is evidenced by the ongoing design and construction of Missouri River crossings. Recent river crossing improvements have included: five lanes added to the Interstate Highway 70 (I-70) crossing during the 1970s (for a total of 10 lanes); a new bridge, completed in August 1989, carrying two lanes on Route 40/61 (future Interstate Highway 64) for a total of four lanes; and, currently under construction, a new six-lane bridge for Route 115. The two bridges for Route 40/61 can be marked to carry three lanes in each direction if Route 40/61 is widened to a six-lane highway in the future.

1.1 BACKGROUND/PROJECT STATUS

Since the 1960s, there have been discussions concerning the extension of Page Avenue from Bennington Place westward across the Missouri River. While no definitive plans were prepared, selected corridors in St. Louis County and St. Charles County remained essentially development-free in order to accommodate this extension. Correspondence from 1971 concerning land purchases for the expansion of Creve Coeur Lake Memorial Park in St. Louis County notes that the long-range planning for this project previously identified the proposed Page Avenue Extension as going through the park area.

An initial review of preliminary alignment alternatives for the extension of Page Avenue was prepared by the Missouri Highway and Transportation Department (MHTD) in 1973. Given the necessity to initiate and construct other regional projects, the Page Avenue Extension was not thoroughly evaluated until 1986 when MHTD prepared its Reconnaissance Report evaluating 15 various alternates and combinations of parts of alternates identified by color codes of red, green, blue or dash lines of the same colors. The report analyzed major construction conflicts, design considerations, relocation potentials, and estimated construction costs. The recommended alternative, subsequently tentatively approved by the Missouri Highway and Transportation Commission, is the Red Alignment, covering approximately 20.54 miles. Along with the Red Alignment, the Green-Black, Yellow-Black and Blue Alignments (as alternates to the Red Alignment in St. Louis County), the Green Alignment (and three subalternates for it), plus the No-Build Alternate are evaluated in this document (Figure 1.1).

The Federal-Aid Highway Act of 1987 included a provision for funding engineering and design for the Page Avenue Extension as a demonstration project. During 1988, three scoping meetings were conducted with interested persons and officials from various local, state and federal agencies. The high level of public interest and concern prompted a decision to proceed directly to an Environmental Impact Statement. The preparation of this document was initiated in October, 1988. The base year of study is 1989. The project construction year is 1995, with the ability to satisfy traffic demand to the year 2015.

This Final Environmental Impact Statement (FEIS) has been prepared to analyze the effects of the preferred alignment, alternates and subalternates for the Page Avenue Extension. In early discussions of secondary impacts in the Missouri River floodplain in St. Louis County, it was noted that the Earth City Expressway Extension, a proposed highway project by St. Louis County's Department of Highways, could have various floodplain impacts. Because of lack of funding resulting from the inability to obtain voter approval for necessary tax increases and other more immediate needs of St. Louis County, the Earth City Expressway Extension is not considered a viable project during the timeframe up to 2015. A preliminary Draft EIS was near completion when the project was curtailed.

It should be clearly understood by all reviewing this document that the Page Avenue Extension will not increase flood protection to the 500-year level for any area on the floodplain and, therefore, will not encourage floodplain development by providing an increase in flood protection. Moreover, the Kansas City District, Corps of Engineers, noted in an August 9, 1990 letter to MHTD that in St. Louis County the "majority of the remaining Missouri River floodplain area cannot be protected by levees which afford any substantial degree of flood protection, due to the resulting increases in upstream water surface profiles" beyond regulatory limits.

The Page Avenue Extension FEIS assumes that the proposed project alignment would cross the Missouri River floodplain with only one interchange in the vicinity of Creve Coeur Mill Road.

1.2 SYSTEM LINKAGE

The proposed Page Avenue Extension would complement the existing regional transportation network by providing an additional Missouri River crossing to improve traffic flow to and through St. Charles County. The main benefit will be to relieve the congestion now occurring, and projected to worsen, on the existing Missouri River crossings, primarily at Route I-70, Route 40/61, and the new Route 115 bridge.

1.3 TRAFFIC DEMAND

The projected increase in Missouri River crossings and corresponding increase in average daily traffic (ADT) is a result of ongoing rapid

suburban growth. St. Charles County is the fastest growing county in Missouri as well as the Missouri-Illinois eight-county St. Louis metropolitan area. The 1970 census figure for St. Charles County was 92,954 persons. By 1980, it had increased to 144,107 (55%) in ten years. The 1990 U. S. Census reported St. Charles County's population at 212,907, a gain of 119,973 or 129% in two decades. This growth has generated increased traffic demands upon the existing highway and local transportation systems.

Traffic projections indicate that the volume of traffic across the Missouri River will increase dramatically over the next 25 years. Traffic using the three existing river crossings (Route 115, Route I-70 and Route 40/61) in 1989 is 201,920 vehicles per day. By the year 2015, the traffic volume is expected to increase to approximately 404,000 vehicles per day, an increase of more than 100% in 25 years.

Even with the construction of the new six-lane Route 115 bridge and the four-lane Route 40/61 bridge capacity along with the existing 10-lane I-70 bridges across the Missouri River, traffic capacity will not be adequate to handle the 2015 traffic volume. The construction of another major river crossing will be required to reduce the overcrowding on the existing roadways between St. Charles and St. Louis Counties, especially Route I-70. To improve regional traffic flow and provide relief to Route I-70, traffic must be diverted from I-70 to other river crossings.

The Page Avenue (Route D) Extension is a proposed multi-lane controlled access freeway that would connect the present Page Avenue at Bennington Place in St. Louis County to Route 94 in St. Charles County and beyond Route 94 to Route 40/61. Table 1.3-1 reports historical and projected traffic volumes without this facility.

TABLE 1.3-1
MISSOURI RIVER CROSSING TRENDS (Vehicles Per Day)

ROUTE	1970	1980	1970-80 % CHANGE	1989	1980-89 % CHANGE	1995	2015
I-70	57,900	75,800	+30.9	141,970	+87.3	144,900	230,000
40/61	8,800	22,600	+156.8	41,900	+85.4	50,900	80,800
115	15,200	16,900	+11.2	18,050	+6.8	58,600	93,100
Totals	81,900	115,300	+40.8	201,920	+75.1	254,400	403,900

The prospective six-lane bridge for Route 115 is under construction. The two-lane Route 40/61 companion bridge across the Missouri River opened August of 1989. With the completion of the Route 115 bridge, the total number of available Missouri River crossing traffic lanes will be twenty.

1.4 TRAFFIC VOLUMES (ADT)

The 1989 average daily traffic (ADT) volumes on the regional highway system are shown by Figure 1.3. These ADTs are from the Missouri Highway and Transportation Department. A review of Figure 1.3 shows that, in St. Louis County, I-270 north of Page Avenue carries the highest volume of traffic at 155,200 ADT.

In St. Charles County, I-70 carries the highest traffic volumes. The ten-lane Missouri River bridge carries 141,970 vehicles per day. Traveling west, I-70 narrows from eight to six lanes west of Route 94 and carries 110,300 vehicles per day. Volumes decrease further to the west. At the Mid Rivers Drive/Route C interchange, the ADT is 80,600. At the Route K interchange, I-70 reduces to four lanes and carries 60,200 ADT. At Lake St. Louis, the four-lane I-70 carries 40,000 vehicles per day.

Route 94 is a four-lane divided highway from I-70 to Route 40/61. Route 94 carries 46,000 vehicles per day immediately south of I-70. At Jungs Station Road, Route 94 carries 43,000 vehicles per day. At Route 40/61, Route 94 carries 25,300 ADT.

Route 40/61 carries 41,900 vehicles per day at the Missouri River Bridge. North of Route 94, Route 40/61 carries 28,300 vehicles per day on the four-lane divided expressway. Traveling north on Route 40/61, traffic volumes further decrease. North of Route N, Route 40/61 carries 21,000 vehicles per day.

1.5 CAPACITY ANALYSIS

The capacity of any roadway segment depends upon the type of roadway, the area it serves, and the number of lanes. The capacity of a given roadway segment is the maximum rate of flow at which vehicles can be reasonably expected to traverse the segment during a specified time period under prevailing roadway and traffic conditions. It is generally expressed as vehicles per hour per lane. Capacity values used in this FEIS were calculated using the methods described in the 1985 Highway Capacity manual, Special Report 209, published by the Transportation Research Board.

The efficiency of travel along Route 40/61 and Interstate I-70 is measured by the Volume-to-Capacity (V/C) ratios on the roadway segments. Low V/C ratio values indicate no congestion. At a V/C ratio of one, where traffic volumes equal roadway capacity; congestion becomes extreme resulting in bumper to bumper, start-stop mode of traffic flow. Table 1.5-1 relates Volume-to-Capacity (V/C) ratios to Level of Service, density, and speed. Roadway capacity of 1,800 vehicles per hour per lane reflects adjustments for terrain, percentage of trucks of various sizes, and interrupted peak hour flow.

TABLE 1.5-1
VOLUME/CAPACITY (V/C) RELATIONSHIPS

V/C RATE	VEHICLES PER HOUR PER LANE	LEVEL OF SERVICE	DENSITY PC/MI/LN	SPEED (MPH)
0.30	500	B	12.0	52
0.40	700	B	15.5	52
0.49	900	B	20.0	50
0.60	1,100	C	25.0	48
0.69	1,250	C	30.0	47
0.86	1,550	D	37.5	43
1.00	1,800	E	67.0	30 - 35
1.20	Variable	F	67.0	0 - 30

General descriptions of operating conditions for each of the level of services are as follows:

- Level of Service A - This level of service describes nearly free flow operation with nearly unimpeded maneuverability.

- Level of Service B - This level of service describes stable flow operation with minimum restrictions on maneuvering. Vehicular speed begins to be dependent by traffic flow.

- Level of Service C - This level of service still provides stable flow operation, but the freedom to maneuver is noticeably restricted. Vehicular speed is increasingly dependent on the traffic flow. Queues begin to form behind any significant blockage.

- Level of Service D - This level of service approaches unstable flow. Drivers have little freedom to maneuver within the traffic stream. Minor flow interruptions create substantial queues.

- Level of Service E - This level of service describes operation at capacity. Traffic flow is very unstable. Any flow interruption or disruption produces extensive queuing. There is little freedom to maneuver within the traffic stream.

- Level of Service F - This level of service describes forced flow. Traffic demand exceeds the roadway capacity. The roadway acts as a storage for vehicles backed up from downstream bottlenecks. This condition usually exists within queues formed behind the breakdowns. Operating speeds generally range from 30 MPH to stop-and-go operation.

1.6 TRAFFIC OPERATIONS ANALYSIS

The 1989 travel conditions and Levels of Service within the boundaries of the Page Avenue Extension Project Area are described below. Levels of Service on the Project Area road network without the proposed alternative alignments are illustrated by Figure 1.4 and with the recommended Red Alignment are illustrated by Figure 1.5.

Route I-70

Traffic volumes across the Missouri River bridge have surpassed the roadway capacity of the bridge during peak hour periods in the direction of highest flow (eastbound in the a.m. and westbound in the p.m.).

During the p.m. peak hour period, major backups occur in St. Louis County on I-70 and the routes feeding I-70. The I-70/I-270 interchange is the major capacity constraint on traffic flow into St. Charles County. This interchange meters the traffic volumes carried on I-70 from I-270. Traffic demand continues to exceed the roadway capacity of I-70 into St. Charles County to the Fifth Street Interchange. Between the Fifth Street and Zumbehl Road interchanges, I-70 operates at the Level of Service D to the Salt Lick Road interchange. West of the Salt Lick Road interchange, I-70 operates with minimal delays at the Level of Service C. At the Route K interchange, I-70 reduces from six lanes to four. Backups on I-70 and its on and off ramps at interchanges occur in St. Charles County as traffic volumes are at or exceed roadway capacity.

During the a.m. peak hour periods, the major backups occur in St. Charles County. Traffic congestion creates backups on the approaches to I-70 interchanges as vehicles attempt to merge into the "at capacity" flow on I-70.

Route 94

The traffic operations along Route 94 and its feeder arterials are controlled by the efficiency of travel through the interconnected signalized intersections along Route 94.

During the p.m. peak hour period, through and turning traffic volumes exceed the capacity of the signalized intersections from the I-70 interchange to Central School Road, with the exception of the three-legged intersection of Hemsath Road at Old Highway 94 which operates at the Levels of Service of D and C. Although the intersections are interconnected, sizeable amounts of delays and backups are caused by the fact that there is more traffic demand on Route 94 than capacity available at the intersections.

Side roads off Route 94 are affected by the limited capacity of the signalized intersections. Backups and delays result as the traffic seeking to turn onto Route 94 waits through several signal cycles before making its turns. During peak hour periods, the signalized intersections

at Central School Road and Kisker Road operate at capacity. Although many vehicles pass through the intersections without stopping, a significant number of vehicles must stop, resulting in large delays and poor flow. West of Kisker Road, Route 94 traffic travels at a Level of Service B with little or no delay to the Route 40/61 interchange.

Mid Rivers Mall Drive

During peak hour periods, the traffic demand exceeds the capacity of the signalized intersection at Mexico Road (Level of Service F) resulting in unacceptable delays, poor progression and oversaturation.

St. Charles County has undertaken a roadway improvement program funded by the one-half cent transportation sales tax, passed in April of 1985, to widen existing two-lane roadways to four-lane urban arterials.

St. Louis County

The signalized intersections of the Page Avenue ramps at Bennington Place are of insufficient capacity for current traffic volumes. Sizeable approach delays result from the traffic demand on the Page Avenue off-ramp during the p.m. peak hour period.

Creve Coeur Mill Road, which can provide access from Olive Street Road to the Earth City Expressway and via the Earth City Expressway onto I-70, operates at Level of Service C.

During peak hour periods, Olive Street Road traffic volumes exceed the capacity of the signalized intersections from I-270 to Creve Coeur Mill Road resulting in delays and backups.

1.7 FUTURE LEVELS OF SERVICE

With the construction of one of the proposed alignments, the resulting Level of Service on the project area road network is illustrated in Figures 2.3, 2.5, 2.7, 2.10. The changes of the traffic volumes at the various river crossings with the various alignments in place are indicated below in Table 1.7-1.

TABLE 1.7-1
MISSOURI RIVER CROSSINGS

ROUTE	WITH RED ALIGNMENT (INCLUDING YELLOW-BLACK, BLUE & GREEN-BLACK) 1989 ADT	WITH RED ALIGNMENT (INCLUDING YELLOW-BLACK, BLUE & GREEN-BLACK) 2015 ADT	WITH GREEN, GREEN-BLACK/GREEN-DASHED/GREEN ALIGNMENTS 2015 ADT	WITH GREEN/GREEN-BLUE DASHED/RED/GREEN ALIGNMENT 2015 ADT	W/O PAGE AVE. EXT. 2015 ADT
115 *	18,050	72,400	74,300	73,800	93,100
I-70	141,970	188,700	188,400	187,000	230,000
40/61 **	41,900	69,700	68,900	68,700	80,800
Page Ave.	-	73,500	72,300	74,500	-
Totals	201,920	404,300	403,900	404,000	403,900

* Two lanes (1989); six lanes (from 1992)
** Two lanes during peak hours (1989); four lanes (from 1990)

As indicated in Table 1.7-1, with the traffic volume at the Missouri River crossings projected to increase 200% between 1989 and 2015, the need for additional crossings becomes evident. Any of the proposed Page Avenue Extension alignments would definitely reduce the traffic volumes on the other three river crossings when compared to the no-build condition.

In addition to the river crossings, the proposed alignments also provide for the improved dispersal of traffic throughout St. Charles County as well as relieve, or minimize further degradation of service, for access to and from Routes I-70 and 40/61 from secondary roads.

Alternates 2.0

2.0 ALTERNATES

Alternates considered for the Page Avenue Extension include the No-Build, Transportation System Management, Mass Transit and two primary Build Alternates, each Build Alternate having three subalternates. Prior to conducting project scoping meetings, MHTD had completed preliminary reports on the Page Avenue Extension in 1973, and again in 1986. The purpose of the 1986 Reconnaissance Report was to reevaluate potential alignments because some of the ones identified in 1973 were no longer reasonable as a result of the concentrated development that had occurred during the intervening years.

This was most evident relative to the 1973 Blue Alignment, as originally proposed, connecting from Route 94 where the Red Alignment intersects near Hemsath Road and then making a northwestern curve to join Route I-70 east of Route K. Given the high number of residential units in the path of this alignment, it was removed from further consideration. The MHTD review of fourteen other combinations of the Red, Green, Green-Green Dashed and Green-Blue Dashed Alternates or combinations thereof resulted in ten of the fourteen combinations being eliminated from further consideration, leaving the Red, Green, Green-Green Dashed, and Green-Blue Dashed routes.

An additional St. Louis County route segment, the Green-Black/Green, was formulated during the DEIS process in 1989 to provide an alternative to avoid parkland. This segment was later utilized to connect to the Red Alignment as well as the Green. Moreover, a revised Blue Alignment segment crossing the strip between Creve Coeur Lake Memorial Park and the leased land and eventually connecting to the Red Alignment, is also included in the FEIS. A Yellow-Black segment, also connecting with the Red Alignment, has also been added as an evaluated alternative in the FEIS. Criteria involving environmental disruption, relocations, cost per mile and design features have been analyzed as part of the evaluation.

The eight build alternates evaluated in this FEIS are:

1. the Red Alignment (Selected Alternate)
2. the Green-Black/Red Combination
3. the Yellow-Black/Red Combination
4. the Blue/Red combination
5. the Green Alignment
6. the Green-Black/Green Combination
7. the Green/Green Dashed Combination
8. the Green/Green-Blue Dashed/Red/Green Combination

Segments or entire alignments or combinations are discussed subsequently, as appropriate, throughout the balance of this document.

2.1 NO-BUILD ALTERNATE

The Missouri Highway and Transportation Department (MHTD), St. Louis and St. Charles Counties and various local municipalities have planned, programmed or placed under construction, numerous roadway improvements in St. Louis and St. Charles Counties. Collectively, these projects comprise the No-Build Alternate with respect to the Page Avenue Extension. The proposed highway improvements representing the No-Build Alternate are illustrated by Figure 2.1 and described below.

MISSOURI HIGHWAY AND TRANSPORTATION DEPARTMENT

I-70
Widen to eight lanes from Mo. Rte. 94 to Zumbehl Rd; Completion of a six-lane freeway from O'Fallon to Wentzville; Improvements of sections between Wentzville and Warren County line; Individual interchange improvements including ramp revisions and bridge widenings.

U.S. Route 40/61
Conversion to a freeway from I-70 to the Missouri River Bridge at the St. Louis County line; Interchange construction at major roadways; Completion of a second bridge across the Missouri River which was opened to traffic in August of 1989.

Mo. Route 79
Completion of the I-70, Mo. Rte. 79 interchange; Completion of an expressway from I-70 to 1.0 mile north of the Salt Lick Rd. interchange.

Mo. Route 94
Widening, auxiliary lanes and signalization at various intersections from I-70 to U.S. Rte. 40/61.

Mo. Rte. 115
Construction of a six-lane bridge across the Missouri River north of the Norfolk and Southern Railroad bridge. Connection of this roadway to I-270 at Missouri Bottom Rd. in St. Louis County and to Mo. Rte. 94 in St. Charles County and westward to I-70.

Mo. Rte. K
Widening from two rural lanes to a five-lane urban cross section, from I-70 south to U.S. Rte. 40/61.

Mo. Rte. M
Widening from two rural lanes to a five-lane urban cross section, from the Norfolk and Southern Railroad to Mo. Rte. 79.

ST. CHARLES COUNTY AND MUNICIPALITIES

Fifth Street (City of St. Charles)
Construction of a new four-lane roadway from Bayard St. north to Mo. Rte. 94.

Fifth Street
New four-lane roadway from south of I-70 to interchange to South River Road.

Harvester Rd.
Widening from two lanes to a four-lane urban arterial.

Jungermann Road
Widening from two lanes to a four-lane urban arterial.

Lake Saint Louis Boulevard
Widening to four-lanes and realign to U.S. Rte. 40/61.

McClay Rd.
Widening from two lanes to a four-lane urban arterial.

Mexico Rd.
Widening from two lanes to a four-lane urban arterial.

Muegge Rd.
Widening from two lanes to a four-lane urban arterial.

Old 94 Rd.
Widening from two lanes to a four-lane urban arterial.

Salt Lick Rd.
Widening from two lanes to a four-lane urban arterial from I-70 to Mexico Rd.

St. Peters/Howell Rd.
Widening from two lanes to a four-lane urban arterial.

Spencer Rd.
Widening from two lanes to a three-lane urban arterial.

Mid Rivers Mall Dr. (City of St. Peters)
Construction of a five-lane urban arterial from Mexico Road to Route 94.

Theole Rd.
Widening from two lanes to a three-lane urban arterial.

Willott Rd.
Widening from two lanes to a three-lane urban arterial.

Others
Widening from two to four lanes, parts of Friedens, Pralle, Hemsath, Jungs Station, and Caulks Hill, from Mo. Rte. 94 south 0.5 to 1.0 miles.

ST. LOUIS COUNTY

Dorsett Road
Widening from two lanes to a five-lane urban arterial from I-270 to Marine Avenue.

Marine Avenue
Widening from two lanes to a five-lane urban arterial from McKelvey Road to Dorsett Road.

Creve Coeur Mill Road
Widening from two lanes to a five-lane urban arterial from Marine Avenue to McKelvey Road.

Earth City Expressway Extension
Construction of a four-lane urban arterial from Olive Boulevard north to Prichard Farm Road. (Implementation is uncertain due to a lack of funding. This roadway is not analyzed in this FEIS.)

Earth City Expressway
Construction of a four-lane urban arterial from St. Charles Rock Road north to Route 115.

2.1.1 Population and River Crossing Trends

Population trends for St. Charles County, St. Louis County and the balance of the eight-county St. Louis Region have been projected by the East-West Gateway Coordinating Council (EWGCC) and are reported by Table 2.1-1. These projections were prepared prior to the 1990 U. S. Census. More recent EWGCC population projections are not available.

TABLE 2.1-1
1989 POPULATION PROJECTIONS - EIGHT COUNTY ST. LOUIS REGION

COUNTY	1989	1995	2000	2005	2010	2015	% CHANGE 1989-2015
St. Charles	193,800	208,479	221,658	233,905	243,931	254,390	+31.3
St. Louis	1,000,465	999,363	995,549	993,737	991,481	989,300	- 1.1
City of St.L.	420,150	410,978	405,515	399,837	393,933	388,100	- 7.6
Franklin	79,500	86,103	91,000	95,404	99,800	104,400	+31.3
Jefferson	161,630	171,159	177,700	182,260	186,800	191,450	+18.4
Madison, IL	247,614	251,054	254,400	255,161	255,800	256,440	+ 3.6
St. Clair, IL	259,129	260,067	261,500	262,513	263,400	264,290	+ 2.0
Monroe, IL	21,095	22,001	22,500	22,754	23,000	23,250	+10.2
TOTALS	2,383,383	2,409,204	2,429,822	2,445,571	2,458,145	2,471,620	+ 3.7

In 1989, the population of St. Charles County was projected to grow at a rate of approximately 5.5% every five years through the remainder of this century and into the next. EWGCC projections suggested St. Charles County would continue to be one of the fastest growing counties in the eight-county St. Louis region over the next 25 years.

A comparison of the 1989 EWGCC population projections, the 1990 Census and a 1992 set of American Statistical Society St. Louis Chapter forecasts is instructive. The conservative nature of the 1989 projections in regard to St. Charles County's growth are obvious. All figures are rounded to the nearest hundred.

TABLE 2.1-2
1992 POPULATION PROJECTIONS - EIGHT COUNTY ST. LOUIS REGION

County	1990	2000	Change	% Change
St. Charles	212,900	259,700	+46,800	+22.0
St. Louis	993,500	988,300	- 5,200	- 0.5
City of St. Louis	396,700	362,400	-34,300	- 8.6
Franklin	80,600	89,900	- 9,300	+11.5
Jefferson	171,400	199,500	+28,100	+16.4
Madison, IL	249,200	249,300	+ 100	<+ .1
St. Clair, IL	262,900	260,500	- 2,400	- .9
Monroe, IL	22,400	23,900	+ 1,500	+ 6.7
Totals	2,389,600	2,433,500	+43,900	+ 1.8

Relative to 1989 projections, St. Charles County surpassed its predicted late 1990s population by the last census. Moreover, it is now expected to surpass its 2015 predicted population by 2000. By itself, St. Charles County is expected to gain more population than the entire St. Louis Region.

Following the recent completion of the two-lane Route 40/61 companion bridge for a total of four lanes and the future completion of the six-lane Route 115 bridge (combined with the existing 10 lanes of Route I-70), the three existing Missouri River crossings will provide twenty lanes of traffic and will carry an estimated 254,400 ADT in 1995 and 403,900 ADT in 2015 between St. Charles and St. Louis Counties. Traffic demand across the three crossings will increase almost 59% between the years 1995 and 2015 and will be in excess of 100% from 1989 onward (Table 2.1-3).

TABLE 2.1-3
MISSOURI RIVER CROSSING TRENDS
NO-BUILD ALTERNATE

ROUTE	1989	1995	1989-1995 % CHANGE	2015	1995-2015 % CHANGE	1989-2015 % CHANGE
I-70	141,970	144,900	+ 2.1	230,000	+ 58.7	+ 62.0
Route 40/61	41,900	50,900	+ 21.5	80,800	+ 58.7	+ 92.8
Route 115	18,050	58,600*	+224.7	93,100	+ 58.9	+415.8
TOTALS	201,920	254,400	+ 26.0	403,900	+ 58.8	+100.0

* New Route 115 six-lane bridge to open in 1993.

2.1.2 Traffic Volumes

The average daily traffic (ADT) volumes for 1989 are illustrated by Figure 1.3. Projected ADTs and levels of service for 2015 on the regional highway system are shown on Figures 2.2 and 2.3, respectively, based upon MHTD forecasts.

Comparing the year 2015 traffic volumes to 1995 and 1989 volumes, respectively, indicates that substantial increases in traffic volumes are anticipated on all the major highways within the Page Avenue Extension project area. These increases appear on Route I-70, Route I-270, Route 40/61, Route 94 and Page Avenue.

2.1.3 Projected Roadway Deficiencies

The efficiency of regional travel between St. Charles and St. Louis Counties can be defined using traffic volume to roadway capacity ratios along Route I-70, Route 40/61 and Route 115. Travel conditions within the Page Avenue Extension project area are represented by the efficiency of travel through the signalized and unsignalized intersections along the roadways within the corridor. Using the delay times and V/C ratios for signalized intersections and reserve capacity for unsignalized intersections, deficient roadway sections were identified and are shown by Figure 2.3 for 2015.

Year 2015

The following roadway segments will operate at the Level of Service F:

Route 115 from Missouri River Bridge to I-270;
I-270 from Page Avenue (Route D) to Olive Street Road (Route 340);
I-70 from I-270 to Route K;
Route 94 from I-70 to Route 40/61;
Route 40/61 from St. Louis County line to Route K;
Mid Rivers Mall Drive from I-70 to Mexico Road;
Bennington Place between Page Avenue on and off ramps;
Page Avenue off ramp; and
Olive Street Road (Route 340) from I-270 to Creve Coeur Mill Road.

The following roadway segments will operate at the Level of Service E:

Route 115 from Missouri River Bridge to I-70;
Route 40/61 from Route K north; and
I-270 from Page Avenue to I-70.

2.1.4 Traffic Operations Analysis

A number of roadways will have forecasted peak hour period volumes under the No-Build Alternate exceeding the roadway capacity for the years 1995 and 2015. These deficiencies will affect travel conditions within the Page Avenue Extension project area as described below.

Year 2015

I-70

Volumes on I-70 from the Missouri River bridges to the Route K interchange range from 126,600 to 230,000 vehicles per day and will exceed roadway capacity (Level of Service F). This amount of traffic will be almost impossible for I-70 to carry, resulting in intolerable conditions. Extremely severe congestion will result in long delays and backups on I-70 and all the major routes that feed it. Peak hours periods will extend to approximately twelve hours.

West of the Route K interchange, I-70 will operate at the Level of Service D to Route 40/61.

Route 40/61

The traffic volume between the Route 94 interchange and the Missouri River bridges is 80,800 vehicles per day, which is far in excess of the capacity of the roadway (V/C = 1.78). The amount of traffic on this section of roadway will result in long delays and backups. Peak hour periods will extend to approximately eight hours per day.

North of the Route K interchange, Route 40/61 will remain at capacity beyond Lake St. Louis.

Route 115

Route 115 bridge across the Missouri River will carry 93,100 vehicles per day. This will exceed the capacity of the bridge (V/C = 1.2) during peak hour periods. Congestion will be severe, resulting in delays and backups along the roadway section and routes feeding Route 115 during the p.m. peak hour period in St. Louis County. Delays will occur in St. Charles County during the p.m. peak hour period as Route 115 traffic attempts to merge with I-70 westbound traffic.

During the a.m. peak hour period, backups will occur on the approaches of the interchange at Route 94, as Route 94 traffic attempts to merge with at-capacity eastbound Route 115 traffic. The peak hour periods are expected to extend to approximately six hours.

Route 94

Long backups are expected on Route 94 approaches to Route 115, I-70 and Route 40/61 interchanges, as Route 94 traffic attempts to merge with already above capacity traffic.

The previous relief in congestion afforded by prior roadway improvements will be dissipated. The volume of traffic on Route 94 will greatly exceed the capacity of the signalized intersections from I-70 to Route 40/61. Congestion will be extremely severe, with large delays and backups at every intersection along Route 94 and its feeder routes.

Route K

During p.m. peak hour periods, the traffic volumes at the signalized intersection at I-70 South Outer Road (Old Highway 40) will exceed the capacity of the intersection. Backups, unacceptable delays, oversaturation and poor progression will result.

The intersection at Route N will continue to operate at the Level of Service B with good progression.

Mid Rivers Mall Drive

During p.m. peak hour periods, the traffic volumes at the signalized intersection with Mexico Road will exceed the capacity of the intersection (Level of Service F), resulting in unacceptable delays, poor progression and oversaturation.

St. Louis County

The capacity of the signalized intersections at Page Avenue and Bennington Place will be insufficient for the volumes of traffic. Large delays will create backups on the Page Avenue off-ramp during p.m. peak hour periods.

The insufficient capacity of the signalized intersections on Olive Street Road from I-270 to Creve Coeur Mill Road will create large delays in westbound through traffic during p.m. peak hour periods. The V/C ratio of through traffic exceeds 2.0 and will require westbound traffic to wait through two or more cycles.

Creve Coeur Mill Road will continue to operate at the Level of Service C with few delays north of the Olive Street Road intersection.

I-270

The p.m. peak hour traffic volumes on I-270 from I-70 to Page Avenue (Route D) will exceed the roadway capacity (Level of Service F), resulting in severe congestion and backups along I-270 and its feeder routes. South of Page Avenue to Olive Street Road (Route 340), I-270 will operate at the roadway capacity (Level of Service E).

2.1.5 Summary

The No-Build Alternate includes all the roadway improvements which feasibly could reduce congestion and improve traffic flow without constructing another Missouri River crossing. With the completion of the new Route 115 bridge and connector roadway between I-70 in St. Charles County and I-270 in St. Louis County, traffic flow from northern St. Charles County to northeast St. Louis County will be improved. However, by the year 2015, the traffic demand at the Route 115 bridge will be greater than the roadway capacity and will not solve the severe congestion problems on I-70. As population and employment concentrations expand toward Route 40/61, the traffic demand created will be well in excess of the roadway capacity at the Missouri River bridge. The recently completed two-lane companion bridge at Route 40/61 will not alleviate the congestion on Route 40/61 or I-70. The congestion on I-70 will be intolerable.

The three Missouri River crossings from St. Charles County to St. Louis County will not be able to carry the forecasted traffic volumes. The extremely severe congestion on Routes 40/61, 115 and I-70 will result in large delays and backups that will extend onto all the feeder routes and feeder streets. As a result, peak hour periods are anticipated to extend beyond eight hours per day and will create major problems for residents of St. Charles County who work in St. Louis County and the City of St. Louis.

2.2 TRAFFIC SYSTEM MANAGEMENT (TSM) ALTERNATE

The TSM Alternate consists of the various techniques to optimize the efficiency of travel within the Page Avenue Extension project area. Included in this alternate are high occupancy vehicles (HOV) lanes, ramp and lane monitoring, the roadway improvements listed in the No-Build Alternate, interconnection of the traffic signal system, and the enhancement of the vanpool and ride sharing programs.

2.2.1 HOV Transport Possibilities on Existing Roadways

The use of HOV lanes emerged during the energy crisis of the late 1970s. Declining gas prices and more fuel efficient cars have made motorists generally less receptive to carpooling. Carpooling must fight the "married to the car" attitude of motorists. The waning or leveling of interest in carpooling and vanpooling can be seen in two programs now in existence. They are RIDESHARE, coordinated by the East-West Gateway Coordinating Council, and Vanpool Services Incorporated (VPSI, Inc.), under contract with St. Louis County.

RIDESHARE inquiries peaked in the mid to late 1970s. At this time, it receives approximately four hundred calls per year from the St. Charles County area. Of that number, 21% join or form carpools. Based upon their 1988 survey, the average carpool has four occupants. Using the rule of thumb that an additional 16% (75% of the newly formed carpool members) independently form carpools, approximately forty new carpools are formed annually.

VANPOOL SERVICES INCORPORATED (VPSI, Inc.) currently has ten vans operating in St. Charles County with a ridership of 165. VPSI, Inc. does not have plans to increase the number of vans operating in St. Charles County.

As a part of the Suburban Mobility Initiatives Program of the Urban Mass Transportation Administration, the St. Charles County Suburban Mobility Committee, in conjunction with EWGCC, prepared a report on Suburban Mobility in St. Charles County. Published in June of 1990, the report examines the use of mass transit alternatives, including a regional ride-sharing program, promotion of vanpooling and improved express bus service.

Focusing upon Route I-70, the report finds for the need to make better use of existing roadway capacity and emphasizes that the use of HOV lanes on Route I-70 would be one of the best means for achieving this aim. It states that while HOV lanes could assist in alleviating traffic volumes on Route I-70, there are major obstacles which will inhibit successful implementation. These must be resolved in order for the use of HOV lanes to effectively reduce commuter traffic volumes. As stated in the report, these factors include:

- "It would involve conversion of an existing lane. This could be unpopular, particularly since, initially, the HOV lane might not be very intensively used and congestion in the remaining lanes could get worse, not better.

- The success of an HOV critically depends on expanding the use of carpools and vanpools. The next chapter notes that, while it may be possible to achieve the necessary growth in these modes, to do so involves reversing an established trend towards more, not less, "drive alone" commuting. This will not happen without a significant commitment of resources to the coordinating agencies and their promotional efforts.

- The lack of adequate bus service limits the available alternatives to driving alone and makes it harder to achieve the operational objectives for an HOV facility.

- Any feasible HOV will not affect the most severe traffic problem, which is the I-270 interchange. The easiest HOV design could further complicate traffic movements and add to the risk of accidents on the approach to this interchange. While the provision of an HOV lane through this junction might be a beneficial project, it would probably be both difficult and expensive and it is unlikely the Highway Authority will be able to undertake such a project in the foreseeable future." (p. 31)

There are major long-standing barriers to the successful use of HOV in the St. Louis Metropolitan Area, none of which are approaching resolution. As such, the installation of HOV lanes cannot be counted on to resolve the traffic problems on I-70 by the year 2015, particularly when the peak hour traffic volumes are projected to be nearly double the capacity of the roadway at the Missouri River crossing.

It should be noted that the current lack of an appropriate state statute would seriously limit HOV lane enforcement. No such enabling legislation has been proposed to date. However, MHTD has a committee studying this problem.

In spite of these difficulties, however, the St. Charles County Suburban Mobility Committee determined that HOV lanes are worth examining in greater depth. Their report's Chapter 7, Conclusions and Comments, requests that MHTD provide for possible long-term HOV options in the initial design of the Page Avenue Extension.

2.2.2 Ramp Metering

Ramp metering regulates the number of vehicles entering the highway in accordance with the available gaps on the highway through the use of traffic signals at the on-ramp. It effectively "stores" vehicles at the ramp entrance before allowing them to enter the highway at optimum intervals. Ramp metering is limited to approaches with low traffic volumes or where other alternative on-ramps are available.

By the year 2015, the peak hour traffic volumes on I-70 and Route 40/61 will be nearly double the capacity of the roadways, creating unacceptably long queues on the entrance ramps. The ramp signals would have to be shut down during peak hour periods.

2.2.3 Local Improvements on Secondary Roads

St. Charles County passed a one-half cent transportation sales tax in April of 1985. Various local municipalities levy a similar tax. Consequently, numerous roadway improvements are contemplated or underway. These improvements include widening many two-lane roads to urban collectors and arterial streets, as listed in the No-Build Alternate section. Included in these improvements is the installation of a system

of interconnected signals with timing and phasing regulated by a master controller. However, optimizing the traffic flow on the collector system will not solve the problems on the major highway system. By the year 2015, peak hour traffic volumes on I-70 will continue to be double the capacity of the roadway at the Missouri River bridges.

2.2.4 Intelligent Vehicle/Highway Systems (IVHS)

Intelligent Vehicle/Highway Systems (IVHS) is a visionary technology that may play a future role in maximizing roadway capacities across America. At this time, this technology does not seem appropriate in Metropolitan St. Louis, in general, or the Page Avenue Extension, in particular. Without a massive involvement in retrofitting multiple highways, a single demonstration route would be of little use. Although its local implementation is probably decades away, MHTD is evaluating this technology today.

2.2.5 Summary

The TSM improvements can optimize available capacity. However, when incorporated with the No-Build Alternate, the TSM Alternate will not increase sufficient roadway capacity for the forecasted traffic volumes within the Page Avenue Extension project area. The peak hour travel conditions in St. Charles County and regional travel between St. Charles and St. Louis Counties would continue to worsen toward the year 2015.

2.3 MASS TRANSIT ALTERNATE

Metropolitan St. Louis' mass transit service primarily comprises a network of bus routes with varying frequencies of service. The first line of a light rail system will become operational in 1993.

2.3.1 Bus System Capabilities/Service to Area

The current role of public transportation in St. Charles County is minimal. There are only two bus routes from the City of St. Charles to the St. Louis central business district. Ridership numbers are low. The #232X St. Charles Express provides four buses to St. Louis during the morning peak hours period with a total daily ridership of 121 as of December of 1991. A local bus, #32 Wellston-M.L. King, Jr., provides three trips per day into St. Louis but no a.m. peak hour service. Some shuttle service is provided by local communities within St. Charles County.

Both the Bi-State Development Agency, Metropolitan St. Louis' quasi-governmental mass transit provider, and the East-West Gateway Coordinating Council (EWGCC) have studied the feasibility of increasing public transportation in St. Charles County. Funding operational costs is the primary problem. The fare box can provide less than one-quarter of operational costs. Presently, neither St. Charles County nor its municipalities contribute to the operating costs of Bi-State's buses. It should be noted that St. Charles County recently formed a transit district of its own.

If and when the operational costs issue is resolved, public transportation may play a larger role in St. Charles County. As roadways become more congested, and travel times and costs increase, public transportation could provide an attractive option for home-to-work trips. However, bus system operations would not solve traffic problems in the Page Avenue Extension project area.

2.3.2 Light Rail Potential

Metropolitan St. Louis' light rail system, "Metro Link," will begin service in 1993. Construction of an 18-mile light rail link from East St. Louis, Illinois to Lambert-St. Louis International Airport is on schedule. Consideration now is being given to the extension of the Metro Link system to other areas, including St. Charles County.

To that end, EWGCC prepared a document entitled St. Louis Systems Analysis for Major Transit Capital Investments, published in March of 1991 and amended in June of 1991. This study represents the preliminary planning phase of the series of studies which must be undertaken and approved for federal funding. The objective of this study was to identify transportation corridors and modal alternatives within various corridors. General corridors were selected for further study in the Alternatives Analysis.

The St. Charles County, Missouri corridor was defined as Lambert-St. Louis International Airport to the City of St. Peters. In the amended June 1991 report, both the St. Charles County, Missouri and St. Clair County, Illinois corridors were chosen as priorities for the next phase in Alternatives Analysis. These corridors were chosen on the basis of ridership, costs, level of congestion, local support, local revenue and right-of-way availability.

According to the report, it is projected that 2,804 a.m. daily auto trips in the St. Charles corridor could be directed to a Metro Link light rail line by the year 2010. While this is a meaningful figure, it is not large enough to improve the level of service on the road system by 2015. Additional roadway improvements will still be required to handle the projected traffic volumes. Moreover, planning for the possibility of light rail is preliminary and the light rail alignment in this corridor has not been identified. Its funding and implementation is problematic at this time.

However, the St. Charles County Committee on Light Rail is actively pursuing political and financial support for developing light rail in St. Charles County. Specifically, it has requested MHTD to design the Page Avenue Extension to be compatible with light rail. There are also current efforts to establish a transportation tax district in St. Charles County. If it succeeds, funds could be generated and allocated to develop light rail along a Page Avenue Extension corridor.

For most favorable consideration by MHTD, this would have to occur within the next one-to-two years, i.e., during the preparation of preliminary and final design for the Page Avenue Extension. Any design modifications to

accommodate light rail would be most economical the earlier they occur in the design process.

In any case, light rail would add substantial construction costs to the project. In particular, it would be expensive to provide access to and from a light rail alignment. A previous Missouri River bridge study concluded that it would be just as cost effective to provide a separate bridge for light rail, than modify the proposed highway. This would also provide the flexibility to allow light rail to be placed along any transportation corridor that could provide the ridership to support such a system.

2.3.3 Mass Transit Projected Usage

Recent work regarding projected mass transit usage to and from St. Charles County has not been encouraging. Ridership for any Mass Transit Alternate is expected to be low. As previously noted, Metro Link service from St. Charles County would reduce morning auto trips by only 2,804 daily. Such a reduction would be helpful but of only marginal impact relative to overall Missouri River crossing problems.

2.4 BUILD ALTERNATES

In the three preceding sections, the No-Build, TSM and Mass Transit alternates were analyzed. These alternates include all of the roadway and transportation improvements which feasibly could reduce congestion and improve traffic flow within the Page Avenue Extension project area without the construction of an additional Missouri River crossing. However, traffic volume forecasts indicate that regional travel between St. Charles County and St. Louis County will exceed the capacity of the three existing river crossings (Route 115, Route I-70 and Route 40/61). Even with construction of the six-lane Route 115 bridge and two-lane Route 40/61 companion bridge, adequate traffic capacity will not exist to carry 2015 traffic volumes. As a result, a fourth Missouri River crossing, the Page Avenue Extension, is recommended as a solution.

2.4.1 Page Avenue Extension - Red Alignment (Selected Alternate)

The proposed Page Avenue Extension Red Alignment, the Selected Alternate, begins at the intersection of Page Avenue and Bennington Place in St. Louis County. A grade separation for Bennington Place over the Page Avenue Extension and west half of a diamond interchange will need to be constructed. The alignment curves northwesterly within a 250-foot wide corridor, free of development, that St. Louis County reserved for the extension of Page Avenue to just west of Seven Pines Drive. The current plan provides a grade separation with Page Avenue Extension passing below Amiot Drive and Seven Pines Drive. This alignment of Page Avenue Extension would continue west across Creve Coeur Lake Memorial Park (CCLMP) and the southern end of Creve Coeur Lake. A bridge of approximately 2,800 feet is required to span Creve Coeur Lake, Creve Coeur Creek and its associated wooded bottomland. The alignment continues tangent to the bridge where it crosses Creve Coeur Mill Road and the St. Louis Southwestern Railroad. An interchange will be provided for River

Valley Drive west of Creve Coeur Mill Road. The alignment then curves to the northwest and becomes tangent on its approach to the Missouri River.

A grade separation over the Page Avenue Extension is provided for River Valley Road. From River Valley Road, the Page Avenue Extension remains tangent and crosses the Missouri River. The bridge will be approximately 3,550 feet long with ten 12-foot lanes, four 10-foot shoulders and a three-foot wide median barrier.

After entering St. Charles County while crossing the Missouri River, the Red Alignment bridge spans the abandoned Missouri Kansas and Texas Railroad, now developed as the KATY Trail State Park. A diamond interchange is to be provided at Upper Bottom Road. The alignment continues northwesterly paralleling Hemsath Road to Route 94.

At its interchange with Route 94, the Red Alignment will turn south and continue to near Route N. The Page Avenue Extension would be the primary road with ramps provided to and from Route 94.

Heading southwest to the Route N interchange, the existing Route 94 corridor will be used. All existing intersections at Kisker Road, St. Peters Road, old Route 94 and Dingledine Road will be rerouted on one-way outer roadways. The alignment of the eastbound lanes of the Page Avenue Extension passes beneath Route 94 by grade separation. Total access is provided between the Route 94 - Route N - Page Avenue interchange by ramps or by direct lane continuity. Five bridges would be needed to direct the traffic between the various routes. After the Route 94 - Route N - Page Avenue interchange, the alignment curves northwest. The Red Alignment will intersect Motherhead Road. A grade separation is proposed over the new Page Avenue at Motherhead Road where the outer road accesses Gutermuth Road. It will cross Dardenne Creek and head northwest to the Route K interchange. Access will be provided at Route K with a partial cloverleaf interchange. The Red Alignment continues on Route N along the south side to Bates Road.

Route N would become an outer road servicing the north side of the alignment from Bates Road to the Route K interchange. McCluer Road will be serviced by a proposed south outer road. The Red Alignment then starts to curve due west at Bates Road, serviced by the south outer road. The Red Alignment continues to Bryant Road diamond interchange. Hanley Road will be serviced by the north outer road. Henke Road will be grade-separated over Page Avenue Extension. The semi-directional interchange between Route 40 and Page Avenue is proposed about 2,000 feet north of the existing Route N intersection with Route 40/61 (future Route I-64). A connection will be needed west of Route 40 to tie Page Avenue into Route N, where four lanes will converge into two west of the interchange before it joins to the existing Route N. An outer road will be built north of the proposed alignment from the east outer road along Route 40 to Bates Road.

The Red Alignment would be an eight-lane fully limited access highway with a 22-foot wide median from Route D to Route 94, with continuous auxiliary lanes between interchanges. It would be an eight-lane limited access

highway with a 22-foot wide paved median along Route 94 to Route N - Pitman Hill Road. One-way outer roadways would be provided along Page Avenue Extension from its junction with Route 94 to Route N. It would be a four-lane fully limited access highway with a 70-foot wide depressed median from Route N - Pitman Hill Road to Route 40/61. The 70-foot median will accommodate expansion for two additional lanes, in each direction, if necessary in the future.

The three subalternates to the Red Alignment in St. Louis County, the Green-Black, the Yellow-Black, and the Blue, would result in the same traffic impacts inasmuch as there are no additional ingress or egress points along the subalternates. Each is described below.

There is one major non-transportation element incorporated into the Red Alignment alone among all the possible Page Avenue Extension build alternates. Inasmuch as this alternate is the only one that would directly impact CCLMP by requiring conversion of 37 acres of parkland, mitigation is required. An "Enhancement Plan" was developed by St. Louis County and MHTD for this purpose. It was adopted by the Missouri Highway and Transportation Commission on May 3, 1991. Its key features were incorporated into its successor, the Section 601 Mitigation Plan, in October of 1992. It includes:

- Acquisition and donation of 628 acres of new land located north, west and south of the existing CCLMP (including purchase of its now-leased portion) for inclusion in an expanded park.

- Development of a 10-foot wide walking/biking path through a new wetlands corridor to connect CCLMP to the KATY Trail State Park in St. Charles County (about 11 acres total).

- A payment of $250,000 to St. Louis County for facilities improvements in CCLMP.

- Dredging Creve Coeur Lake.

- Modifying the Page Avenue Extension CCLMP bridge design to reduce operational and visual environmental impacts.

In addition, Section 601 of the Pipeline Safety Act of 1992 authorizes the U. S. Secretary of Transportation to waive Section 4(f) requirements for the Red Alignment's traversal of CCLMP provided that the Secretary and the State of Missouri enter into an enforceable agreement to implement a "project mitigation plan." All the key features of the former Enhancement Plan, as noted above, are specified. Additional required mitigation actions include:

- Construction of nature trails in the wooded uplands added to CCLMP.

- Development of a Wetland Wildlife Area that includes lake areas and marshes, trails, observation points and other environmentally compatible features in CCLMP or its expanded portion.

- Construction of a new lake in the expanded portion of CCLMP to help alleviate Creve Coeur Creek's and Creve Coeur Lake's chronic siltation problems.

- Additional design and construction features intended to minimize the environmental impacts of the Red Alignment's CCLMP bridge.

- Such other mitigation measures as the U. S. Secretary of Transportation may determine are appropriate for mitigation purposes.

2.4.1.1 Page Avenue Extension - Green-Black/Red Combination

The Page Avenue Extension Green-Black/Red Combination begins at the intersection of Page Avenue and Bennington Place in St. Louis County. A grade separation for Bennington Place over the Page Avenue Extension and the west half of the diamond interchange would be constructed. The Green-Black Combination proceeds southwest toward Seven Pines Drive, where a grade separation is provided under Seven Pines Drive. The route continues southwest through the Greenfield condominium complex. Beyond the Greenfield complex, it enters a utility corridor on the south side of Greenbough Drive. Continuing along the utility corridor, the taking of the Old Farm Estates swimming pool, a private facility, will be necessary. The roadway then crosses Creve Coeur Mill Road and St. Louis County Waterworks Road. Subsequently, it curves to the north, crossing the west portion of the Little Lake Golf and Sports Center. The Green-Black Combination then continues northwest where it joins the Red Alignment at the common point. An interchange would be provided near the common point at River Valley Drive west of Creve Coeur Mill Road.

2.4.1.2 Page Avenue Extension - Yellow-Black/Red Combination

The Page Avenue Extension Yellow-Black/Red Combination begins at the intersection of Page Avenue and Bennington Place in St. Louis County. A grade separation for Bennington Place over the Page Avenue Extension and the west half of the diamond interchange will be constructed. The roadway then proceeds southwest through the Parkway Estates Subdivision, Willowyck Estates Subdivision and the Seven Pines Subdivision. Grade separation structures will be provided at Willowyck Drive and Seven Pines Drive. The Thornhill Branch of the St. Louis County Library would be taken. The Yellow-Black/Red Combination then enters the utility corridor and continues westerly where it joins the Green-Black Segment east of Bookbinder Drive and, ultimately, the Red Alignment at the common point west of Creve Coeur Mill Road. An interchange would be provided nearby at River Valley Drive west of Creve Coeur Mill Road.

2.4.1.3 Page Avenue Extension - Blue/Red Combination

The Page Avenue Extension Blue/Red Combination begins at the intersection of Page Avenue and Bennington Place in St. Louis County. A grade separation for Bennington Place over the Page Avenue Extension and west half of the diamond interchange will be constructed. The roadway would curve to the northwest, utilizing the 250-foot wide open corridor of the

Red Alignment for a short distance. It will then curve to the west crossing Glenbernie Drive and Seven Pines Drive. Glenbernie Drive will be dead-ended on both sides of the roadway. A grade separation will be provided at Seven Pines Drive. The Blue/Red Combination continues west across Robandee Lane, Mayerling Drive, Windport Lane and Amiot Drive. A grade separation will be provided at Amiot Drive. The roadway continues west across the bluff and enters privately-owned land south of CCLMP. A bridge of approximately 2,100 feet is required to cross the Creve Coeur Creek floodway and its associated wooded bottomland. It then proceeds westerly where it crosses Creve Coeur Mill Road and the St. Louis Southwestern Railroad. It then continues to the northwest, where it connects to the common point. An interchange would be constructed near the common point to provide access to River Valley drive west of Creve Coeur Mill Road.

2.4.1.4 Traffic Volumes

The forecasted average daily traffic (ADT) volumes for the year and 2015 are shown by Figure 2.4, as provided by the Missouri Highway and Transportation Department. Traffic volumes on the Missouri River bridges are illustrated by Table 2.4-1. This data applies to the Red Alignment and the three combinations described above.

TABLE 2.4-1
MISSOURI RIVER CROSSINGS
PAGE AVENUE EXTENSION
RED ALIGNMENT AND COMBINATIONS

ROUTE	1989 ADT	2015 ADT	1989-2015 % CHANGE
Rte 115	18,050	72,400	+301.1
I-70	141,970	188,700	+32.9
Page Ave	-	73,500	N/A
Rte 40/61	41,900	69,700	+66.3
TOTALS	201,920	404,300	+100.2

2.4.1.5 Year 2015

Traffic volumes shown by Figure 2.4 reveal dramatic increases in volumes on all the major routes in St. Charles County as the demographic shift west of the Missouri River continues. ADT volumes at the four Missouri River crossings are projected to increase approximately 100% from 1989 to 2015 with 72,400 vehicles per day on the Route 115 bridge, 188,700 on I-70, 73,500 on Page Avenue, and 69,700 on Route 40/61.

In St. Louis County, I-270 traffic volume between I-70 and Page Avenue are projected to decrease from 136,800 in 1995 to 136,100 vehicles per day and

slightly increase to 153,900 south of Page Avenue in 2015. This volume of 153,900 vehicles per day is approximately the same as in 1989.

2.4.1.6 Road Deficiencies

The deficiencies in the roadway system for the Page Avenue Extension, Red Alignment and combinations, are illustrated by Figure 2.5 for year 2015.

Year 2015

The following roadway segments will operate at the Level of Service F:

I-70 from I-270 to Route K;
Route 40/61 from St. Louis County line to Route 94;
Mid Rivers Drive from I-70 to Mexico Road;
Route K from I-70 to I-70 South Outer Road (Old Highway 40);
Bennington Place between Page Avenue ramps;
Olive Street Road from I-270 to Creve Coeur Mill Road;
I-70 Westbound on and off ramps from Route 94 to Route K;
Route 40/61 Westbound off ramp at Route 94; and
Page Avenue Westbound off ramp at Bennington Place.

The following roadway segments will operate at the Level of Service E:

Route 115 from Missouri River Bridge to I-270; and
I-270 from Page Avenue to Olive Street Road (Route 340).

2.4.1.7 Summary

The Page Avenue Extension Red Alignment, or its combinations, would not solve all the problems along the I-70 corridor. However, such a roadway could greatly reduce transportation problems between St. Charles and St. Louis Counties as well as within St. Charles County. Any such route will transport 73,500 vehicles per day across the Missouri River and operate near capacity (Level of Service D) from I-270 to Route K. It will reduce traffic volumes across the existing and prospective Missouri River bridges.

2.4.2 Page Avenue Extension - Green Alignment

The Page Avenue Extension Green Alignment would begin at the intersection of Page Avenue and Bennington Place in St. Louis County. A grade separation for Bennington Place over the Page Avenue Extension and the west half of the diamond interchange needs to be constructed. The Green Alignment will continue southwest, where a grade separation is provided under Seven Pines Drive. The alignment gradually curves northwest after the Seven Pines overpass to Amiot Drive. A grade separation is proposed over Page Avenue for Amiot Drive. The alignment will remain tangent in the northwest direction where it would cross the leased non-contiguous portion of CCLMP before spanning Creve Coeur Mill Road and the St. Louis Southwestern Railroad on a grade separation approximately one mile south of the River Valley Road and Creve Coeur Mill Road intersection. An interchange would be provided at River Valley Drive west of Creve Coeur

Mill Road. The Green Alignment will curve to the westerly direction after crossing Creve Coeur Mill Road to become tangent with the Missouri River Bridge.

The Green Alignment's Missouri River bridge would be approximately 8,990 feet long with a main channel span of approximately 1,760 feet in length and approach spans approximately 7,230 feet. The roadway will consist of ten 12-foot wide lanes, four 10-foot shoulders, and a three-foot wide median. Remaining tangent with the bridge, it would traverse agricultural floodplain before crossing the KATY Trail State Park, by a grade separation. Another grade separation, to the west, would maintain access to residential properties east of a diamond interchange at Caulks Hill Road. The alignment will continue northwest, with a grade separation over the Page Avenue Extension provided for Dingledine Road.

The roadway would continue to curve to the northwest where it would intersect Route 94 with a directional type interchange. The Page Avenue Extension will remain tangent from the Route 94 interchange to the St. Peters/Cottleville Road interchange. A diamond interchange is planned at St. Peters/Cottleville Road. The alignment remains tangent until just before Mexico Road where it curves north to an interchange at Mexico Road. Within the interchange limits, Mexico Road would have five lanes. North of Mexico Road to I-70, the alignment parallels Salt Lick Road. Salt Lick Road would become a frontage street. An outer road would be constructed west of the proposed alignment.

The Page Avenue Extension Green Alignment ends in the City of St. Peters at the recently modified Route I-70 - Route 79 interchange. An additional bridge and northbound lane would need to be provided over Route I-70.

The Green Alignment would be a ten-lane limited access highway with a 22-foot wide depressed median from Bennington Place to Route 94. It would be a six-lane fully limited access highway with a 46-foot wide median from Route 94 to Mid Rivers Mall Drive. From Mid Rivers Drive to Route I-70, it would be a four-lane fully limited access highway with a 70-foot wide median.

2.4.2.1 Traffic Volumes

The forecasted average daily traffic (ADT) volumes for 2015, shown by Figure 2.6, were obtained from the Missouri Highway and Transportation Department. Traffic volumes on the Missouri River bridges are reported by Table 2.4-2.

TABLE 2.4-2
MISSOURI RIVER CROSSINGS
PAGE AVENUE EXTENSION
GREEN ALIGNMENT

ROUTE	1989 ADT	2015 ADT	1989-2015 % CHANGE
Route 115	18,050	74,300	+311.6
I-70	141,970	188,400	+ 32.7
Page Ave.	----	72,300	N/A
Route 40/61	41,900	68,900	+ 64.4
TOTALS	201,920	403,900	+100.0

2.4.2.2 Year 2015 ADT

Traffic volumes shown by Figure 2.6 reveal the dramatic increases in volumes on all the major roadways in St. Charles County reflecting anticipated continued population growth. Regional traffic demand across the Missouri River bridges are projected to increase by 53% from 1995 levels and will have doubled since 1989. Traffic volumes on I-70 will increase by nearly 66% for the section between Mid Rivers Drive to Lake St. Louis. Route 40/61 will increase by over one hundred percent from 1989 levels and Route 115 will triple in volume. Interstate 270 in St. Louis County will remain at volume levels below existing conditions.

2.4.2.3 Roadway Deficiencies

Deficient roadway sections for the Page Avenue Extension, Green Alignment, are identified in Figure 2.7 for the year 2015. Deficient roadway segments were identified by the methods previously described.

Year 2015

The following roadway segments will operate at the Level of Service F:

I-70 from I-270 to Route K;
Route 40/61 from St. Louis County (Missouri River) to Route K;
Mid Rivers Drive from I-70 to Mexico Road;
Bennington Place between Page Avenue ramps;
Olive Boulevard from I-270 to Creve Coeur Mill Road;
I-70 westbound on and off-ramps at Route 94, Mid Rivers Mall Drive, and Route K;
Route 40/61 westbound on and off-ramps at Route 94; and
Page Avenue westbound off-ramp at Bennington Place.

The following roadway segments will operate at the Level of Service E:

Route 115 from Missouri River Bridge to I-270;
Route 40/61 from Route K to I-70;
Page Avenue Extension from Route 94 to Mid Rivers Mall Drive;

TABLE 2.4-3
MISSOURI RIVER CROSSINGS
GREEN/BLUE-GREEN DASHED/RED/GREEN COMBINATION

ROUTE	1989 ADT	2015 ADT	1989-2015 % CHANGE
Route 115	18,050	73,800	+308.1
I-70	141,970	187,000	+ 31.7
Page Avenue	--	74,500	N/A
Route 40/61	41,900	68,700	+ 64.0
TOTALS	201,920	404,000	+100.1

2.4.5.2 Year 2015

Traffic volumes shown by Figure 2.9 reveal dramatic projected increases in volumes on all the major roadways in St. Charles County and reflect a 31% population increase after the year 1989. Regional travel between St. Charles and St. Louis Counties is projected to double from 1989, with 404,000 vehicles per day crossing the Missouri River. Interstate 70 traffic volumes between Route 40/61 and Mid Rivers Mall Drive will increase by an average of 86% and traffic volumes on Route 40/61, north of Route 94 to Interstate 70, will more than double. Interstate 270 in St. Louis County will remain at volumes less than the existing levels.

2.4.5.3 Roadway Deficiencies

Deficient roadway sections for the Page Avenue Extension, Green/Green-Blue Dashed/Red/Green Combination are illustrated by Figure 2.10 for the year 2015. Deficient roadway segments were identified by the methods previously described.

Year 2015

The following roadway segments will operate at the Level of Service F:

Interstate 70 from Interstate 270 to Route K;
Route 40/61 from St. Louis County line to Route K;
Route 94 from I-70 to Jungs Station Road;
Route 94 from Kisker Road to Woolfrum Road;
Mid Rivers Mall Drive from I-70 to Mexico Road;
Olive Street Road from I-270 to Creve Coeur Mill Road;
Interstate 70 westbound on and off ramps at Route 94, Mid Rivers Mall Drive, Route K;
Route 40/61 westbound on and off ramps at Route 94; and
Page Avenue westbound off ramp at Bennington Place.

The following roadway segments will operate at the Level of Service E:

Route 115 from Route 94 into St. Louis County;

Route 40/61 from Route K north;
Route 94 from Woolfrum Road to Route 40/61;
Route K from Interstate 70 to Interstate 70 South Outer Road; and
Interstate 270 from Page Avenue (Route D) to Olive Street Road (Route 340).

2.4.5.4 Summary

The Page Avenue Extension's Green/Green-Blue Dashed/Red/Green Combination cannot solve all the problems along the I-70 corridor, but would greatly improve the transportation problems within St. Charles County and regional travel flow between St. Charles and St. Louis Counties when compared to the No-Build Alternate. It is anticipated to carry 74,500 vehicles per day across the Missouri River and operate near capacity (Level of Service D) from Bennington Place in St. Louis County to Route 94 in St. Charles County. Traffic volumes across the Missouri River on the Route 115, I-70, and Route 40/61 bridges are expected to decrease when compared to the No-Build Alternate. Bridge volumes would be reduced by 19,300 vehicles per day on Route 115, 43,000 on I-70, and 12,100 on Route 40/61.

2.5 SUMMARY OF BUILD ALTERNATES

The two basic alignments and combinations derived from each are evaluated below.

2.5.1 Deficiencies to Correct

The forecasted year 2015 traffic volumes of 403,900 to 404,300 vehicles per day across the Missouri River will exceed the capacity of the three bridges (Route 115, I-70, and Route 40/61) in operation under the No-Build Alternate. During peak hours, traffic volumes will be nearly double the roadway capacity on I-70 and Route 40/61. Traffic volumes on Route 94 from I-70 to Route 40/61 will greatly exceed the capacity of the signalized intersections. Severe congestion will spread onto all feeder routes of I-70, Route 40/61, Route 94, and Route 115. At times, during peak hour periods, motorists will believe St. Charles County is one large parking lot. The No-Build Alternate, including improvements under the TSM and Mass Transit Alternates, could optimize usage of existing facilities but would create no new capacity. No matter what else might be done, it is apparent that an additional Missouri River bridge will be required between I-70 and Route 40/61 to relieve the forecasted traffic volumes generated by the continued population growth in St. Charles County that will increase regional traffic demand. The proposed extension of Page Avenue with a bridge crossing the Missouri River and extending into St. Charles County would alleviate some of the projected congestion on the existing bridges and feeder routes.

2.5.2 Evaluation of Build Alternates

Eight Page Avenue Extension alignments or combinations have been considered. The Missouri River crossings for each alternative are shown in Table 2.5-1.

TABLE 2.5-1
TRAFFIC VOLUME COMPARISONS (AVERAGE DAILY TRAFFIC)
PAGE AVENUE EXTENSION BUILD ALTERNATES
MISSOURI RIVER CROSSINGS - YEAR 2015

ROUTE	RED, AND RED/ GREEN-BLACK, YELLOW-BLACK, BLUE	GREEN	GREEN/GREEN-BLACK DASHED & GREEN/GREEN DASHED	GREEN/GREEN-BLUE DASHED/ RED/GREEN
Route 115	72,400	74,300	74,300	73,800
I-70	188,700	188,400	188,400	187,000
Page Avenue	73,500	72,300	72,300	74,500
Route 40/61	69,700	68,900	68,900	68,700
Totals	404,300	403,900	403,900	404,000

2.5.3 Red Alignment

The Red Alignment, in conjunction with the other river crossings, would carry the most traffic across the Missouri River and provide the best relief to Route 94 traffic problems. During peak hour periods, it also offers the best relief for Route 40/61 traffic north of Route 94, as well as I-270 between I-70 and Page Avenue. Peak hour traffic will remain basically the same for all alternates at the Route 40/61 bridge. During peak hour periods, I-70 traffic volumes will be the highest of all the alignments. Roadway sections that will remain with insufficient capacity for the peak hour traffic demand are I-70 from I-270 to Route K, Route 40/61 from the Missouri River Bridge to Route 94, and Route 94 from I-70 to Page Avenue.

2.5.4 Green-Black/Red Combination

For the purpose of this report, the traffic operations evaluation is the same as the Red Alignment.

2.5.5 Yellow-Black/Red Combination

For the purpose of this report, the traffic operations evaluation is the same as the Red Alignment.

2.5.6 Blue/Red Combination

For the purpose of this report, the traffic operations evaluation is the same as the Red Alignment.

2.5.7 Green Alignment

The Green Alignment and combinations derived from it, in conjunction with the other river crossings, would rank behind the Red Alignment in volumes of traffic carrying 1,200 to 2,200 vehicles per day less. The Green

Alignment's traffic volumes along Route 94 are the least of all the alignments analyzed. Its peak hour traffic volumes are greater than the roadway capacity on I-70 from I-270 to Route K, Route 40/61 from Route K to the Missouri River bridge, and Route 94 from I-70 to Route 40/61.

2.5.8 Green/Green-Black Combination

For the purpose of this report, the traffic operations evaluation is the same as the Green Alignment.

2.5.9 Green/Green Dashed Combination

For the purpose of this report, the traffic operations evaluation is the same as the Green Alignment.

2.5.10 Green/Green-Blue Dashed/Red/Green Combination

This combination would carry the second highest volume of traffic across the Missouri River of all the Page Avenue Extension Alignments and provides the best relief for I-70 Missouri River Bridge traffic. Peak hour traffic volumes are greater than the roadway capacity on I-70 from I-270 to Route K, Route 40/61 from Route K to the Missouri River Bridge, and Route 94 from I-70 to Route 40/61.

2.5.11 Summary

The variance among the eight Page Avenue Extension alignments or combinations is small. For all intents and purposes, each provides the same level of service. The variance between Page Avenue Missouri River crossings amounts to 2,200 ADT, ranging from 72,300 to 74,500 ADT. This difference results from the varying influences the local road network has on particular alignments. This difference (about 3%) does not alter the total outcome or change the level of service.

2.5.12 East-West Gateway Coordinating Council Plans

The findings of this FEIS are consistent with the conclusions contained in the St. Charles Transportation Study prepared by the East-West Gateway Coordinating Council (EWGCC) in 1987. The St. Charles Transportation Study examined six highway improvement alternates for year 2000 traffic volumes. They were the Minimum Build, Route 115 Extension, and four Page Avenue Extension Build Alternates. The document's conclusions, substantiated by this FEIS, found that for year 2000 and beyond traffic volumes will exceed the practical capacity of the Route 115, I-70 and Route 40/61 Missouri River crossings. Obviously, the No-Build Alternate is inadequate. An additional Missouri River crossing will be needed to relieve the forecasted traffic generated by ongoing development in St. Charles County. Unfortunately, both the Transportation Study prepared by EWGCC and this FEIS conclude that even with the construction of the Page Avenue Extension, travel conditions within St. Charles County and between St. Charles and St. Louis Counties will be no better than those experienced today. Although potential changes in St. Charles County's

employment base could modulate bi-county travel patterns, the need for a new Missouri River crossing will remain.

3.0 AFFECTED ENVIRONMENT

Any bridge and highway project of the magnitude of the Page Avenue Extension inevitably affects a broad spectrum of natural and human circumstances and activities. This chapter describes the environment within the Page Avenue Extension project area in general and, more specifically, within alignment corridors 1,000 feet in width. This provides a useful context for analyzing the impacts associated with construction and operation of such a facility.

3.1 PROJECT AREA LIMITS

The Page Avenue Extension project area is located in western St. Louis County and eastern St. Charles County, Missouri. Generally the area is bounded by Route I-270 on the east, Route 340 (Olive Street Road) on the south, Route 40/61 on the west and Route I-70 on the north. The area includes the "Golden Triangle" area of St. Charles County, an active development area bounded by Route 40/61, Route I-70 and the Missouri River.

The Page Avenue Extension project area comprises an area of 85,017 acres or 132.8 square miles. The St. Louis County portion of the project area includes 15,799 acres or 24.7 square miles (18.6% of total). The St. Charles County portion of the project area covers 69,218 acres or 108.1 square miles (81.4% of total).

3.2 PHYSIOGRAPHIC FEATURES

The topography of the project area is mostly gently sloping uplands with elevations ranging from 450 feet along the Missouri River floodplain to a height of approximately 700 feet above sea level in St. Louis County. Small valleys and rock terraces covered by loess from glaciation comprise the upland areas in both St. Louis and St. Charles Counties.

Major physical characteristics include: the Missouri River, the associated Missouri River floodplain, Creve Coeur Lake, the steep bluff formations on either side of the Missouri River, and Dardenne Creek. The Missouri River flows through the area along a east-north-northeast course. The Missouri River floodplain, which is very flat and regularly experiences inundation, lies along both sides of the river and parallels its course. The bluffs on either side of the Missouri River floodplain have steep slopes, greater than 15 percent. The difference in elevation between the floodplains and the ridges varies from 150 to 250 feet. Dardenne Creek, which has been partially channelized, is the most prominent natural feature inside the St. Charles County portion of the project area. Within St. Louis County's floodplains, Creve Coeur Lake is the dominant natural feature within the project area.

3.3 GEOLOGY, GROUNDWATER AND SOILS

The project area is located in the Dissected Till Plains Sections of the Central Lowland Province of the Interior Plains (Fenneman, 1964). This region is characterized by wide rolling hills separated by steep ravines. The largest single feature in the region is the deep valley of the Missouri River. The average elevation of the river bottom in the highway corridor is approximately 445 feet above mean sea level (msl). Bordering the river bottoms, on both sides, are limestone bluffs that reach an elevation of around 600 feet above msl. The maximum height of the uplands is approximately 670 feet above msl.

The width of the Missouri River bottoms within the project area is approximately 3.2 miles. The proposed build alternates also cross the bottomland of Dardenne Creek, which ranges from 0.4 mile to 1.2 miles wide.

3.3.1 Geology

St. Louis County Corridors

Within the St. Louis County corridors there are three different stratigraphic columns present:

1. Loess (30 to 80 feet thick) over Pennsylvanian Age bedrock - mostly shale.

2. Loess (10 to 50 feet thick) over Mississippian Age limestone bedrock. This limestone (Ste. Genevieve and St. Louis) is susceptible to sinkhole development (Karst topography).

3. One hundred feet or more of alluvial sands, gravels, silts and clays over Mississippian Age bedrock.

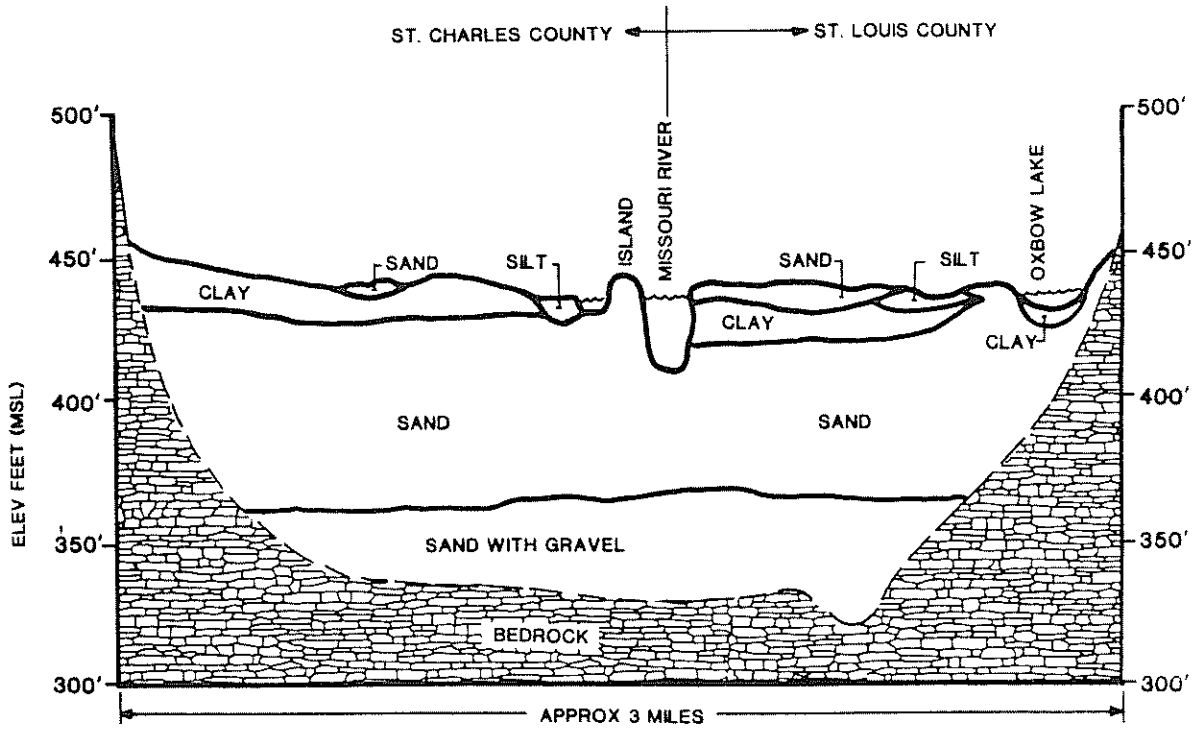
St. Charles County Corridors

The corridor alternates cover a wide area of eastern St. Charles County and cross varied bedrock types. The corridors also cross bottomland filled with deep (64-128 feet thick) alluvium (Figure 3.1). This alluvium comprises of sands, gravels, silts and clays. The bedrock below the alluvium varies from Mississippian Age limestones to Pennsylvanian Age shales.

The upland geology consists of shallow (4-8 feet) to deep (up to 64 feet thick) loess deposits over bedrock. Beneath the mantle of loess are generally two bedrock types: limestone and shale. Near the Missouri River the limestone bedrock (St. Louis Limestone and the Salem Formation) is subject to sinkhole development (Karst topography).

FIGURE 3.1

ALLUVIAL MATERIAL IN THE MISSOURI RIVER VALLEY
GENERALIZED CROSS SECTION



Prepared by TCT-St. Louis - Modified from Missouri Geological Survey, Department of Natural Resources; 1967

Also present are the red shales of the Mississippian Age Lagonda Formation. This formation stretches in a narrow band, that parallels the Missouri River, from the City of St. Charles to Harvester.

3.3.2 Seismicity

The proposed alternates and corridors are within the seismotectonic zone referred to as the Central United States Random Zone. This zone is characterized by horizontal compressive stress and low, random seismicity. The structural features near the project area include the Lincoln anticline, Pittsfield anticline, Dupo anticline, Eureka-House Springs anticline, the Cap Au Gres fault and the St. Genevieve fault zone. The New Madrid fault zone is located approximately 150 miles south of the project area.

The Central U.S. Random Zone has experienced 0.1 earthquakes per 1000 km^2 in the last 100 years. There were two maximum known earthquakes, with a body wave magnitude (m_b) of 5.3 [Modified Mercalli Intensity (I_o) of VII], and 13 known earthquake events that occurred between m_b = 4.5 to 4.9. The maximum credible earthquake (MCE) - the largest earthquake that can reasonably be expected to occur - for this zone is m_b 5.6 (I_o = VIII). The operating basis earthquake (OBE) - the largest earthquake which can be expected during the lifetime of a project - is m_b 5.3 (I_o = VII to VIII).

Structures such as bridges and overpasses should be designed to ensure that an OBE would not cause a failure in operational integrity.

The Universal Building Code (UBC) Seismic Zone numbers range from 0 being the lowest potential for earthquake hazards to 4, which has the greatest potential for earthquake hazards. The City of St. Louis was declared as a Zone 2, but it has adopted, or rather created, a zone number of 1.5. The creation of the UBC Seismic Zone number of 1.5 is allowable, as a city or area can choose to lower or increase the earthquake building standards. In St. Louis, the UBC Seismic Zone of 1.5 does not require by law that any building, structure, bridge, municipal landfills or hazardous waste landfills meet any earthquake building codes; even though design engineers must consider the possibility of an earthquake in structural plans.

Guidance from FHWA indicates that all future projects for the St. Louis area will have to conform to Zone 2 design criteria. The criteria indicate the various lateral and acceleration factors to be used in design calculations and reviews. These factors provide the necessary adjustments to insure the roadway and bridges are designed to meet potential earthquake stresses for a region.

In November of 1968, an earthquake of 5.5 on the Richter Scale occurred in the Wabash Valley Seismic Zone of southeastern Illinois. Fifty-three buildings experienced minor damage in the City of St. Louis. In June of 1987, another quake occurred just thirty miles north of the 1968 earthquake. This earthquake registered 5.0 on the Richter Scale at the epicenter, but no damage was experienced in the St. Louis area.

3.3.3 Karst Areas

Karst topography occurs within the project area (Figure 3.3). This Karst topography is evidence of the formation of solution cavities, caves and sinkholes within the limestone bedrock. The areas of known Karst development in the project area are: 1) directly in line with the Red and Green Alignment corridors from the current terminus of Highway D to the bluff line (St. Louis County) and 2) adjacent to the portion of the Red Alignment from the bluff line to Highway 94 (St. Charles County). There is also the possibility that solution enlargement of the bedrock fractures and bedding plains has occurred in the upland limestone along the Missouri River throughout the project area. No sinkholes exposed at the surface were noted within any of the alternate project corridors during field studies for this project. However, the existence of subsurface solution cavities should be anticipated in the areas described above and particular care should be exercised to minimize interruption of Karst drainage through roadway development.

3.3.4 Groundwater

There are two types of aquifers found in the project area: alluvial and bedrock. The alluvial aquifers are found in the bottomland along the Missouri River. Water producing zones of this aquifer are the thick sand, gravel, and sand/gravel mixes that are the base units of the alluvium. These water producing zones range from 60 to 100 feet thick. Wells in the Missouri River alluvium are reported to produce between 600 and 2,650 gallons per minute (gpm). Within this area, the water table is often within 20 feet of the surface.

The bedrock aquifers comprise many different rock units. These rock units vary from the massive St. Louis Limestone, to the uniform and porous St. Peters Sandstone, to the dense confining layers of the Maquoketa Shale. Wells extending into the deeper formations, which contain thick beds of fractured dolomite, are able to produce moderate to large volumes of water (10 to 500 gpm).

A survey was performed of the public water supply wells located within or near the corridors. There are 30 public water supply wells located in the vicinity of the project area. However, only 22 of them are currently in operation.

There are two wells located within the proposed corridors (Figure 3.4). These are the St. Charles County Public Water Supply District #2 Well No. 4 and the Rolling Meadows Well.

The No. 4 Well is located at the southeast corner of Highway N and McClure Road (along the Red Alignment). This well is 1,500 feet deep with a static water level of 305 feet below ground level. It yields 550 gpm.

The Rolling Meadows Well is in the Rolling Meadows Trailer Park, one mile northwest of the intersection of Highway 40 and Highway N (along the Red

Alignment). It produces 90 gpm but the depth and static water level are not known. The water district has discontinued its use of this well because of the small yield. However, the Missouri Department of Natural Resources uses the well as part of its ongoing study of groundwater quality in the region.

3.3.5 Mineral Resources

There are limited mineral resources in the project area. The only resources exploited within the vicinity of the proposed corridors include: limestone that is quarried out of a large open pit operated by St. Charles Quarry Company (the quarry is located along South River Road between Highway I-70 and Hemsath Road at the bluff line); shale quarried from a pit about one mile east of Harvester; and construction-type sand and gravel dredged from the Missouri River throughout the project area. Some coal resources are also present in the project area. They are not currently extracted. Since the area where they are located is predominantly residential, it is unlikely that such extraction would be carried out in the future.

3.3.6 Aesthetic Earth Resources

The most prominent aesthetically valuable features in the project area include the bluffs that run along each side of the Missouri River floodplains and Creve Coeur Lake in Creve Coeur Lake Memorial Park. The "Falling Spring" at Creve Coeur Lake, the expansive bottomland with its wetlands, forests and patchwork of cultivated fields, as well as the steep-sided valleys cut into the bluff line by small streams that feed into the Missouri River, are also features of aesthetic value.

3.3.7 Soils

The project area contains 24 different soil types. Fifteen of the soil types are bottomland soils, mostly within the floodplain of the Missouri River. Nine of the soils are found upon the upland. The majority (16) of the soils are silt loams. There are also two silty clay loams and two silty clays, two loamy fine sands, one loamy sand, and one clay.

Table 3.3-1 presents a list of some selected physical properties of the soils found within the project corridors. The physical properties presented are percent clay, shrink-swell potential and erosion factor (K).

There are six soil types that are dominant (in occurrence) within the proposed corridors. Three of these are bottomland soils and the remaining three are in the upland. A brief description of these six soils is given below.

Bottomland Soils

The Eudora silt loam is a nearly level, well-drained soil found in elongate areas within the floodplain of the Missouri River. The

permeability of this soil is moderate and surface runoff is slow. The land use of the soil is predominantly agricultural for corn, soybeans and wheat.

Blake silty clay loam is a nearly level, somewhat poorly drained soil found in irregular shaped areas on the Missouri River floodplain. The permeability is low and surface runoff is slow. The majority of the land use is agricultural with corn, soybeans, wheat and truck crops the dominant crops.

Dockery silt loam is a nearly level, somewhat poorly drained soil found in the floodplains of creeks and streams. In the project area, it is the predominant soil in the expansive bottomland associated with Dardenne Creek and its tributaries. The permeability of this soil is moderate and surface runoff is slow. The predominant land use is agricultural, either for row crops or pasture.

Upland Soils

Menfro silt loam is found on the loess-covered terraces, slopes and ridgetops of the upland. The slopes on which this soil rest range from 2 to 30%. These soils are considered well-drained, the permeability is moderate, and the surface runoff from cultivated area ranges from medium to very rapid. The land use of the gentler slopes is agricultural, for row crops and pasture. The steeper slopes are used for woodland.

The Harvester - Urbanland complex is a silt loam or silty clay loam. This soil is found on the loess covered ridges and side slopes of the uplands. The slopes range from 2-14%. In most areas, the upper 20 to 40 inches of this soil have been disturbed or moved by earth-moving equipment. The permeability is moderately slow. Shrinking and swelling is moderate. The land use is predominantly urban. Generally, this soil is covered by streets, parking lots, buildings, and residential lawns and gardens.

Weller silt loam is a moderately well-drained soil found on the ridgetops and upper side slopes of the upland. The permeability is slow and surface runoff is medium. The dominant land use is agricultural comprising row crops, pasture and hay production.

A map of the soils association is included as Figure 3.5. This map shows the relationships of the soils within the project area.

3.3.8 Prime Farmland

Prime farmland is defined by the United States Department of Agriculture (USDA) and its Soil Conservation Service (SCS) as the best land for producing food, feed, forage, fiber and oilseed crops. Prime farmland has the soil quality, growing season and moisture supply needed to economically produce a sustained high yield of crops when it is treated and managed with acceptable farming methods.

TABLE 3.3-1

SELECTED PHYSICAL PROPERTIES AND PRIME FARMLAND CLASSIFICATION OF THE SOILS IN THE PAGE AVENUE EXTENSION STUDY AREA

Soil Name	% Clay	Shrink-Swell Potential	Erosion Factor K	Prime Farmland	Hydrologic Group
Wilbur Silt Loam	10-17	Low	0.37	Yes - with flood protection	C
Blake Silty Clay Loam	10-35	Low to Moderate	0.37	Yes	B
Waldron Silty Clay	35-50	High	0.32	Yes - if drained	D
Sarpy Loamy Fine Sand	2-5	Low	0.15	No	A
Haynie Silt Loam	15-25	Low	0.37	Yes	B
Dockery Silt Loam	15-27	Low	0.37	Yes	C
Eudora Silty Clay	5-18	Low	0.43	Yes	B
Carr Fine Sandy Loam	2-15	Low	0.24	Yes	B
Hodge Loamy Fine Sand	8-15	Low	0.17	No	A
Westerville Silt Loam	12-38	Low	0.37	Yes - if drained	C
Edinburg Silty Clay Loam	25-46	High	0.37	Yes - if drained	C
Auxvasse Silt Loam	8-50	Low to High	0.43	Yes - if drained	D
Kennebec Silt Loam	22-30	Moderate	0.32-0.43	Yes	B
Booker Clay	46-75	Very High	0.28	Yes - if drained and not flooded	D
Haymond Silt Loam	10-18	Low	0.37	Yes	B
Parkville Clay	4-70	Low to High	0.28	Yes - if drained	C

TABLE 3.3-1

SELECTED PHYSICAL PROPERTIES AND PRIME FARMLAND CLASSIFICATION OF THE SOILS IN THE PAGE AVENUE EXTENSION STUDY AREA
(continued)

UPLAND SOILS

Soil Name	% Clay	Shrink-Swell Potential	Erosion Factor K	Prime Farmland	Hydrologic Group
Harvester-Urbanland Complex	18-35	Low to Moderate	0.32	No	B
Menfro Silt Loam	8-35	Low to Moderate	0.37	Yes - with 2-5% slopes	B
Winfield Silt Loam	20-35	Low to Moderate	0.37	No	B
Weller Silt Loam	16-48	Low to High	0.43	Yes - with 0-5% slopes	C
Armster Silt Loam	15-48	Moderate to High	0.37	No	C
Herrick Silt Loam	20-42	Moderate to High	0.32-0.43	Yes - with 2-5% slopes	B
Keswick Silt Loam	22-48	Moderate to High	0.37	No	D
Mexico Silt Loam	15-55	Low to High	0.32-0.43	Yes - with 1-5% slopes, if drained	D
Goss Cherty Silt Loam	7-60	Low to Moderate	0.24	No	B

There are 17 soil types along the path of the proposed corridors that are considered prime farmland by the SCS, USDA (1982). Thirteen of the prime farmlands are located in the bottomland, although some of these have qualifiers for drainage and flooding. Four upland soil types are classified as Prime Farmland if their slopes do not exceed 5%.

Table 3.3-2 is a list of the Prime Farmland soils found in the project area.

TABLE 3.3-2
PRIME FARMLAND SOILS IN CORRIDOR ALIGNMENTS

BOTTOMLAND

Wilbur Silt Loam (with flood protection)
Blake Silty Clay Loam
Waldron Silty Clay (if drained)
Haynie Silt Loam
Dockery Silt Loam
Eudora Silty Clay
Carr Fine Sandy Loam
Westerville Silt Loam (if drained)
Edinburg Silty Clay Loam (if drained)
Auxvasse Silt Loam (if drained)
Booker Clay (if drained and not flooded)
Haymond Silt Loam
Kennebec Silt Loam

UPLAND

Menfro Silt Loam (with 2-5% slopes)
Weller Silt Loam (with 0-5% slopes)
Herrick Silt Loam (with 2-5% slopes)
Mexico Silt Loam (with 1-5% slopes)

3.4 WATER QUALITY

The dominant physical features in the project area are the Missouri River bottomlands and the adjacent rolling hills. Many of the hills are of loessial soils and are deeply dissected by numerous streams. Streams dissecting the hills adjacent to the Missouri River are generally high-gradient streams with steep, eroded banks. They are subject to extreme flow variation, with many being intermittent in flow. Those streams flowing through the bottomlands and the topographically gentler uplands have a more meandering shape, are of lower gradient, and have broad streambeds with heavy bed-loads. These variations in morphometry, flow and associated bed-load movement are the primary characteristics determining the existing water quality of the streams.

The proposed build-alternate corridors transect several main water bodies: Creve Coeur Creek/Creve Coeur Lake, the Missouri River, Duckett Creek, Dardenne Creek and Crooked Creek (tributary to Dardenne Creek). Tributaries to these water bodies are also frequently crossed. Table 3.4-1 presents a list of the water bodies the corridors would transect. These crossings and drainage patterns are shown by Figure 3.2.

As a part of field work for this project, stream conditions at each of the potential major stream crossings were examined and water quality samples were taken. The results of this reconnaissance are reported by the Technical Memorandum Water Quality Technical Report. The analytical results of the samples collected are within acceptable limits when compared to applicable Missouri Water Quality Standards. Subsequent paragraphs summarize the major stream descriptions.

Creve Coeur Creek and Creve Coeur Lake are located in western St. Louis County. Drainage is to the north. The surrounding area is mainly residential, but agricultural, commercial and recreational uses are also prominent.

Creve Coeur Creek flows through the Creve Coeur Lake and empties into the Missouri River. The Missouri Water Quality Standards (MWQS) designates the following uses for Creve Coeur Creek: Livestock and Wildlife Watering (LWW) and Protection of Warm Water Aquatic Life (AQL). An area located south of the lake is classified as a wetland.

Creve Coeur Lake is designated for the following uses: LWW, AQL and Boating and Canoeing (BTG). The lake and creek south of Creve Coeur Lake are designated Metropolitan No Discharge Streams. The Metropolitan Sewer District (MSD) Missouri Bottoms Wastewater Treatment Plant is located along Creve Coeur Creek north of the lake.

The portion of the Missouri River near St. Louis is referred to as the Lower Missouri River. The land use in the area of St. Louis is primarily residential and commercial, but it also includes agricultural (especially in the floodplain), industrial and recreational. All of the proposed corridors cross the river.

The Missouri River supplies drinking water for approximately half of the population of Missouri. Due to the hardness and poor water quality of the Lower Missouri, public water supplies treat the water to acceptable drinking water standards prior to distribution.

TABLE 3.4-1
SURFACE WATERS POTENTIALLY
AFFECTED BY THE PROJECT

RED ALIGNMENT AND BLUE/RED COMBINATION

- Creve Coeur Creek*
- Missouri River
- Unnamed Tributary to Missouri River
- Crooked Creek
- Dardenne Creek
- Unnamed Tributaries to Crooked Creek (2 crossings)
- Unnamed Tributaries to Dardenne Creek (8 crossings)

GREEN ALIGNMENT

- Creve Coeur Creek
- Missouri River
- Unnamed Tributary to Missouri River
- Dardenne Creek
- Unnamed Tributaries to Dardenne Creek (19 crossings)
- Unnamed Tributary to Duckett Creek

GREEN-BLACK/RED AND YELLOW-BLACK/RED COMBINATIONS

- Creve Coeur Creek
- Unnamed Tributary to Creve Coeur Creek
- Missouri River
- Unnamed Tributary to Missouri River
- Crooked Creek
- Dardenne Creek
- Unnamed Tributary to Crooked Creek (2 crossings)
- Unnamed Tributary to Dardenne Creek (8 crossings)

GREEN/GREEN DASHED COMBINATION

(Including Connecting Green Route)
- Creve Coeur Creek
- Missouri River
- Unnamed Tributary to Missouri River
- Dardenne Creek
- Unnamed Tributaries to Dardenne Creek (18 crossings)

GREEN/GREEN-BLUE DASHED/RED/GREEN COMBINATION

(Including Connecting Green Route)
- Creve Coeur Creek
- Missouri River
- Unnamed Tributary to Missouri River
- Duckett Creek (2 crossings)
- Unnamed Tributary to Duckett Creek
- Dardenne Creek
- Unnamed Tributaries to Dardenne Creek (16 crossings)

* Only the Red Alignment would bridge the area just south of and adjacent to Creve Coeur Lake

GREEN-BLACK/GREEN COMBINATION

- Creve Coeur Creek
- Missouri River
- Unnamed Tributary to Missouri River
- Dardenne Creek
- Unnamed Tributaries to Dardenne Creek (19 crossings)
- Unnamed tributary to Duckett Creek

Generally, the Missouri River is muddy, has a strong current, has a shifting sand bottom, and contains rapidly changing water levels. Previously, it was more biologically productive in terms of the growth of aquatic plants and animals. However, channelization for navigation and flood control purposes, among other factors, have caused changes that have reduced its productivity. Algae and rooted aquatic plants are not plentiful and productivity is less than similarly sized river systems such as the Illinois, Mississippi and Ohio Rivers. At times, low dissolved oxygen or the presence of toxic substances may cause problems for aquatic life at isolated locations downstream of municipal, industrial and electric utility discharges.

The Missouri Water Quality Standards designate the Missouri River in the project area for the following uses: LWW, AQL, BTG, Irrigation (IRR), Drinking Water Supply (DWS), and Industrial (IND).

Published water quality data from the Lower Missouri is summarized in the Water Quality Technical Report. Of the data reviewed, the only data exceeding standards is a December 1986 sample for the concentration of arsenic.

Duckett Creek, located in St. Charles County, mainly traverses residential areas. The Duckett Creek Wastewater Treatment Plant is located near the mouth of the creek.

Lower Dardenne Creek is located in St. Charles County. Generally, the creek flows to the northeast. The proposed corridor alternates transect the creek and its tributaries south of I-70. The MWQS designate the first 22 miles (from the mouth) for the following uses: LWW, AQL and BTG. The next 6 miles are designated for LWW and AQL. From the headwaters to I-70, which includes the project area, the creek is designated as a Metropolitan No-Discharge Stream.

The Harvester-Dardenne Wastewater Treatment Plant, located along an unnamed tributary in this area, has ceased operation. Historically, total ammonia and dissolved oxygen concentrations were often in violation of the standards, as wastewater from the treatment plant probably caused a majority of the violations. With the cessation of the treatment plant, conditions have improved.

The area along Crooked Creek is mainly residential and agricultural. Since Crooked Creek is a tributary to Dardenne Creek, the overall water quality is expected to be similar.

3.5 VEGETATION/HABITAT

Vegetation, in terms of land use and habitat, is described in this section for the non-built environment for each alternate corridor.

3.5.1 Methodology

The proposed corridors included in the DEIS were observed in the field between April and June of 1989. Field work for the additional corridors occurred during August of 1991. A modified land use classification system

of cover types was used for mapping purposes (Table 3.5-1). Using aerial strip maps of the proposed alignments, the first survey of the area was done to separate out agricultural and built-up lands. These were recorded on the field maps but, given their disturbed nature, were not systematically checked for plant species. The built-up category includes lands currently containing residential houses, commercial establishments and industrial areas. The land was clearly evident for the majority of the areas within these classifications.

Land falling within the general category of agricultural was subdivided on the basis of the type of use at the time of observation. Land that was in a cultivated crop may become pasture or hayland during that season and vice-versa. Generally, land used as a sod crop was classified as pasture-hayland rather than cultivated even though it is often an annual crop.

Undeveloped upland communities falling within the 1000' corridor were field checked for species present, presence of rare or endangered species or critical habitat, and quality of habitat.

Woodlands

Evaluations for the quality of woodland habitat are based on species composition including the proportion of climax species present, species diversity, and presence of all age classes. Woodland sites considered of good or high quality were composed of primarily climax species with at least a few individual trees over 36" in diameter. The degree of development of a diverse ground strata was also considered in an overall rating.

An estimated land use or habitat acreage for each alignment was calculated using a standard All-Purpose Acreage and Aerial-Photo-Coordinate Grid. The Red and Green Alignments were broken down into segments including St. Louis County, St. Charles County from the Missouri River to Highway 94, and past Highway 94.

3.5.2 Results

Each alignment and combination is described in terms of land use and plant communities present and illustrated by Figure 3.6. Areas which are in cultivation or have been developed are noted as such. Table 3.5-2 reports the acreage. Based upon these acreage estimations, the percentage of each alignment in each type of vegetative cover was calculated. Within each alignment or combination certain quality areas, particularly worthy of note, were identified and are listed in the following subsections. Additional information on wetlands is presented in Section 3.6.

TABLE 3.5-1
UNIFORM LAND USE CLASSIFICATION SYSTEM (COVER TYPES)

I. UPLANDS (Non-wetlands). Areas not periodically flooded with water, soils not hydric or, if so, they have been drained.

A. Agricultural and Built-up Land

1. Orchard
2. Vineyard
3. Cropland
4. Pasture and Hayland
   H. Hayland
   P. Pasture
5. Mining Area
6. Urban and Built-up Land

B. Undeveloped Uplands. Types within this division refer to non-wetlands that are not converted to agriculture or built-up land.

1. Woodland
2. Tree Savanna
3. Shrubland
4. Shrub Savanna
5. Grassland
6. Forbland

II. WETLANDS. Areas periodically flooded with water, soils hydric.

A. Non-vegetated Stream Bed.

B. Emergent Wetland.

1. Persistent
2. Nonpersistent

C. Scrub-Shrub. Woody wetlands less than 6 m in height (20 ft) including shrubs, and young or stunted trees.
1. Bottomland Shrub Savanna
2. Bottomland Shrubland

D. Wooded Wetlands. Wooded wetlands with average tree height greater than 6 m.
1. Bottomland Tree Savanna.
2. Bottomland Woodland.

E. Open Water. Surface area occupied by open water greater than 50% of the year. Vegetation, if present, is submerged.

TABLE 3.5-2
VEGETATION/HABITAT ACREAGE BY ALIGNMENT

Habitat	Red	%	Green-Black/Red	%	Blue/Red	%	Yellow-Black/Red	%
Cultivated	1214.2	(44.0)	1278.5	(45.3)	1223.4	(44.4)	1278.5	(44.4)
Pasture-Hay	344.5	(12.5)	324.3	(11.5)	338.1	(12.3)	324.3	(11.3)
Mining/Extractive	10.0	(*)	10.0	(*)	10.0	(*)	10.0	(*)
Developed	701.6	(25.4)	752.1	(26.7)	720.0	(26.2)	811.3	(28.2)
Upland Woods	271.2	(9.8)	254.0	(9.0)	267.8	(9.7)	254.0	(8.8)
Tree-Shrub Savanna	-		-		-		-	
Grass-Old Field	24.1	(*)	35.6	(1.3)	35.6	(1.3)	35.6	(1.2)
Exposed Shore	-		-		-		-	
Wetlands								
Emergent Wetland	-		-		-		-	
Wetland Woods	122.9	(4.5)	98.2	(3.5)	88.9	(3.2)	98.2	(3.4)
Subtotal-Wetlands	122.9		98.2		88.9		98.2	
Open Water	68.8	(2.4)	68.8	(2.4)	68.8	(2.5)	68.8	(2.4)
Totals	2757.3		2821.5		2752.6		2880.7	

Habitat	Green	%	Green-Black/Green	%	Green/Green Blue Dashed Red/Green	%	Green/Green-Dashed	%
Cultivated	629.8	(33.3)	661.4	(34.8)	734.1	(35.6)	772.1	(40.2)
Pasture-Hay	238.1	(12.6)	213.7	(11.3)	228.1	(11.1)	228.1	(11.9)
Mining/Extractive	-		-		-		-	
Developed	592.6	(31.4)	620.4	(32.7)	688.9	(33.4)	427.9	(22.3)
Upland Woods	189.5	(10.1)	181.9	(9.6)	208.5	(10.1)	220.5	(11.5)
Tree-Shrub Savanna	10.0	(*)	10.0	(*)	10.0	(*)	10.0	(*)
Grass-Old Field	119.1	(6.4)	111.1	(5.9)	103.2	(5.0)	102.2	(5.3)
Exposed Shore	-		-		-		-	
Wetlands								
Emergent Wetland	8.6	(*)	9.6	(*)	2.0	(*)	24.0	(1.3)
Wetland Woods	70.3	(3.8)	58.5	(3.1)	67.8	(3.3)	110.8	(5.8)
Subtotal-Wetlands	78.9		68.1		69.8		134.8	
Open Water	33.0	(1.8)	20.1	(1.7)	20.1	(1.0)	28.7	(1.5)
Totals	1891.0		1899.6		2062.7		1924.3	

(* = less than 1% of total)

3.5.2.1 Red Alignment

Vegetative cover along the Red Alignment corridor may be summarized as follows: Two areas of wetland concentrations are present, both in St. Louis County. One is at Creve Coeur Lake, the other is near the Missouri River. Upland woods are represented by the east bluff of the Missouri River and one area adjacent to Route 94. Other woodland areas are significantly disturbed.

3.5.2.2 Green Alignment

Along the Green Alignment, west of the Harvester Road interchange to the junction of the Green Alignment and the Green Dashed Segment, most of the land use is agricultural. There are several areas of grass dominated old fields. These appear to have been mowed areas in the past that are slowly reverting to a natural vegetation. Of particular interest in this section is an upland woods adjacent to Custellia School which serves as a Missouri Department of Conservation outdoor classroom area. The wooded area has oak-hickory dominance with a wide variety of young plants of different species. It appears to have a well-developed spring herbaceous flora. This woods is one of the larger wooded areas lying within the corridors in St. Charles County. It is associated with an extensive ravine system.

3.5.2.3 Green-Black Segment

From Bennington Place westward, the Green-Black Segment transects suburban residences before entering a utility corridor. Along the bluff above Creve Coeur Creek is a section of oak-maple woodlands. At the base of the bluff is a bottomland woodland dominated by black willows.

3.5.2.4 Yellow-Black Segment

The Yellow-Black Segment extends southwesterly from Bennington Place through a residential area. Most plant species are introduced and comprise native and non-native trees, shrubs and lawns. Where the route turns westerly and follows the unnamed tributary to Creve Coeur Creek, a wooded strip 200-1,000 feet wide follows the streambed. The dominant trees are willows, poplars and maples with a few oak and elm species noted. This mix of grassland and woodland riverine mixture continues onward to where the Yellow-Black Segment joins the Green-Black Segment.

3.5.2.5 Blue Alignment Segment

The Blue Segment proceeds westward from Bennington Place through a residential area. Most plant species are introduced and consist of native and non-native trees, shrubs and lawns. At the bluff above the floodplain is a high quality upland woods dominated by oaks and maples, with a well-developed understory and shrub layer with a wide variety of forbs. Beyond the base of the bluff is a low-lying woods extending west to Creve Coeur Creek. Past Creve Coeur Creek, the segment crosses mowed grass and cultivated lands until reaching the common point.

3.5.2.6 Green Dashed Segment

There is a relatively large, good quality oak-hickory upland woods where the Green Dashed Segment climbs St. Charles County's Missouri River bluffs. The area is classified as a woods because of the extent of trees in the area, even though some residences are scattered throughout.

3.5.2.7 Green-Blue Dashed Segment

A relatively large section of woods near each end of this segment is of good quality with mature oak and hickory dominating. The herbaceous flora of these sections are also well-developed. The majority of the wooded strip along Duckett Creek is narrow. Although narrow, it has good canopy cover and is relatively undisturbed.

3.6 WETLANDS

The overall approach to wetlands identification and assessment was guided by the provisions of Section 404(b)(1) of the Clean Water Act, which specifies a 3-tiered approach for projects potentially affecting wetlands. The approach requires that the following be included in project planning and that they be prioritized in the order given:

1. Avoidance. This requires identification of wetland areas early on in the project and attempts to route the project "away from" wetlands. For this project, wetlands surveys commenced at the inception of the EIS process were used in the development of project alignments.

2. Minimization. This requires that, where it is not feasible to completely avoid wetland encounters, routing and/or design be adjusted to minimize such encounters. For this project, several adjustments were made in project alignment to effect such minimization.

3. Mitigation. This requires that, where wetland impacts cannot be totally avoided, compensation be provided such that no net loss of wetland habitat results. For this project, it was not feasible to avoid all wetland impacts and mitigation is proposed as specified in subsequent sections of this EIS.

At the time of the vegetation community survey of the project area, project alignments were designated at the 1,000' corridor level only. Initial identification of wetlands (as presented in Section 3.5) was carried out for these corridors at a screening level to develop a comparison of wetland impacts of the alternatives. In addition to the field surveys described in Section 3.5, the "screening level wetland delineations" were based on: U. S. Fish and Wildlife Service National Wetlands Inventory Maps, USGS topographic maps, historic (1984, 1986 and 1988) aerial photography obtained by the USDA Soil Conservation Service (SCS), and SCS soil mapping and lists of hydric soils for the counties involved. For the areas suspected to be wetlands based on this information, "Routine Wetland Delineation Forms" from the 1987 Corps of

Engineers Wetland Delineation Manual were completed on the basis of this information in order to make wetland determinations.

During the initial field work, agricultural lands were not considered as potential wetlands. However, during additional studies carried out in 1991, agricultural lands were included for all alignment corridors. Wetland areas of these agricultural lands were separated, on the basis of SCS mapping, into "Farmed Wetlands" and "Prior Converted Wetlands." "Farmed Wetlands" are eligible for classification as "Jurisdictional Wetlands." "Prior Converted" lands are not if the U. S. Army Corps of Engineers is in agreement with the determination made by the SCS.

These initial wetlands surveys were carried out for screening purposes and they do not constitute delineations of "jurisdictional wetlands." A jurisdictional wetlands survey of the Red Alignment was performed in November of 1992 and is described in Section 4.12.2.

The screening study indicates that wetland acreage within the 1,000' corridor ranges from 78.9 under the Green Alternate to 134.0 under the Green/Green-Dashed Alternate.

Descriptions of wetland resources, by corridor, based on these "screening studies" are presented in the following subsections.

3.6.1 Red Alignment Corridor

The Red Alignment corridor traverses several potential wetland areas (Figure 3.6.1). Of these, the several habitats associated with Creve Coeur Lake, the farmed wetlands west of Creve Coeur Mill Road, and the east bank of the Missouri River crossing are of greatest concern. At the base of the bluff at Creve Coeur Lake, there are four separate wetland or potential wetland habitats. The herbaceous emergent aquatic plant zone, dominated primarily by cattails, but including other herbaceous species, is a wetland according to the Manual. The flora is dominated by OBL and FAWC plant species. Much of the substrate was saturated even during the dry summer during which it was examined, with the remaining portions showing evidence of frequent flooding or saturation, i.e. high, poorly decomposed organic matter content and surface accumulation of organic debris. The hydrology of this community appears to be frequent-flooded based on the amount, type and pattern of debris carried in by surface water. The open water habitat, a small embayment of Creve Coeur Lake, has a submerged aquatic plant population and relatively shallow water. The wooded wetland, dominated by willows between the embayment and Creve Coeur Creek, also has a saturated substrate in part, evidence of organic build-up, and water-transported debris.

On the western bank of Creve Coeur Creek, a large, highly-disturbed, bottomland woods area occurs. Although much of this wooded area is dominated by wetland species, the hydrology does not show the degree of frequency of flooding as the previously described habitats. Also, the soils do not show as many characteristics of hydric soils, although the two soils of the area, Blake Silty Clay and Eudora Silt Loam are classified as hydric.

The depression containing emergent wetland approximately 1,600 feet west of Creve Coeur Mill Road is a narrow strip of low lying land within the farmed wetland area. It has wetland vegetation. The soil of the depression is Booker Clay, a hydric soil. It must also be considered that much of the cultivated ground to the west of this depression is frequently flooded well into spring and early summer as attested to by aerial photography. Loss or degradation of this habitat would adversely impact wildlife during wet periods in the fall and spring.

From just northwest of the levee where the Red Alignment crosses the Missouri, there is a typical floodplain forest community. The wooded area encompasses part of the mainland proper as well as Jane Downing Island. Portions of this habitat are lower in elevation than others. These low areas have saturated soils much of the year. Since there is no levee protection, the area must be considered to have relatively frequent flooding. Within this zone is a slough with a closure dam. The banks of the slough were observed to have a developing herbaceous flora due to the drought conditions during summers of 1988 and 1989. Normally, such areas would be primarily bare or nearly barren with exposed mud banks. Below the closure dam is a sandbar that in most years would be void of vegetation.

The Red Alignment also passes over a probable wetland in agricultural use that lies on the river side of the levee. The area is covered with old field type vegetation, mostly grasses. However, it has probably been cultivated recently since no woody invader species were observed.

On the river side of the island are exposed sandbars formed by deposition behind wing dams. These are non-vegetated but are part of the wetland habitat. The soils on the river side of the levee and on Jane Downing Island are Sarpy Loamy Fine Sand and a Blake-Eudora-Waldron complex, which are hydric soils when frequently flooded.

Within the western portion of the alignment is one other potential wetland habitat. Where the Red Alignment now crosses Dardenne Creek, there is a narrow maple-poplar wooded strip with Dockery soil which is probably only occasionally flooded and then for a short period of time.

There are also a number of ponds located within the alignment. These are not natural bodies of water and do not have an extensive wetland flora associated with them.

3.6.2 Green-Black Segment Corridor

The Green-Black Segment descends the bluff by running along the path of an unnamed tributary to Creve Coeur Creek. This creek is entrenched because of the increased gradient near the bluff, and has little or no floodplain. The wooded border along the creek consists of upland forest. Where the right-of-way joins the creek bank, occasional colonies of cattails (Typha sp.) and Smartweed (Polygonim sp.) are found. As the Green-Black Segment reaches the Missouri River floodplain, it crosses Creve Coeur Creek and a former creek meander. Remnant bottomland forest borders Creve Coeur Creek and the former meander. The soils in this area are Wilbur Silt Loam,

Eudora Silt Loam, Booker Clay and Blake Silty Clay Loam. The floor of the wooded zones are probably only saturated following heavy rains.

The Green-Black Segment turns northwestward and crosses a wetland in agricultural use that is approximately 1,600 feet west of Creve Coeur Mill Road. This area is described in Section 3.6.1.

3.6.3 Yellow-Black Segment Corridor

The Yellow-Black Segment crosses principally developed land and does not cross any wetlands. Near the center of this segment, it crosses an unnamed tributary of Creve Coeur Creek. This section of the right-of-way is classified on National Wetlands Inventory Maps as "palustrine forest," with a note that the classification was not field-checked. Field work carried out for this project clearly indicated that this area is upland forest and it is classified as such herein. The FWS has been notified of this change so that they can refine their classification.

3.6.4 Blue Segment Corridor

The Blue Segment crosses the bottomland woods that extend along Creve Coeur Creek south of Creve Coeur Lake. This woods is described in Section 3.6.1.

3.6.5 Green Alignment Corridor

A bottomland woods extends from the base of the eastern bluff to Creve Coeur Creek and a fringe beyond and to just downstream of where the Green Alignment crosses Creve Coeur Creek. Black willows with an herbaceous layer of nettles dominate this community. The soils (Wilbur Silt Loam) had considerable portions still saturated well into June at the time of the investigation. It appears to flood frequently during heavy rains and then subsequently remains saturated for some time.

West of Creve Coeur Mill Road, the Green Alignment crosses a large expanse of farmed wetland and/or prior converted wetland. This includes a small portion of the emergent wetland described for the Red Alignment. The farmed wetlands are generally flooded during the non-growing season and often flooded during the early part of the growing season. This area was determined using USDA Agriculture Service overflight photos for the years 1984, 1986, 1987, and 1988, as well as communication with Missouri Department of Conservation representatives. The extent of flooding in this area during winter-early summer varies annually but must be considered a major wetland waterfowl use area for the majority of years.

The levee west of River Valley Road separates a small amount of farmed wetland and wooded wetland from the rest of the floodplain. Within this section is a narrow T-shaped grove of maple-poplar trees. Floristically, this narrow area is wooded wetland. The soil is hydric, Blake-Eudora-Waldron complex. Given the lack of levee protection the hydrology is that of a wetland. In the same area, adjacent to the Missouri River, there is a long section of maple-poplar woods, a continuation of the riverine woods on the Red Alignment. Soils and hydrology agree that this is a wetland woods. The quality of this section of woods, however, is not as good as

that along the Red Alignment. This is shown by species diversity and tree size. A narrow sandbar complex is associated with wing dams that are also present in this location.

On the west bank of the Missouri River in St. Charles County is a small crescent-shaped area apparently formed by the remains of an old levee and a newer levee behind it. Floristically, this area is a marginal wetland. During field checking in late May 1989, "agricultural weeds," some of which may be wetland plants, were predominant. The area holds some pooled water for several days at a time and would be subject to flooding.

The broad river floodplain along this alignment contains one narrow drainage ditch which has a maple-poplar woods associated with it. The woods is at approximately the same elevation as the cultivated fields surrounding it. The soil can be considered hydric, Blake (mesic Aquic Hapludolls) and Haynie-Blake complex (mesic Mollic Udifluvents and Aquic Hapludolls). Except in wet years, the hydrology may not be adequate to meet the wetland requirement. There are also several small groves associated with depressions in the floodplain. These may meet the hydrology requirements and may be subject to pooled water for several weeks or longer at a time. One grove has a small pond associated with it.

Several pools are located near and at the point that the alignment crosses Greens Bottom Road and leaves the floodplains. The extent of the flooded area varies with time, gradually decreasing after precipitation. However, some water may remain for several months at a time, if not permanently. Floristically, as the pools dry up, a mixed flora and agricultural weed community develops. Those areas which dry more rapidly have a higher percentage of weeds. The surrounding area is in cultivated crops. Even areas that may not dry up until mid-June or later show evidence of previous cultivation. The extent of undisturbed hydric soil is not known at this time. If left undisturbed, much of this locale would quickly revert to a wetland flora.

A small rectangular field, just west of Highway 94 and adjacent to a school recreation field, shows the prerequisite wetland flora, willows and sedges communities, probable sporadic flooding and saturated soil. The area is associated with a small intermittent stream and is adjacent to an artificial pond. The overall area is less than one acre.

The Green Alignment's crossing of Dardenne Creek encompasses a triangular maple-poplar woods and the fringe of trees on the other side of the creek. The soil is considered hydric, Dockery and Westerville (mesic Aquic Udifluvents and Aeric Fluvaquents). The hydrology is not known. This area may experience infrequent overflows from Dardenne Creek but could become saturated following heavy rains.

3.6.6 Green Dashed Segment Corridor

The series of impoundments along Greens Bottom Road previously described for the Green Alignment also occur at the beginning of the Green Dashed Segment. Additionakkt, there are two other wet communities along this strip. One is a maple-hackberry-poplar woods associated with a ravine/intermittent stream coming off the bluff on the other side of the

road. The woods have, in addition to the wetland indicator flora, a soil which remains saturated for several weeks following heavy rains. At least minimally, all three criteria of the jurisdictional wetland are met. A narrow strip running between part of this woods and Greens Bottom Road is a canary grass dominated community. Although it shares essentially the same hydrology as the woods, it appears to have been cultivated in the past.

The soil of this area is classified Booker (mesic Vertic Maplaquolls) and Haynie (mesic Mollic Udifluvents), both classed as hydric soils.

3.6.7 Green-Blue Dashed Segment Corridor

Although this alignment includes a considerable portion of Duckett Creek, the communities associated with the creek, with one exception, are not considered wetlands. Only the lowest portions of the steep creek banks support predominately wet species. One exception is a narrow field in the upper reaches of the stream. The flora is primarily dominated by sedges, bulrushes and rushes with a scattering of willow and poplar saplings. A cattail stand occupies one end and a canary grass stand is located at the other end. The creek side of the field has a built-up ridge along it, that prevents good drainage following rains. The area has ponded water, as evidenced by dried algal crusts in places as well as the vascular flora. This is probably an adequate indication of an impeded hydrology that meets the wetland requirement. Although the soil is not considered a hydric soil, the impeded drainage of such a small area may not be either large enough to be on the soils map or recent enough to lack soil modification adequate for a change in classification.

Additional information on wetlands is presented in Section 4.12.2.

3.7 BIRDS, MAMMALS AND HERPTILES

During preparation of the DEIS, transects were inventoried for birds, mammals and herptiles along the Red and Green Alignments and the Green Dashed and Blue-Green Segments. In preparation of the FEIS, no new transects were inventoried for the Green-Black, Yellow-Black or Blue Segments due to the intense development along them and the identical habitat between the original Red and Green Alignments that are less than 6,000 feet apart in St. Louis County. The Yellow-Black/Red and Blue/Red Combinations each share more than 17 miles with the Red Alignment. For present purposes, Red Alignment data applies to these corridors. The Green-Black/Red and Green-Black/Green Combinations, for present purposes, correspond to the Red and Green Alignments, respectively.

3.7.1 Methods

Bird Inventory

Relative abundance of avian fauna (bird species) was determined at two seasons of the year within each of the major habitat types identified in the vegetation analysis (Section 3.5). Determination was made by censusing along sixty-two 1,000-foot transects and sighting individual species, hearing vocal calls or activity sounds, and noting signs of

activity (nests, castings, tracks, feathers). Sampling periods were late spring and late summer 1989.

Mammal Inventory

Relative abundance and presence of mammal species was determined by two sample sessions over two seasons, late spring and late summer 1989. These determinations were made by using signs and visual sightings.

Amphibian and Reptile (Herptile) Inventory

A general background for the herptile species of the study area was provided by consulting the national field guides (Conant, 1975; Behler and King, 1979), and more particularly, the Missouri state herpetological distribution studies by Wiley (1968) and Anderson (1965) for Missouri, and by Smith (1961) for Illinois. Other studies that have been conducted along the Mississippi River Valley, such as the GREAT III study area report and the WIU 1981 study at the east end of the present FAP 408 highway study in Illinois (Thurow, 1981) were referenced.

The primary field methods for herptiles, as well as all other vertebrate species, consisted of two sampling sessions involving general field reconnaissance and observations. Surface active and arboreal herptiles were listened to and/or observed during late spring, early summer, and late summer 1989. Secretive forms were searched for by turning rocks and logs in appropriate habitat. Herptiles seen during studies of other classes of vertebrate fauna were also recorded and included in data analysis. Aquatic forms were sought by watching shorelines and open water. No capture devices or methods were used. The presence of any frog calls were recorded as were animals observed, or killed, on roads. Shed snake skins were noted as well.

3.7.2 Field Results

Census (Sampling) Data

Censuses for all three groups of vertebrates (birds, mammals and herptiles) were conducted simultaneously on the same dates. The first sample session was in late spring/early summer on 7, 8, 9, 16 June and 11 and 12 July, 1989. The second session was in late summer on 24, 25, 27 July, 1989. Sampling was conducted from dawn to dusk during the diurnal and crepuscular portions of a day. Sixty-two sites along the Red and Green Alignments and Green Dashed and Green-Blue Segments in various habitat types were sampled. Eleven different habitat types were identified along the alignments.

The number of censuses taken in each habitat (cover) type varied. Habitat types were not distributed evenly nor present in equal amounts along the corridors. Therefore, the types could not be sampled equally. However, sampling efforts roughly paralleled the abundance and diversity of habitat types identified. When possible, data was treated so as to provide opportunities for comparison among corridors and relative vertebrate abundance and distribution. (Tables 3.7-1, 3.7-2, 3.7-3, 3.7-4 and 3.7-5).

3.7.2.1 Bird Census Results

Seventy-one species of birds were documented in the project area during the sampling sessions. The list includes only those birds documented during the censuses. As such, it is very likely an underestimate of the maximum number of bird species using some project area habitat for breeding, wintering or migration sometime during the year. Additional species were observed during a related study (November 1988 through March 1989) or reported from bird lists by field biologists and bird watchers from the area. No Federal or State threatened or endangered species of birds were noted breeding in the project area. However, the threatened or endangered species that were of concern for St. Louis and St. Charles Counties are listed in the biological studies technical memorandum. It should be stated that two adult bald eagles were sighted flying through the project area during field observations for the Page Avenue Extension Wintering Bald Eagle Study (Dunstan, 1989).

Of special interest is the historic record of avifauna activity in the area identified as the Creve Coeur Bottoms and Upper Creve Coeur Lake. In prior years, for example as recently as 1988, large numbers of wetland and open water avian species such as ducks and geese occupied the region of Upper Creve Coeur Lake, especially during migration. A total of 214 bird species have been recorded within the bottoms from 1974 to 1989, a large portion of the total being wetland species. Only a remnant of the original wetland acreage remains at the present time. No remarkable numbers or exceptional species of wetland birds were documented in the remnant Upper Creve Coeur Lake area during this study.

The number of species and individuals documented in different habitat types varied. The greatest number of bird species (52) occurred in the Upland Woodland Habitat. Lesser numbers of species occurred in Cropland (36), Pasture/Hayland type (26), Pasture/Grassland type (26), Grassland (24), and Urban/Human Developed (5). The number of species documented for all wetland related habitat classifications totaled 55. For all non-wetland classifications it totaled 60 species. Bird species from wooded wetland habitats totaled 52 species, and from nonvegetated stream beds and emergent wetland habitats totaled 21 species.

TABLE 3.7-1
INDEX VALUES FOR NUMBER OF SPECIES PER SAMPLE PER ALIGNMENT FOR SAMPLING SESSIONS I AND II

	Number of Species/Number of Samples		
Alignment/Segment	Bird	Mammal	Herptiles
Red [67]*	0.850 (57)	0.41 (14)	0.18 (6)
Green [26]*	1.77 (46)	0.62 (8)	0.23 (3)
Green-Dashed [16]*	2.56 (41)	1.00 (8)	0.25 (2)
Green-Blue Dashed [6]*	4.17 (25)	1.67 (5)	0.00 (0)

[]* Number of samples for each alignment.
() Total number of species in samples.

TABLE 3.7-2
INDEX VALUES FOR NUMBER OF INDIVIDUALS PER SAMPLE PER ALIGNMENT FOR SAMPLING SESSIONS I AND II

	Number of Species/Number of Samples		
Alignment/Segment	Bird	Mammal	Herptiles
Red [67]*	20.55 (1,377)	2.30 (154)	0.93 (62)
Green [26]*	15.65 (407)	1.54 (40)	0.23 (6)
Green-Dashed [16]*	15.81 (253)	1.69 (27)	0.38 (6)
Green-Blue Dashed [6]*	18.83 (116)	3.67 (22)	0.00 (6)

[]* Number of samples for the alignment.
() Total number of individuals in samples.

TABLE 3.7-3
VERTEBRATE SAMPLING RESULTS
ACCORDING TO HABITAT TYPES

Birds

Habitat Type	No. of Transects Counted	Total No. Species	No. Species Per Sample	Total No. Individ.	No. Ind. Sample
Cropland	50	36	0.72	488	9.8
Pasture & Hay	8	26	3.25	370	46.3 (flocks)
Developed	2	5	2.50	12	6.0
Upland Woods	24	52	2.20	483	20.1
Grassland (Old Field)	4	24	6.00	91	22.8
Stream Bed	4	12	3.00	73	18.3
Wooded Wetland	28	52	1.86	637	22.8
Open Water	4	16	4.00	58	14.5

TABLE 3.7-4
VERTEBRATE SAMPLING RESULTS
ACCORDING TO HABITAT TYPES

Mammals

Habitat Type	No. of Transects Counted	Total No. Species	No. Species Per Sample	Total No. Individ.	No. Ind. Sample
Cropland	50	8	0.16	64	1.28
Pasture & Hay	8	5	0.63	16	2.0
Developed	2	0	0.00	0	0.0
Upland Woods	24	9	0.38	65	2.7
Grassland (Old Field)	4	6	1.50	4	1.0
Stream Bed	4	2	0.50	6	1.5
Wooded Wetland	28	10	0.38	92	3.3
Open Water	4	6	1.50	16	4.0

TABLE 3.7-5
VERTEBRATE SAMPLING RESULTS
ACCORDING TO HABITAT TYPES

			Herptiles		
Habitat Type	No. of Transects Counted	Total No. Species	No. Species Per Sample	Total No. Individ.	No. Ind. Sample
Cropland	50	1	0.02	4	0.08
Pasture & Hay	8	1	0.13	4	0.5
Developed	2	0	0.00	0	0.0
Upland Woods	24	3	0.13	12	0.5
Grassland (Old Field)	4	0	0.00	0	0.0
Stream Bed	4	1	0.25	2	0.5
Wooded Wetland	28	1	0.04	11	0.4
Open Water	4	5	1.30	44	11.0

3.7.2.2 Mammal Census Results

A total of 16 species of mammals were documented from all habitats and censuses. The list includes only those mammals documented during the censuses and is very likely an underestimate of the maximum number of mammal species using the project area over a typical year. The presence of specific small mammal species is difficult to document in a reconnaissance level only project. However, no rare, threatened or endangered State or Federal terrestrial small mammal species are listed for St. Louis and St. Charles Counties. The status of two small terrestrial mammals, the southeastern shrew (Sorex longirostris) and the Meadow Jumping Mouse (Zapus hudsonius) are of interest as species with "status incompletely known" for Missouri and have potential to exist in the portion of Missouri being studied (Missouri Conservation Commission, 1984). However, no Endangered Species status is affiliated with either of these species.

The numbers of mammal species found in wetland and non-wetland cover types (habitats) were similar, 12 and 13, respectively. Nine species were found in both habitats. Seven were found in only one type. The number of species found in Wooded Wetland and Nonvegetated or Emergent Wetland habitats were nine and six. Thirteen species were documented from non-wetland habitats, with all thirteen species found in Woodland Habitat, eight in Cropland, six in Pasture/Grassland, and Pasture/Hayland, and five in Grassland.

Although small mammals were not trapped in this study, data from a comparable study allows the opportunity for speculation. Twenty-seven mammal species were trapped and/or documented in similar habitat types in west-central Illinois about 75 miles north of the project area. Eleven small mammal species were documented by trapping, all of which could possibly be in the present study area. Small mammal species were found in each habitat type classified grassland, pasture/grassland, and woodland

types had eight to nine species of small mammals each; thereby indicating the importance of these types of habitats. It is likely that similar findings would occur in the project area if trapping had been included as a sampling method.

No capture or sound detection methods were used to document flying mammals (bats). However, observations for activity were made during the diurnal and crepuscular periods of sample days. Bats were noted in the project area, primarily in and near wooded habitat types. No species data was gathered. No records of breeding activity of any rare or endangered bats listed by the Missouri Conservation Commission (1984) were found for St. Louis or St. Charles Counties. Three species, the Small-footed bat (Myotis leibii), the Indiana bat (Myotis sodalis), and the Gray bat (Myotis grisescens) are listed as possibly being present in the general area some time during the year. The Indiana bat and the Gray bat are both of national importance and considered "endangered" (Missouri Cons. Commission, 1984). No caves for use as overwintering or nursery habitat were found in the project area and none were reported by state or federal agency personnel. No trees used as nursery areas were found in either the upland or wetland woods nor were any bats detected hiding in any trees during the day. However, one area with potential for bat occupancy is the Duckett Creek woods along the Green-Blue Dashed Segment. This riparian forest presents a substantial "edge" condition and a variety of adjacent open habitat types.

3.7.2.3 Amphibian and Reptile (Herptile) Census Results

A total of ten species of herptiles were documented for all habitats censused. The list includes only those herptiles documented during the official censuses and is likely to underestimate the actual number and diversity of herptiles present in the project area some time during an entire year. The 1989 field research season followed 1988's year of severe drought in the project area. This may have influenced the finding by depressed populations of herptiles, especially breeding amphibians. No rare, threatened or endangered herptiles were documented in the field.

All of the herptile species were found in wet areas, except the Eastern Box Turtle, regardless of habitat type classification for the sample location. The wet areas were small ponds, rivers, creeks, ditches and water-covered wetlands. The four-toed Salamander (Hemidactylium scutatum), and the Wood Frog (Rana sylvatica) are two rare herptile species that occupy moist woods and may be negatively impacted by the loss of habitat. However, no specimens of these species were found. Three other herptile species listed by the Missouri Department of Conservation as rare or endangered for St. Charles County are the Western Smooth Green Snake (Opheodrys vernalis blanchardi), Western Fox Snake (Elaphe vulpina vulpina) and the Eastern Massauga (Sistrurus catenatus catenatus), the first two typically found in a prairie habitat, and the latter one in marsh habitat. No specimens or signs of any of these three species were found.

3.7.3 Habitat Types and Species and Numbers Diversities

The incidence of vertebrate species and population of individuals varied with habitat type. Eight of the 11 types of habitat were sampled with 1,000-foot transects. The number of transects in each habitat type related to the amount and dispersion of each habitat within the four corridors and were unequal. As noted previously, the number of species in an area is habitat specific. The number of individuals present is closely related to the number of samples (transects) in an area.

Bird species diversity is best represented by the number of birds recorded for a specific habitat type and is presented in Table 3.7-3 as "the maximum number of species" from the combined samples, sessions I and II. Wooded habitat, both upland and wetland types, ranked high in importance. Cropland ranked second, and grassland and pastureland had very similar species diversity. The others ranked relatively lower in species diversity.

The number of birds per habitat type is best represented by dividing the total number of birds recorded by the number of samples (transects) per habitat type. Ranking by number of individuals is similar for the wooded areas (upland and wetland) and grassland (old field), and markedly high for pasture/hayland (Table 3.7-3). However, the numbers of birds recorded during session II in the pasture/hayland included large flocks of blackbirds flying over and around the open fields which biased the data upward.

The number of mammal species per habitat is similar in ranking to that of birds with wooded areas (upland and wetland) being of greater importance and cropland ranking third (Table 3.7-4). Although small mammals were not trapped in this study, a west-central Illinois study (Dunstan, et al., 1985) indicated the importance of woodland to ten species of small mammals (shrews, mice, voles, and a lemming). The number of species in grassland ranked with woodland (9) at the top of the preferred habitats and pasture/grassland third (Dunstan, et al., 1985).

The number of individual mammals per habitat type also indicates the importance of woodland (upland and wetland). However, open water (actually the ecotone on the edge of open water) ranked of greatest importance, primarily because of the easily recognized "signs" indicating the past presence of mammals. Lesser numbers of small mammals were found in pasture/ hayland which ranked fourth as a habitat type for mammals.

The number of herptile species per habitat type indicated the importance of open water habitat and related "edge" (Table 3.7-5). It was also easier to see herptile species in the open and this may bias the data upward. Upland woods ranked second in importance. Relatively few species of herptiles were documented in the project area because of the difficulty of seeing or finding herptile species in very dense undergrowth habitats. Also, major breeding congresses of amphibians occurred prior to the initial field work.

The largest documented numbers of herptiles occurred in open water habitat where large numbers of turtles swam and sunbathed along river banks and

lake shores. Upland woods, exposed streambeds, and pasture/hayland tied for third as important habitat.

In summary, woodland (both upland and wetland) is important habitat for birds and mammals, and open water areas are important to herptiles.

3.8 LAND USE

The East-West Gateway Coordinating Council (EWGCC) is one of the primary sources of land use data for the St. Louis Region. It regularly estimates existing land use by acres for its transportation zones and prepares land use projections at five-year intervals derived from these estimates. For the FEIS, EWGCC transportation zone land use estimates and projections were used for the entire project area as well as the St. Louis County and St. Charles County portions.

The eight land use classifications utilized are defined as follows:

(1) Residential (RES). All dwelling units including single-family homes, multiple-family structures, rooming and boarding houses, mobile homes, hotels used as permanent residences, etc., whether concentrated or dispersed, including immediate grounds.

(2) Commercial (COM). All commercial and related activities, including wholesale and retail trade, plus such service trades as finance, repair and construction as well as professional offices and commercial recreation such as bowling alleys, theatres, amusement parks, miniature golf courses, race tracks, skating rinks, etc.

(3) Industrial (IND). Light and heavy manufacturing activities and associated uses such as offices and warehouses, power generation plants, water and sewer treatment facilities, communication facilities (telephone, television, radio, relay stations, etc.).

(4) Public (PUB). All activities serving large segments of the population, whether developed and provided by public or private interests. It includes governmental offices and service structures, military installations, cemeteries, museums, libraries, coliseums, armories, schools, colleges, prisons, hospitals, medical offices, churches, synagogues, convents, nursing homes, charitable facilities, fraternal organizations, etc.

(5) Recreation (REC). All public and private parks and memorials, youth camps, golf courses, country clubs, swimming pools, resort lodgings, etc. Also included is certain open land used for recreational activities which do not require structures.

(6) Transportation (TRA). Includes all truck, rail, bus and port terminals, railroad switching yards, airports and MHTD commuter lots.

(7) Extraction (EXT). Includes all active mining operations and any activities related to the retrieval of raw materials from the earth.

(8) Other (OTH). Includes all unidentified activities and uses which were not included in one of the classifications listed above. In the context of the Page Avenue Extension project area, most of it comprises agricultural land (i.e., croplands, orchards, nurseries, livestock facilities, permanent pastures, etc.). Open non-developed non-recreational land such as floodplains, wetlands and steep slopes, wooded or heavily-brushed private grounds, abandoned properties, vacant lots, etc. as well as surface waters, i.e. rivers, lakes and streams, are also included.

It should be noted that no separate category was established for land used to accommodate streets, roads, freeways, railroad tracks, etc. Land devoted to these uses is included in the categories abutting or adjacent to such transportation facilities. Except for MHTD commuter lots, parking is similarly treated.

3.8.1 Land Use Trends (1970-1985)

Land use by acreage has been estimated for the Page Avenue Extension project area for the years 1970, 1980 and 1985. Figures for the entire project area are reported in Table 3.8-1.

TABLE 3.8-1
ESTIMATED PROJECT AREA LAND USE BY ACRES (1970-1985)

YEAR	RES	COM	IND	PUB	REC	TRA	EXT	OTH	TOTAL
1970	7,359	301	670	354	2,477	226	142	73,488	85,017
1980	13,510	1,067	914	680	1,899	272	529	66,146	85,017
1985	15,985	1,322	913	684	1,979	272	525	63,337	85,017

Source: East-West Gateway Coordinating Council

In 1970, large tracts of the project area, on both sides of the Missouri River, were ripe for development. Interstate Highways 70 and 270 had been completed and were providing easy, quick access to land that previously had been thought too distant and difficult to market. Single-family homes were built and sold by the thousands as the population boomed.

The Page Avenue Extension project area developed rapidly between 1970 and 1980. With the maturation/filling-in of most of the easily developable (non-floodplain) land in the St. Louis County portion and the general economic downturn during the early 1980's, the rate of development slowed precipitously between 1980 and 1985 in St. Louis County. In St. Charles County, however, easily developed agricultural land remained in abundance and, moreover, could be acquired and developed for significantly less than St. Louis County costs. All told, the acreage devoted to residential land use in the entire project area more than doubled in fifteen years and was approaching one-fifth of all land.

Between 1970 and 1985, commercial acreage more than tripled in the project area. Industrial acreage grew by more than a third and land developed for public purposes almost doubled. Land devoted to transportation uses (other than streets, roads and highways) grew by 20%. Land utilized for extraction (quarries and sand and gravel operations) almost tripled.

Land used for recreation purposes is reported to have declined more than 20%. A large apparent loss took place in the St. Louis County portion of the project area and was about 541 acres between 1970 and 1980. It is probable that much, or perhaps all, of this loss may have been due to reinterpretation of land use classifications in regard to recreational uses.

In 1985, about one-quarter of the project area could be classified as "developed", while the remaining acreage comprised a mixture of developable land (mostly agricultural land in St. Charles County), conditionally developable land (mostly agricultural floodplain in St. Louis County that requires greater flood protection for major development), undevelopable land (i.e., bluffs, steep slopes, odd-sized and orphan parcels, etc.) and surface water. The 1970 through 1985 average rate of absorption and development of acreage in the "Other" classification was less than 1% per year.

Certain aspects of 1970 through 1985 land use trends come into sharper focus when the St. Louis County and St. Charles County portions of the Page Avenue Extension project area are examined individually. Land use trends by acreage for the St. Louis County portion of the project area are illustrated by Table 3.8-2.

TABLE 3.8-2
ESTIMATED ST. LOUIS COUNTY PROJECT AREA LAND USE BY ACRES (1970-1985)

YEAR	RES	COM	IND	PUB	REC	TRA	EXT	OTH	TOTAL
1970	2,202	153	654	204	1,857	226	57	10,446	15,799
1980	3,309	267	830	405	1,316	270	324	9,078	15,799
1985	3,475	272	816	405	1,316	270	324	8,921	15,799

Source: East-West Gateway Coordinating Council

Development was rapid until 1980. From 1970 to 1980, the "Other" classification was absorbed at a rate in excess of 1.25% per year. Residential acreage grew by over 50% and commercial expansion approached 75%. Industrial, public, transportation and extractive uses all evidenced strong rates of growth. As noted above, recreational acreage declined for reasons that are unclear.

From 1980 until 1985 development slowed dramatically in the St. Louis County portion of the project area. Economic conditions were variable but the basic problem was more fundamental: the growing scarcity of easily developable land. The last great expanse of potentially developable land

was mostly floodplain which could not or would not be developed more intensively until or unless much more extensive flood protection could be provided. From 1985 onward, residential development began to become more problematic in St. Louis County.

The St. Charles County portion of the project area experienced few developmental impediments. The rate of development fluctuated but was always strong. Table 3.8-3 details 1970 through 1985 growth.

TABLE 3.8-3
ESTIMATED ST. CHARLES COUNTY PROJECT AREA LAND USE BY ACRES (1970-1985)

YEAR	RES	COM	IND	PUB	REC	TRA	EXT	OTH	TOTAL
1970	5,157	148	15	150	621	0	85	63,042	69,218
1980	10,201	800	84	275	583	2	205	57,068	69,218
1985	12,510	1,050	97	279	663	2	201	54,416	69,218

Source: East-West Gateway Coordinating Council

Between 1970 and 1980, an average of almost 600 acres per year, or almost 1%, of undeveloped land in the St. Charles County portion of the project area was being developed. Between 1980 and 1985, the annual pace of development decelerated to about 530 acres a year, or about 0.75%. There are reasons to believe that the rate of development has quickened since 1985.

Large amounts of developable land and pro-development county and municipal governmental policies contributed to this rapid growth. Of course, the basic motive force was that large numbers of people, for varying reasons, simply wanted to live and do business in St. Charles County. This strong market demand was only slightly dampened by the national economic downturn of the early 1980's. Moreover, it was not checked by chronic Missouri River crossing problems and related traffic jams as well as rising raw land prices.

The fifteen years ending in 1985 saw impressive gains in almost all developed land use categories. Residential acreage increased by more than 140 percent. Commercial land use sextupled and industrial land use more than quintupled.

Land used for extraction more than doubled and land used for public purposes almost doubled. Between 1970 and 1985, a small amount of land was developed for MHTD commuter lots and constituted the sole transportation land use. (As previously noted, acreage utilized for roads, streets, expressways, other parking, etc. are aggregated and classified with adjoining uses.)

Recreational acreage is reported to have dipped and then rebounded. Part, or all, of the 38 acres lost between 1970 and 1980 may be due to a reinterpretation of the recreational land use classification. In any

case, it showed a net increase of almost 7% for the fifteen-year period through 1985.

By far the largest land use classification by acreage was "Other". It steadily decreased from the over 90% it held in 1980. Yet, after fifteen years of rapid development, more than three-quarters of the St. Charles County acreage within the project area in 1985 remained relatively untouched. Much of this land is likely to be developed in the future.

3.8.2 Generalized Project Area Land Use Map

Current-year land use by acre data is not available. However, for purposes of the Final Environmental Impact Statement, a Generalized Project Area Land Use Map has been prepared. Recent aerial surveys and field work were utilized in its creation (Figure 3.7).

3.8.3 Projected Land Use (1990-2010)

The East-West Gateway Coordinating Council (EWGCC) has prepared land use projections by acres at five-year intervals beginning in 1990 for each of its transportation zones that are included in its service area. This data has been aggregated for the zones that comprise the Page Avenue Extension project area. These projections assume the full development of the Riverport site in St. Louis County (Maryland Heights). They do not assume construction of the Page Avenue Extension, the Earth City Expressway Extension nor any additional floodplain development.

The entire Page Avenue Extension project area is an amalgam of its portions in St. Louis and St. Charles Counties. Its combined projected land use figures are reported by Table 3.8-4.

TABLE 3.8-4
PROJECTED PAGE AVENUE EXTENSION PROJECT AREA LAND USE BY ACRES (1990-2010)

YEAR	RES	COM	IND	PUB	REC	TRA	EXT	OTH	TOTAL
1990	19,503	1,917	1,196	969	2,155	272	469	58,536	85,017
1995	20,952	2,384	1,433	1,183	2,300	272	470	56,023	85,017
2000	21,793	2,936	1,622	1,357	2,450	272	470	54,117	85,017
2005	24,347	3,259	1,524	1,535	2,563	272	489	51,028	85,017
2010	26,169	3,839	1,424	1,635	2,699	272	527	48,452	85,017

Source: East-West Gateway Coordinating Council

Even with the predicted limited contributions of St. Louis County, projected growth rates for the entire project area are impressive. This is directly attributable to the expected high rate of St. Charles County growth. On average, over 500 acres per year, or about 0.59% of the total acreage, are anticipated to be newly developed each year between 1990 and 2010.

Detailed analysis of these projections is more productive at the county level. Table 3.8-5 indicates marginal land use changes projected for the St. Louis County portion of the project area.

TABLE 3.8-5
PROJECTED ST. LOUIS COUNTY PROJECT AREA LAND USE BY ACRES (1990-2010)

YEAR	REC	COM	IND	PUB	REC	TRA	EXT	OTH	TOTAL
1990	3,769	395	931	437	1,340	270	322	8,335	15,799
1995	3,896	513	990	453	1,340	270	322	8,015	15,799
2000	4,018	624	1,044	469	1,338	270	322	7,714	15,799
2005	4,025	703	950	480	1,330	270	324	7,717	15,799
2010	4,021	773	846	485	1,316	270	324	7,764	15,799

Source: East-West Gateway Coordinating Council

Only modest amounts of new development are projected, or will be possible, within the St. Louis County portion of the project area given the relative lack of flood protection for most of its otherwise developable acreage. Some of the new development that is predicted will be concentrated in the "500-Year" flood protected Riverport project along the existing Earth City Expressway near Interstate Highway 70. The balance of it would be scattered throughout the project area, above the floodplain for the most part.

Predicted residential acreage growth is indicative of the limits of growth that the St. Louis County project area has already experienced for years. Between 1990 and 2010 only 252 acres of additional residential development are expected to occur. This represents only 1.60% of the project area's 15,799 acres. The net gain from all development within the St. Louis County portion of the project area for the years 1990-2010 will be a projected 571 acres, or 3.61% of 15,799 acres.

Continued strong growth is projected for the St. Charles County portion of the Page Avenue Extension project area, as indicated by Table 3.8-6.

TABLE 3.8-6
PROJECTED ST. CHARLES COUNTY PROJECT AREA LAND USE BY ACRES (1990-2010)

YEAR	RES	COM	IND	PUB	REC	TRA	EXT	OTH	TOTAL
1990	15,734	1,522	265	532	815	2	147	50,201	69,218
1995	17,056	1,871	443	730	960	2	148	48,008	69,218
2000	17,775	2,312	578	888	1,112	2	148	46,403	69,218
2005	20,322	2,556	574	1,055	1,233	2	165	43,311	69,218
2010	22,148	3,066	578	1,150	1,383	2	203	40,688	69,218

Source: East-West Gateway Coordinating Council

Between 1990 and 2010, 9,513 acres are expected to be developed in some manner beyond the "Other" classification. This is about 475 acres per year, or roughly 0.69% annually. By other estimates, these figures are conservative. In any case, the pulse of development is expected to be strong throughout the period.

The St. Charles County portion of the project area is predicted to register strong gains in most land use classifications. Residential acreage will grow by more than 40%. Commercial land use should double. Public land use is expected to more than double.

Industrial acreage is projected to grow and then plateau. Recreational space should increase by about 70%. Extraction uses will show modest increases after the year 2000. Transportation uses (beyond non-commuter parking, roads, streets, expressways, etc.) will remain minor.

Assuming these predictions are accurate, there will still be large amounts of developable land for many years beyond the year 2010. For a variety of reasons, all the theoretically developable land will never, in fact, be developed. In any case, the capacity for the St. Charles County portion of the Page Avenue Extension project area to absorb new development will be immense well into the next century.

On balance, these land use projections suggest that the economic base of St. Charles County will remain too small to support the local population. Although larger numbers of people will live and work in St. Charles County, most working households will continue to have one or more adults regularly commuting to St. Louis County, the City of St. Louis or elsewhere for employment.

3.9 PROJECT AREA DEVELOPMENT

Much of the Page Avenue Extension project area has been urbanized. In St. Louis County, almost all of the territory between Interstate Highway 270 and the northeast-southwest bluffline east of the floodplain has been intensely developed for residential and commercial uses. The large expanse of land below the bluffline is the Missouri River's natural floodplain and is currently used for agricultural and public recreational purposes. However, the first major flood-protected development, Riverport, is well underway. Infrastructure currently in place includes roads, railroad tracks, two water treatment facilities (St. Louis County Water Company and City of St. Louis Water Department), a large sewage treatment facility and two small airports.

Directly across the Missouri River, in St. Charles County, is another large expanse of floodplain. It is primarily used for agricultural activities. The major portion of the St. Charles County project area comprises rolling hills beyond the natural bluff above the floodplain. Traditionally, this land has been agricultural. For the past three decades, however, its development has been rapid. The primary development corridor is located along the south side of Route I-70. A secondary development corridor runs northeast-southwest along either side of Route 94. The easternmost territory between these two roadways is a general mixture of residential and commercial uses that is steadily spreading to

the west and south. In places, development has hopscotched ahead in isolated pockets scattered throughout rural landscapes.

3.10 BARRIERS

By far, the most significant physical barrier located within the project area is the Missouri River. It separates St. Louis County from St. Charles County. Other physical barriers are present in the project area such as bluffs, the Missouri River floodplains, steep slopes and small or large streams.

3.11 DEMOGRAPHIC CHARACTERISTICS

This section describes the basic social characteristics of the Page Avenue Extension project area. Most of this and related analyses were prepared in 1989, utilizing data from the 1980 U. S. Census as well as independent population information and/or population estimates and projections for the period 1980-1990 and beyond. Given its timing and phased-release reporting, data from the 1990 U. S. Census has been, and in part remains, unavailable for use in this work. Moreover, much of the available 1990 data is preliminary in nature and subject to revision. For these reasons, this FEIS makes limited use of the 1990 U. S. Census.

3.11.1 Historical Population Growth and Migration

Since 1970, population growth has been rapid throughout most of the Page Avenue Extension project area. This phenomenon is directly attributable to the strong outflow of residents and commerce along the Route I-70 and Route 40/61 (Route I-64) corridors away from the City of St. Louis and its older suburbs in St. Louis County. It is the consensus among local urbanologists that this decentralization probably will continue until well beyond this decade, although the pace will fluctuate. To a lesser extent, this phenomenon is occurring along other major developmental corridors on both sides of the Mississippi River.

Decentralization notwithstanding, the larger community has grown at a minute rate. For the past two decades, the entire St. Louis Metropolitan Area has been a "no growth/slow growth" area (Table 3.11-1).

TABLE 3.11-1
ST. LOUIS METROPOLITAN STATISTICAL AREA (MSA) POPULATION (1970-1990)

1970**	1980**	1990 ***
2,428,653	2,376,998 (-2.13%)	2,444,099 (+2.82%)

Includes St. Louis City, St. Louis County, St. Charles County, Jefferson County and Franklin County in Missouri as well as Clinton County, Jersey County, Madison County, Monroe County and St. Clair County in Illinois.

Sources: ** American Statistical Association, St. Louis Chapter
*** 1990 U. S. Census

Utilizing these figures, total growth between 1970 and 1990 was 15,446 individuals or about 0.64%. This is well below the net "natural increase" of births less deaths and indicates a net ongoing outmigration from Metropolitan St. Louis. Within this context, the recent rapid growth of western St. Louis County (i.e., beyond Route I-270) and St. Charles County apparently represents the relocation and redistribution of existing local populations rather than new growth.

St. Charles County, in its entirety, has been the prime beneficiary of the decentralization of Metropolitan St. Louis. It has quadrupled in population since the first Route I-70 bridge opened in 1958. Table 3.11-2 denotes a pattern of extraordinary growth.

TABLE 3.11-2
ST. CHARLES COUNTY POPULATION (1960-1990)

1960*	1970*	1980*	1990**
52,970	92,954 (+75.48%)	144,107 (+55.03%)	212,907 (+47.74%)

Sources: * St. Charles County Planning Department
** 1990 U. S. Census

Although the rate of growth has tended to slow somewhat with the expansion of its population base through time, St. Charles County gained 68,800 people during the 1980s. Most of this growth occurred in that portion of St. Charles County located within the Page Avenue Extension project area. It is continuing at a rapid pace.

St. Louis County is "topping-out" its population growth. Most of its easily developed land has been utilized. Moreover, average household size is steadily declining as the population matures. Table 3.11-3 reports St. Louis County's population growth since 1960.

TABLE 3.11-3
ST. LOUIS COUNTY POPULATION (1960-1990)

1960*	1970*	1980*	1990**
703,532	951,671 (+35.27%)	974,180 (+2.37%)	993,529 (+1.99%)

Sources: * St. Louis County Department of Planning
** 1990 U. S. Census

Population growth in St. Louis County, as a whole, was modest during the 1980s. The signs of an impending population crest are clear. However, these figures do not disclose the massive internal redistribution of population that has been underway for more than two decades. Older, inner-county communities have been losing population while newer areas, mostly beyond Route I-270, have grown dramatically.

The Page Avenue Extension project area straddles a now-maturing region within St. Louis County as well as the most active development area within St. Charles County. Utilizing East-West Gateway Coordinating Council (EWGCC) "transportation zone" data, population growth has been recorded and estimated for the entire project area in Table 3-11.4. These estimates do not reflect 1990 U. S. Census data and, in particular, likely understate the St. Charles County portion of the project area's 1985 and 1990 population.

TABLE 3.11-4
PAGE AVENUE EXTENSION PROJECT AREA POPULATION (1970-1990)

	1970	1980	1985 (est.)	1990 (est.)
Project Area	45,817	102,086 (+122.81%)	118,086 (+15.67%)	151,789 (+28.54%)
St. Louis County	23,344	32,208 (+37.97%)	32,871 (+2.06%)	33,404 (+1.62%)
St. Charles County	22,473	69,878 (+210.94%)	85,215 (+21.95%)	118,385 (+39.93%)

Source: Booker Associates, Inc. utilizing EWGCC data.

The St. Louis County portion of the project area has stopped growing rapidly. However, St. Charles County's portion is still experiencing vigorous growth. On balance, its estimated growth between 1985 and 1990 was an average of more than 6,600 people per year, or roughly 6.75% per year compounded. Again, this probably understates the actual figures.

3.11.2 Projected and Recent Population Growth

The East-West Gateway Coordinating Council also has prepared population projections at five-year intervals until 2010. These estimates do not reflect 1990 U. S. Census data but do assume the complete development of Riverport in the project area. They do not assume the development of the Page Avenue Extension and/or the Earth City Expressway Extension and/or any additional Missouri River levees. Nevertheless, the projections forecast steady, continued growth for the entire project area, at progressively slower rates after 1990, per Table 3.11-5. On balance, these estimates are conservative, in particular relative to St. Charles County, as compared to other sources.

TABLE 3.11-5
PAGE AVENUE EXTENSION PROJECT AREA PROJECTED POPULATION (1980-2010)

	1990 (est.)	1995 (est.)	2000 (est.)	2005 (est.)	2010 (est.)
Project Area	151,789 (+28.54%)	161,166 (+6.18%)	170,759 (+5.95%)	179,834 (+5.31%)	187,542 (+4.29%)
St. Louis County	33,404 (+1.62%)	33,349 (-0.16%)	33,334 (-0.04%)	33,383 (+0.15%)	33,423 (+0.12%)
St. Charles County	118,385 (+38.93%)	127,817 (+7.97%)	137,425 (+7.52%)	146,451 (+6.57%)	154,119 (+5.24%)

Source: Booker Associates, Inc. utilizing EWGCC data.

These 1989 projections differ greatly relative to the St. Louis County and St. Charles County portions of the project area. Virtually no growth is projected for the project area in St. Louis County. However, growth in St. Charles County is expected to proceed at impressive, but slowing, rates during the 1990s and beyond.

Recent 1990 U. S. Census data has underscored the conservative nature of the population projections previously cited. Although 1990 data will not be disaggregated in time to be fully utilized for this FEIS, the available information indicates that the St. Charles County portion of the project area grew at a faster rate than expected. The St. Louis County project area, however, probably experienced modest levels of population growth

more in keeping with those forecasted. Updated project area projections for 1995 and beyond, based upon 1990 data, are not available for the FEIS.

As previously indicated, St. Louis County's total population grew from 974,180 to 993,529 between 1980 and 1990. This amounted to 19,349 people or 1.99%. Figures for St. Louis County's portion of the project area are not available. However, most of the City of Maryland Heights, which was incorporated in 1985, comprises the largest part of the St. Louis County project area. Maryland Heights, as a whole, lost population between what it would have been in 1980 and what it was in 1990. Its population declined to 25,407 from 26,413 for a loss of 1,006 or 3.96%. All told, new residential construction in the City of Chesterfield as well as unincorporated portions of the St. Louis County project area probably more than compensated for any losses elsewhere.

The 1980s brought continued dramatic growth to St. Charles County. As a whole, St. Charles County grew from 144,107 to 212,907, a gain of 68,800 individuals or 47.74%. As recently as April of 1990 St. Charles County's newly issued Year 2000 Master Plan was estimating a 1990 population of only 199,598. Most of this growth occurred within the St. Charles County portion of the project area. Included therein were all or parts of the communities reported in Table 3.11-6:

TABLE 3.11-6
ST. CHARLES COUNTY PROJECT AREA COMMUNITIES POPULATION (1980-1990)

Community	1980 Pop.	1990 Pop.	Gain	Per. Gain
Cottleville	184	2,936	2,752	1,495.65%
Dardenne Prairie	59	1,769	1,710	2,898.31%
Lake St. Louis	3,843	7,400	3,557	92.56%
O'Fallon	8,677	18,698	10,021	115.49%
St. Charles (City)	37,400	54,555	17,155	45.87%
St. Peters	17,029	45,779	28,750	168.83%
Weldon Spring	609	1,470	861	141.38%
Wentzville	3,193	5,088	1,895	59.35%

Source: 1990 U. S. Census

Some of the 1980-1990 community population gains represent annexations of prior development in unincorporated areas. For the most part, however, the reported gains reflect large amounts of post-1980 residential construction.

It seems likely that St. Charles County and its project area communities will continue to grow at vigorous rates for the foreseeable future. Obviously, anticipated growth can be slowed or accelerated by local and/or national economic cycles. Predicted rates of population increase vary. However, no authoritative source expects a leveling-off anytime soon. It should be noted that St. Charles County's Year 2000 Master Plan (1990) reports projected populations for St. Charles County of 250,797 and

293,633 by 2000 and 2010, respectively. Revised East-West Gateway Coordinating Council regional population projections will not be available before mid-1992 at the earliest.

3.11.3 Social and Demographic Characteristics Data

The 1980 U.S. Census remains, in large part at this writing, the most detailed and reliable source for most social-demographic analyses of the Page Avenue Extension project area. As noted previously, detailed data from the 1990 U.S. Census will not be released in time to be included in this evaluation.

In most instances, the social and demographic circumstances existing in 1980 should be roughly the same today. There is no indication that there have been dramatic changes in the relative ages, incomes, racial composition, educational achievement levels, etc. of the population between 1980 and now. Although the population has grown rapidly in most of the project area, the general characteristics of the population have remained approximately the same. In 1980, the project area overwhelmingly comprised young to middle-aged, middle-income, white households headed by one or more individuals with at least a high school education. This remains true today. Insofar as can be determined, no "special" population concentrations or neighborhoods would be affected by the Page Avenue Extension.

Seventeen 1980 census tracts are located completely or partially in the project area. For seven of the census tracts, data has been approximated for that part of the census tract located within the project area. In these instances, estimated values were prepared for those census tract "fragments." Accordingly, all values derived from census data and aggregated for the Page Avenue Extension project area as a whole, or its St. Louis County and St. Charles County component parts, are, in fact, estimates. This was necessitated by the fact that census tract boundaries and project area boundaries do not always conform to each other.

For purposes of socio-demographic analysis, the "St. Louis Region," as a whole, has been determined to be the standard of reference. It is coterminous with the East-West Gateway Coordinating Council's eight-county service area and regional database. Accordingly, it comprises the City of St. Louis, St. Louis County, St. Charles County, Franklin County and Jefferson County in Missouri. In Illinois, Madison County, St. Clair County and Monroe County are included as well. Subsequent references to the St. Louis Region and/or any regional characteristics are keyed to this regional formulation. In 1980, its population was 2,323,843 persons, 53,155 fewer than the "St. Louis Metropolitan Statistical Area" (MSA) which also includes Clinton County and Jersey County in Illinois. The 1990 U. S. Census determined the regional population to be 2,389,616. This figure is 54,483 less than the MSA total of 2,444,099.

3.11.3.1 Minority Population Groups

Blacks are, by far, the dominant non-white minority population group in the St. Louis Region. The East-West Gateway Coordinating Council has determined that in 1980 blacks represented over 94% of the region's total

non-white population. Other non-white population groups live in the St. Louis Region, but they tend to be very small in numbers and non-concentrated. Foreign-born residents tend to be similarly dispersed. There are also white sub-populations, but with rare exceptions such as the Italian-American "Hill" neighborhood in the City of St. Louis, they are also non-concentrated. Most of the region's black population is concentrated in the City of St. Louis, northern and northwestern inner St. Louis County suburban communities, and East St. Louis, Illinois as well as nearby Illinois cities and towns.

The 1980 U. S. Census reported small black populations within the project area. The maximum figure was 5.0% for Census Tract 3122 in St. Charles County. However, only a small fragment of this mostly rural census tract is located within the project area. By comparison, the regional percentage of black population was 17.5%.

More than half of all blacks residing anywhere in the Page Avenue Extension project area in 1980 lived in St. Louis County. The black population in the St. Louis County portion of the project area was estimated to have been 685 persons. This represented an estimated 2.13% of a total population of 32,208.

The black population in 1980 of the St. Charles County portion of the Page Avenue Extension project area was even smaller than in St. Louis County. An estimated 613 individuals comprised an estimated 0.88% of the total population of 69,878. St. Charles County's total non-white population was 2.15%, only 3,093 of 144,107 residents.

Overall, the entire Page Avenue Extension project area had a very small black population in 1980. Only 1,298 black people were estimated to be part of a total population of 102,086. This amounted to an estimated 1.27% of the total population.

Since 1980, the black population has almost certainly grown, in both absolute numbers and percentages, throughout the project area. However, insofar as can be determined, there are no established concentrations of black population to this date. Nor do there seem to be any established concentrations of any other minority and/or foreign-born population groups. All available information indicates that the project area population today is overwhelmingly white with small numbers of blacks and even smaller numbers of other minority groups. All such minority populations are, apparently, non-concentrated and well-dispersed throughout the Page Avenue Extension project area.

3.11.3.2 Age Distribution

In 1980, the St. Louis Region's age distribution was as reported in Table 3.11-7.

TABLE 3.11-7
ST. LOUIS REGION POPULATION AGE DISTRIBUTION (1980)

Age	Population	Percent
17 and under	665,582	28.64%
18 through 24	289,439	12.46%
25 through 64	1,097,670	47.24%
65 and over	271,152	11.67%
All	2,323,843	100.01%

Source: 1980 U. S. Census

The median age for the region was 30.5 years, slightly higher than the national average of 30.0 years. The proportion of those 17 and under had dropped since 1970 from 35.50%. The percentage of residents 18 and over had risen as the median age increased from 27.6 years in 1970 to 30.5 years in 1980. All of this was indicative of the natural maturation of "baby boomers" as well as a net migration of younger residents out of the St. Louis Region.

The Page Avenue Extension project area population, as a whole, was younger than the region. Its 1980 age distribution is estimated in Table 3-11.8.

TABLE 3-11.8
PAGE AVENUE EXTENSION PROJECT AREA POPULATION AGE DISTRIBUTION (1980)

Age	Population	Percent
17 and under	34,477	33.77%
18 through 24	11,614	11.38%
25 through 64	52,499	51.43%
65 and over	3,496	3.42%
All	102,086	100.00%

Source: 1980 U. S. Census

The median age in the project area is estimated to have been 27.71 years. The age characteristics for the St. Louis County portion of the project area roughly approximated regional values. Its 1980 age distribution is estimated in Table 3-11.9.

TABLE 3-11.9
ST. LOUIS COUNTY PROJECT AREA POPULATION AGE DISTRIBUTION (1980)

Age	Population	Percent
17 and under	8,914	27.68%
18 through 24	4,176	12.97%
25 through 64	17,762	55.15%
65 and over	1,356	4.21%
All	32,208	100.01%

Source: 1980 U. S. Census

The median age in this area was an estimated 29.95 years.

The population of St. Charles County portion of the project area in 1980 was much younger. The 1980 age distribution for it is estimated to have been as indicated in Table 3-11.10.

TABLE 3-11.10
ST. CHARLES PROJECT AREA POPULATION AGE DISTRIBUTION (1980)

Age	Population	Percent
17 and under	25,563	36.58%
18 through 24	7,438	10.64%
25 through 64	34,737	49.71%
65 and over	2,140	3.06%
All	69,878	99.99%

Source: 1980 U. S. Census

The figure of 26.68 years is estimated to have been the median age for this area in 1980.

In 1980, the St. Louis County portion of the project area was beginning to plateau after about two decades of rapid residential growth. Many of its residents were middle-aged and older, and children were beginning to leave home. As it matured, its age distribution was coming closer to regional norms.

The St. Charles County portion of the project area was in the midst of a residential development "boom" in 1980 which continues today. The ongoing influx of young families has probably helped to keep this area one of the youngest in the St. Louis Region. The 1990 U. S. Census will report a high percentage of children. There will be major increases in the 18-64 age range in absolute numbers. The number of adults 65 and over will grow, but their relative percentage will still remain very small. As long

as St. Charles County attracts young families, it will continue to grow and, in a regional sense, tend to stay "young."

3.11.3.3 Income and Poverty Levels

The 1980 U. S. Census reported per capita income for 1979. The St. Louis Region's per capita income was calculated as $7,687.00. The 1979 national per capita income was $7,330.00. The 1980 U. S. Census also reported the "poverty level" based upon 1979 incomes. The figure of 10.2% was calculated as the percentage of the St. Louis Region's population at or below the poverty level. This compared to 12.4% for the State of Missouri and 12.5% for the entire United States. All census tracts within the Page Avenue Extension project area reported 1979 per capita incomes in excess of the regional per capita income. Each of them also reported an incidence of poverty level lower than the regional level.

The 1979 per capita income for the entire St. Louis County portion of the project area is estimated to have been $10,499.35, or 136.59% of the regional figure. Assuming the regional per capita income of $7,687.00 represented the 1979 threshold of the "middle class," the entire St. Louis County portion of the project area was generally middle to upper-middle class in character. This observation is bolstered by the low poverty level population in 1979 of 643 persons or 1.99% of the 32,308 residents of the St. Louis County portion of the project area. This was less than one-fifth of the regional incidence of 10.20%.

The 1980 U. S. Census also indicated that the St. Charles County portion of the Project Area was predominantly "middle class" in nature. In six of nine instances, 1979 census tract per capita incomes were in excess of the regional figure of $7,687.00. The 1979 per capita income for the entire St. Charles County portion of the project area was $8,121.13 or 105.65% of the regional figure of $7,687.00. The large proportion of young St. Charles County households with small children at home tended to depress per capita income amounts. The low per capita income reported for the fragment of Census Tract 3122 reflected its largely non-urbanized development and socio-demography.

Overall, the 1979 poverty level population of the St. Charles County portion of the Page Avenue Extension project area was a low 3.10%, approximately one-third of the regional incidence.

Viewed as a whole, the entire bi-county Page Avenue Extension project area was prosperous as compared to the St. Louis Region. The 1979 total project area per capita income was $8,871.45 for its 1980 population of 102,086. This figure represents 115.41% of the regional figure of $7,687.00. The project area had a low poverty level population of 2,811. This was an incidence of 2.75% as compared to the regional incidence of 10.20 percent. The vast majority of project area residents exceeded the regional per capita income and were middle-class to upper middle-class economically. There were, apparently, no poverty level population concentrations of any size and relatively few poor people anywhere within the area.

More than a decade later, all indications are that the basic income patterns observed previously remain true today. By regional, as well as absolute, standards the project area is a prosperous middle-class to upper middle-class array of communities without large poverty level population concentrations. This character should persist for the foreseeable future.

3.11.3.4 Educational Attainment

Educational attainment is closely correlated to income. As a general rule in America, people with more education have greater incomes than people with less education. Numerous individual exceptions notwithstanding, this observation can serve as a useful analytical tool for describing and comparing population groups.

The 1980 U. S. Census determined that there were 1,368,822 persons age 25 or over in the St. Louis Region. Of this group, 878,968 (64.21%) had at least completed high school. Nationally in 1980, 66.5% of the population age 25 and over had achieved a high school education.

The St. Louis Region also trailed in the percentage of college graduates age 25 or over. In 1980, 216,172 of the 1,368,822 people in this age group, or 15.79%, were college graduates. The national figure was 16.2%.

Educational attainment levels for 1980 throughout the Page Avenue Extension project area tended to exceed regional and national levels. Among 55,995 individuals age 25 or more a total of 45,995, or 82.14%, had at least graduated high school. This figure exceeded the regional norm by 27.92 percent. The relative proportion of college graduates was even greater. A total of 12,779 people, or 22.82%, had attained a full college education. This surpassed the regional rate by 44.52%.

Recently developed suburban residential areas tend to have higher educational attainment levels. It is also true that younger Americans have had, on average, greater opportunities than their parents to further their educations. The facts that the Page Avenue Extension project area basically has been developed since 1960 (1970 in St. Charles County) and has been inhabited by somewhat younger adults than regional norms helps explain its high educational attainment levels. High educational attainment levels, in turn, help explain the relative prosperity of its residents as compared to overall regional income levels.

Project area educational attainment in 1980 did vary widely among individual census tracts. However, all attainment levels in the St. Louis County portion of the project area exceeded regional levels. The data is reported by Table 3.11-11.

TABLE 3.11-11
EDUCATIONAL ATTAINMENT (1980)

	Pop. 25(+)	H.S.Grads.	Percent	Col.Grads.	Percent
St. Louis County Project Area	19,118	16,784	87.79%	6,832	35.74%
St. Charles County Project Area	36,877	29,211	79.21%	5,947	16.13%

Source: 1980 U. S. Census

Educational attainment levels for 1980 tended to be lower throughout the St. Charles County portion of the Page Avenue Extension project area. This was particularly true relative to college graduation. The percentage of college graduates age 25 or over (16.13%) was less than half of the St. Louis County portion of the project area (35.74%) and barely exceeded the regional level (15.79%). However, the proportion of St. Charles County high school graduates (79.21%) exceeded the regional rate (64.21%) by a substantial amount.

The St. Charles County portion of the project area achieved its prosperity (1979 per capita income was 105.65% of the regional level) by means in addition to education. Although its per capita income was somewhat lowered by the more rural nature of St. Charles County, it also was diminished by its population's relative youth and high fertility. Peak earning years tend to occur in the middle to late-middle years of life. It seems reasonable to infer, then, that large numbers of people had good paying jobs that did not require college and/or a large number of households had at least two wage earners.

Educational attainment levels in the St. Charles County portion of the Page Avenue Extension project area may have risen substantially since 1980. Less of the land is rural and more land has been developed for residential and other uses. Moreover, much of this new development is of a price, size and quality that is geared to higher-income households.

3.11.3.5 Household Size

The 1980 U. S. Census reported 827,229 households in the St. Louis Region with an average of 2.77 persons per household. This compared to a 1970 figure of 3.16 persons per household. The 1980 national statistic was 2.75 persons per household.

Household size is a good barometer of the presence of children, in general, and younger children in particular. It also reflects the rates of marriage, cohabitation, separation, divorce and death. By 1980, most of the "baby boom" generation had left home but had not yet begun to produce as many children as its parents had.

"Gross Persons per Household" is the result of dividing the total population of an area by its total number of households. Actual average

household size, i.e. the real numbers of people per actual households may be smaller than indicated due to the fact that certain persons within a particular census tract may live in institutional settings and, therefore, slightly inflate the actual "persons per household" number. Nevertheless, gross persons per household can be a valuable indicator when used within its limitations.

Utilizing East-West Gateway Coordinating Council (EWGCC) information derived from census data and population projections, gross persons per household have been determined and/or projected through 1990 at various intervals since 1970 for the entire Page Avenue Extension project area as well as its St. Louis County and St. Charles County portions. The figures for the entire project area are included in Table 3.11-12.

TABLE 3.11-12
PAGE AVENUE EXTENSION PROJECT AREA GROSS PERSONS PER HOUSEHOLD
(1970-1990)

	1970	1980	1985 (est.)	1990 (est.)
Project Area	3.85	3.00	2.74	2.65
St. Louis County	3.83	2.76	2.69	2.60
St. Charles County	3.87	3.13	2.76	2.66

Source: Booker Associates, Inc. utilizing EWGCC data.

The ongoing reluctance of "baby boomers" to have larger families has reduced the gross persons per household since 1980. Within the project area, St. Charles County's "youth" relative to St. Louis County has produced larger households inasmuch as a higher proportion of St. Louis County children are older and have already left home. As St. Charles County matures, its average household size will more closely approximate regional norms.

3.12 SOCIALLY SENSITIVE LOCATIONS/FEATURES

There are, apparently, no neighborhoods or other elderly/minority/ethnic group population concentrations anywhere in the project area that might constitute a socially sensitive location, except for individual facilities. The elderly population is a fraction of regional levels and is well-dispersed. Blacks are the only noteworthy minority group but their numbers are very small. Only 1.27% of the project area's population was black in 1980. The black population is still comparatively minute and, it seems, non-concentrated. There are no other minority groups of any size.

There are other special populations that require particular consideration relative to EIS requirements. Disabled individuals are present throughout the project area in unknown numbers. There is reason to believe, given the general population's relative youth and prosperity, that the incidence of disability does not exceed the regional rate and, in fact, may be

somewhat less. In any case, there do not seem to be any concentrations of disabled persons except for extended care facilities.

Non-drivers and/or transit-dependent individuals are also present. Their numbers among adults, however, are probably quite small. There are several reasons for this. The relative youth and prosperity of suburban areas such as the Page Avenue Extension project area is always indicative of high levels of automobile use. Moreover, major employment centers are located some distance from the project area and public transportation is limited in St. Louis County and practically nonexistent in St. Charles County. Within the project area, the incidence of adult non-drivers and/or transit-dependent individuals is much less than the regional level.

There are institutional facilities that, on an individual basis, concentrate special population groups. Nursing homes, for example, provide extended care for many individuals who because of advanced age or disabling illness or injury can no longer take care of themselves or otherwise live at home.

St. Louis County has operated its Lakeside Center at 13044 Marine Avenue since 1963. Recently, the facility housed an average of 60 adolescent females and males who were court-referred for treatment of behavioral and emotional problems for periods lasting one month to several years. At any one time, as many as 50% of these individuals may be from minority population groups. The Page Avenue Extension's Red Alignment would pass within 800' of this location.

The State of Missouri's Division of Mental Health operates residential facilities for retarded and developmentally disabled adults at two sites within the project area. A "habilitation" facility is located at 22 Marr Lane in St. Peters. A group home is situated at 13100 Greenbough Drive in unincorporated St. Louis County. The habilitation facility in St. Peters would not, apparently, be directly impacted by any of the proposed Page Avenue Extension Alignments. The group home on Greenbough, however, would have to be displaced to construct the Green Alignment.

3.13 EXISTING PLANNING

A number of political jurisdictions are represented within the Page Avenue Extension project area (Figure 3.8). Most have formulated plans for particular parts and/or areas of activity therein. It is fair to generalize that most of these documents anticipate some level of developmental growth. In certain instances, moreover, they guardedly advocate development of problematic areas such as floodplains. For the purpose of providing an overview of these plans, they will be addressed in the following groups:

- St. Louis County Planning;
- St. Charles County Planning; and
- State and Regional Planning.

3.13.1 St. Louis County Planning

Planning for the St. Louis County portion of the Page Avenue Extension project area has been performed by the three principal political jurisdictions that serve as its local governmental bodies: St. Louis County (which also serves as the local government for the unincorporated area in the southwest corner of the St. Louis County portion of the project area), the City of Maryland Heights (which includes in its borders the majority of the St. Louis County project area) and the City of Chesterfield (which embraces a small fragment of the southwestern corner of the St. Louis County project area).

The Howard Bend Levee District, incorporated in 1987, is a quasi-governmental public entity. It produced its Plan of Reclamation for the floodplains located upstream of the Riverport site in 1988.

The Village of Champ is located in the northeastern corner of the project area. There is no information indicating any recent planning efforts under its aegis.

The most basic planning document shaping St. Louis County developmental policies is its General Plan (1980). This comprehensive plan has been updated once by the General Plan Update (1985). The 1980 document recognizes the existence of some unprotected floodplains "with industrial potential" (Page 47) located within the project area as depicted in its Future Land Use Map. The plan allows the development of protected floodplains but, somewhat contradicting its prior language, encourages the use of unprotected floodplains for open space and agricultural use (Page 59) without mentioning more intensive development.

The General Plan (1980) fails to address the need for any additional bridges between St. Louis County and St. Charles County. The 1985 General Plan Update notes that new bridges across the Missouri River would not only afford more efficient transportation of people and goods, but could also foster further regional decentralization of people and jobs (pages 33 and 40-41). It ultimately endorses the development of additional north-south arterials beyond Route I-270 (Earth City Expressway Extension) and new bridges across the Missouri River (Page Avenue Extension) while protecting established neighborhoods and environmentally sensitive areas (page 36). Generalized alignments are indicated for the Earth City Expressway Extension and the Page Avenue Extension on the Land Policy Map as "Road Improvements" (page 27).

The same "Land Policy Map" also designates most of the Missouri River flood plains within the St. Louis County portion of the Page Avenue Extension project area as "Unprotected Flood Plain with Development Potential" (page 27). The "Land Development Classifications" accompanying the map describe this acreage as "unprotected floodplain area of the Missouri River under special consideration in recognition of future development potential" (page 26). The remainder of the floodplains are included with other "Preservation" areas such as parks and public open space "which should be excluded from urbanization" (Page 26).

The text of the General Plan Update (1985) reflects some ambivalence toward floodplain development. It notes that land is becoming an increasingly scarce commodity in St. Louis County and that "this presents a particular problem in areas where environmentally sensitive land is now being considered for urban uses" (page 19). It also states that "there are a limited number of places where major concentrations of (new) jobs are likely" and lists Earth City, Chesterfield Valley and Riverport (each partially or totally located within protected floodplains) as likely locations (page 40). Ultimately, its "Unprotected Floodplain and Development Potential Policy" suggests that St. Louis County shall "promote economic development of the floodplain of the Missouri River that takes into consideration" various factors (page 24).

St. Louis County intends to issue a policy-oriented summary document tentatively titled "A Five-Year Strategic Action Plan for St. Louis County (1990-1995)" in 1992. This document has been delayed, for various reasons, and will represent a departure from previous large-scale planning efforts. A review of available component elements suggests that floodplain development will be viewed with less favor than in the past.

There are at least three other existing St. Louis County Government planning documents that have some relevance to the St. Louis County portion of the project area. The 1983 Creve Coeur Lake Restoration Project, prepared for St. Louis County's Department of Parks and Recreation, documented the reclamation of Creve Coeur Lake, the centerpiece of Creve Coeur Lake Memorial Park (CCLMP). Currently, a new plan for Creve Coeur Lake Memorial Park is being conceptualized. However, Recreation Spaces Community Places 1982-2000 (1982) is a county-wide parks and recreation plan that suggests additional expansion and improvement of Creve Coeur Lake Memorial Park as well as creation of a new neighborhood park south of Page Avenue that was never implemented. It also advocates protecting open space areas along the Missouri River (page 75).

The St. Louis County Department of Highways and Traffic periodically updates and revises its Highway System Plan. Since its inception during the early 1980s as a joint project with the St. Louis County Department of Planning, the Highway System Plan, a collection of maps, has always included a generalized route for the Page Avenue Extension. In fact, St. Louis County has reserved a corridor for routing Page Avenue through what is now a portion of CCLMP and across the Missouri River since the 1970s. The Earth City Expressway Extension, among other related road projects, has also been a part of the Highway System Plan since it was first prepared. An additional plan, St. Louis County's Olive Street Road West Study (1983), only peripherally involves the project area and basically deals with land use and zoning issues.

Most of the St. Louis County portion of the Page Avenue Extension project area is located within the City of Maryland Heights, Missouri. Incorporated in 1985, Maryland Heights is St. Louis County's largest municipality in land area and one of its most populated. One of its early acts was to commission the preparation of its first comprehensive plan.

Maryland Heights' Comprehensive Plan (1987) recognizes that the issue of floodplain development is vital to the community's future. It notes:

> "Unless territory now in flood plain areas is reclaimed for development, and in part is residentially developed, Maryland Heights will not have significant population growth. The City area not in floodplain is nearly 'full,' and many of the areas which could be developed and/or redeveloped are only suitable for commercial or light industrial uses." (page VI)

Subsequently, it also remarks:

> "During the latter part of the 1980 decade, the City will reach the limit of developable land, unless a 500-year levee is built to protect the several thousand acres of lowland property..... As a place of residence, Maryland Heights will have difficulty in achieving significant growth in the future. The land available for new residential development is very limited (unless a 500-year levee is constructed)." (page 4)

Much of the rest of the document describes alternative futures for Maryland Heights, i.e. with and without a 500-year levee.

Both graphically and textually, the Land Use and Transportation Plan elements of the Maryland Heights Comprehensive Plan assume and/or advocate construction of the Page Avenue Extension as well as the Earth City Expressway Extension (Plate 5 and page 61). No distinctions in this regard are made for levels of flood protection.

Maryland Heights' Comprehensive Plan encourages the improvement of Creve Coeur Lake Memorial Park and its facilities (page 69). It also suggests a parks and open space ordinance that would basically apply to floodplain areas if a Missouri River levee were to be constructed (page 75).

Riverport is a large mixed-use (office/hotel/entertainment/industrial) development located at the northern edge of Maryland Heights and the St. Louis County portion of the Page Avenue Extension project area. Its 565.4 acres of land are largely floodplain protected by 500-year levees and other flood-control measures. Several structures have already been completed, including a partially-enclosed amphitheater.

The City of Chesterfield, Missouri was incorporated in 1988. A small fragment of the Page Avenue Extension project area, mostly Missouri River floodplain, lies within Chesterfield's municipal boundaries. Chesterfield's first comprehensive plan was completed in 1990. Chesterfield would not be directly impacted by the Page Avenue Extension.

The Howard Bend Levee District, incorporated in 1987, is the quasi-governmental successor to the Howard Bend Levee Association which had been active since 1935. Owners of more than 50% of the Levee District's acreage agreed to its formation following flooding that took place in October of 1986. That flood was estimated to be a 60 to 65-year event. However, most of the flood protection afforded by the existing levees was at about 25-year flood levels.

The Howard Bend Levee District's Plan of Reclamation (1988) outlines a modest series of flood protection measures intended to bolster the existing levee system from Bonhomme Creek downstream to Riverport's 500-year levee system. The total cost in 1988 construction dollars is estimated to be $245,500 (page 8). The document does not estimate how much additional protection, if any, that these improvements might provide beyond the 25-year level.

Within the Howard Bend Levee District, the City of St. Louis Water Division is constructing a 500-year levee around its Howard Bend water purification facility. This complex is located on the Missouri River upstream from both of the Page Avenue Extension crossings. The levee will be completed in 1992.

It should be noted that the entire project area within St. Louis County's Missouri River floodplain is located in the Cities of Maryland Heights and Chesterfield. Both communities participate in the National Flood Insurance Program. Therefore, any levee grading would require local permits. This assumes, of course, that such work would be permissible under applicable Federal Government regulations.

3.13.2 St. Charles County Planning

Many plans have been developed that affect the St. Charles County portion of the Page Avenue Extension project area. St. Charles County adopted and published its Year 2000 Master Plan in 1990. The prior St. Charles County Master Plan was completed in 1973. The 1990 document's Major Highway Plan (Map 20) depicts the Page Avenue Extension's Red Alignment. Supporting text notes that this facility "would provide a more direct route to St. Louis County from the heart of the Golden Triangle in St. Charles County" (page 140). It also outlines the importance of car pooling, van pooling, commuter parking lots, HOV lanes, public transit, TSM and light rail in alleviating St. Charles County's transportation problems.

In 1990, the East-West Gateway Coordinating Council, the St. Louis Region's metropolitan planning organization, issued its study entitled Suburban Mobility in St. Charles County. Prepared in cooperation with local officials, businessmen and residents, this document surveys the origins and prospects for local transportation policies. It suggests ways of optimizing St. Charles County's road network as well as assesses the need for public transportation. Section 2.2.1 of this FEIS reports major aspects of this document.

The East-West Gateway Coordinating Council's St. Charles County Transportation Study (1987) is a comprehensive examination of St. Charles County's major street and highway needs. After extensive analysis, the text concludes:

> "It is clear that additional lanes of traffic across the Missouri River will be required to accommodate travel demand in year 2000 and beyond. Existing structures have been expanded to their maximum limits. An additional major bridge across the Missouri River is needed. The.most logical route is an extension of Page

> Avenue from St. Louis County. This has been proposed for over fifteen years. The precise location of such a route is the major issue." (page 118)

Much of the document is devoted to evaluating the three basic alternative alignments previously considered by the Missouri Highway and Transportation Department's Reconnaissance Report/St. Louis-St. Charles Counties Page Avenue Extension/New Missouri River Crossing (1986), as well as another hybrid alternative. The ultimate determination is phrased as follows:

> "Upon careful examination it was decided that the Red Line alternative should be selected for the Recommended Transportation Plan." (page 120)

This was also the recommendation of the Missouri Highway and Transportation Department's Division of Surveys and Plans in 1986.

The Land Use Plan of Unincorporated St. Charles County (1983) was prepared by the St. Charles County Planning Department. It projects high rates of population growth and physical development for St. Charles County. Since it was written, large tracts of formerly unincorporated land within the project area have been annexed by the cities of St. Charles, St. Peters, O'Fallon and Lake St. Louis, as well as smaller communities. Usually, such land is somewhat developed at the time of annexation.

The document addresses transportation concerns to a limited extent. However, it fails to consider the problems of Missouri River bridges and related roadways. It does, however, articulate goals, objectives and policies that would tend to control or discourage development on floodplains or prime agricultural land (pages 44-46).

The St. Charles County Missouri River Crossing Report (1978) was prepared for the Missouri River Bridges Committee, a group composed of municipal and county officials of St. Charles County. The document states the need for two new Missouri River crossings originating from both the Brown Road and Page Avenue corridors in St. Louis County. It does not recommend one corridor in preference to the other or suggest any possible alignments.

Municipal planning activity in the St. Charles County portion of the Page Avenue Extension project area has varied greatly among its major cities. Large-scale planning has been muted for the past decade in the City of St. Charles. A transportation plan prepared in 1980 focused upon problems associated with 5th Street. The last municipal comprehensive plan was produced in 1974 and did not address the need for new Missouri River bridges.

The City of St. Peters has relied upon ongoing planning efforts to help manage its rapid urbanization. Its Comprehensive Plan Supplement (1987) reports that it grew from a population of 518 in 1970 to an estimated population of 26,000 in December, 1985 (page 4). Before 2000, its municipal officials expect it to exceed 50,000 people. (The 1990 U. S. Census reported a population of 45,779.)

The core planning document for St. Peters is The Comprehensive Plan for St. Peters, Missouri (1982). It was updated by the Comprehensive Plan Supplement in 1987. Another update was completed in 1990. St. Peters planning activities are directed toward circumstances and problems existing within its regularly-expanding boundaries. Although it is not a riverfront community, its 1987 Comprehensive Plan Supplement did make a passing reference to progress concerning the Highway 115 and Page Avenue Extension projects across the Missouri River (page 27). It should be noted that each of the proposed alignments under consideration for the Page Avenue Extension would traverse various parts of St. Peters.

The City of O'Fallon, Missouri is also growing. Traditionally, its orientation has been to the north of Interstate Highway 70, beyond the northern limits of the Page Avenue Extension project area. In recent years, however, it has annexed large amounts of land south of Route I-70. O'Fallon's 1990 population totaled 18,698 individuals, an increase of 116% since 1980.

The centerpiece of its planning has been O'Fallon Year 2000 Comprehensive Plan (1985). It does not include an examination of Missouri River crossing problems. In 1986, MHTD identified one alignment, the Red (Preferred) Alignment, which would directly impact the City of O'Fallon. Somewhat modified, this route corresponds to the current Red Alignment, the Selected Alternate.

The City of Lake St. Louis is unique in that it has been a planned community since its inception as an exurban development in the 1960's. It was incorporated as a city in 1975 and now occupies much of the northwestern corner of the Page Avenue Extension project area. Its 1990 population was 7,400, 93% more than in 1980.

In early 1989, Lake St. Louis adopted The Comprehensive Plan for the City of Lake St. Louis as its basic planning document for the future. It acknowledges the Red Alignment. Implementation of this alignment would have profound effects upon Lake St. Louis' southern development.

The City of Wentzville, Missouri, includes the far northwestern tip of the Page Avenue Extension project area. Wentzville has not prepared any community-wide or transportation plan documents. In any case, none of the proposed alignments or combinations would directly impact Wentzville. Its 1990 population of 5,088 represented a 59% increase since 1980.

The first major planning effort ever undertaken for the Village of Cottleville was completed and adopted in May of 1989. The Village of Cottleville Land Use Plan was prepared in anticipation of the dramatic growth this crossroads community expects during the 1990s. Cottleville is the location of the 135-acre campus of the new St. Charles County Community College, on a site directly in the path of the proposed Green Alignment. Moreover, Cottleville is near the Red Alignment. Cottleville's Land Use Plan assumes that the Red Alignment will be built and will generate large amounts of new development in and around the community. Cottleville is situated near the center of the St. Charles County portion of the project area. Between 1980 and 1990 its population rose from 184 to 2,936, a gain of 1,496%.

Weldon Spring, Missouri is located east of the intersection of Missouri Route 94 and Route 40-61 (future Interstate Highway 64) at the southwestern edge of the St Charles County portion of the project area. Its 1990 population was 1,470.

The Weldon Spring Comprehensive Plan was completed in 1989. Its planners have suggested that the Red Alignment would make a logical northeast boundary for the City of Weldon Spring. They anticipate expanded commercial development at the intersection of Highway K and Route 40-61 when it is implemented.

The Village of Dardenne Prairie embraces a large arc of land east of Route 40-61 that is mostly rural in nature. Limited resources have precluded the preparation of formalized plans. However, local officials are aware that the Red Alignment would traverse the northern portion of their community. Between 1980 and 1990, the community's population grew from 59 to 1,789, a gain of 2,898%.

There are several "unofficial" communities scattered throughout the St. Charles County project area. They include: All Saints Village, Dardenne, Harvester, Howell and Jacobs. None are incorporated and most have been or will be absorbed into incorporated jurisdictions. Insofar as can be determined, none of them have developed any plans.

3.13.3 State and Regional Planning

The Missouri Highway and Transportation Department, Division of Surveys and Plans issued its Reconnaissance Report/St. Louis - St. Charles Counties Page Avenue Extension/New Missouri River Crossing in February of 1986. Until the completion of the Page Avenue Extension's Draft Environmental Impact Statement in 1990, it represented the most detailed analysis of issues relating to construction of the Page Avenue Extension. Two basic possible routes are examined in depth (Red and Green Alternates), as well as optional variations for segments of both alignments.

A previous study for the Page Avenue Extension had been completed in 1973. The Blue Line Alternate, as identified in 1986, utilized part of the preferred route selected in 1973. However, the Blue Line Alternate in 1986 was "dropped from further consideration primarily because of the physical interference and neighborhood environmental disruption" (Page 5). Between 1973 and 1986, new development had rendered the Blue Line Alternate, as then located, effectively unworkable. The Blue Segment discussed in this FEIS is unrelated to the 1973-1986 Blue Line Alternate.

The ultimate recommendation is the Red-Red Dashed-Red Line Alternate (pages 29-30). This once-hybrid alignment subsequently evolved into the the Red Alignment detailed by this document.

The Green Alignment, and all the optional variations except the Red Dashed Alternate, are rejected by the Reconnaissance Report because of costs and/or excessive dislocation and/or perceived lack of sufficient benefits. A major advantage cited for both the Red and Red-Dashed Alternates is that

each would use an existing segment of Route 94, thereby minimizing right-of-way costs and dislocation.

A number of current projects that the Missouri Highway and Transportation Department (MHTD) are actively pursuing in the St. Louis Region have at least tangential bearings upon the Page Avenue Extension. They include: Route I-64/U.S. Highway 40-61 reconstruction (a phased program including major improvements from the new Route I-64 and I-270 interchange west to the new Missouri River Bridge), and the new Missouri Route 115 Missouri River bridge and freeway that would ultimately link Interstate 270 in St. Louis County to Interstate Highway 70 in St. Charles County, and further upgrading of Route 40/61 in St. Charles County to interstate highway standards and eventual redesignation as Route I-64.

The principal highway planning document for the St. Louis Region is the East-West Gateway Coordinating Council's Long-Range Transportation Plan: Highway Component (1984). The plan summarizes the major regional highway issues and presents a plan to meet the most critical highway needs through 1995. All but the most western portion of the Page Avenue Extension project area is within the scope of this report. Its successor plan, not expected to be finished until the early 1990s, will address regional needs through 2010.

The 1984 document includes the Page Avenue Extension (with a generalized alignment linking it to Interstate Highway 70 east of Highway K) in its 9511 Network of proposed regional highway improvements (pages 62 and 82). The 9511 Network is described as a "maximum build.....most ambitious program" as compared to other alternatives (pages 53-54).

The Page Avenue Extension is not included in the 9512 Network, the Long-Range Transportation Plan's recommended alternative representing a balance between the "minimum-build" and "maximum-build" networks. The East-West Gateway Coordinating Council (EWGCC) utilizes a broad array of objective and subjective criteria in making its determinations of any project's worth. Much of this work is described and summarized in Highway Project Evaluations (1984), a technical paper documenting interim products of the Long-Range Transportation Plan.

The Page Avenue Extension is assigned to the Medium Priority classification as a project priority based upon quantitative analysis (pages 58-60). However, the application of an array of more subjective criteria (qualitative constraints) further reduces its classification. The technical paper combines its consideration of the Page Avenue Extension with the Route 115 improvements. The EWGCC transportation planning staff writes:

> "Page Avenue Extension: Bennington Place to I-70 Route 115 Extension: I-270 to I-70. The projects have been proposed as alternative means of relieving the heavy congestion associated with the existing Missouri River crossings. Although the need for such relief is obvious, particularly in the case of the I-70 bridge, social and environmental factors, the lack of consensus among concerned governmental units as to which project

should be pursued, and the high costs relative to funding realities, preclude recommendation of either project at this time. Consideration of less extensive improvements to address the crossings' problem may be warranted.

Action taken: downgrade to low priority" (pages 62-63).

EWGCC has engaged in transportation planning as an ongoing, open-ended, fluid process for many years. It should be noted that it regularly has prepared more narrowly focused, sub-regional documents such as the St. Charles County Transportation Study (1987), previously cited, in the course of its long-range transportation planning work. This newer document unequivocally supports the Page Avenue Extension and, moreover, recommends the Red Alignment for its implementation.

3.14 FLOODPLAINS

Federal Emergency Management Agency (FEMA) National Flood Insurance program maps were used to delineate areas of the regulatory floodways and floodplains (Figure 3.9). The Creve Coeur Creek/Creve Coeur Lake, Missouri River and Dardenne Creek floodplains would be encountered depending upon the alignment or combination implemented. Within these floodplains are regulatory floodways.

The floodway is the channel of a river plus any adjacent floodplain areas that must be kept free of encroachment in order that the Base Flood (1% chance event) may be conveyed without causing more than a one foot increase to the Base Flood Elevation. Any encroachment in the floodway must be designed so that it would not result in any increase to the Base Flood Elevation (100-year).

3.15 PEDESTRIAN AND BICYCLIST ACTIVITIES

Pedestrian and bicyclist activities occur throughout the Page Avenue Extension project area. Some of them are structured activities coordinated by a group for a particular time and specified locale. Examples of this include the bike rides that local enthusiasts regularly organize on roadways in and around Creve Coeur Lake Memorial Park and associated wetlands and floodplains in St. Louis County. Most of it, however, probably comprises children playing and adult individuals or couples exercising or traversing relatively short distances on errands. In general, most of the project area is not especially well-suited for unstructured walking, jogging, running, hiking, biking, etc. For example, most residential subdivisions lack sidewalks, a fact that probably discourages casual walkers and young cyclists.

Formalized multipurpose trails designed for non-motorized activities have been developed in the project area to a limited degree and more are contemplated. The City of St. Peters is well underway in its ambitious program to link many of its community facilities with a bikeway network. The City of Lake St. Louis has enacted an ordinance that authorizes development of its bikeway system. Other municipal bikeways within the

St. Charles County or St. Louis County portions of the project area are probable this decade.

The State of Missouri Department of Natural Resources, however, is developing its KATY Trail State Park for hiking and bicycling along an abandoned, approximately 200-mile long stretch of the Missouri-Kansas-Texas Railroad (MKT or KATY) right-of-way. Within the project area, the KATY trail proceeds along the abandoned rail right-of-way on the edge between the floodplains and bluffs in St. Charles County. Railroad bridges are adopted for use by installing wooden decking and safety rails. The project area's segment became operational in 1991. The Page Avenue Extension would pass above it at any of four points, depending upon the alignment or combination ultimately implemented.

The KATY Trail State Park is intended solely for hikers and bicyclists, including the elderly and the physically disabled. Hunting, horseback riding and motorized vehicles (except powered wheelchairs) are excluded. Security measures at trail heads and road crossings deter unauthorized vehicles from entering the corridor. The City of St. Peters has plans to extend one or two of its bikeways to link with the KATY Trail State Park. The City of St. Charles has retained its ownership rights to part of the former railroad right-of-way and is exploring the concept of operating a "tourism train" along the Missouri River.

At this time, there are no designated multipurpose trails located within the St. Louis County portion of the project area. However, some pedestrian pathways in Creve Coeur Lake Memorial County Park (CCLMP) are used by bicyclists, although they were not intended for this purpose. Insofar as can be determined, no multipurpose trails exist, or are formally planned, on the St. Louis County side of the Missouri River. It has, however, been suggested that there is potential for a St. Louis County Missouri River riverfront trail within the project area.

3.16 CULTURAL RESOURCES

Cultural resources include examination of historic sites, buildings and archaeological sites.

3.16.1 Survey Rationale

An overview study of cultural resources of the Page Avenue Extension project entitled "An Overview of the Cultural Resources Within the Vicinity of the Page Avenue Extension, St. Louis and St. Charles Counties, Missouri" was prepared to satisfy NEPA requirements for the FEIS. This overview characterizes the types of cultural resources that may occur in the project area. Moreover, it provides sufficient information with which to assess the possible impacts of the construction of any particular route or alignment. Furthermore, this overview provides sufficient context to evaluate the potential significance of any identified site that may be impacted.

In accordance with Section 106 of the National Historic Preservation Act (as amended), an intensive and systematic cultural resources survey of the

proposed project area has been completed by MHTD to the extent possible. Results of this cultural resource survey are presented in Section 4.22.

3.16.2 Cultural Resources: A Definition

Cultural resources are connoted to include historic sites, historic-architectural sites, prehistoric or historic archaeological sites, or other sites of unusual cultural value. No sites of the latter type exist within the Page Avenue Extension project area. Historic sites include those places that are associated with persons or events of local, regional or national historical significance, or that epitomize, typify or otherwise are symbolic of prominent eras, places or communities of local, regional or national significance. Historic-architectural sites include buildings or other structures that are or were considered of outstanding design, that are associated with a prominent architect or engineer, or that represent outstanding or unique examples of an era or style. Prehistoric archaeological sites include those physical places that contain the remnants or evidences of prehistoric human activities. This comprises artifacts or other information (data) pertinent to the scientific study of prehistory. Historic archaeological sites include sites that would otherwise be considered as historic or historic-architectural sites, but which have deteriorated to the point that all that remains are artifacts left in an archaeological context. Specific sources consulted are listed in the referenced section of the overview.

Sites are included in this survey as cultural resources or potential cultural resources if they meet the definition of historic properties outlined in 36 CFR 800.2(e), or if it is apparent that the criteria of eligibility for inclusion in the National Register of Historic Places might reasonably be applied to them. Guidance on this was sought from 36 CFR 60 (August 1988), National Register Bulletin 15, Guidelines for Applying the Criteria of the National Register of Historic Places, The Master Plan for Archaeological Resource Protection in Missouri (Weston and Weichman, 1987), as well as a review of the types of properties listed on the National Register or considered eligible for the National Register at the Missouri Department of Natural Resources Office of Historic Preservation. The listing of such properties in this report in no way implies that they already are listed on the National Register, or that they have been determined eligible for it, unless it is so stated specifically.

3.16.3 Survey Methods

The survey of cultural resources associated with the Page Avenue project consisted of two basic phases. The initial phase consisted of the examination and review of archival records. The site file records of the Archaeological Survey of Missouri and the Missouri Department of Natural Resources Office of Historic Preservation (MDNROHP) for St. Louis and St. Charles Counties were examined for information pertaining to known archaeological sites. Cultural resource survey reports on file at MDNROHP were examined for information pertaining to the results of surveys within or near the project study area and additional information on specific sites. Information pertaining to local history, historic sites, and historic architectural sites was examined from primary and secondary

materials on hand at MDNROHP, the State Historical Society of Missouri, the Missouri State Library, the Missouri State Archives, and the St. Charles County Historical Society. The St. Louis County Historic Buildings Commission and the Creve Coeur Historical Society, a local group in St. Louis County, also were contacted for information regarding such sites. An extensive discussion on the area's historical background and cultural history provides documentation of these efforts and provides the historical context against which specific sites can be evaluated.

The second phase of the survey involved a systematic examination of the project area for previously unreported cultural resources. A pedestrian survey was made for all areas where permission could be obtained. This survey followed standard archaeological practices and included systematic shovel testing for those areas with poor visibility. Archaeological sites that were discovered during the survey were plotted on maps, described, and a representative sample of artifacts was collected from the site. All previously unreported sites that were found during the survey have been reported to the Archaeological Survey of Missouri and assigned official site numbers.

Historic architecture also was examined during the survey. With permission from MDNROHP, the evaluation and documentation of architectural remains was limited to those properties believed to be 50 years in age or older. Historical and photographic documentation of such properties has been submitted to MDNROHP for their evaluation and determination of eligibility.

3.16.4 The Page Avenue Extension Project Study Area

The Page Avenue Extension project study area is bounded, roughly, by Route I-270 on the east, Route 40/61 (future Route I-64) on the south and west, and Route I-70 on the north. It includes a small area of rolling, loess-covered hills in St. Louis County, a segment of the Missouri Trench extending from bluff to bluff in the vicinity of Creve Coeur Lake and Green's Bottom, and a large area of rolling, loess-covered uplands in St. Charles County. The latter area, bounded by Route 40/61, Route I-70 and the Missouri River bluffline, is known locally as the "Golden Triangle." Brief discussions of the local physical and biological environments, insofar as they relate to prehistoric and historic occupation of the area, are included in the overview.

A detailed description of the alternate corridors considered is provided in Chapter 2 of this document.

3.16.5 Types of Cultural Resources in the Page Avenue Extension Project Study Area

Prehistoric sites in the project study area may range in age from Paleoindian through the Protohistoric Periods. Surveys within the project study area, or in proximity to it, have yielded Paleoindian, Early Archaic, Middle Archaic, Late Archaic, Early Woodland, Middle Woodland, Late Woodland, Early Mississippian and Middle Mississippian sites or artifacts. Historic Indian or Oneota sites have not been identified in the area. Paleoindian, Early and Middle Archaic and Late Woodland sites

are comparatively rare and neither well-documented nor known. By comparison, Late Archaic and Late Woodland sites are much more frequently recognized and have received somewhat more attention. Some small Mississippian farmstead sites also have been recognized and excavated, such as 23 SC55/66. In general, however, the majority of the information relating to prehistoric sites in the area comes from surface surveys. Proportionally, there is much less existing excavation data. Some of it is located in relatively obscure places, or is cursory, and therefore for most purposes is either inaccessible or inadequate.

In terms of site types, most known sites are open sites. These may be campsites, villages, or extractive sites, or if site function is problematic, "lithic scatters." There are known cave or rockshelter sites in the project study area. Burial sites, such as mounds, rock cairns, or cemeteries are known from the vicinity of the project area and surrounding areas. Most have been destroyed, excavated or looted. These are especially likely to occur along the higher blufftops. No prehistoric mortuary sites have been identified within the project areas thus far.

Reliance on surface indications for the determination of site significance or integrity is often problematic in this area because of decades of relatively intense surface collection. The relatively small number of diagnostic artifacts recovered during the Phase I survey (and thus the limited number of sites that could be dated) is a direct consequence of long-term, selective artifact collecting by local amateurs. Soil erosion and agricultural practices have further damaged site integrity in many instances, sometimes obviating the scientific value of specific sites. In several instances, however, it has been demonstrated that subplowzone, in situ deposits yielding information on community settlement patterns and subsistence still remain, even where surface indications are scant. Overall, intact subplowzone cultural deposits are most likely to be preserved in certain alluvial settings such as portions of the Missouri River or Dardenne Creek floodplains. Intact cultural deposits are less likely to be found in hillslope or hilltop settings.

Historic sites in the project study area are largely limited to sites of local significance. These include sites associated with persons or events of some identifiable prominence during a particular era of the area's historical development (e.g., the colonial era, the early American frontier, settlement and expansion, etc.), or some aspect of a particular era (e.g., the fur trade). Many, but not all, such sites that are listed in such sources within the project study area are included in the Page Avenue Extension cultural resources overview. Some of those that are in the vicinity of the proposed Page Avenue Extension are listed specifically below.

Some sites, notably those along the route of the original Boone's Lick Trail (road), have been evaluated by at least some reviewers as being of national significance. These were recognized decades ago by the Daughters of the American Revolution (DAR), who erected markers at the sites in 1913. It does not appear that these sites (Coontz Fort, Gill Tavern, Naylor's Store) will be directly affected by construction of the proposed project. These sites exist as historic archaeological sites, if at all,

aside from the DAR markers. The marker for Gill Tavern apparently has been moved from its original location.

Another major historical event with which portions of the project study area might be associated is the famous Meriwether Lewis and William Clark expedition of 1804. It has been suggested that they camped in the vicinity of Spring Bend after traveling upstream from St. Charles. According to their notes, however, they camped on an island in the Missouri River on the night of May 21, 1804. Accordingly, claims that they camped that evening at Spring Bend are questionable.

The last historical event of national significance with which any site within or adjacent to the project study area is associated is World War II and the development of the atomic bomb. Some of the development of this technology occurred at Weldon Spring. No sites associated with this era or project will be impacted by the proposed construction. The Weldon Spring Ordnance Works, now abandoned, lies southwest of the project area. It is not specifically discussed in the overview because it is outside the overview limits.

Historic architectural sites within the project study area are limited, for the most part, to examples of period architecture that reflect the preferred styles and/or construction techniques of a particular era. Almost all of these were originally isolated on rural individual farmsteads. Some occur(red) in small hamlets. Examples of the types of structures typical of the area during the nineteenth and early twentieth centuries are included in the overview. Listings of structures included in previous surveys of such sites that lie within the project study area are also included.

Many of the examples are vernacular with some ornamental adornments borrowed from more formal styles added as trim. Occasionally there is an example of a more "high" style structure. The rural styles in St. Charles County are similar, in general, to the styles visible in the City of St. Charles. Usually, pure formal architectural styles are reserved for public buildings, churches in particular. Several examples occur in the Golden Triangle area. None are threatened by the Page Avenue Extension. Examples of rural domestic architecture are fast disappearing in the project area, as farming continues to decline and residential suburbia expands.

The results of the intensive field survey are presented in Section 4.22.

3.17 PUBLIC LANDS

Inasmuch as the Page Avenue Extension would be funded partly with federal monies, properties that are publicly-owned public parks, recreation areas, waterfowl and wildlife refuges, or historic sites would require evaluation per Section 4(f) of the Department of Transportation Act (80 Stat. 931, Public Law 89-670) as codified in 49 USC 303 and 23 USC 138. Section 601 of the Pipeline Safety Act of 1992 permits the Secretary of Transportation to waive the requirements of Section 4(f) for the Red Alignment only in the proposed action.

Areas that received funding from the Land and Water Conservation Fund Act (LWCF) must be evaluated according to Section 6(f) requirements. Under this program, suitable replacement lands must be provided as part of the project implementation. While there are numerous public facilities within the project area, and multiple possible Page Avenue Extension routes, there is only one site that raises Section 6(f) issues. Creve Coeur Lake Memorial Park, in St. Louis County, is near the eastern terminus of the Red Alignment. This park and lake provide numerous passive and active recreational opportunities including athletic fields, playgrounds, an archery range, picnic areas, tennis courts, boating, fishing, sunbathing and bird watching. The facility constitutes Section 6(f) lands because of its history of LWCF funding sources. It is owned and operated by St. Louis County's Department of Parks and Recreation.

The KATY Trail State Park in St. Charles County is also subject to the waiver provided by Section 601. This trail system is being developed along the old Missouri-Kansas - Texas Railroad (KATY) line that runs along the Missouri River. Each alignment or combination would cross this trail only once.

Individual alignment analyses are included in the accompanying Section 6(f) Evaluation concerning Creve Coeur Lake Memorial Park.

Three properties in St. Charles County have been identified as Section 6(f) resources. These include:

- Wapelhorst Community Park (Pronque Tract) #29-00869
- St. Peters Brookmount Linear Trail #29-01291
- St. Peters Sports Center Area #29-01072L

None of these are directly impacted by any of the proposed alignments or combinations of the Page Avenue Extension.

Environmental Consequences 4.0

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter describes the probable beneficial and adverse social, economic and environmental impacts of each of the alternate alignments and combinations under consideration for the Page Avenue Extension. Such impacts range in scope from none (no probable impact) or negligible to local impacts to general impacts. As a rule, beneficial impacts would tend to be more large-scale, i.e. spread throughout bigger geographical areas and/or populations. Adverse impacts would tend to be localized.

4.1 LAND USE IMPACTS

The Page Avenue Extension will affect land use patterns within its immediate vicinity along its entire length. Beyond these direct impacts, it will have important consequences for development throughout the St. Louis Region. Existing land use throughout the Page Avenue Extension project area is highly variegated (Figure 4.1). This is predictable given broadly differentiated natural conditions (i.e. a major river with locally significant tributaries, associated floodplains and wetlands, one of Missouri's largest natural lakes, river bluffs, soils suitable for agriculture, etc.) and evolving metropolitan development patterns.

4.1.1 Consistency of Alternates and Local Plans

Existing local plans are discussed, at length, in Section 3.13, EXISTING PLANNING.

Since the 1986 publication of the Missouri Highway and Transportation Department's (MHTD) Reconnaissance Report, a number of planning documents have been prepared by various local, county, and regional authorities. Without exception, the final documents that address project area transportation issues assume and/or advocate implementation of the Page Avenue Extension Red Alignment (Red Alternate).

The primary transportation planning document produced since 1986 with bearing upon the Page Avenue Extension has been the East-West Gateway Coordinating Council's St. Charles County Transportation Study (1987). Much of its analysis is devoted to consideration of four possible Page Avenue Extension corridors. It concludes that a Page Avenue Missouri River crossing is necessary (page 118) and "...that the Red Line Alternate should be selected..." (page 120).

In retrospect, it is clear that issuance of the Reconnaissance Report represented a watershed event in local planning. Prior to this action, there was no apparent local consensus as to how necessary the Page Avenue Extension might be, in general, or where it should go, in particular, as expressed in official documents. By publishing its analysis, MHTD seems to have effectively resolved these controversies insofar as interested local planning entities are concerned.

4.1.2 Direct Land Use Impacts

Direct land use impacts, i.e. the "footprints" of the various alternates, are reported below. Since preparation of the DEIS, certain modifications have been made. The land use impacts data has been updated. Also, data has been generated pertaining to the new Yellow-Black and Blue Segments.

Additional land use data changes are attributable to a new interchange.

A site has been selected in St. Louis County along the Red Alignment for an interchange with River Valley Drive that would connect to Creve Coeur Mill Road. (The portion of the Red Alignment over Creve Coeur Mill Road and the interchange area also would accommodate a future connection to the proposed Earth City Expressway Extension, if built.) This interchange would add an additional 47.9 acres of agricultural land to the Red Alignment's direct land use impacts.

Comparable interchanges have been conceptualized for the Green Alignment and various combinations. An estimated 55.0 acres would be required to accommodate the Green-Black and Yellow-Black Segments. About 45.8 acres would be needed to serve the Blue Segment and, with minor adjustments, the Green Alignment.

Subsequent land use data reflects the addition of these interchanges, as well as other modifications, since the DEIS was issued.

Land use classifications are detailed in the Land Use section of 3.8, Affected Environment.

TABLE 4.1-1
RED ALIGNMENT LAND USE IMPACTS IN ACRES

	RES	COM	IND	PUB	REC	TRA	EXT	OTH	TOTALS
St. Louis County	48.4	0	0	0	40.6	1.0	0	134.2	224.2
Mitigation Plan	4.0	33.2	0	.0	44.0	0	0	557.8	639.0
St. Charles Co.	17.7	10.5	0	.7	.3	.9	0	1,032.8	1,062.9
Totals	70.1	43.7	0	.7	84.9	1.9	0	1,724.8	1,926.1

MHTD would implement the mitigation plan described in Section 601 of the Pipeline Safety Act of 1992 in St. Louis County to expand Creve Coeur Lake Memorial Park (CCLMP), as well as create a hiking/biking path link to the KATY Trail State Park as part of a mitigation program for traversing CCLMP. The Enhancement Plan is described in the Section 6(f) Evaluation.

The Red Alignment, west of the common point, can be combined with three different segments east of the common point. Each of the resultant combinations would avoid any direct impacts within CCLMP. None would

include any element of the mitigation plan. Included are the Green-Black/Red Combination, the Yellow-Black/Red Combination and the Blue/Red Combination.

TABLE 4.1-2
GREEN-BLACK/RED COMBINATION LAND USE IMPACTS IN ACRES

	RES	COM	IND	PUB	REC	TRA	EXT	OTH	TOTALS
St. Louis County	37.5	8.3	12.4	0	4.5	.5	0	146.2	209.4
St. Charles Co.	17.7	10.5	0	.7	.3	.9	0	1032.8	1062.9
Totals	55.2	18.8	12.4	.7	4.8	1.4	0	1179.0	1272.3

TABLE 4.1-3
YELLOW-BLACK/RED COMBINATION LAND USE IMPACTS IN ACRES

	RES	COM	IND	PUB	REC	TRA	EXT	OTH	TOTALS
St. Louis County	29.4	8.3	16.5	1.7	4.5	.5	0	151.3	212.2
St. Charles Co.	17.7	10.5	0	.7	.3	.9	0	1032.8	1062.9
Totals	47.1	18.8	16.5	2.4	4.8	1.4	0	1184.1	1275.1

TABLE 4.1-4
BLUE/RED COMBINATION LAND USE IMPACTS IN ACRES

	RES	COM	IND	PUB	REC	TRA	EXT	OTH	TOTALS
St. Louis County	37.4	0	0	0	0	1.0	0	171.4	209.8
St. Charles Co.	17.7	10.5	0	.7	.3	.9	0	1032.8	1062.9
Totals	55.1	10.5	0	.7	.3	1.9	0	1204.2	1272.7

The Green Alignment and its combinations each avoid the main portion of CCLMP. However, the Green Alignment does cross CCLMP's leased non-contiguous southern tip. None of these routes include a CCLMP mitigation plan. Variations of the Green Alignment include the Green-Black/Green, Green/Green Dashed and Green/Green-Blue Dashed/Red/Green Combinations.

TABLE 4.1-5
GREEN ALIGNMENT LAND USE IMPACTS IN ACRES

	RES	COM	IND	PUB	REC	TRA	EXT	OTH	TOTALS
St. Louis County	37.2	0	0	0	8.1	.7	0	137.9	183.9
St. Charles Co.	110.8	6.4	1.6	0	0	0	0	385.8	504.6
Totals	148.0	6.4	1.6	0	8.1	.7	0	523.7	688.5

TABLE 4.1-6
GREEN-BLACK/GREEN COMBINATION LAND USE IMPACTS IN ACRES

	RES	COM	IND	PUB	REC	TRA	EXT	OTH	TOTALS
St. Louis County	37.5	8.3	12.4	0	4.5	.5	0	125.5	188.7
St. Charles Co.	110.8	6.4	1.6	0	0	0	0	385.8	504.6
Totals	148.3	14.7	14.0	0	4.5	.5	0	511.3	693.3

TABLE 4.1-7
GREEN/GREEN DASHED COMBINATION LAND USE IMPACTS IN ACRES

	RES	COM	IND	PUB	REC	TRA	EXT	OTH	TOTALS
St. Louis County	37.2	0	0	0	8.1	.7	0	137.9	183.9
St. Charles Co.	81.2	6.4	1.8	0	0	0	0	448.1	537.5
Totals	118.4	6.4	1.8	0	8.1	.7	0	586.0	721.4

TABLE 4.1-8
GREEN/GREEN-BLUE DASHED/RED/GREEN COMBINATION
LAND USE IMPACTS IN ACRES

	RES	COM	IND	PUB	REC	TRA	EXT	OTH	TOTALS
St. Louis County	37.2	0	0	0	8.1	.7	0	137.9	183.9
St. Charles Co.	85.1	7.6	1.6	.9	0	0	0	529.1	624.3
Totals	122.3	7.6	1.6	.9	8.1	.7	0	667.0	808.2

4.2 FARM IMPACTS

Project area bottomlands of the Missouri River and Dardenne Creek are used extensively for agriculture. The acreage of farmland to be converted to highway under the various alternates has been estimated by using preliminary highway maps.

Coordination was conducted with the U. S. Department of Agriculture , Soil Conservation Service (SCS), to determine the potential impacts of the proposed alignments to prime, unique, or statewide or locally important farmland. SCS completed the Farmland Conversion Impact Rating form (AD 1006) for both St. Louis and St. Charles Counties. The completed forms are in the "Comments and Coordination" section.

In St. Louis County, the Red Alignment combined with its Mitigation Plan would convert 642 acres of prime and unique farmland to highway. The Green Alignment would convert about 52 acres from prime and unique farmland to highway. The Green/Green-Black Alignment would also convert about 52 acres of prime and unique farmland, as would the other Green Alignment variants.

The Green-Black/Red, Yellow-Black/Red and Blue/Red Combinations would convert 342,341 and 328 acres, respectively.

In St. Charles County, the Red Alignment would convert about 180 acres of prime and unique farmland. The Green Alignment would convert about 121 acres from farmland to roadway. The Green/Green Dashed Alignment would convert 153 acres of farmland to roadway. The Green/Green-Blue Dashed/Red/Green Alignment would convert 133 acres of prime and unique farmland to roadway. Each of the Red Alignment's variants would convert 180 acres in St. Charles County.

TABLE 4.2-1
PRIME AND UNIQUE FARMLAND CONVERSION

	RED	GREEN-BLACK/ RED	YELLOW-BLACK/ RED	BLUE/RED
St. Louis Co.	642*	162	161	148
St. Charles Co.	180	180	180	180
Totals	822 Acres*	342 Acres	341 Acres	328 Acres

* Includes Mitigation Plan

	GREEN	GREEN/GREEN-BLACK/GREEN	GREEN/GREEN DASHED/GREEN	GREEN/GREEN-BLUE DASHED RED/GREEN
St. Louis Co.	52	52	52	52
St. Charles Co.	121	121	153	133
Totals	173 Acres	173 Acres	205 Acres	185 Acres

The site assessment criteria and land evaluation scores combined are as follows:

TABLE 4.2-2
FARMLAND SITE ASSESSMENT CRITERIA AND LAND EVALUATION SCORES

	RED	GREEN-BLACK/RED	YELLOW-BLACK/RED	BLUE/RED
St. Louis Co.	149*	140	142	139
St. Charles Co.	134	134	134	134

* Includes Mitigation Plan

	GREEN	GREEN/GREEN-BLACK/GREEN	GREEN/GREEN DASHED/GREEN	GREEN/GREEN-BLUE DASHED RED/GREEN
St. Louis Co.	150	151	150	150
St. Charles Co.	128	128	127	131

These figures are below the 160 points indicated as a minimum for consideration of protection of farmland in the Farmland Protection Act.

It is recognized that an additional order of farm impacts would result relative to landlocked parcels, adverse travel, severed operations, etc. Such phenomena may occur at multiple locations in agricultural areas along any of the alignments or combinations. Final design could eliminate or ameliorate many of these problems. Moreover, non-agricultural development could convert many farmsteads prior to implementation that would otherwise be impacted.

4.3 SOCIAL IMPACTS

The social impacts of the Page Avenue Extension would be somewhat muted by the high degree of socio-demographic homogeneity of the Page Avenue Extension project area. Basically, the potentially impacted population comprises middle to upper-middle class young to middle-aged white households. There are no known established concentrations of any sub-populations characterized by race, ethnicity, age, physical disabilities, etc. anywhere within the project area except for individuals receiving extended care at social service facilities or nursing homes. However, none of these facilities would appear to be prospectively directly impacted by any of the alignments or combinations under current consideration except for the Missouri Division of Mental Health's group home at 13100 Greenbough Drive in St. Louis County. This facility would be displaced by the Green Alignment and the Green-Black/Green and Green/Green Dashed Combinations.

Other predictable social impacts are described in the analyses which follow.

4.3.1 Regional Decentralization Impact

As noted in Section 3.11.1, total estimated population growth in the St. Louis Metropolitan Statistical Area between 1970 and 1990 was only 15,446. The 1970 population was 2,428,652. By 1990 it had risen to 2,444,099 representing a net gain of only 0.64% in twenty years. During the same period, St. Charles County as a whole more than doubled in population. Its 1970 population of 92,954 grew to 212,907 in 1990, a gain of 119,953 or 129.05%. All of St. Louis County registered more modest growth. Its 1970 population of 951,671 reached 993,529 in 1990, an increase of 41,858 or 4.40%.

It is the consensus among local population analysts that St. Louis County may be approaching its population peak within the foreseeable future. However, St. Charles County is expected to continue its strong population growth (at various projected rates) for another decade or more. Regional population forecasts predict very modest growth.

Within the context of this "slow growth/no growth" recent regional history and prospects, some local planners and others question if it makes sense to further decentralize population and development. It can be argued that each new subdivision in St. Charles County, historically an outlying agrarian exurban area, represents only, in effect, centripetal population redistribution and not real growth. The argument continues that this ought not to happen because it makes it too difficult for more centrally located political jurisdictions to stabilize their populations and economic bases.

"Decentralization of jobs and people" is one of the stated subthemes of St. Louis County's 1985 General Plan Update (page 1). In reference to projects such as the Page Avenue Extension it notes that:

> "The construction of new bridges across the Missouri River would allow a more efficient movement of people and goods to and from St. Louis County and its neighbors. While the availability of such new bridges could foster further decentralization of people and jobs to outlying counties, such improvements to the regional transportation system could also benefit St. Louis County." (page 33)

It later states that "....the movement toward decentralization of jobs to other parts of the region is a significant issue facing the (St. Louis) County." (page 40) It goes on to remark that the development of new employment centers such as Earth City, Chesterfield Valley and Riverport, all of which are situated on the outer edges of St. Louis County, "...could serve employment needs of outlying counties with relative ease and thereby promote additional decentralization of service jobs and people to those areas." (page 41)

Large-scale decentralization within the St. Louis Region is an ongoing, complex, multicausal process that predates the first notions of a Page Avenue Extension by more than two decades. Whether it is good, or bad, inevitable, or avoidable, to be welcomed, or endured, depends upon the points of view of interested observers. However, it is fair to predict that an operational Page Avenue Extension, along any possible route, would facilitate, if not accelerate, historical regional decentralization trends.

4.3.2 Neighborhood and Community Cohesion

Single-family homes arrayed in subdivisions and low-rise multi-family townhouse/condominium/apartment complexes are the basic neighborhood and community building blocks of the Page Avenue Extension project area. People live in other circumstances (farm houses, mobile homes, group facilities, large estates, etc.) but subdivisions and multi-family complexes are, by far, the dominant residential modes. Such developments, by their very natures, tend to house large numbers of people of similar socio-economic circumstances within recognized geographic limits.

The Page Avenue Extension would inevitably impact a series of such developments. The construction of major new roadways in urbanized areas necessitates disrupting established communities. The nature of these impacts can vary in both duration and severity depending upon the precise route as well as local factors.

Lists have been compiled of the various communities/neighborhoods/developments that exist across possible routes of the Page Avenue Extension. It should be noted that potential impacts can be modified, and often avoided, during final design. Each of the eight basic alignments or combinations are detailed below:

The Red Alignment (St. Louis County)

1. Parkway Estates
2. The Village of Seven Pines
3. Seven Pines
4. Royal Pines (grounds only)

The Red Alignment (St. Charles County)

1. Harvest Acres
2. Greenwood Acres
3. Cottle Heights
4. Westwood Manor

The Green-Black/Red Combination (St. Louis County)

1. Parkway Estates
2. Sherwood Manor
3. Willowyck Estates

4. Greenfield (Polo Run)
5. Old Farm Estates

The Green-Black/Red Combination (St. Charles County)

Identical to Red Alignment

The Yellow-Black/Red Combination (St. Louis County)

1. Parkway Estates
2. Willowyck Estates
3. Greenfield (Polo Run)
4. Old Farm Estates

The Yellow-Black/Red Combination (St. Charles County)

Identical to Red Alignment

The Blue/Red Combination (St.Louis County)

1. Seven Pines
2. The Village of Seven Pines
3. Old Farm Estates
4. Amiot

The Blue/Red Combination (St. Charles County)

Identical to Red Alignment

The Green Alignment (St. Louis County)

1. Parkway Estates
2. Sherwood Manor
3. The Village of Seven Pines
4. Windsor Park (Polo Run)
5. Greenfield (Polo Run)
6. Old Farm Estates

The Green Alignment (St. Charles County)

1. The Bluffs
2. Bluff Meadows
3. Summerview Estates
4. Summerfield Parkway Estates
5. Stafford Estates
6. Stafford Place II
7. Nottingham Forest
8. The Farm
9. Hunter's Pointe
10. Sunny Meadows
11. Sunny Hills

12. Englewood
13. Brookwood Estates
14. Summerwinds Estates
15. Four Winds

The Green-Black/Green Combination (St. Louis County)

Identical to Green-Black/Red Combination

The Green-Black/Green Combination (St. Charles County)

Identical to Green Alignment

The Green/Green Dashed Combination (St. Louis County)

Identical to Green Alignment

The Green/Green Dashed Combination (St. Charles County)

1. The Vineyards
2. Stafford Estates
3. Stafford Place II
4. Nottingham Forest
5. The Farm
6. Hunter's Pointe
7. Sunny Meadows
8. Sunny Hills
9. Englewood
10. Brookwood Estates
11. Summerwinds Estates
12. Four Winds

The Green/Green-Blue Dashed/Red/Green Combination (St. Louis County)

Identical to Green Alignment

The Green/Green-Blue Dashed/Red/Green Combination (St. Charles County)

1. Woodmere
2. Woodcliff
3. Merriweather Park
4. Country Side
5. Forest Spring
6. Harvest Acres
7. Hunter's Pointe
8. Sunny Meadows
9. Sunny Hills
10. Englewood
11. Brookwood Estates
12. Summerwinds Estates

13. Four Winds

The nature and amount of social impacts will largely depend upon which alignment and its final design. Such impacts can be minimized but they cannot be eliminated.

Predictable neighborhood social impacts of the Page Avenue Extension include:

1. Splitting some neighborhoods;

2. Isolating fragments of certain neighborhoods;

3. Potentially interfering with access to, or the availability of, certain public services in certain locations; and

4. Increasing relative residential property values beyond the immediate vicinity of the roadway.

On balance, by utilizing preserved corridors, a high percentageof existing rights-of-way, and undeveloped land, the Red Alignment will produce the lowest levels of adverse neighborhood social impacts.

One of the controversies to date has concerned any interchange between the Red Alignment and Amiot Drive in St. Louis County. One proposal for this interchange was to provide access off the Red Alignment to the east to Marine Avenue and access on to the Red Alignment to the west from Marine Avenue. The original concept of providing a grade separation at Amiot Drive for the Red Alignment with no access to or from Marine Avenue has been rejected. Well over one hundred letters were received as a result of scoping meetings and the public hearing. A majority of the letters strongly opposed any access to or from the Red Alignment at Amiot Drive. A similar majority also opposed any closure of Amiot Drive that would eliminate access to and from Marine Avenue.

Although MHTD has no plans to provide a Red Alignment interchange at Amiot Drive, it has come to recognize the need for another St. Louis County interchange between Bennington Place and the Missouri River. At and around the common point, any of the alignments or combinations would have a full-access interchange with River Valley Drive which, in turn, could be utilized by Creve Coeur Mill Road traffic. Moreover, any of these facilities ultimately could be adapted for use with the Earth City Expressway Extension, if and when it is built. The area impacted is agricultural floodplain and social impacts would be minimal.

4.3.3 Changes in Travel Patterns and Accessibility

The basic purpose of the Page Avenue Extension, no matter which route might be implemented, would be to make it easier for St. Charles County residents to commute by automobile each workday to and from employment centers in St. Louis County and the City of St. Louis. By reducing work-

related commute times and problems, the Page Avenue Extension would make all of St. Charles County, in general, a better place to live. The downside for St. Charles County in regard to travel patterns and accessibility is the potential local disruption that would result, particularly in directly impacted residential communities, as noted in the previous subsection. On balance, the Red Alignment and the Green-Black/Red Yellow-Black/Red or Blue/Red Combinations would produce substantially fewer impacts than any other route.

The Red Alignment, by itself, would clearly have the least negative local circulation impacts in St. Louis County. However, any Page Avenue Extension would produce only a small benefit in reduced commute times for St. Louis Countians. Almost all of St. Charles County would directly, or indirectly, gain from reduced regional travel times. There would be no similar benefit in St. Louis County except for residents of the St. Louis County project area who might be close to an on-ramp and/or who need to regularly go to St. Charles County or points west. However, most people living in the St. Louis County portion of the project area would already have quicker ways of accessing I-70, I-270 and I-64 (Route 40) for regional travel than utilizing any possible route of the Page Avenue Extension.

In both St. Louis and St. Charles Counties, the primary advantage the Red Alignment enjoys relative to local circulation disruption is directly attributable to its utilization of a preserved corridor (in St. Louis County and parallel to Hemsath Road in St. Charles County) as well as existing rights-of-way (most notably Route 94 in St. Charles County). In large part, the Red Alignment was conceptualized to avoid social impacts of all kinds. As a result, it achieves this goal better than any other alignment or combination.

4.3.4 Community Services and Institutions

The Page Avenue Extension will impact school districts in two fundamental ways: student enrollments and local tax revenues. Insofar as can be determined at this time, no individual public school (or full-time private or parochial school) would be directly impacted by any possible route of the Page Avenue Extension. No school dislocation and relocation would take place.

In St. Louis County, the Parkway School District serves the bulk of the project area. The rest of it, basically north of Ameling Road, is within the Pattonville School District. The Red Alignment, the Green Alignment and all of their combinations would be located exclusively inside the Parkway School District (Figure 4.2).

Initially, any of these routes would result in fewer students and less tax revenue for the Parkway School District. However, the losses of students and tax revenue would be greatest as a result of the Green Alignment and its combinations. Conversely, the Red Alignment's CCLMP Enhancement Plan

would deny the Pattonville School District substantial revenues as large amounts of land were converted from private to public ownership.

In St. Charles County, the Francis Howell School District (R3), the Ft. Zumwalt School District (R2), and the Wentzville School District (R4) would each be impacted by the Red Alignment. The Green Alignment and Green/Green Dashed Combination would traverse the Francis Howell School District (R3) and the Ft. Zumwalt School District (R2). Likewise, the Green/Green-Blue Dashed/Red/Green Combination would be contained within the Francis Howell School District (R3) and the Ft. Zumwalt School District (R2). The Green Alignment would yield the greatest estimated enrollment losses in St. Charles County public schools.

Through time, any operational Page Avenue Extension would induce new development (both nearby and throughout St. Charles County) that would more than offset tax revenue losses necessitated by its construction. New school attendance areas and major school bus rerouting might be required in St. Charles County.

The potential disruptive impacts of any route of the Page Avenue Extension upon particular parochial or private schools in the bi-county project area could vary from none or negligible to substantial. These impacts can be quite localized. For the most part, they would be attributable to short-term population losses and/or long-term population gains.

It should be noted that the basic Green Alignment, specifically the section from Route 94 to Route I-70, would pass through the site of the new St. Charles County Community College campus on St. Peters-Cottleville Road. The initial phase of new development is complete and first classes were held in January of 1992. This institution represents both a major investment and employer for St. Charles County residents.

Any Page Avenue Extension would impact recreational areas and facilities (see Section 4.21). In St. Louis County, the Red Alignment would directly impact Creve Coeur Lake Memorial Park (CCLMP). The Green Alignment would take 8.1 acres of CCLMP's leased parkland. Other routes would avoid CCLMP, but would impact lesser recreation sites such as ballfields, golf facilities, a swimming pool, etc., all of which are private recreation areas. In St. Charles County, the only direct impact upon recreation would be the Red Alignment's taking of all or part of a privately-owned, commercial golf practice range on Route 40/61 (future Route I-64) for an interchange. No land would be required from the KATY Trail State Park, only an aerial easement.

Only one church might be directly impacted by any of the prospective Page Avenue Extension routes. In St. Louis County, part of the grounds at St. John Bosco Church, a parish ballfield, might be required to construct the Red Alignment, depending upon its final design.

Police protection in St. Louis County portion of the project area is provided by the City of Maryland Heights for the most part. A tiny

portion of the project area is within Chesterfield and is served by its police department. The balance of the area, including the Village of Champ, is protected by the St. Louis County Police.

In the St. Charles County portion of the project area, St. Charles, St. Peters, O'Fallon, Lake St. Louis and Wentzville each have municipal police departments. The St. Charles County Sheriff Department provides law enforcement services for the rest of the area. Additionally, the Missouri State Highway Patrol regularly patrols major roadways in both St. Charles County and St. Louis County.

The Page Avenue Extension would inevitably mean increased workloads for local law enforcement agencies inasmuch as there would be a new freeway to patrol.

Fire protection service for the project area in St. Louis County is provided by four fire protection districts: Creve Coeur, Chesterfield, Maryland Heights and Pattonville-Bridgeton Terrace. In St. Charles County, the project area is served by the City of St. Charles Fire Department as well as the Cottleville, Lake St. Louis, O'Fallon, St. Charles, St. Peters and Wentzville Fire Protection Districts. Any or all of these entities might ultimately have more households and businesses to protect as a result of growth directly or indirectly generated by the Page Avenue Extension (Figure 4.3).

One potential negative impact could be that the new roadway might represent an impediment to the timely arrival of local police, firefighters or emergency equipment at suburban locales in St. Louis County and/or St. Charles County. Typically, suburban residential area circulation networks are labyrinthine mazes with as few as one outlet and numerous cul-de-sacs. As such, they intentionally try to discourage speeding, foster a sense of neighborhood, eliminate traffic seeking shortcuts, etc. Through careful and thoughtful design, adverse impacts can be reduced and/or eliminated. Even local emergency services (fire, police and ambulance) sometimes can be, and are, slowed by suburban residential street layouts.

Any of the Page Avenue Extension alignments or combinations would be superimposed upon existing development patterns and circulation systems. As such, each has the potential of further complicating suburban residential circulation networks by, for example, creating more cul-de-sacs. In this regard, in both St. Louis and St. Charles Counties, the Red Alignment enjoys a special advantage as compared to the other routes. By utilizing preserved corridors and/or undeveloped non-residential areas, it would have comparatively minimal impacts upon existing local circulation systems. This suggests that relative to future emergency services response times, all other factors being equal, the Red Alignment would be inherently less of an impediment than any other route. In any case, thoughtful design can reduce or eliminate some such impacts.

4.3.5 Safety Impacts

The Page Avenue Extension would have only a marginal net impact upon highway and traffic safety and overall public safety. Any trips made upon the Page Avenue Extension should be safer, statistically, than those made on lesser thoroughfares.

4.3.6 Social Group Impacts

The Page Avenue Extension would have direct, and indirect, impacts upon a number of people. Some of these people would belong to recognized subpopulations or social groups. However, demographic research indicates that such individuals tend to be small in numbers and geographically dispersed throughout the project area.

The most obvious large group that would be impacted by the Page Avenue Extension would be displaced households. Household displacement, based upon 1989 and/or later data, is reported in Table 4.3-1 below.

TABLE 4.3-1
ESTIMATED DISPLACED HOUSEHOLDS

	St. Louis County	St. Charles County	Project Area
Red Alignment	17	54	71
(Mitigation Plan)	(3)	(0)	(3)
Green-Black/Red Combination	133	54	187
Yellow-Black/Red Combination	92	54	146
Blue/Red Combination	75	54	129
Green Alignment	168	396	564
Green-Black/Green Combination	133	396	529
Green/Green Dashed Combination	168	341	509
Green/Green-Blue Dashed/ Red/Green Combination	168	323	491

Insofar as can be determined at this time, there are no large numbers or known concentrations of subpopulations or any social groups that would be impacted within the Page Avenue Extension project area. It is assumed that subpopulations and social groups, when their numbers are known or can be reasonably estimated, would be impacted in proportion to their numbers within the general population. General population displacement estimates follow based upon 1980 "Gross Persons Per Household" statistics. Later figures would indicate fewer people per average household.

TABLE 4.3-2
ESTIMATED DISPLACED POPULATION

	St. Louis County	St. Charles County	Project Area
Red Alignment	47	169	216
(Mitigation Plan)	(8)	(0)	(8)
Green-Black/Red Combination	367	169	536
Yellow-Black/Red Combination	254	169	423
Blue/Red Combination	207	169	376
Green Alignment	464	1,239	1,703
Green-Black/Green Combination	367	1,239	1,606
Green/Green Dashed Combination	464	1,067	1,531
Green/Green-Blue Dashed/ Red/Green Combination	464	1,011	1,475

Within these populations are various subpopulations. Three key subpopulation displacement impacts have been estimated below. In each case, care has been taken to not underestimate these impacts.

Blacks are the largest known minority subpopulation group in the Page Avenue Extension project area. In 1980 they comprised 2.13% and 0.88% of the populations in the St. Louis County and St. Charles County portions of the project area, respectively. Table 4.3-3 assumes that these percentages have doubled since then.

TABLE 4.3-3
ESTIMATED BLACK DISPLACED POPULATION

	St. Louis County	St. Charles County	Project Area
Red Alignment	2	3	5
(Mitigation Plan)	(0)	(0)	(0)
Green-Black/Red Combination	16	3	19
Yellow-Black/Red Combination	11	3	14
Blue/Red Combination	9	3	12
Green Alignment	20	22	42
Green-Black/Green Combination	16	22	38
Green/Green Dashed Combination	20	19	39
Green/Green-Blue Dashed/ Red/Green Combination	20	18	38

Disabled household displacements are estimated elsewhere. However, not every person living in a "handicapped" family is disabled although such households will sometimes have more than one disabled person residing there. For this estimate, each "handicapped" household is assumed to have 1.33 disabled individuals. An additional six individuals are also included for the Green Alignment's totals in St. Louis County to allow for displacement of the Missouri Division of Mental Health's group home at 13100 Greenbough. The resulting figures are reported below.

TABLE 4.3-4
ESTIMATED DISABLED DISPLACED POPULATION

	St. Louis County	St. Charles County	Project Area
Red Alignment	0	1	1
(Mitigation Plan)	(0)	(0)	(0)
Green-Black/Red Combination	4	1	5
Yellow-Black/Red Combination	3	1	4
Blue/Red Combination	3	1	4
Green Alignment	11	13	24
Green-Black/Green Combination	4	13	17
Green/Green Dashed Combination	11	12	23
Green/Green-Blue Dashed/ Red/Green Combination	11	11	22

Census data from 1980 indicated that 4.21% and 3.06% of the project area's population was elderly (aged 65 and over) in St. Louis County and St. Charles County, respectively. These percentages are estimated to have risen to 5.89% and 3.98%. The following estimates of elderly displaced populations result, as indicated in Table 4.3-5.

TABLE 4.3-5
ESTIMATED ELDERLY DISPLACED POPULATION

	St. Louis County	St. Charles County	Project Area
Red Alignment	3	7	10
(Mitigation Plan)	(0)	(0)	(0)
Green-Black/Red Combination	22	7	29
Yellow-Black/Red Combination	15	7	22
Blue/Red Combination	12	7	19
Green Alignment	27	49	76
Green-Black/Green Combination	22	49	71
Green/Green Dashed Combination	27	42	69
Green/Green-Blue Dashed/ Red/Green Combination	27	40	67

The estimated potential displacement impacts of any of the possible routes would appear not to disproportionately fall upon black people (the only sizable minority or ethnic group), the disabled or the elderly. There is no reason to believe that non-drivers or transit-dependent individuals among active adults are numerous or would be disproportionately harmed.

Ethnic and minority business opportunities should be enhanced, to a limited extent, by the Page Avenue Extension. During its construction there will be substantial employment for minorities working in the building trades. Any induced development will also generate construction jobs. When operational, the Page Avenue Extension will facilitate the movement of people and commerce between St. Charles County and the rest of the St. Louis Region. Increased minority economic opportunities may result from this activity.

The principal positive social impact that the Page Avenue Extension could produce would be to ease the movement of people and commerce within the fastest growing area of the St. Louis Metropolitan Region. This benefit would be diffused among a large population, but it would be most concentrated among individuals living in St. Charles County. Other beneficiaries would include those employed to design, construct and maintain the Page Avenue Extension as well as those who would benefit most from induced development: business people, architects and engineers, bankers, urban and regional planners, lawyers, construction workers, public sector employees (schools, fire, police, administrative), real estate developers, etc.

4.4 RELOCATION IMPACTS

Construction of the Page Avenue Extension would require numerous properties of various kinds to be acquired in whole or in part. The

extent of such acquisitions, and necessary household and business relocations, are major considerations in evaluating the relative merits of the alignments and combinations under review.

4.4.1 Relocation Analysis Methodology

Relocation estimates for each of the Page Avenue Extension Alignments, segments and combinations have been prepared based upon circumstances that existed in 1989. More recent data has been developed for the Red Alignment and its combinations (St. Louis and St. Charles Counties) as well as the Green-Black Segment (St. Louis County). Field inspections, aerial photographs, surveys and maps were utilized for this purpose. The primary purpose of such estimates is to illustrate relative impact levels of the possible routes under consideration.

The Page Avenue Extension project area is vibrant, dynamic and growing, particularly in St. Charles County. Such growth, if nothing else, will alter the ultimate amounts and mixes of relocation impacts. Additionally, there is the problem that there can be no precise alignment, and no final relocation analysis, until detailed design work is completed. Within any possible corridor, the final design will modify the numbers of relocations. Even preliminary design work, for example, has reduced the Red Alignment's predicted relocations.

For the purposes of this report, any structure, site, or farm within any proposed right-of-way (250 feet to 600 feet or more) for all the alignments is usually considered a relocation property in its entirety. In reality, sometimes only a small part of such a property might be required and the remainder could function quite well for its owners. Conversely, it is sometimes necessary or desirable to acquire properties that are outside the right-of-way; for example, in order to ease drainage or noise abatement problems. Such indirect relocations are not reflected in the relocation impact totals. On balance, the following direct relocation estimates should be considered reasonable approximations only, based upon available information.

4.4.2 Relocation Estimates

The relocation impacts for each alignment or combination have been categorized by land use classifications. For relocation analysis, in this context, these land use classifications are defined in Section 3.8.

Table 4.4-1 summarizes the various direct relocation impacts that the Red Alignment of the Page Avenue Extension would produce. Subsequent tables detail direct relocation impacts for other routes.

TABLE 4.4-1
RED ALIGNMENT RELOCATION IMPACTS

St. Louis County

RES: 17 single-family units
OTH: 10 farm units

Also impacted: Creve Coeur Lake Memorial Park (REC)

Mitigation Plan

RES: 3 single-family units
COM: 3 businesses
OTH: 3 farm units

St. Charles County

RES: 54 single-family units
COM: 14 businesses
PUB: 3 medical offices
REC: 1 golf facility *
OTH: 55 farm units

Also impacted: 2 MHTD commuter parking lots and 1 MHTD shed (TRA)
* Privately owned

Entire Route
(Including Mitigation Plan)

RES: 74 single-family units
COM: 17 businesses
PUB: 3 medical offices
REC: 1 golf facility *
OTH: 68 farm units

Also impacted: Creve Coeur Lake Memorial Park (REC) and 2 MHTD commuter parking lots and 1 MHTD shed (TRA)

* Privately owned

TABLE 4.4-2
GREEN-BLACK/RED COMBINATION RELOCATION IMPACTS

St. Louis County

RES: 52 single-family units
RES: 81 duplex/triplex units
IND: 1 utility corridor (various facilities)
REC: 1 ballfield *
REC: 1 swimming pool *
REC: 1 golf facility *
OTH: 12 farm units

* Privately owned

St. Charles County

Identical to Red Alignment

Entire Route

RES: 106 single-family units
RES: 81 duplex/triplex units
COM: 14 businesses
PUB: 3 medical offices
IND: 1 utility corridor (various facilities)
REC: 1 ballfield *
REC: 1 swimming pool *
REC: 2 golf facilities *
OTH: 67 farm units

Also impacted: 2 MHTD commuter parking lots and 1 MHTD shed (TRA)
* Privately owned

TABLE 4.4-3
YELLOW-BLACK/RED COMBINATION RELOCATION IMPACTS

St. Louis County

RES: 92 single-family units
PUB: 1 public library
IND: 1 utility corridor (various facilities)
REC: 1 ballfield *
REC: 1 swimming pool *
REC: 1 golf facility *
OTH: 12 farm units

* Privately owned

St. Charles County

Identical to Red Alignment

Entire Route

RES: 146 single-family units
COM: 14 businesses
PUB: 1 public library
PUB: 3 medical offices
IND: 1 utility corridor (various facilities)
REC: 1 ballfield *
REC: 1 swimming pool *
REC: 2 golf facilities *
OTH: 67 farm units

Also impacted: 2 MHTD commuter parking lots and 1 MHTD shed (TRA)
* Privately owned

TABLE 4.4-4
BLUE/RED COMBINATION RELOCATION IMPACTS

St. Louis County

RES: 75 single-family units
OTH: 10 farm units

St. Charles County

Identical to Red Alignment

Entire Route

RES: 129 single-family units
COM: 14 businesses
PUB: 3 medical offices
REC: 1 golf facility *
OTH: 65 farm units

Also impacted: 2 MHTD commuter parking lots and 1 MHTD shed (TRA)
* Privately owned

TABLE 4.4-5
GREEN ALIGNMENT RELOCATION IMPACTS

St. Louis County

RES: 92 single-family units
RES: 58 duplex units
RES: 18 triplex (or more) units
REC: 1 polo practice field in leased parkland (CCLMP)
REC: 1 model airplane flight facility *
OTH: 11 farm units

* Privately owned

St. Charles County

RES: 288 single-family units
RES: 46 triplex (or more) units
RES: 62 rental apartment units
COM: 16 businesses
IND: 1 materials fabrication facility
IND: 1 electrical substation
OTH: 32 farm units

TABLE 4.4-5 (continued)

Entire Route

RES: 380 single-family units
RES: 58 duplex units
RES: 64 triplex (or more) units
RES: 62 rental apartment units
COM: 16 businesses
IND: 1 materials fabrication facility
IND: 1 electrical substation
REC: 1 polo practice field in leased parkland (CCLMP)
REC: 1 model airplane flight facility *
OTH: 43 farm units

* Privately owned

TABLE 4.4-6
GREEN-BLACK/GREEN COMBINATION RELOCATION IMPACTS

St. Louis County

RES: 52 single-family units
RES: 81 duplex/triplex units
IND: 1 utility corridor (various facilities)
REC: 1 ballfield*
REC: 1 swimming pool*
REC: 1 golf facility*
OTH: 12 farm units

* Privately owned facilities

St. Charles County

Identical to Green Alignment

TABLE 4.4-6 (continued)

Entire Route

RES: 340 single-family units
RES: 127 duplex/triplex (or more) units
RES: 62 rental apartment units
COM: 16 businesses
IND: 1 utility corridor (various facilities)
IND: 1 materials fabrication facility
IND: 1 electrical substation
REC: 1 ballfield*
REC: 1 swimming pool*
REC: 1 golf facility*
OTH: 44 farm units

* Privately owned

TABLE 4.4-7
GREEN/GREEN DASHED COMBINATION RELOCATION IMPACTS

St. Louis County

Identical to Green Alignment

St. Charles County

RES: 233 single-family units
RES: 46 triplex (or more) units
RES: 62 rental apartment units
COM: 16 businesses
IND: 1 materials fabrication facility
IND: 1 electrical substation
OTH: 37 farm units

Entire Route

RES: 325 single-family units
RES: 58 duplex units
RES: 64 triplex (or more) units
RES: 62 rental apartments
COM: 16 businesses
IND: 1 materials fabrication facility
IND: 1 electrical substation
REC: 1 polo practice field in leased parkland (CCLMP)
REC: 1 model airplane flight facility *
OTH: 48 farm units

* Privately owned

TABLE 4.4-8
GREEN/GREEN-BLUE DASHED/RED/GREEN COMBINATION RELOCATION IMPACTS

St. Louis County

Identical to Green Alignment

St. Charles County

RES: 231 single-family units
RES: 46 triplex (or more) units
RES: 46 rental apartments
COM: 34 businesses
PUB: 4 medical facilities
IND: 1 materials fabrication facility
IND: 1 electrical substation
OTH: 55 farm units

Entire Route

RES: 323 single-family units
RES: 58 duplex units
RES: 64 triplex (or more) units
RES: 46 rental apartment units
COM: 34 businesses
PUB: 4 medical facilities
IND: 1 materials fabrication facility
IND: 1 electrical substation
REC: 1 polo practice field in leased parkland (CCLMP)
REC: 1 model airplane flight facility
OTH: 66 farm units

* Privately owned

Numerous other possible route combinations could be created by utilizing one or more segments of the basic Red and/or Green Alignments as well as one or more of the segments. The estimated total relocation impacts of these combination routes would be within the ranges of the two basic alignments and six combinations reported herein.

4.4.3 Households Displaced and Family Characteristics

For purposes of estimating the numbers of households displaced and the family characteristics of these households, two basic assumptions have been made:

1. Each residential unit has one household (no "doubling-up" and no vacant units).

2. The family characteristics of these households correspond to 1980 census data for the project area and/or the St. Louis Region as adjusted (if possible) for the passage of time. Per these assumptions, estimates of potentially displaced households have been made and are reported below.

As noted previously, the Page Avenue project area was, in 1980, overwhelmingly white. The only minority population of any size reported within the project area comprised black people. However, only 1.27% of the 1980 entire project area population was estimated to be black (2.13% in St. Louis County and 0.88% in St. Charles County).

The black population within the project area remains the only minority population of any size. However, there are no black population concentrations. Since 1980, the black population has grown in both absolute numbers and relative percentages. Assuming that its percentages doubled in St. Louis County and St. Charles County, and that it is equally or randomly distributed throughout these jurisdictions along the prospective routes, the resulting estimates of black population displacement are reported in Table 4.3-3. Table 4.4-9 assumes 3.0 people per household to estimate black household displacement.

TABLE 4.4-9
ESTIMATED BLACK DISPLACED HOUSEHOLDS

	St. Louis County	St. Charles County	Project Area
Red Alignment	1	1	2
(Mitigation Plan)	(0)	(0)	(0)
Green-Black/Red Combination	5	1	6
Yellow-Black/Red Combination	4	1	5
Blue/Red Combination	3	1	4
Green Alignment	7	7	14
Green-Black/Green Combination	5	7	12
Green/Green Dashed Combination	7	6	13
Green/Green-Blue Dashed/ Red/Green Combination	7	6	13

There are no other racial, minority or ethnic groups of any apparent size residing anywhere in the project area other than the black population.

Determining the "handicapped" population of the project area is largely a function of the estimated incidence of various kinds and levels of disabilities. At least one national survey has determined that as many as 10%, or more, of all Americans are living with some kind of disability as a result of disease, trauma, birth defects, age, poor nutrition and diet, inadequate medical care, etc. Such research is intended to be comprehensive and include all kinds and levels of disabilities.

Realistically, a figure of 10% is too high for the number of "handicapped" families that might require special relocation assistance if they were displaced by any alignment of the Page Avenue Extension. The nature, severity and frequency of disabilities vary greatly among affected individuals and households. Moreover, the base project area population tends to be somewhat younger and more prosperous than national or regional norms. For these reasons, a household disability rate of 2.5%, one-fourth of a 10% general national disability rate, has been estimated to be a reasonable approximation of the household disability incidence in the Page Avenue Extension project area. Accordingly, the following numbers of "handicapped" households are projected for each of the basic possible alignments and combinations:

TABLE 4.4-10
ESTIMATED DISABLED DISPLACED HOUSEHOLDS

	St. Louis County	St. Charles County	Project Area
Red Alignment	0	1	1
(Mitigation Plan)	(0)	(0)	(0)
Green-Black/Red Combination	3	1	4
Yellow-Black/Red Combination	2	1	3
Blue/Red Combination	2	1	3
Green Alignment	4	10	14
Green-Black/Green Combination	3	10	13
Green/Green Dashed Combination	4	9	13
Green/Green-Blue Dashed/ Red/Green Combination	4	8	12

Table 4.3-5 estimates the elderly population (65 and over) that would be displaced by the Page Avenue Extension. Households that include one or more elderly individuals tend to be smaller than the general population's average household size. Table 4.4-11 assumes that each household that has an elderly person includes an average of 1.4 such individuals in order to estimate the number of displaced elderly households.

TABLE 4.4-11
ESTIMATED ELDERLY DISPLACED HOUSEHOLDS

	St. Louis County	St. Charles County	Project Area
Red Alignment	2	5	7
(Mitigation Plan)	(0)	(0)	(0)
Green-Black/Red Combination	16	5	21
Yellow-Black/Red Combination	11	5	16
Blue/Red Combination	9	5	14
Green Alignment	19	35	54
Green-Black/Green Combination	16	35	51
Green/Green Dashed Combination	19	30	49
Green/Green-Blue Dashed/ Red/Green Combination	19	29	48

The 1980 U.S. Census reported that approximately 29% of all households in the St. Louis Metropolitan Area had four or more persons. The figure for the entire Page Avenue Extension area was 38.26% (St. Louis County 29.93% and St. Charles County 43.39%). Given the general decline of birth rates following 1965, it is probable that these figures are substantially lower. It is estimated that larger households comprise 20.4% and 34.7% of the St. Louis County and St. Charles County portions of the project area, respectively. Accordingly, the following estimates of large family displacement are projected for each of the basic Page Avenue Extension routes:

TABLE 4.4-12
ESTIMATED LARGE FAMILY DISPLACED HOUSEHOLDS

	St. Louis County	St. Charles County	Project Area
Red Alignment	3	19	22
(Mitigation Plan)	(0)	(0)	(0)
Green-Black/Red Combination	27		
Yellow-Black/Red Combination	19	19	38
Blue/Red Combination	15	19	34
Green Alignment	34	137	171
Green-Black/Green Combination	27	137	164
Green/Green Dashed Combination	34	118	152
Green/Green-Blue Dashed/ Red/Green Combination	34	112	146

Income levels throughout most of the Page Avenue Extension project area in 1979, as reported by the 1980 U. S. Census, were middle-income to upper middle-income. The statistical incidence of poverty was very low. In the St. Louis County portion of the project area, per capita income averaged 136.59% of the regional figure with a very low 1.99% poverty population incidence. The St. Charles County portion of the project area was somewhat less prosperous. Its per capita income averaged 105.65% of the regional figure with a low poverty population incidence of 3.10%, more than 50% greater than St. Louis County's. By comparison, the poverty population in 1979 was determined to be 10.20% for the St. Louis Region.

Field surveys during 1989 confirmed that the vast majority of households potentially displaced by any possible Page Avenue Extension alignment or combination would be, apparently, middle-income or greater. Some small isolated pockets of obviously lower-income households existed, most notably along segments of the Green Alignment and Green Dashed Subalternate in St. Charles County. In no event, however, would these households total more than an estimated 5% of displaced households along any one entire route.

Owner/tenant estimates of possible Page Avenue Extension displaced households have been developed based upon data collected during 1989 field checks. For these purposes, 100% occupancy has been assumed for all housing types. All obvious rental units, i.e. apartments, are assumed to be tenant-occupied. A flat 3.0% of non-apartments (single-family homes, farm houses, duplex townhomes, condominiums, etc.), also are assumed to be tenant-occupied. All remaining dwelling units are assumed to be owner-occupied. The following owner/tenant displacement estimates have been developed within these parameters:

TABLE 4.4-13
ESTIMATED OWNER/TENANT DISPLACED HOUSEHOLDS

	St. Louis County Owners/Tenants	St. Charles County Owners/Tenants	Project Area Owners/Tenants
Red Alignment	16/1	52/2	68/3
(Mitigation Plan)	(3/0)	(0/0)	(3/0)
Green-Black/Red Combination	129/4	52/2	181/6
Yellow-Black/Red Combination	129/4	52/2	181/6
Blue/Red Combination	89/3	52/2	141/5
Green Alignment	163/5	324/72	487/77
Green-Black/Green Combination	129/4	324/72	453/76
Green/Green Dashed Combination	163/5	271/70	434/75
Green/Green-Blue Dashed/ Red/Green Combination	163/5	269/54	432/59

4.4.4 Relocation Housing Availability and Costs

Households displaced by the Page Avenue Extension could relocate over a wide area. Many households, perhaps most, would wish to relocate in the same general vicinity. Other households might move a considerable distance in order to be closer to work, friends or relatives, or adjust to changing economic and personal circumstances.

The vast majority of dwelling units that might be displaced by the Page Avenue Extension range in age from newly constructed to, perhaps, a general maximum of roughly twenty-five years. With rare exceptions, they are attractive and well-maintained. The average single-family home is worth in excess of $100,000. Particular locales have single-family homes that cost two or three times as much. Duplex townhomes and triplexes or condominiums vary from less than $50,000 to $100,000 per unit.

There are no potential impacted apartment units in St. Louis County. Monthly apartment rents among affected units in St. Charles County cover a fairly narrow spectrum. In mid-1989, one bedroom units rented for between $281.00 and $395.00. Two bedroom units ranged between $310.00 and $445.00. One complex rented three bedroom and four-bedroom units for $397.00 and $426.00, respectively. None of these monthly rents included heat, air conditioning or electricity.

At this time, most households displaced by any of the proposed routes of the Page Avenue Extension would have ample opportunities to find replacement decent, safe and sanitary housing. Many households would probably be able to relocate within the same subdivision or multifamily complex. The displacement impacts within individual neighborhoods would vary greatly, but most would be able to absorb substantial internal relocation in remaining areas through the normal housing turnover process.

The western St. Louis County and St. Charles County areas represent large and active segments of the St. Louis Region's residential market. A high percentage of the St. Louis Region's annual production of 7,560 to 11,500 (1985-1988) new single-family detached homes has been in and around the Page Avenue Extension project area. Similarly, many of the new 2,500 to 8,800 unit annual (1985-1988) production of multifamily housing has been located in the project area or its environs. Recently, however, regional single-family development has been weak. Moreover, there is a general glut of multifamily housing with vacancy rates reported between 10% and 20% for many months.

Total residential displacement for the Page Avenue Extension, based upon available data, is estimated to range between 74 and 564 households. Owner-occupied units are estimated to comprise between 71 and 487 of those impacted. Tenant-occupied units are estimated to range between 3 and 77.

A limited survey of available St. Louis County and St. Charles County residential project area real estate (existing and new) determined the ranges of prices and monthly rents, reported below, during the week of

August 20, 1989. In general, local prices and rents have remained flat or declined since then in light of national and local economic problems.

St. Louis County Project Area (For Sale/All Types)

One Bedroom: $68,000 to $74,000
Two Bedrooms: $56,900 to $150,000
Three Bedrooms: $65,000 to $240,000
Four Bedrooms: $80,000 to $250,000
Five or More Bedrooms: $100,000 to $240,000 and up

St. Louis County Project Area (For Rent/All Types)

One Bedroom: $300 to $475
Two Bedrooms: $350 to $550
Three Bedrooms: $450 to $1,000
Four Bedrooms: $650 to $1,000 and up
Five or More Bedrooms: $750 to $1,200 and up

St. Charles County Project Area (For Sale/All Types)

One Bedroom: $25,000 to $60,000
Two Bedrooms: $35,000 to $80,000
Three Bedrooms: $55,000 to $200,000
Four Bedrooms: $68,900 to $300,000
Five or More Bedrooms: $90,000 to $1,900,000

St. Charles County Project Area (For Rent/All Types)

One Bedroom: $200 to $450
Two Bedrooms: $310 to $750
Three Bedrooms: $397 to $1,200
Four Bedrooms: $426 to $1,200
Five or More Bedrooms: $600 to $1,500

4.4.5 Special Composition Relocation Impacts

Any project the size of the Page Avenue Extension has the potential to impact neighborhoods, public facilities, non-profit organizations, and families having "special composition" (e.g. ethnic, minority, elderly, disabled, or other factors), which may require special relocation considerations. Extensive fieldwork and other research has identified four such sites that might be impacted. No neighborhoods have been identified as having special composition. It is probable, however, that small numbers of non-concentrated special composition households would be displaced by any Page Avenue Extension route.

The St. Louis County Government's Lakeside Center has existed at 13044 Marine Avenue since 1963. It treats adolescent boys and girls with behavioral and emotional problems who live at the facility for periods lasting from one month to several years. As many as 50% of its residents

are from minority groups. The Lakeside Center is approximately 800 feet northwest of the proposed Red Alignment. It might experience secondary impacts such as noise from this route of the Page Avenue Extension. Its relocation, however, would not be required.

In 1989, the State of Missouri's Division of Mental Health purchased the house at 13100 Greenbough Drive in unincorporated St. Louis County. This residence is being operated as a group home for as many as six mentally disabled adults. Displacement of this residence would be required by the Green Alignment.

Two special composition sites have been identified in St. Charles County. The Developmental Activity Center has been operated by Community Living for the Handicapped since 1988 in leased space in a small commercial center at 771 Harvester Road, Units D and E. This facility provides a regular weekday day care program of activities for mentally disabled and developmentally disabled adults who are not yet able to work in sheltered workshops or seek regular employment. As currently configured, the Red Alignment would be in close proximity to this facility but would not require its relocation. The Green/Green-Blue Dashed/Red/Green Combination would also produce similar effects.

In St. Peters, the State of Missouri operates a multi-unit "habilitation" residence for mentally disabled adults. This facility is located at 22 Marr Lane, north of existing Route 94. Its relocation would not be required by any alignment or combination.

Nursing homes and other kinds of extended care facilities concentrate populations of elderly and physically incapacitated individuals. Such institutions are located throughout the Page Avenue Extension project area in St. Louis and St. Charles Counties. Insofar as can be determined to date, however, none of these existing facilities would be directly impacted by any route now being considered for the Page Avenue Extension.

If and when a neighborhood, public facility, non-profit organization, or individual family having special composition must be relocated for the Page Avenue Extension and/or related roadway improvements, the Missouri Highway and Transportation Department (MHTD) shall strictly adhere to all applicable laws and regulations in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

4.4.6 Last Resort Relocation Housing

Abundant affordable relocation housing currently exists for almost all potential displaced households of any prospective Page Avenue Extension route. However, if the available housing inventory were insufficient, did not meet relocation standards, or was not within the financial capability of those impacted, last resort housing measures would be employed.

At this time, these measures include, but are not limited to, replacement housing payments in excess of usual limits, rehabilitation of expansion of

existing replacement housing, construction of a new replacement dwelling, direct loans including interest-free loans, the relocation of a dwelling, etc.

4.4.7 Business Displacement Impacts

Business displacement impacts have been individually estimated for each alignment or combination based upon 1989 and/or updated information as possible. A summary of the displacements is presented by Table 4.4-14. Also included as "businesses," in this instance only, are various facilities with commercial aspects that are otherwise classified as industrial (IND), recreational (REC), public (PUB), etc., sites for land use purposes, e.g. a materials fabrication facility, a golf facility, a medical facility, etc.

TABLE 4.4-14
BUSINESS DISPLACEMENTS

	St. Louis County	St. Charles County	Project Area
Red Alignment	0	18	18
(Mitigation Plan)	(3)	(0)	(3)
Green-Black/Red Combination	2	18	20
Yellow-Black/Red Combination	3	18	21
Blue/Red Combination	0	18	21
Green Alignment	0	18	18
Green-Black/Green Combination	2	18	20
Green/Green Dashed Combination	0	18	18
Green/Green-Blue Dashed/ Red/Green Combination	0	40	40

A high percentage of the businesses impacted would involve franchises or facilities leased by tenants. No large employers would be affected. Based upon 1989 research, a maximum of the equivalent of 188 full-time employees might be impacted in addition to any owners/franchisees. (Part-time employment is aggregated to full-time employment. For example, two 20 hours a week part-time employees are the equivalent of one full-time employee.) The Green/Green-Blue Dashed/Red/Green Combination would displace the most employees.

The sites of most of the estimated business displacement impacts are highly clustered at various locations in St. Charles County. The Red Alignment would displace businesses primarily along and near Route 94 and Route 40/61. Almost all of the Green Alignment, Green-Black/Green Combination and Green/Green Dashed Combination's business displacement impacts would occur at or near Route 94 and, to the north, Mexico Road. The interchange at Route 94 would be the focus of the Green-Blue Dashed Segment's business displacement impacts. If it were incorporated into the

Green/Green-Blue Dashed/Red/Green Combination, additional business impacts would occur west along Route 94 as well as around Mexico Road.

None of the businesses that would be displaced are estimated to employ more than the equivalent of ten full-time employees. Most of them are located along or off major thoroughfares with high traffic counts. Ease of access and high visibility to large volumes of potential customers are particularly important to auto/truck related businesses, gas and convenience mini-marts, restaurants (particularly "fast-food" operations) and retail outlets. Generally, these businesses pay a premium for such locations. Other businesses can prosper in less prominent circumstances.

Existing businesses within St. Charles County are relocating, or adding new locations, all the time. Within the project area, the thrust of new business development is to the west and southwest along Route I-70, Mexico Road and Route 94. In the future, Route N, another east-west road, probably will experience important business development at key intersections. Major north-south roadways such as Jungermann Road, St. Peters-Cottleville Road, St. Peters-Howell Road and Route K are already experiencing various degrees of business growth. Route 40/61 someday might enjoy large-scale, quality, non-automobile oriented business development in conjunction with its redevelopment as Route I-64. A sizable number of Page Avenue Extension displaced businesses could be expected to relocate along and near these roads.

A larger number, however, of businesses displaced by any route of the Page Avenue Extension would probably try to relocate in the immediate general area. The new interchanges, intersections, and service roads associated with any alignment or combination should create many sites for business relocations and new businesses. One way or the other, most displaced businesses would probably relocate rather than cease operations.

Numerous nearby businesses would be impacted by the Page Avenue Extension that would not be displaced and relocated. Construction could be, in many instances, highly disruptive for extended periods of time. Dust, noise, vibrations, access reduction, etc. might be ongoing problems. It is probable that some marginal businesses might fail during this period. In general, however, most businesses ultimately would benefit from proximity to a major thoroughfare such as an operational Page Avenue Extension.

4.4.8 Farm Displacement

Table 4.4-15 reports projected farm displacements, i.e. farm units impacted, based upon available data.

TABLE 4.4-15
FARM DISPLACEMENTS

	Project Area
Red Alignment	68
(Mitigation Plan)	(3)
Green-Black/Red Combination	67
Yellow-Black/Red Combination	67
Blue/Red Combination	65
Green Alignment	43
Green-Black/Green Combination	44
Green/Green Dashed Combination	48
Green/Green-Blue Dashed/ Red/Green Combination	66

4.4.9 Relocation Impacts Discussions

In the course of preparing this Final Environmental Impact Statement, there have been numerous contacts with local governments, civic organizations, groups and individuals. Usually, these contacts were for the purpose of collecting information relative to non-relocation concerns. Residential and business displacement impacts, including any measures or coordination needed to reduce general and/or specific impacts, were secondary points of discussion if, indeed, they were discussed at all.

Displacement data gathering and analysis began during July of 1989. The large array of possible routes in multiple neighborhoods and political jurisdictions presented some discussion difficulties. When displacements and relocations were discussed, the following points were made:

1. residential and business displacements should be minimized to the extent possible, and
2. ample relocation opportunities are available locally in most instances.

4.4.10 Relocation Policy Commitment

The Page Avenue Extension Acquisition and Relocation Program will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Relocation resources will be made available to all impacted residents without discrimination in conjunction with the procedures and requirements of 49 CFR Part 24. No displacement will occur until comparable decent, safe and sanitary replacement housing is available.

4.5 ECONOMIC IMPACTS

In order to assess the economic impacts as a result of the extension of Page Avenue, interviews were conducted with key economic development

actions in the affected area. These interviews covered such questions as: What will the impacts be? Are these positive or negative? What type of development can be anticipated? What will be the impact on public service delivery? Respondents were encouraged to express their perception and viewpoints. As a result, the following points were commonly expressed:

- The extension of Page Avenue will have a definite impact on local economic and land use patterns;
- Various types of commercial and industrial areas will be developed along the route, as opposed to residential, institutional or recreational facilities;
- Without construction of a larger levee in St. Louis County (providing more flood protection), there will be minimal additional economic growth in St. Louis County as a result of the road extension; and
- Without construction of the levee, the cumulative impacts of the Page Avenue Extension primarily will positively ease existing journey to work flow, but will provide no other positive economic impacts, i.e., there will be no additional development in the floodplain.

The short-term large-scale economic infusion provided by constructing such a facility was also recognized. Notwithstanding the importance of this immense regional boost, the overall orientation of the discussions was more long-range. Projects of this nature have economic implications that stretch decades into the future.

Comments from representatives from St. Louis and St. Charles Counties are summarized below:

St. Louis County

Within St. Louis County, the Page Avenue Extension would traverse acreage designated by the Corps of Engineers as 100-year floodplain. If 500-year levees were built, the land would be protected from flooding to the degree that development could occur. However, construction of one or more such levees would be difficult, if not impossible, in light of existing regulatory requirements. Moreover, new development would require massive additional investments of capital for infrastructure such as access roads, water, sewers, etc. as well as extensive planning, design and legal work. On balance, large-scale new development, with or without any major new highway, will be problematic and uncertain.

Interviews with St. Louis County Economic Council representatives revealed that there are no current developer interests in this area. After Earth City and Riverport are full, there will be unmet demand in St. Louis County for commercial/industrial land. The project area represents some of St. Louis County's best remaining flat land, which is potentially

developable if 500-year levees were constructed. Seventy-five percent of St. Louis County is developed and most of the remainder is either in the floodplain or has severe topographic problems.

If the levees were built, the area could accommodate commercial/industrial uses. There is existing demand in St. Louis County for large (100,000 square feet) warehousing and office campus complexes, light manufacturing, and assembly plants. This area would be a good site for commercial/industrial uses because it could provide needed access to regional labor pools.

City of Maryland Heights

Interviews with representatives from the City of Maryland Heights in St. Louis County indicated there would be various economic impacts if the Page Avenue Extension were implemented without a levee. It was recognized that there will be disruption of the existing agricultural economy of the project area. Much of the floodplain is farmed and land in active production would be removed from agricultural use.

It was believed that the new roadway could stimulate an exodus from Maryland Heights to St. Charles County. Maryland Heights competes with St. Charles County for both residents and industry. Although Maryland Heights now offers a better location, this advantage could be lost. Page Avenue can provide access to draw people out of Maryland Heights. St. Charles County land is cheaper than St. Louis County acreage and will attract people based on both price and access. A loss of population and industry may hurt Maryland Heights.

Another negative impact, according to Maryland Heights, relates to municipal service delivery. Community officials suggested that because the Page Avenue Extension would be a limited access road, Maryland Heights will not be able to efficiently cross the road to deliver services (fire, police, snow plows). MHTD disagrees. Adequate access would be maintained in every instance, although the Red Alignment would alter existing circulation patterns the least of any St. Louis County route.

The economic impacts of a 500-year Missouri River levee were discussed. It was noted that if a levee were built, there would be several economic benefits for the community. The area would become prime land for commercial and industrial development, providing a competitive edge against St. Charles County. The construction of the levee would take as much as 6,000 acres out of the floodplain and make a substantial portion of developable.

In addition, environmentally, the land could be improved. It was noted that the farmers have stripped the land of trees and other vegetation in order to farm the area. Wetlands have been claimed for farming, also, leaving little of the original wetlands. Development would provide an opportunity to require developers to reconstruct the wetlands and plant

vegetation. Development could also provide quality access to the river for recreation.

St. Charles County

Representatives of the St. Charles Industrial Development Authority (IDA) stated that St. Charles County will continue to be Missouri's number one growth county well into the 1990s. Any Page Avenue Extension route will enhance the county's growth position. The primary economic spinoffs would be commercial and industrial development. Page Avenue would provide the opportunity for a new development corridor. Its limited access will not discourage business as long as there is access to the interchanges.

Exterior utilities and other supporting infrastructure should not be any problem and would not constrain development. St. Charles County will offer large tracts of developable land along Page Avenue which St. Louis County cannot offer.

For the most part, future land use would be commercial and industrial uses. Commercial uses would include all types of retail, office, strip commercial, etc. developments. Industrial uses probably would trend toward warehousing service facilities and light manufacturing. The "Golden Triangle" is the fastest growth area in the county and Page Avenue would enhance its commercial/industrial growth. Growth in the area would occur in phases, depending on which municipality reaches any segment of Route 94 with utilities and the appropriate zoning first.

City of St. Peters

No community has benefitted more from recent St. Charles County growth than the City of St. Peters. What was, as recently as 1970, a small rural community has emerged as, perhaps, the most dynamic St. Charles County community. It anticipates additional growth of all kinds as its population soars past 50,000 in the near future.

City of O'Fallon

Representatives of O'Fallon's economic development efforts feel Page Avenue would have a positive impact on economic development in O'Fallon. Future land use would likely be retail/strip commercial along the portion of the Red Alignment that traverses O'Fallon. Because the surrounding area is residential, industrial development is not likely. Page Avenue may draw some business from Route I-70.

With the Page Avenue Extension in place, O'Fallon would be able to attract more residents who work in St. Louis. Approximately 50% of St. Charles County workers work in St. Louis County. Business will follow the residential activity. The Page Avenue Extension would open up a new corridor for development.

4.6 JOINT DEVELOPMENT

Joint development activities are those that promote mutual effort to accommodate various proposed actions. For Page Avenue Extension such coordinated development occurred in 1971 when St. Louis County Department of Parks and Recreation purchased land to develop Creve Coeur Lake Memorial Park. The extension of Page Avenue was identified as a co-development issue. In conjunction with that alignment, a corridor from Bennington Place to Creve Coeur Lake Memorial Park was preserved free from development as the transportation corridor for Page Avenue Extension. Adjacent development was coordinated to be located on either side of the alignment. In a similar manner in St. Charles County from the Missouri River along Hemsath Road to Route 94, that corridor has remained free of intensive development as a result of coordination with local officials as well as the desire of landowners.

In this corridor is Spring Bend, an estate overlooking the Missouri River. Coordination among the property owner, MHTD and Missouri's Department of Natural Resources has rerouted the Red Alignment. Moreover, Spring Bend has been proposed as a future state park.

4.7 PEDESTRIAN AND BICYCLISTS

As noted in Section 3.15, there is only one major pedestrian and bicycle facility that would be affected by the Page Avenue Extension: the State of Missouri's KATY Trail State Park in St. Charles County, along the old Missouri Kansas and Texas Railroad right-of-way. The Page Avenue Extension would pass above the KATY Trail State Park at one of four possible points, depending upon the location of the Page Avenue Extension, as implemented.

The St. Charles County portion of any crossing would include an elevated section going over the KATY Trail State Park as the highway proceeds up from the Missouri River floodplains to the bluffs toward Route 94. Indirect impacts would primarily be visual intrusion to an otherwise natural setting as well as possible noise and debris from the roadway. These same impacts already occur at other bridge crossings of the trail in St. Charles County and are inevitable where such facilities meet. Mitigation considerations will include design features that preclude any support structure from directly impacting the trail or its right-of-way. There will be no physical contact between the Page Avenue Extension and the KATY Trail State Park.

The Page Avenue Extension would be a state highway and, as such, pedestrian and bicycle use would be allowed. Accommodations for pedestrians and bicyclists are being coordinated with local bicyclists from the local Gateway Trailnet organization. Their goal is to have designated lanes or separate lanes for bicyclists and access ramps at the KATY Trail State Park and at the existing levee in St. Louis County.

The Red Alignment's mitigation plan will include a hiking/biking path link between CCLMP in St. Louis County and the KATY Trail State Park. The path would thread through a constructed wetlands corridor parallel to the new roadway and utilize its bridge. The path will join the KATY Trail State Park. MHTD will develop the trail according to AASHTO standards. The trailheads will be designed by DNR and MHTD. Design construction plans and specifications will be agreed to by DNR and MHTD.

4.8 AIR QUALITY IMPACTS

This section provides a summary of the air quality analysis performed to determine the impacts of the no-build and candidate build alternates for the Page Avenue Extension. A detailed discussion of the methodology used and results of Carbon Monoxide Emission Rate Program (COERP) and CALINE3 models are presented in a separately prepared Technical Memorandum, prepared in conjunction with the project. Traffic data was provided by MHTD for the base year (1995) and the design year (2015).

4.8.1 Analysis Methods

Estimates of future concentrations of carbon monoxide (CO) for the years 1995 and 2015 were made for 15 locations for the No Build and Build Alternates.

Six sites were evaluated for all the alternates, including the no-build alternate. The remaining nine locations were evaluated only for the build alternates because traffic data was not available for these nine locations for the no-build situation.

Receptor locations were chosen to represent those points along the project corridor at which highest traffic volumes (potentially worst-case air quality impacts) can be expected for each alternate and combined with those meteorological conditions that result in the highest possible concentrations of carbon monoxide (CO) at the receptor. Additional receptors were chosen to provide geographic coverage throughout the project corridor.

Two computer programs, COERP and CALINE3, were used as the basic analysis tools for developing project CO levels. Consequently, the model predictions for CO levels represent a worst case scenario and not the typical operating conditions.

4.8.1.1 COERP Program

The calculation of vehicle emission rates was performed using COERP. The COERP methodology uses the procedures documented in the USEPA's "Guidelines for Air Quality Maintenance, Planning and Analysis: Volume 9 (Revised): Evaluating Indirect Sources" published in September, 1978. The program calculates CO emission rates for mobile sources under various conditions using Mobile 3 Source Emission Factors (average national values). Roadway segments (two separate directions) were evaluated as

straight line segments. Input parameters required for the program include: analysis year, percent cold starts, ambient temperature, traffic vehicle mix, type of region, lane capacities (service volumes), signed speed limit, and traffic volumes. Inputs used for this study are listed in Table 4.8-1.

Mobile 3 emission factors vary with the study year and the age and type of vehicles in the traffic stream. Also, Mobile 3 does not include the credit for vehicle inspection and maintenance programs and can therefore be considered conservative for this project location.

TABLE 4.8-1
INPUT PARAMETERS FOR CO MODELING

		All Road Segments
Vehicle Mix (%)	Light Duty Vehicle	96
	Light Duty Truck	1.3
	Motorcycles	0.0
	Heavy Duty - gasoline	0.7
	Heavy Duty - diesel	2.0
Speed (mph)		Varied According To Projected Congestion
Cold Starts		10%
Ambient Temperature		22°F
Wind Speed		1 meters per second
Wind Direction		0°o to 360°
Wind Interval		10°
Stability Class		D
Persistence Factor		0.64
Surface Roughness		0.10 meters
Mixing Height		400 meters

Both directions of traffic were evaluated, with the receptor placed closest to the westbound lane identified as greatest vehicles per peak hour in p.m. (worst case). The worst case emission rates for each traffic direction and similar wind directions were added to obtain the total emission rate for that line segment. These total emission rates were subsequently used as input data to the air quality dispersion model, CALINE3.

The input data for lane capacities, traffic volumes, and traffic vehicle mix was supplied by the Missouri Highway and Transportation Department. The level of service for the various alternates and years analyzed was supplied from Booker Associates' Traffic Operation Analysis Technical Report. Typically, for non-congested traffic volumes associated with a

level of service C or D conditions, a 40-mph speed in both directions was used; this represents a normal speed during peak load conditions. When the level of service was congested (level of service E or F) a 20-mph speed was used for the west bound traffic to represent a congested level of service during peak load conditions and it was assumed that east bound traffic is non-congested (40 mph). The magnitude of the COERP emission rates increase when the lane capacities, traffic volume, and speed reach over capacity. Adjustment to the number of vehicles per lane was necessary at the 20 mph speed to keep the COERP model functioning properly. The number of lanes used was three in each direction, except for the N-2 location (Blanchette Bridge = 5 lanes). This was based upon current project design information supplied by MHTD at the project's inception. Subsequent design modifications indicate four lanes with an auxiliary lane (five lanes) on each bridge.

4.8.1.2 CALINE3 Program

The carbon monoxide dispersion model approved for use in this study is known as CALINE3. CALINE3 is the "third generation" California Line Source Dispersion Model developed by the California Department of Transportation. The CALINE3 model is used to predict carbon monoxide concentrations near highways and arterial streets, given traffic emissions (from COERP), site geometry and meteorology. The program uses the Gaussian dispersion model.

One of the intermediate steps accomplished prior to initiating data input into the CALINE3 program was to develop a coordinate grid system of the line segment being analyzed, including the receptor site where the CO concentrations were being estimated.

Part of the grid system assumed all elevations to be at grade. Ramps and fill were not considered. This assumption is the worst case condition; elevated structures have lower CO estimates. It was assumed that the receptor elevation was 5.0 feet above the elevation for the nearest traffic lanes.

Additional input parameters required to perform a CALINE3 analysis include: wind direction and speed, persistence factor, surface roughness, background CO concentration, and stability class.

Background levels of carbon monoxide were estimated based on monitoring data collected at three air quality monitoring sites in St. Louis County. Each site is within several miles of the project corridor. No air quality monitoring sites are located in St. Charles County.

4.8.2 Carbon Monoxide Predictions

Using the methods described above, the analysis was completed for each of the build alternates and the no-build alternate. The standards cited in this study are current Federal Air Quality Standards as published by the USEPA.

4.8.2.1 Projected Air Quality Results for the Red Alignment and Variants

The four receptors (R-1, R2, R4, R-5) evaluated along the Red Alignment had projected maximum 1-hour CO concentrations ranging from 2.26 ppm to 2.76 ppm (1.44 ppm to 1.77 ppm maximum 8-hour) for the construction year 1995. For the design year 2015, the projected maximum 1-hour concentrations ranged from 2.46 ppm to 2.86 ppm (1.57 ppm to 1.83 ppm maximum 8-hour). These projected concentrations are below the standards of 35 ppm 1-hour and 9 ppm 8-hour CO concentrations.

The existing receptors (N-1 through N-5, R-3) evaluated with the Red Alignment had projected maximum 1-hour CO concentrations ranging from 2.56 ppm to 9.56 ppm (1.64 ppm to 6.25 ppm maximum 8-hour) for 1995. The projected maximum 1-hour concentrations for 2015 ranged from 3.06 ppm to 9.76 ppm (1.98 ppm to 6.25 ppm maximum 8-hour). These projected CO concentrations are below the 1-hour standard (35 ppm) and 8-hour standard (9 ppm).

The air quality results for the Green-Black/Red, Yellow-Black/Red and Blue/Red Combinations are essentially the same as those for the Red Alignment.

4.8.2.2 Projected Air Quality Results for the Green Alignment and the Green-Black/Green Combination

The three receptors (G-1 through G-3) along the Green Alignment had projected 1-hour maximum CO concentrations ranging from 2.36 parts per million (ppm) to 2.56 ppm (1.51 ppm to 1.64 ppm maximum 8-hour) for 1995. For 2015 the projected 1-hour maximum concentrations ranged from 2.46 ppm to 5.76 ppm (1.57 ppm to 3.69 ppm 8-hour maximum).

The existing receptors (N-1 through N-5, R-3) evaluated with the Green Alignment had projected 1995 1-hour maximum concentrations ranging from 2.56 ppm to 9.56 ppm (1.64 ppm to 6.12 ppm 8-hour maximum). The projected maximum 1-hour concentrations for 2015 ranged from 4.56 ppm to 9.76 ppm (2.92 ppm to 6.25 ppm 8-hour maximum).

Similar conditions are projected for the Green-Black/Green Combination in St. Louis County.

All of these concentrations are below the standards.

4.8.2.3 Projected Air Quality Results for the Green Dashed Segment

One receptor along the Green Dashed Segment (GD-1) and two along the associated Green Alignment (G-1 and G-3) had projected 1995 1-hour maximum CO concentrations ranging from 2.36 ppm to 2.56 ppm (1.51 ppm to 1.64 ppm maximum 8-hour). The projected 2015 1-hour maximum concentrations ranged from 2.46 ppm to 5.76 ppm (1.57 ppm to 3.69 ppm maximum 8-hour).

The projected CO concentrations for the existing receptors (N-1 through N-5, R-3) evaluated with the Green Dashed Segment were the same as those projected with the Green Alignment 1995 and 2015.

All of these projected CO concentrations are below the standards.

4.8.2.4 Projected Air Quality Results for the Green-Blue Dashed Segment

One receptor along the Green-Blue Dashed Segment (GB-1) and two along the associated Green Alignment (G-1 and G-3) had projected 1995 1-hour maximum concentrations ranging from 2.26 ppm to 2.56 ppm (1.41 ppm to 1.64 ppm maximum 8-hour). The projected 2015 1-hour maximum concentration ranged from 2.46 ppm to 5.86 ppm (1.57 ppm to 3.75 ppm maximum 8-hour).

The projected CO concentrations for the existing receptors (N-1 through N-5, R-3) evaluated with the Green-Blue Dashed Segment were the same as those projected with the Green Alignment for 1995 and 2015. All of these CO concentrations are below the standards.

4.8.2.5 Projected Air Quality Results for No-Build Alternate

The existing receptors (N-1 through N-5, R-3) evaluated with the no-build alternate had projected 1995 1-hour CO concentrations ranging from 2.76 ppm to 9.66 ppm (1.77 ppm to 6.18 ppm 8-hour maximum). For 2015, the projected 1-hour concentrations ranged from 4.56 ppm to 10.76 ppm (2.42 ppm to 6.89 ppm maximum 8-hour).

The projected CO concentrations are below the 1-hour standard, and the 8-hour standard is exceeded only in 2015 at Site N-2 (I-70, Blanchette Bridge).

4.8.3 Summary of Carbon Monoxide Results

CO concentrations at all the receptors for all the alternates in both the construction and design years, were below the standards of 35 ppm 1-hour maximum. CO concentrations at all the receptors for all the alternates in both the construction and design years were below the 9 ppm 8-hour maximum. Based on calculations utilizing three lanes and incorporating four lanes with auxiliary lane (i.e., five lanes at the crossings), the air quality is projected to improve due to the reduction in traffic interruptions which would occur as a result.

If the Page Avenue Extension is built, regardless of the alternate chosen, a reduction of CO concentrations (1-hour and 8-hour) at the Blanchette Bridge is predicted, and the 8-hour standard is not expected to be exceeded.

4.8.4 Air Quality Conformity Statement

The National Ambient Air Quality Standards (NAAQS) for carbon monoxide have been established by the federal government in response to the Clean

Air Act of 1990 to protect human health and welfare. The NAAQS for CO are 35 ppm for a one-hour concentration and 9 ppm average 8-hour concentration, both of which are not to be exceeded more than once per year. The total CO levels for the alternates, including no-build, are not predicted to surpass these standards. Since the analysis was based on worst-case conditions of traffic density, average vehicle speed, receptor distance and conditions of wind and stability, it is concluded that all other receptors within this project area will receive pollution concentrations in lesser amounts. This suggests that concentrations of CO at all locations in this study area will remain below the NAAQS under all alternatives in 1995 and 2015. Therefore, the project will not have a significant impact on local or regional air quality. The Page Avenue Extension is included in East-West Gateway Coordinating Council's Transportation Improvement Program (TIP). The TIP has, in turn, been determined to be in conformity with the Clean Air Act reviewed by EPA and approved by UMTA and FHWA on November 8, 1991; a letter regarding this is in the Comments and Coordination section (Volume 3).

4.9 NOISE IMPACTS

This section provides a summary of the noise assessment performed to determine the impacts for the No-Build and candidate Build Alternates for the Page Avenue Extension. A detailed discussion of the methodology used and results of the assessment are presented in a separately prepared Technical Memorandum. The analysis was based on traffic data provided by MHTD for the base year (1995) and the design year (2015) along with appropriate data from the 1986 Reconnaissance Report prepared by MHTD. It was carried out in accordance with Highway Traffic Noise and Abatement Policy and Procedures, promulgated by MHTD on November 1, 1991.

The FHWA's noise abatement criteria is when the predicted noise level approaches or exceeds an Leq of 67 dBA or when there is substantial increase between the existing noise level and the predicted noise level. The Missouri State Highway and Transportation Department's approved noise abatement criteria is an Leq of 65 dBA or more. If the predicted peak hour noise level results in an Leq of 65 dBA or more, then the project will have a noise impact and noise abatement will be provided if warranted and feasible. The following conditions must be met in order for a noise abatement wall to be constructed:

1. Noise wall must provide noise reduction of at least 5 dBA.
2. Noise wall must provide an Leq of 65 dBA or less.
3. Noise wall must provide attenuation for more than one receptor.
4. Noise wall must be 18' or less in height above ground.
5. Noise wall must not interfere with normal access to the property.
6. Noise wall must not pose a traffic safety hazard.
7. Noise wall must not exceed a cost of $20,000 per receptor.

4.9.1 Assessment Approach

In this study, automobile and truck traffic are the sources assessed. Noise modeling was performed on the alternatives to assess how the noise from the automobiles and trucks impacted receptors along the corridor routes. Along each alternative, a series of "representative receptors" was selected to represent all the receptors likely to be affected by noise under that alternative. Noise measurements were taken at these "representative receptors" by MHTD and project consultants.

A computer model was used to predict noise levels at these receptors for the construction year (1995) and the design year (2015). Existing and projected noise levels were then compared to assess projected impacts. Impacts were assessed in relation to two principal parameters: (1) comparison to existing noise levels ("increase in noise"), and (2) comparison to FHWA design criteria for highway noise. Once this assessment was made, another computer model was used to assess areas for noise abatement in accordance with the guidance set forth in the MHTD memorandum cited above.

4.9.2 Background Noise Measurements

MHTD conducted a field study of current noise conditions along the project corridor during December 1988. As location and design studies for the project increased in detail, additional "representative receptors" were selected and existing noise measurements taken at them.

Noise levels for this study area are in units of Leq on an A-weighted scale, measured in decibels (dB). The Leq is the steady-state sound level which, in a stated period of time, would contain the same acoustic energy as the time-varying sound level during the same period. The A-weighted scale (dBA) emphasizes frequencies that approximate the response of the human ear.

Table 4.9-1 describes the representative receptors and presents the results of the measurements taken at them. The locations of these receptors in relation to the alternative project alignments are indicated on Figures 4.4.1 through 4.4.6. The range of current noise readings shown on Table 4.9-1 indicates the diversity of land use in the project area. Areas of high activity and those proximate to high-volume roadways display noise levels of over 60 dBA and several such areas display levels above FHWA criteria (67 dBA) or MHTD criteria (65 dBA) for residential use. Other areas, more distant from major traffic arterials, show noise levels as low as 43.0 dBA.

TABLE 4.9-1
REPRESENTATIVE RECEPTORS

Receptor Designation	Location	Measured Noise Level (Leq, dBA)
1	1761 Staunton (Bennington Place-South)	62.1
2	Mateus and Sauterne (Bennington Place-North)	55.5
3	Castle Bar (Bennington Place-South)	52.3
4	1801-1802 Chelmsford (Bennington Place-North)	60.8
5	15494 River Valley Drive (River Valley Drive-South)	46.6
7	2327 Brook Lane (Creve Coeur Lake-North)	59.9
10	48 Jeffrey Wayne Drive (Mexico Road-South)	54.0
14	1440 Heritage Landing (94 & Hemsath-North)	60.0
15	White Farmhouse, Hanley Road (Hanley Road-South)	57.1
16	5307 Gutermuth Road (Motherhead Road-North)	55.3
17	21 Knollwood (94 & Route N-South)	53.9
18	1st Baptist Church of Harvester (94 & Horstmeier-South)	63.3
19	Harvester Christian Church (94 & Harvester-South)	63.1

TABLE 4.9-1 (continued)

Receptor Designation	Location	Measured Noise Level (Leq, dBA)
20	1125 Monza Drive (94 & Harvester)	53.6
21	Meyer Lane & Towers Road (Tower Road-North)	47.8
22	14 Ranch (Caulks Hill Road-North)	48.0
23	194 Hunters Pointe (94 & Central School Road-West)	52.0
K	KATY Trail State Park (Intersection with Corridor for Red Alignment)	43.0
K1	KATY Trail State Park (Beneath Highway 40-61 Bridge)	66.5
K2	KATY Trail State Park (Beneath I-70 Bridge)	66.9
Q	100' East of Creve Coeur Mill Road 100' North of ℄ of Blue Alignment	65.8
QB	Intersection of Amiot and Bookbinder (Seven Pines Subdivision)	51.1
QC	Intersection of Bennington Common and Marine Terrace (Sherwood Place Subdivision)	59.3
QD	Parkway Estates at Staunton Court	53.8
QE	Parkway North High School at Fee Fee Road	62.4
QF	Intersection of Bookbinder and Strawberry Lane (Seven Pines Subdivision)	56.0

TABLE 4.9-1 (continued)

Receptor Designation	Location	Measured Noise Level (Leq, dBA)
QG	Creve Coeur Mill Road South of River Valley Drive	66.9
QH	Creve Coeur Memorial Park South of Dripping Spring	63.6
QI	Creve Coeur Memorial Park 100' North of Blue Alignment Corridor, East Side of Creek	47.8
QJ	Red Alignment Corridor, East Bank of Creve Coeur Lake	53.0
QK	Creve Coeur Mill Road at Water Works Road	67.4
V	Red Alignment/I-64 Subdivision	61.0
P	Subdivision Northeast of Red Alignment/Highway K Intersection	56.4
B	North Side of 94 at Harvester Road	62.8
G2	Mexico Road/Green Alignment	55.2
G3	Green Alignment 5,000' North of 94	52.6
GB	Green Alignment 2,500' South of 94 (West)	56.3
GC	Green Alignment 2,500' South of 94 (East)	57.2

4.9.3 Computer Modeling for Assessment

Noise analysis was performed using FHWA's STAMINA 2.0/OPTIMA Noise Programs. The STAMINA program was used to predict highway traffic noise. The OPTIMA program was used for noise barrier assessment and design. Computations from the STAMINA program were used to compare the existing condition with future scenarios for the alternatives. The field study noise monitoring data for Table 4.9-1 served as the baseline for evaluation of the construction year (1995) and the design year (2015) output. Noise data were computed along each of the alternatives. Traffic data was provided by MHTD for peak hour volumes, speed during peak design hour, vehicle mix and directional mix.

Each alternative modeled was subdivided into a series of segments with common characteristics. In addition to the roadway and traffic parameters cited above, these "common characteristics" included gradient and relation to adjacent topography (elevation or depression) and shielding effects of topography or structures.

Output from the STAMINA 2.0 program was used to assess the entire routes of the alternatives. This assessment included calculating the distance to the 65 dBA and 72 dBA contour lines. These "contour" lines demarcate distances out from the alternatives to which specified noise levels attributable to projected traffic extend.

4.9.4 Noise Modeling Results and Impacts

Noise modeling was performed to assess the impacts of the alternatives and the no-build alternative. The following Tables 4.9-2 through 4.9-8 summarize noise modeling results and the impacts of the alternatives on noise sensitive areas. The previously referenced Figures 4.4.1 through 4.4.6 show the alternate alignments, the noise receptors and the noise contours discussed in the following sections.

TABLE 4.9-2
RED ALIGNMENT
PROJECTED NOISE LEVELS
COMPARED TO BACKGROUND NOISE READINGS

Receptor ID	Approximate Location (Direction)	Measured Background (dBA)	Projected 1995 (dBA)	Projected Increase 1995	Projected 2015 (dBA)	Projected Increase 2015
2	Bennington Place (North)	55.5	62.9	7.4	64.6	9.1
3	Bennington Place (South)	52.5	60.9	8.4	62.6	10.1
5	River Valley Drive (South)	46.6	58.1	11.5	59.3	12.7
7	Near Creve Coeur Lake (North)	59.9	59.9*	0	59.9*	0
14	94 & Hemsath (North)	60.0	60.0*	0	60.0*	0
19	94 & Harvester (South)	63.1	63.1*	0	63.1*	0
18	94 & Horstmeier (South)	63.3	63.3*	0	63.3*	0
17	94 & N (South)	53.9	65.0	11.1	68.0	14.1
16	Motherhead Road (North)	55.3	60.7	5.4	62.6	7.3
15	Hanley Road (South)	57.1	58.4	1.3	60.2	3.1
23	94 & Central School	52.0	63.1	11.1	64.5	12.5
V	Red Alignment at I-64	61.0	61.0*	0	61.0*	0

TABLE 4.9-2 (continued)
RED ALIGNMENT
PROJECTED NOISE LEVELS
COMPARED TO BACKGROUND NOISE READINGS

Receptor ID	Approximate Location (Direction)	Measured Background (dBA)	Projected 1995 (dBA)	Projected Increase 1995	Projected 2015 (dBA)	Projected Increase 2015
P	Highway K	56.4	59.1	2.7	60.8	4.4
QG	Red Route Corridor (100' from Creve Coeur Mill Road	66.9	66.9*	0	66.9*	0
B	94 at Harvester	62.8	62.8*	0	62.8*	0
K	KATY Trail State Park	43.0	53.0	10.0	54.2	11.2
QJ	Red Route, East Shore, Creve Coeur Lake	53.0	56.7	3.7	58.7	5.7

* Projections indicate no increase when geometrics considered

TABLE 4.9-3
GREEN ALIGNMENT
PROJECTED NOISE LEVELS
COMPARED TO BACKGROUND NOISE READINGS

Receptor ID	Approximate Location (Direction)	Background 1988 (dBA)	Projected 1995 (dBA)	Projected Increase (1995)	Projected 2015 (dBA)	Projected Increase (2015
1	Bennington Place (South)	62.1	62.1*	0	62.1*	0
4	Bennington Place (North)	60.8	60.8	3.2	65.8	5.0
22	Caulks Hill Road (North)	48.0	60.9	12.9	62.8	14.8
23	North of 94 (West)	52.0	62.5	10.5	64.2	12.2
10	Mexico Road (South)	54.0	60.8	6.8	62.3	8.3
G2	Mexico Road (North)	55.2	63.3	8.1	64.8	9.6
G3	North of 94 (East)	52.6	61.9	9.3	63.6	11.0
GB	South of 94 (West)	56.3	61.2	4.9	63.0	3.7
GC	South of 94 (East)	57.2	59.9	2.7	61.8	4.6
223	Caulks Hill Road (South)	51.1	60.2	9.1	62.0	10.9

* Projections indicate no increase when geometrics considered.

TABLE 4.9-4
GREEN-DASHED ALIGNMENT
PROJECTED NOISE LEVELS
COMPARED TO BACKGROUND NOISE READING

Receptor ID	Approximate Location (Direction)	Background 1988 (dBA)	Projected 1995 (dBA)	Projected Increase (1995)	Projected 2015 (dBA)	Projected Increase (2015
1	Bennington Place (South)	62.1	62.1*	0	62.1*	0
4	Bennington Place (North)	60.8	64.0	3.2	65.8	5.0
21**	Caulks Hill Road (North)	48.0	60.0	12.2	61.9	14.1
23	North of 94 (West)	52.0	62.5	10.5	64.2	12.2
10	Mexico Road (South)	54.0	60.8	6.8	62.3	8.3
G2	Mexico Road (North)	55.2	63.3	8.1	64.8	9.6
G3	North of 94 (East)	52.6	61.9	9.3	63.6	11.0
GB	South of 94 (West)	56.3	61.2	4.9	63.0	3.7
GC	South of 94 (East)	57.2	59.9	2.7	61.8	4.6
223	Caulks Hill Road (South)	51.1	60.2	9.1	62.0	10.9

* Projections indicate no increase when geometrics considered.
** Represents segment not in Green Alignment.

TABLE 4.9-5
GREEN-BLUE ALIGNMENT
PROJECTED NOISE LEVELS
COMPARED TO BACKGROUND NOISE READING

Receptor ID	Approximate Location (Direction)	Background 1988 (dBA)	Projected 1995 (dBA)	Projected Increase (1995)	Projected 2015 (dBA)	Projected Increase (2015
1	Bennington Place (South)	62.1	62.1*	0	62.1*	0
4	Bennington Place (North)	60.8	64.0	3.2	65.8	5.0
20	South of 94 (North)	53.6	61.0	7.4	62.4	8.8
23	North of 94 (West)	52.0	62.5	10.5	64.2	12.2
10	Mexico Road (South)	54.0	60.8	6.8	62.3	8.3
G2	Mexico Road (North)	55.2	63.3	8.1	64.8	9.6
G3	North of 94 (East)	52.6	61.9	9.3	63.6	11.0
GB	South of 94 (West)	56.3	61.2	4.9	63.0	3.7
GC	South of 94 (East)	57.2	59.9	2.7	61.8	4.6

* Projections indicate no increase when geometrics considered.
** Represents segment not in Green Alignment.

TABLE 4.9-6
BLUE ALIGNMENT
PROJECTED NOISE LEVELS COMPARED TO
BACKGROUND NOISE READINGS

Receptor ID	Approximate Location (Direction)	Background 1988 (dBA)	Projected 1995 (dBA)	Projected Increase (1995)	Projected 2015 (dBA)	Projected Increase (2015)
Blue Alignment:						
1	Bennington Road (South)	62.1	62.1*	0	62.1*	0
3	Bennington Road (South)	52.5	60.9	8.4	62.6	10.1
Q	Creve Coeur Mill Road (West Area of CCLMP)	65.8	65.8*	0	65.8*	0
QI	East Area of CCLMP	47.8	53.7	5.9	54.4	6.6

* No increase when geometrics considered.

TABLE 4.9-7
YELLOW-BLACK ALIGNMENT
PROJECTED NOISE LEVELS
COMPARED TO BACKGROUND NOISE READING

Receiver	(dBA) Present	1995 Projected	1995 Increase	2015 Projected	2015 Increase
1	62.1	62.1*	0	62.1*	0
QC	59.3	59.3*	0	59.3*	0
QD	53.8	53.8*	0	53.8*	0
QE	62.4	62.4*	0	62.4	0
QF	56.0	63.8	7.8	66.4	10.4

* No increase projected when geometrics considered.

TABLE 4.9-8
GREEN-BLACK ALIGNMENT
PROJECTED NOISE LEVELS COMPARED
TO BACKGROUND NOISE READING

Receptor ID	Approximate Location (Direction)	Background 1988 (dBA)	Projected 1995* (dBA)	Projected 2015* (dBA)
1	Bennington Road (South)	62.1	62.1*	62.1*
QK	Creve Coeur Station at Creve Coeur Mill Road	67.4	67.4*	67.4*
QF	Seven Pines Subdivision Bookbinder & Strawberry Lane	56.0	57.1	60.5

* No increase projected when geometrics considered.

4.9.5 Comparison of Noise Impacts of the Alternatives

This section compares the noise impacts of the alternatives in three subsections. Subsection 4.9.5.1 compares the impacts on the Creve Coeur Lake Memorial Park. Subsection 4.9.5.2 compares impacts on the KATY Trail State Park. Subsection 4.9.5.3 compares noise impacts on residential properties and other sensitive receptors.

4.9.5.1 Noise Impacts on Creve Coeur Lake Memorial Park

One of the alternative routes, the Red route, crosses Creve Coeur Lake Memorial Park (CCLMP). The Green Alignment crosses the leased area south of the park. The Blue Alignment passes between CCLMP and the leased area on non-parkland. This section examines the noise impacts of these alternates.

Section 4.9.5.1.1 describes noise studies carried out in the early "screening" stages of project development. As the levels of detail of planning and design increased during the course of project development, more detailed noise studies were performed. These are discussed in Section 4.9.6.2.2.2.

4.9.5.1.1 Screening Level Noise Studies

CCLMP is bounded to the north by Marine Avenue, to the west by Creve Coeur Mill Road, to the south by subdivisions, and to the est by the Missouri River bluffs. As indicated on Table 23, noise monitoring was performed in 6 areas within the park as part of this initial study. Levels recorded at these 6 areas reflect both the diversity of adjacent land use and the effects of

aircraft noise. Recorded levels ranged from 47.8 in the southeastern section of the park, near the bluffs, to 66.9, 100′ west of Creve Coeur Mill Road near the park's western boundary. The principal sources of current noise, noted on the field sheets for the noise monitoring studies, were heavy truck traffic along Creve Coeur Mill Road, aircraft passing over the area enroute to Lambert-St. Louis International Airport, and automobile traffic within the northeastern section of the park where parking access is provided.

Locations Relative to Planned Uses: The Red Alignment would cross CCLMP near the southern end of Creve Coeur Lake. As such, it would divide proposed high-density recreation uses from more passive, low-density areas. The Blue Alignment would pass through an area south of the park. The Green Alignment would cross the leased area within a half-mile of the park's southern end.

Roadway Geometrics - Planned Elevations of the Alternatives: The alternatives would traverse CCLMP on an elevated section in order to route them from the bluffs on the east to the Missouri River floodplain. The Red Alignment would cross the park at elevations (above existing grade) of 100′ on the east to 40′ on the west. Elevations of the Blue and Green Alignments would range from 80′ on the east to 40′ on the west.

Table 4.9-9 indicates noise impacts of the three alternatives that will affect CCLMP and the leased area. Two of the receptors listed on the table, QI and QJ, represent areas of current relative serenity in the park. Receptor QB is located in the leased area. The other three are proximate to Creve Coeur Mill Road and represent areas affected by that road. As Table 4.9-9 indicates, none of the alternatives was projected to result in noise impacts on what are currently the "noisier" areas of the park. In the leased area, the Green Alignment was projected to result in "significant" (greater than 10 dBA) effects (though only on a small section of the leased area). The Blue Alignment was projected to have "major" (5-10 dBA) effects (though the resulting projected noise levels will still be suitable for parkland use), and the Red Alignment will have "minor" (1-5 dBA) effects.

TABLE 4.9-9
NOISE IMPACTS ON CREVE COEUR LAKE MEMORIAL PARK
WITHIN 100' OF DESIGNATED ROUTES

Alt. Route	Receptor	Current Level	Measured Projected (1995)	Increase (1995)	Projected (2015)	Increase (2015)
Red	QG	66.9	66.9	0	66.9	0
	QJ	53.0	53.7	.7	54.4	1.4
Blue	QI	47.8	53.7	5.9	54.4	6.6
	Q	65.8	65.8	0	65.8	0
Green (Leased Area)	QB	51.1	60.2	8.9	62.0	10.9
	Q	65.8	65.8	0	65.8	0

4.9.5.1.2 Detailed Noise Studies - Red and Blue Alignments

In November of 1992, a series of 25 noise measurements were taken at areas representing all areas of CCLMP and the leased area. Locations are shown on Figure 4.4.7. These measurements were then used as the basis for development of existing noise contours, shown on Figure 4.4.8. The Green Alignment, as well as the Green-Black and Yellow-Black Alignments, are located at a sufficient distance from CCLMP that the predicted 57 dBA contour for these lines would fall beyond the park boundaries. The STAMINA model was then used to develop predictions of the extent of the 57 dBA contours for the Red and Blue Alignments for the year 2015. 57 dBA is the FHWA criterion for "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 area is to continue to serve its intended purpose" (FHWA, 1986). These predicted contours are also shown on Figure 4.8. The existing and predicted noise contours were then juxtaposed to develop areas and acreages which are predicted to receive 2015 noise levels of 57 dBA or greater as a result of project development. These acreages are shown on Table 4.9-10. MHTD has agreed to provide replacement land for these areas as a part of the Creve Coeur Lake Memorial Park mitigation plan.

TABLE 4.9-10
NOISE IMPACTS OF PAGE AVENUE EXTENSION
THROUGH CREVE COEUR LAKE MEMORIAL PARK

Red Alignment

(1)	228.6 Acres	Total acreage within park which is predicted to have a noise level of 57 dBA or more as a result of Page Avenue prior to consideration of noise levels on Creve Coeur Mill Road.
(2)	57.5 Acres	Acreage within Area (1) which currently has a noise level of 57 dBA or more.
(3)	37.0 Acres	Acreage within Area (1) which is within proposed right of way and aerial easement.
(4)	11.4 Acres	Acreage included in Area (1) which is also included in Area (3).
(5)	3.6 Acres	Acreage included in Area (1) which is outside of park boundary south of Station 905+00.
(6)	141.9 Acres	Acreage of parkland which will be impacted by the predicted noise level of 57 dBA or more. Area (1) minus Area (2) minus Area (3) plus Area (4) minus Area (5).

Blue Alignment

(1)	84.8 Acres	Total acreage within park which is predicted to have a noise level of 57 dBA or more as a result of Page Avenue prior to consideration of noise levels on Creve Coeur Mill Road.
(2)	20.8 Acres	Acreage within Area (1) which currently has a noise level of 57 dBA or more.
(3)	0.0 Acres	Acreage within proposed right of way and aerial easement (Blue Alignment passes through area outside of park).
(4)	64.0 Acres	Acreage of parkland which will be impacted by the predicted noise level of 57 dBA or more. Area (1) minus Area (2) minus Area (3).

4.9.5.2 Noise Impacts of Project Alternatives on KATY Trail State Park

Eight build alternatives for the Page Avenue Extension have been studied for this report. All of these alternatives would pass over one of two bridges crossing the Missouri River and the KATY Trail State Park. These alternatives and the crossings which apply to each are indicated on Table

4.9-11. The two crossings are termed "Red" for the northern route and "Green" for the southern route.

TABLE 4.9-11
ALTERNATIVE ALIGNMENTS AND RELATED RIVER CROSSINGS

Alignment	Bridge (and KATY Trail) Crossing
Red Alignment (Selected Alternate)	Red
Green-Black/Red Combination	Red
Yellow-Black/Red Combination	Red
Blue/Red Combination	Red
Green Alignment	Green
Green-Black/Green Combination	Green
Green/Green Dashed Combination	Green
Green/Green-Blue Dashed/Red/ Green Combination	Green

Four receptors were studied to assess noise impacts of the two crossings. Their locations and basic roadway characteristics of the crossing are shown in Table 4.9-12. Information for "K1" and "K2" is presented for comparison. Projections of future noise levels were made at "K" and "K3", the two rail crossings. These are shown on Table 4.9-13. These projections indicate that the impacts within 100' of the crossings will be "significant" (greater than 10 dBA in terms of increase over existing conditions) but not such that they will exceed FHWA (67 dBA) or MHTD (65 dBA) standards for noise abatement.

TABLE 4.9-12
NOISE-RELATED CHARACTERISTICS OF
KATY TRAIL STATE PARK HIGHWAY CROSSINGS

Crossing	Average Daily Traffic (Year)	Representative Receptor	Height of Roadway Above Trail (Feet)	Current Noise Level
Red Alignment	73,500 (2015)*	K	80	43.0, Measured
Route 40-61	44,160 (1991)	K1	25	66.5, Measured
I-70	162,670 (1991)	K2	55	66.9, Measured
Green Alignment	72,300 (2015)	K3	25	43.0, Extrapolated from K

TABLE 4.9-13
PROJECTED NOISE IMPACTS OF TWO ALTERNATE CROSSINGS OF THE KATY TRAIL STATE PARK (All Levels in dBA)

Crossing/ Receptor	Current Noise Level	Projected 1995 Level	Increase 1992-1995	Projected 2015 Level	Increase 1992-2015	Federal Standard for Parks*	Exceeds/ Less than Standard 1995	Exceeds/ Less than Standard 2015
Red/K	43.0	53.0	10	54.2	11.2	67	Less	Less
Green/K3	43.0	55.9	12.9	57.8	14.8	67	Less	Less

* MHTD standard is 65 dBA, Leq.

4.9.5.3 Noise Impacts on Residential Properties and Other Sensitive Receptors

Impacts in this section are assessed in accordance with two parameters. The first is the criterion for consideration of noise abatement (65 dBA) specified in MHTD's Highway Traffic Noise and Abatement. The second is assessment of whether or not a receptor or group of receptors are predicted to experience noise increases of 10 dBA or more as a result of the given alternative under consideration. Such an increase, while not in itself a criterion for abatement under MHTD guidelines, is considered to be sufficient to result in a change in the noise environment which is readily noted by residents.

Table 4.9-14 presents the types, locations and numbers of receptors affected in relation to the above-mentioned criteria for each alternative.

4.9.6 Construction Noise Impacts

The final alignment chosen will receive excessive noise during the construction period of the project. Some areas of the final alignment will require extensive grading and probably some rock quarrying which will impact the existing land uses and land use activities.

Trucks and large earthmovers produce the most construction noise because they are used for long periods of time and move over the entire length of the alignment. Bulldozers, air compressors, drills, generators and other tools combine to increase the noise impacts to the surrounding areas. Noise levels of the construction equipment are between 70-96 dBA at 100 feet.

Construction noise mitigation should be considered in all residential areas impacted. Some noise control measures used in MHTD construction specifications include ensuring that all construction equipment is equipped with adequate mufflers, ensuring that construction work be confined to the hours between 7:00 a.m. and 7:00 p.m., and assuring that noise barriers be constructed prior to extensive grading of the roadway.

TABLE 4.9-14
COMPARISON OF NOISE IMPACTS OF ALTERNATIVES - RECEPTORS AND LOCATIONS

Alignment	Receptors Affected	Projected (2015) Noise Level	Above Criteria	Increase Over Existing Level
Red	40 SFUs * Bennington Place	62.6	No	10.1
	1 SFU at River Valley Drive	59.3	No	12.7
	17 SFUs at Highways 94 and N	68.0	Yes	14.1
	21 SFUs at Highway 94 Central School Road	64.5	No	12.5
Green	35 SFUs at Caulks Hill Road, North Side	62.8	No	14.8
	21 SFUs North of 94 on West Side of Alignment	64.2	No	12.2
	24 SFUs North of 94 on East Side of Alignment	63.6	No	11.0
	36 SFUs at Caulks Hill Road, South Side	62.0	No	10.9
Green-Dashed	32 SFUs North of Intersection with Towers Road	61.9	No	14.1
	21 SFUs North of 94 on West Side of Alignment	64.2	No	12.2
	24 SFUs North of 94 on East Side of Alignment	63.6	No	11.0

TABLE 4.9-14 (continued)

Alignment	Receptors Affected	Projected (2015) Noise Level	Above Criteria	Increase Over Existing Level
Green-Blue	21 SFUs North of Intersection with 94 on West Side	64.2	No	12.2
	24 SFUs North of Intersection with 94 on East Side	63.6	No	11.0
Blue	40 SFUs in Bennington Place to North of Alignment	62.6	No	10.1
Yellow-Black	40 SFUs in Seven Pines	66.4	Yes	10.4
Green-Black	No receptors affected by either criterion in segment.			

SFU = Single-Family Unit

4.9.7 Noise Abatement Measurements

As presented in Section 4.9.3, noise impacts for all alternatives were assessed in relation to both MHTD criteria and increase of 10 dBA or more over existing noise levels. The results of this assessment are summarized in Table 4.9-15.

TABLE 4.9-15
SUMMARY OF NOISE IMPACTS ON RECEPTORS

Alternative	Number of Receptors over 65 dBA Criterion	Number of Receptors Experiencing Increases of >10 dBA Over Existing
Red	17	79
Green	0	116
Green-Dashed	0	77
Green-Blue	0	45
Blue	0	40
Yellow-Black	40	40
Green-Black	0	0

Noise abatement evaluation was carried out in accordance with Highway Traffic Noise and Abatement - Policy and Procedures, MHTD, 11/1/91. That document specifies that those areas projected to experience noise levels greater than 65 dBA are eligible for noise abatement if warranted and feasible.

One area along the Red Alignment and one area along the Yellow-Black Alignment were projected to receive noise levels above the 65 dBA criterion. Both of these areas are subdivisions. None of the other alternatives is projected to result in noise impacts which would be eligible for abatement. These two areas are addressed in the following subsections.

4.9.8 Red Alignment Noise Abatement

Of the four areas proximate to the Red Alignment which are predicted to receive major noise impacts, only those near the intersection of Highways 94 and N are eligible for abatement. The other three areas listed on Table 26, Section 4.9.3, are not projected to receive noise in excess of the 65 dBA criterion.

The area of concern encompasses 17 single-family units in the subdivisions of Greenwood Acres (north side of alignment), Timberwood Trails (south side of alignment), and Wood Glen Estates (south side of alignment). Aerial photographs were used to determine the lengths of the barriers which would be required for abatement. Their lengths and locations are:

North Side of Alignment:

From 4,000′ west of the intersection of Highways 94 and N extending westward for a length of 3,000 feet.

South Side of Alignment:

From 3,500′ west of the intersection of Highways 94 and N extending westward for a length of 3,400′.

The total barrier length required is, thus, 6,400 feet.

Since a noise reduction of only 3 dBA is required to meet the 65 dBA criteria and only 5 dBA is required to meet MHTD guidelines, a barrier of minimal (10′) height will suffice. The cost for such a barrier, constructed from concrete, is $150 per lineal foot, in-place. The estimated cost for abatement of the Red Alignment is therefore: $150 x 6,400 feet = $960,000. This results in a cost per receptor of approximately $56,500. Since this exceeds the MHTD criteria of $20,000 then noise abatement is not planned for the Red Alignment.

4.9.9 Yellow-Black Alignment Noise Abatement

One area of 40 single-family residential units in Seven Pines Subdivision is projected to receive noise levels exceeding the 65 dBA criterion in 2015. This area is situated to the south of the alignment at Bookbinder Drive. A

barrier of approximately 1,500′ in length would be required to abate the noise in this area.

The projected (2015) noise level is 66.4 dBA. Thus, the reduction required to meet the criterion is less than 2 dBA. Given this fact and the topography of the area, a 10′ wall will suffice. At a cost of $150 per lineal foot, the estimated cost for the Yellow-Black Alignment is: $150 x 1,500 feet = $225,000. This results in a cost per receptor of approximately $5,650. Since this is within the MHTD criteria, noise abatement is planned for the Yellow-Black Alignment. Should a more detailed design analysis on this alignment reveal that the noise abatement measures are not warranted, they will not be provided. This decision will be made only after the public involvement process.

4.10 WATER QUALITY IMPACTS

4.10.1 Surface Water

Effects on surface water quality can be categorized into long and short-term impacts. Short-term impacts are those associated with the presence and the operation and maintenance of the highway after it is built. A more detailed discussion of water quality issues is presented in a separate technical report. Table 4.10-1 identifies the number of the water bodies, streams and the Missouri River the corridors would transect.

Erosion control measures described in the Missouri Standard Specifications For Highway Construction, which will be used throughout the project, will minimize negative impacts. Recent U. S. Environmental Protection Agency (EPA) nonpoint pollution guidelines, as administered by Missouri's Department of Natural Resources (DNR), will also be observed. Any stream work will be done in accordance with the Missouri Channelization Guidelines.

Whenever possible, project construction within water bodies will be avoided. When water bodies must be involved, construction methods will preserve the natural drainage and accommodate existing water-carrying capacities.

Short-term impacts to surface water quality would occur if any of the build alternates are chosen. These impacts include erosion, siltation, and an increase in nutrients during construction.

Most of the interchanges along all the alignments would be located near streams. The Green Alignment crosses more water bodies than the other routes. Along all routes, most of the soils adjacent to the streams and in the floodplains are easily erodible. In general, the more water bodies that are crossed, the greater the amounts of easily erodible soil which will be encountered.

TABLE 4-10.1
WATER BODIES IMPACTED

Alternative	Road Miles*	No. of Water Body Crossings
Red Alignment	20.5	15
(Mitigation Plan)	(-)	(-)
Green-Black/Red Combination	21.0	16
Yellow-Black/Red Combination	21.0	16
Blue/Red Combination	20.4	15
Green Alignment	14.4	24
Green-Black/Green Combination	14.5	24
Green/Green Dashed Combination	15.0	22
Green/Green-Blue Dashed/Red/Green Combination	15.5	23

* Rounded to nearest tenth of a mile.

Long-term impacts to surface water quality would occur if any of the proposed alignments are chosen. These impacts would also occur on existing roads if the no-build alternate is chosen.

The source of highway runoff contaminants is primarily from vehicles, maintenance of the highway (deicing salts), and measures for the control of roadside vegetation (pesticides and fertilizers).

The impacts to water quality related to this project can be minimized during development of detailed design plans, construction specifications, and long-term operational requirements.

Mitigative Measures

Several categories of mitigation measures are included in the planning process for this project. The most significant in terms of water quality are those described in the Missouri Standard Specifications for Highway Construction. That document prescribes specific measures to be included in contract specifications for projects. As previously noted, current EPA guidelines will also be observed.

Some general recommended practices to limit water-quality impacts which will be included in subsequent project plans and project construction specifications are:

- Develop sediment collection plans for construction runoff.
- Control the maximum area of unprotected soil that can be exposed for each phase at any one time.

- Make use of clearing and proposed grading lines to limit clearing and protect native cover.
- Reduce the duration of unprotected soil exposure by requiring stage seeding and mulching as work is completed.
- Provide measures for sediment control from borrow areas, haul roads, and waste disposal areas during use, with restoration after use.
- Protect bodies of water and running streams from siltation with temporary measures such as berms, dikes and sediment basins until permanent measures are effective.
- Plan for temporary and permanent control of concentrated runoff from construction areas (sediment traps, filter barriers).
- Use flat slopes to maximize erosion control by vegetation.
- Make use of temporary seedings between construction phases and when permanent seedings are out of season.
- Apply mulches as soon as possible in the construction sequence, using proven anchoring methods.
- Seed and mulch by segments on high cuts and fills.
- Provide for access to slopes where it is shown that maintenance practices have to be used to retain vegetation effectiveness.
- Use native plant species to the greatest extent possible. Use proven long-lived species requiring a minimum of maintenance.

Construction will preserve the natural drainage and/or accommodate existing water-carrying capacities.

4.10.2 Groundwater Impacts

In St. Charles County, groundwater is used extensively for drinking water supply, with 22 wells operating within the vicinity of the project area. The area would probably only affect the groundwater quality in this area where sinkholes have developed (Karst areas). Drainage in Karst areas is principally in the subsurface, where sinkholes can become direct hydraulic links to the groundwater and present a greater possibility of groundwater contamination from highway-derived pollutants. To avoid this potential for groundwater contamination, the drainage pattern along the highway will be integrated to avoid conveyance of highway runoff by sinkholes. At this time, no sinkholes are known along any St. Charles County route. However, they have been observed on the bluffs over Creve Coeur Creek in St. Louis County.

During preparation of the final design, the potential for sinkholes proximate to the roadway will be specifically identified and MHTD will take measures to ensure that construction activities will not impact groundwater connections. MHTD will notify MODNR if abandoned wells are encountered during construction or if existing wells are to be abandoned as a result of the construction.

Two municipal water supply wells are located near the Red Alignment. One of these is an active well. The other has been discontinued as a supply well but is used by DNR for monitoring. Inasmuch as final design work has not been performed, it is not known if the wells would fall within the proposed highway right-of-way. If the proposed highway does pass over these wells, each would have to be replaced, or closed, per DNR standards.

The major bedrock aquifers that are tapped by the water supply wells in this region are very deep (up to 1,750 feet). The construction of the proposed highway should have no effect upon the recharge or water quality of these aquifers. However, since most wells remove water from every aquifer encountered, there is a possibility of near surface groundwater contamination, highway stormwater drainage should not be allowed to enter sinkholes.

The well fields that use the alluvial aquifers within the Mississippi and Missouri River valleys are not near the corridor and should not be affected by this project.

4.11 PERMITS

The U. S. Army Corps of Engineers (COE), Kansas City District and St. Louis District, have been contacted regarding the crossing of wetlands, streams, the Missouri River and its associated floodplain. Initial coordination with the COE indicated that it was their position at the time not to review highway alignments until the final corridor selection has been made. MHTD will apply for a Section 404 Permit for crossing the Missouri River floodplain using this FEIS for documentation needs.

The COE has indicated during coordination by telephone on October 15, 1992 and in a meeting held on October 20, 1992 that sufficient analysis has been conducted and included in the FEIS to serve as supporting documentation to satisfy the Section 404(b)(1) guidelines of the Clean Water Act.

The Missouri River is the only navigable stream within the project. The initial coordination with the U. S. Coast Guard (St. Louis) for the Section 9 Bridge Permit has been completed. From a river navigation analysis, the Coast Guard indicated that the river crossing associated with the Green Alignment would be the preferred alignment. The preference for the Green Alignment is based on the consistency of the navigation channel to remain located midchannel along this straight reach of the river, even during periods of high water. At the Red Alignment crossing located on the bend in the river, the navigation channel tends to shift

from the St. Charles County side of the river to the St. Louis side of the river during periods of high water.

4.11.1 Navigation

When normal water depths are available, which has not occurred during the past few years due to drought conditions in the Upper Missouri River basin, barge traffic may consist of barges configured either 3-wide by 4-deep or 2-wide by 5-deep.

During the 10-year period of 1978-1987, annual shipment of commodities by barge averaged 5,651,150 tons, with the high of 6,557,841 tons in 1986 and a low of 4,682,640 tons in 1982. The trend was generally upward from 1983 to 1988 with 1986 data indicating over 6,557,000 tons shipped. There was a decrease in 1989.[1]

The primary types of commodities shipped in 1989 included sand/gravel, rock, wheat, cement, sorghum grains, fertilizers and corn, for a total of 588,293,532 ton-miles of river traffic. As long as adequate navigation flows are provided from upstream reservoirs, then this trend of 5.5-6.5 million tons of goods shipped is likely to continue.

The Red Alignment, the Selected Alternate, will require bridge clearances to satisfy the fluctuating navigation channel in this portion of the river, including a minimum clear span of 600 feet from the St. Charles County bank and at least a vertical clearance of 52 feet above the 2% flowline. The Coast Guard has indicated that the FEIS is satisfactory for the bridge permit application process.

Local government Floodplain Development Permits, per Title 44 CFR 60.3 (d) and applicable local ordinances, have been acquired for excavating, filling, grading, paving, drilling, fencing and construction within floodplain areas.

All government regulations regarding the Missouri River floodway and navigation requirements will be followed in the design of the river crossing.

4.12 HABITAT AND WETLAND IMPACTS/WETLAND MITIGATION PLAN

The effect of highway construction utilizing the various alignment alternatives varies with the proportion of the alignments or combinations currently in agriculture and the amount of developed land. The wetlands calculations comparing alternatives in this subsection are based on the

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[1]Source: Waterborne Commerce of the United States, Calendar Year 1989. Part 2, Waterways and Harbors, Department of the Army, Corps of Engineers, WRSC-WCUS-89-2.

corridor-level studies described in Chapter 3. More detailed wetland studies for the selected alignment are presented in Section 4.12.2.

4.12.1 Habitat and Wetland Impacts - Comparison of Corridors

The longest alignment, the Red Alignment, has 25.4% of the area classified as developed land. It has another 56.5% designated as some form of agriculture. These two land classes, both highly disturbed as far as vegetation is concerned, account for slightly over 80% of the alignment. Of the remaining portion of the alignment, approximately 10% is upland woods and 7% wetland and open water. Highway construction traversing upland woods will have considerable impact on the overall vegetation. The majority of the remaining upland woods have some medium to older aged trees, i.e., 16 inches and larger dbh (diameter at breast height). None of the wooded tracts are very large in size. They are generally associated with either ravine systems, slopes too steep for housing or agriculture, or streams. Reduction of this remnant of woods will further fragment the wildlife habitat of woodland animals and their corridors by which they may move from area to area. A positive effect of the proposed right-of-way would be an increase in the amount of grass and grass-forb habitat which is very low in this area.

Although the total acreage of wetlands involved is small in comparison to the total acreage of the alignment, the effect of highway construction on wetlands would have a detrimental impact on the emergent wetland and wetland woods within the alignment. The alignment would also impact areas of farmed wetland.

Habitat acreage comparisons for the Yellow-Black/Red, Blue/Red and Green-Black/Red Combinations are listed in Table 3.5-2. All three variants take more developed acreage in the range of 20-100 acres, more grass-old field by 11 acres, and less wetland woods by 23-33 acres than the Red Alignment.

The Green Alignment has land use patterns similar to the Red Alignment. Developed land accounts for 31.4%, which is slightly higher than the Red Alignment, while agricultural land is slightly lower, 45.9%, giving a total of 77% disturbed land. The amount of farmed wetland affected by the Green Alignment is greater than the Red Alignment. Upland woods, tree-shrub savanna, and successional upland fields make up almost 17% of the alignment. Of the 10% wooded portion, one of the larger wooded areas is a Missouri Department of Conservation outdoor teaching area adjacent to Custellia School. Although the woods appears somewhat more disturbed than several other wooded tracts, the fact that it is a teaching facility for the public schools adds to its importance. Highway construction at this area would incur a loss of not only wooded habitat but of a high use area and a teaching facility. In other respects, the upland woods along this alignment are not substantially different than those on the Red Alignment. The only tree-shrub savanna area on any of the alignments is associated with a power line cut. This type of community is kept in a state of change by repeated cutting and/or spraying by the utility company. The Green Alignment has the largest proportion of disturbed successional land

of any of the alignments. Since this habitat is in a state of flux, it is not a permanent habitat type. Normal land use generally provides replacement of this habitat as each piece proceeds in succession or is converted back to agriculture or is developed.

Like the Red Alignment, the greatest amount of wetland woods on the Green Alignment is in St. Louis County. The Creve Coeur Creek area has a well-developed woods but little emergent wetland. The amount of wooded wetland associated with the Missouri River edge is less than the Red Alignment, as is the amount of exposed non-vegetated shore habitat. The narrowness of the wetland wooded strips between Creve Coeur Mill Road and the river make these pieces of less importance than the larger riverine habitat on the Red Alignment.

On the St. Charles County side of the Missouri River, the alignment crosses two small wooded areas but, because of size, these are relatively unimportant. Emergent wetland is represented by a portion of pooled rainwater ponds and associated vegetation. This area, adjacent to Greens Bottom Road and continuing along the Green Dashed Segment is of sufficient size and quality that its loss would be a serious loss of wetland habitat for waterfowl and other aquatic and semiaquatic animals. Just west of Route 94 is a small mixed wooded and emergent wet community. Although the area is small and associated with an artificial pond and altered drainage system, it provides some wetland habitat in an otherwise upland area. Its small size and limited flora reduce its significance. There are two wetland wooded areas within the alignment associated with Dardenne Creek. One of these, adjacent to the creek, would be eliminated if the Green Alignment were implemented.

The Green-Black/Green Combination consists of the old grass field habitat covering the utility corridor, upland and bottomland wooded areas near Creve Coeur Creek, and then old grass field and agriculture as it proceeds out into the floodplain. Habitat percentages where the Green-Black Segment is attached to either the Red or Green Alignment are identified by Table 3.5-2.

The Green/Green Dashed Combination includes an alternate segment south to Route 94. Along this section, it has a significantly lower proportion of land use in development and in agriculture than the Green Alignment. It has, however, proportionately more upland woods and wetlands. Of the upland woods along this route, at least one-third, although classified as woodland, have scattered residences within it. This same area contains some of the best quality upland woods of the areas studied for this project based on species diversity and size of trees. The wetland habitats along Greens Bottom Road include both emergent wetlands and wetland woods. The emergent wetlands is composed of pooled run-off water and variable acreage of emergent vegetation. The effect of highway construction using this alternate route would be the loss of quality wetlands not easily replaced.

The Green/Green-Blue Dashed/Red/Green Combination's key element is another alternate segment south of Route 94. Land use within this section is primarily developed land, 53%, with only 6% in agriculture. Approximately 39% is in upland woods. Although the Green-Blue Dashed Segment overlaps Duckett Creek for almost half its length, there is very little land designated as wetland. The one small pocket of impeded drainage, and hence wetland, lies adjacent to the upper portion of Duckett Creek. The wooded fringe along Duckett Creek is classified as upland woods on the basis of species composition and the steep, rarely flooded sides of the creek. There are two good-sized wooded tracts on the alignment. One at the western end and one near the beginning of the alignment. Both have well-developed herbaceous layers and mixed aged tree strata. A right-of-way through them would not only greatly reduce their size but leave two small isolated wooded tracts instead of a moderate sized stand.

4.12.2 Wetland Determinations - Red Alignment

As is cited elsewhere in this document, the Red Alignment was selected and was the alignment for which further design studies were performed. Subsequent to these design studies, wetland determinations and delineations in accordance with the 1987 Corps of Engineers Wetlands Delineation Manual were carried out for this more precisely defined area and reviewed by the Kansas City District, U. S. Army Corps of Engineers.

These determinations and delineations are fully described in Wetlands Delineation Report, Page Avenue Extension, Red Alignment, submitted to the Kansas City District, U. S. Army Corps of Engineers, in November of 1992. The results of the study are depicted graphically on Figures 4.6.1 through 4.6.4 and are summarized in Table 4-12.1, Jurisdictional Wetlands, Page Avenue Extension, Red Alignment.

Readers comparing acreage calculations from Table 4.12-1 to those presented in Table 3.5-2 should note that Table 3.5-2 is based on 1,000' corridors while Table 4.12-1 is based on designed rights-of-way, typically 250'.

As Table 4.12-1 indicates, there are six principal types of wetlands encountered by the Red Alignment. These are described below:

1. "Seasonally-Flooded Basins". These areas consist mainly of old farm ponds which have been abandoned, have silted in, and have developed wetland vegetation, but are wet for only a part of a given year. Seasonally-flooded basins occur along the segment from the Highway 40/61 interchange eastward to Highway 94.

2. "Wet Woods", or bottomland forests, occur along Crooked Creek (approximately one mile east of the Dardenne Creek crossing), on Jane Downing Island, on the Missouri River bottoms between the chute of Jane Downing Island and the levee, and in CCLMP. Two additional areas of wet woods not encountered by the alignment occur to the southwest of CCLMP.

TABLE 4.12-1 - ACREAGE AND LOCATION OF JURISDICTIONAL WETLANDS IN RED ALIGNMENT

Site No.	Location/Description	App. Acreage	Type
W-1	Former farm pond near Highway 40-61 and Orf Road	0.10	Seasonally flooded basin
W-2	Former farm pond near Highway 40-61 and Orf Road	0.13	Seasonally flooded basin
W-3	Former farm pond near Route N and Bryan Road	0.18	Seasonally flooded basin
W-4	Former farm pond along Bryan Road approx. 900' North of Route N	0.15	Seasonally flooded basin
W-5	Shallow pond, near intersection of Routes N and K	0.3	Emergent wetland
W-6	Tributary to Dardenne Creek near Highway N	0.2	In-stream wetland
W-7	Along Crooked Creek in Dardenne Bottoms	0.2	Wet woods
W-8	North of Gutermuth Road	2.0	Emergent wetlands
W-9	NE Corner of Highway 94 and Route N	0.1	Wet woods
W-10	NW Corner of Highway 94 and Route N	0.15	Wet woods
W-11	1,300' West of Intersection of Highway 94 and Route N	0.1	Seasonally flooded basin
W-12	1,600' West of Intersection of Highway 94 and Route N	0.2	Seasonally flooded basin
W-13	500' NW of Intersection of Highway 94 and Route N	2.1	Emergent wetland
W-14	200' NE of Intersection of Highway 94 and Route N	0.5	Wet woods
W-15	Western Edge of Spring Bend Property	0.3	Sinkhole pond
W-16	Eastern Edge of Spring Bend Property	0.14	Sinkhole pond
W-17	Middle of Jane Downing Island	1.0	Wet woods
W-18	Between River Chute and Levee (Swale & Borrow Pit)	0.9	Wet woods
W-19	Approx. 2,500' West of Creve Coeur Mill Road at Base of Terrace	8.4	Agricultural wetland
W-20	Creve Coeur Creek at CCLMP Crossing	0.09	Wet woods
W-21	Wooded Area at CCLMP Crossing	2.0	Wet woods
W-22	Cattail/Buttonbush Marsh at CCLMP Crossing	10.4	Emergent wetland
	Total Wetland Acres in Red Alignment	29.64	

upon the degree of the development of a wetland ecosystem with a diversity of plant and animal life. The development of such diversity is dependent on a variety of factors such as adjacent land use, availability of seed sources and position in relation to annual animal migration corridors;

5. Sufficient Acreage for Both Mitigation Value and for Development of Wetland Ecosystems - Mitigation must be at least on a 1:1 basis. In addition, development of a self-sustaining system requires sufficient land to withstand the effects of adjacent competing or incompatible land uses, and;

6. Management - Protection and Control - This criterion takes several factors into account. These include:

   - Accessibility for that operation and maintenance which will be required;

   - Potential for protection of the site from "adverse" natural occurrences or conflicting adjacent land use practices; and

   - The site needs to be contiguous to be managed with efficiency. As an example, one large wetland would be more efficient to manage than several smaller wetlands (with the same combined acreage) that are scattered throughout the floodplain.

The six sites were evaluated regarding the criteria listed above. A summary of the evaluation is provided in Table 4.12-3 and a brief discussion of the evaluation of each site follows.

Site A - Park Mitigation Plan Area

Site A rated high in all categories of the screening process, but because of potential land use conflicts it is not a fully viable mitigation site for all wetlands impacted by the Red Alignment, only those impacted within the park. The major land use conflict is that if the proposed Red Alignment is built the CCLMP will receive the Site A property as part of the CCLMP Mitigation Plan (Figure 4.7).

Site B - Right-of-Way Linear Wetlands

Site B ranked relatively high during the screening process. It is small in size (±11 acres) and would remove prime farmland from production. This site would not be optional wet woods habitat, but it could be very good emergent wetland habitat. A linear wetland would provide extensive shoreline that would be accessible to wildlife along its 2.5-mile length.

TABLE 4.12-3

SCREENING OF ALTERNATIVES*

Site	Potential for Replacement In Kind	Use Without Disruption of Existing Resources	Self-Maintaining; Low O&M	Habitat Diversity/ Adjacent Land Use	Sufficient Acreage	Management Protection and Control
A Park Mitigation Area	3	1	1	1	Yes	1
B Adjacent to Right-of-Way	1	2	2	2	No	1
C Upper Creve Coeur	1	5	1	2	Yes	1
D Green's Bottom	1	5	2	1	Yes	6
E Catfish Island	1	5	2	2	Yes	6
F Bonhomme Island	1	5	2	2	Yes	6

*Ranked on a 1 to 6 basis with alternatives relative to one another, "1" being the best of the alternatives.

In general, the impacts upon fish and wildlife caused by the modification of habitat for the proposed action will be minimal in light of past actions. Upland environments already have been radically modified by residential and commercial development. Floodplain habitats have been altered by agricultural, residential and commercial developments. However, there is the possibility of affecting migratory waterfowl habitat within the floodplain. The main area of concern, expressed by the Missouri Department of Conservation, is the portion of the St. Louis County floodplain that is directly west of Creve Coeur Lake. The expressed concern is that this wetland habitat, which is used by Canada geese and other migratory waterfowl, may be destroyed or disrupted by the highway and the associated development that it may follow. This area is an integral part of wetland mitigation considerations.

Another area of concern, from a plant-life aspect, is the natural area known as the Cherbonnier Spring Bend (Knowles) Tract. This tract is located along the Missouri River bluffs (St. Charles County) near the corridor of the Red Alignment. An extensive collection of Missouri wildflowers has been established on this property (approximately 100 acres). These wildflowers have been introduced in order to develop such a collection at one location. It did not naturally occur at this site.

This site has been catalogued by The Nature Conservancy, which generated a large species list. It also should be noted that Dr. Peter Raven, Director of The Missouri Botanical Garden, refers to this property as "one of the loveliest and most significant collection of Missouri wildflowers to be found in any collection." (Letter 8-5-86) Coordination between MHTD and the owner has resulted in shifting the Red Alignment to the north so that it can avoid direct impacts to this unique property. Moreover, as noted elsewhere, Spring Bend may ultimately become a state park.

4.14 FLOODPLAIN IMPACTS

In accordance with Executive Order 11988, floodplain development is to be avoided whenever possible. The connection of Page Avenue from its terminus at Bennington Place to a logical location in St. Charles County will necessitate the roadway crossing Creve Coeur Creek, Missouri River and Dardenne Creek floodplains. There is no practicable alternative to this crossing location.

Present floodway encroachments at Missouri River mile 33.0 show only a 0.4 foot difference between the elevations of the natural 100-year frequency flood and FEMA's regulatory floodway. Existing and proposed developments downstream of river mile 33.0 cause another 0.3 foot increase in the 100-year frequency flood elevation. As a result, the Page Avenue Extension has an available encroachment of, and can cause no more than, a 0.1 foot increase in the 100-year computer water surface profile.

Effects of floodplain encroachment can be categorized into long and short-term impacts. Highway construction in the floodplain would cause short-term impacts if sediment or debris accumulated in the streams or culverts.

This would cause a reduction in the water-carrying capacity of the stream and may cause flooding adjacent to the floodplains. This can be mitigated by environmentally conscious construction procedures, such as erosion control blankets and sediment control fences.

Long-term impacts would be those associated with the altering of the stream and land. Wherever the corridor would cross a water body, a culvert or bridge may be constructed, thereby modifying the stream channel. These changes may affect both the quality of aquatic habitat in the immediate area of the structure plus permanently modify the hydraulics of the channel. Since the ability of the soil to store excess water during flood events would be reduced, flooding may occur adjacent to the floodplains. These can be eliminated by careful design at the crossings and modification of the channel.

Roadway fill will be constructed with Page Avenue above the 100-year flood elevation. Through the use of open conduits, the natural drainage and existing water-carrying capacities will be preserved.

The floodplains of the Missouri River and Dardenne Creek and its tributaries will be encountered by the Red Alignment. Approximately 141 acres of floodplain would be within the right-of-way in St. Louis County and 257 acres of floodplain would be encountered in St. Charles County, for a total of 398 acres.

The floodplains of the Missouri River and Dardenne Creek and its tributaries would be encountered with the Green Alignment. Approximately 76 acres of the floodplain would be encountered in St. Louis County and 460 acres in St. Charles County for a total of 536 acres.

Approximately 179 acres of the Missouri River floodplain would be encountered as the Green Dashed Segment in St. Charles County, exclusive of the connecting Green Alignment. Approximately 568 acres would be encountered with the connecting alignment is added.

The floodplains of the Missouri River and adjacent tributaries, approximately 23 acres, would be encountered as the Green-Blue Dashed Alternate is currently proposed in St. Charles County, excluding the Green Route. Approximately 548 acres would be encountered if the connecting Green Route is added.

If none of the proposed build alternates were implemented, there would be no additional impacts on the existing floodplain which are due directly to the project.

TABLE 4.14-1
FLOODPLAIN IMPACT IN ACRES

	St. Louis County	St. Charles County	Total
Red Alignment	141	257	398
Blue/Red Combination	138	257	395
Green-Black/Red Combination	157	257	414
Yellow-Black/Red Combination	157	257	414
Green-Alignment	76	460	536
Green-Black/Green Combination	76	460	536
Green/Green Dashed Combination	76	92	568
Green/Green-Blue Dashed/ Red/Green Combination	76	472	548

4.14.1 Effects Upon Base Flood Elevations

The proposed alignments and combinations cross the regulated floodways of Creve Coeur Creek, the Missouri River, Dardenne Creek and adjacent streams. Crossing of regulated floodplains will be designed and constructed in compliance with applicable floodplain regulations. The design of this highway will be such that no increase in the base flood elevations will occur due to construction in the floodway. Any increase in base flood elevation due to construction in the floodway fringe will not exceed regulatory limits. This will be accomplished through a combination of minimal construction in the floodways, a minimum number of bridge piers, hydrodynamically efficient design of bridge piers and/or culverts, and improvements of the river and creek channels. For the purpose of this report, it is acknowledged that the relative impacts on base flood elevations are equal among the alternative routes and are not a factor in route selection.

A future phase of the design process will require a study of the bridges' types, sizes and locations. At that time, a detailed hydraulic analysis of the flows and water surface elevations will be made in accordance with the requirements of the Federal Emergency Management Agency and the U. S. Army Corps of Engineers. The Missouri River analysis will use the Corps of Engineers, Kansas City District, Step Backwater Program for hydraulic calculations and determination of water surface profiles. It is recognized that upstream and downstream construction has taken place which may not be reflected in FEMA's FIS. Therefore, the Kansas City District, Floodplain Management Unit, will be contacted for current flow vs. profile elevation data to be used in the hydraulic analysis of the Missouri River. This must be done at an early stage in the design development of the bridge. Calculations of hydraulics and water elevations for other regulated streams may use HEC-2 or other programs which are in compliance with the local flood insurance studies. Sufficient data will then be available for review by regulatory agencies and for use in obtaining required permits.

In addition to regulated floodplains, careful consideration will be given to the hydrology of the entire route. Storm drainage systems primarily consisting of open channels and culverts will be used to maintain as much as possible of the existing drainage patterns.

The above concepts have been discussed with the St. Louis District and the Kansas City District of the Corps of Engineers. They are in agreement with the statements that detailed hydraulic analysis could be done after a route is selected and at an early stage of the performance of the type, size and location studies for bridge crossings. The final design will be such that there will not be an accumulative increase in either flood heights or velocities.

4.14.2 Floodplain Development Potential

From Bonhomme Creek on the south, downstream to Route I-70 in St. Louis County, an estimated 9,160 acres of land stretches from the base of the bluffs to the Missouri River. Most of this land was once natural floodplain, but almost all of it has been altered by human activities.

Within the more than 14 square miles of this expanse, a minimum of 3,000 net-developable acres of mostly agricultural land can be identified as the likely focus of induced project area development that might occur if sufficient flood protection were provided for large portions of this territory. The induced development area would be bounded roughly by Riverport and the Fred Weber Company's North Stone Plant quarry to the north, the bluffs and/or an expanded Creve Coeur Lake Memorial Park (Enhancement Plan) to the east, the St. Louis County Water Company's property to the south and the Missouri River to the west. Facilities such as the Metropolitan Sewer District's Missouri River wastewater treatment plant, Arrowhead Airport and Creve Coeur Airport would be assumed to remain in place and functioning. Additional open space preservation and/or restoration is also assumed.

Given the regional historical land absorption rates since 1970, 3,000 developable acres would represent an immense amount of land to absorb for development. Locally, the largest individual demand for developable land has been for residential purposes. However, for a variety of reasons, there has been no significant floodplain residential development for over a decade in the St. Louis Region. Consequently, industrial, commercial and office uses would constitute the most probable utilization of this land. This further reduces the predictable overall absorption rate, especially in light of the multiplicity of other possible regional locations currently and potentially available in the metropolitan area. It is not unreasonable to assume that it would take as much as thirty or more years to fully develop the 3,000 acres.

The precise character of this development would reflect a myriad of changing factors and circumstances through time. Nevertheless, it is possible to intelligently speculate as to its general outlines. The recent evolution of Riverport is helpful in this regard. Originally

envisioned to have approximately a 29% retail/restaurant/hotel composition, this sector is being de-emphasized in favor of greater office center development. Large-scale, long-term development efforts frequently reformulate development strategies while underway as economic conditions evolve. A reasonable conjecture concerning the final disposition of the 3,000 acres determined most likely to experience induced development is reported in Table 4.14-2.

TABLE 4.14-2
PROJECT AREA INDUCED DEVELOPMENT LAND USE FORECAST

Land Use Classification	Amount	Percentage
Residential	60 Acres	2%
Office	600 Acres	20%
Retail/Restaurant/Hotel	510 Acres	17%
Wholesale/Warehouse/Industrial	1,830 Acres	61%
Total	3,000 Acres	100%

These estimates reflect anticipated land use thirty years after enhanced 500-year flood protection systems begin to be put in place. The entire floodplain portion of the 3,000 acres is assumed to have become flood-protected at 500-year levels during this period. Without such protection, large-scale development would be impossible.

Development would probably occur in small increments within numerous projects of various scales initiated in sequence with enhanced flood control measures. Although the entire territory could be flood-protected by one system and comprehensively developed, it would more likely be advanced in tracts comprising several hundred acres at a time. Although ultimately more expensive, this approach would offer the advantage of phasing flood protection and requiring less investment "up-front."

Assuming that requisite flood protection were in place, development would most likely radiate from two places: the interchange of Page Avenue Extension/Earth City Expressway Extension and the southern edge of Riverport. Retail/restaurant/hotel uses would probably concentrate around the interchange. Office building location could be more diffuse but would gravitate toward high visibility, easy access sites alongside the major roadways. Housing, if it were to occur at all, would probably occupy higher ground at the southern fringe of the area. Wholesale/warehouse/industrial uses would tend to be located on cheaper, less visible or desirable sites. It is probable that one or more rail spurs would have to be provided for these uses. However, this area is being considered for a comprehensive floodplain wetland/natural area which would include mitigation wetlands for those impacted by the Page Avenue Extension.

Floodplain Development Impacts

Growing numbers of people would work in the area as well as visit and, perhaps, reside. Economic, transportation, social, environmental, etc. impacts would be numerous and range from the negligible to the substantive.

Typical office campus developments generate 100 employees per acre. Theoretically, 60,000 people could work on the 600 acres of net developable land identified for office development. At 10 to 20 employees per acre, the 1,830 acres of net wholesale/warehouse/industrial use could generate between 18,300 to 36,600 jobs. Including potential full- and part-time retail/restaurant/hotel jobs, the area would easily become one of the St. Louis Region's primary employment centers.

Moreover, it would be a revenue generator for the City of Maryland Heights as well as other governmental entities. Given the St. Louis Region's slow economic growth since 1970, many of these jobs, in effect, would probably represent the relocation of economic activities from other commercial and industrial centers. Downtown St. Louis, Clayton and older industrial areas, office developments, business parks, etc. would all be affected to varying degrees as would their taxing governmental bodies.

Substantive St. Louis County floodplain development could also affect St. Charles County's economic development. The net effect of this would be to shift the regional economic "center of gravity" to a more western and southern point unless it were offset by large gains in other places.

Transportation patterns could also be impacted on local and regional levels. Projected office and industrial development, by themselves, would generate an estimated 230,100 vehicle trips per day. Retail/restaurant/ hotel development and residential development, if any, would greatly increase the ultimate figure. A large investment in roads and traffic controls would be required within the area. Without the Earth City Expressway Extension or an equivalent roadway, along with the quick access to Route I-270 afforded by the Page Avenue Extension, internal traffic problems would be intolerable.

Massive development of the project area floodplain might tend to reduce traffic in and around areas such as Downtown St. Louis and Clayton. Within its immediate vicinity, however, it would generate large new demands upon roadways that are already approaching or beyond design capacities. Route I-270 and Olive Street Road (Route 340) would be most affected as well as Page Avenue, Route 141 (Woods Mill Road), Route I-64 (Highway 40) and Route I-70. Expansion of some of these roadways would be difficult, expensive and, in some instances, probably cost-prohibitive. Lesser arterials and feeders such as Creve Coeur Mill Road, Marine Avenue, Dorsett Road and Fee Fee Road would also be impacted.

The primary social impact of St. Louis County floodplain development would be very localized. Agriculture as a way of life would fade if the

existing farmland were increasingly developed. Eventually, agricultural land use could be expected to disappear. Shorter and less demanding commutes to and from work, however, would be a collateral general social benefit for many employees in the developing area.

The environmental impacts of developing the area would go beyond the displacement of agricultural lands that provide habitat for local and transient wildlife and the inevitable parallel decline of prior species diversity and numbers. Mitigation measures and developmental buffers notwithstanding, noise, water and air quality impacts would inevitably affect preserved and/or replacement wetlands as well as nearby residential areas. The opportunities for hiking and bicycling would be among the unstructured recreational pursuits that might be limited unless one or more multipurpose trails were incorporated as part of an overall development policy.

4.15 WILD AND SCENIC RIVERS

None of the proposed alternates impact any rivers of streams listed on or proposed for listing on the National Wild and Scenic Rivers System. No outstanding national and/or state resource waters will be impacted by the Page Avenue Extension.

4.16 THREATENED OR ENDANGERED SPECIES

4.16.1 Bald Eagle

Two Federally listed endangered species are found within the project area. The bald eagle (Haliaeetus leucocephalus) was reported from the area. The biological assessment report that was completed as a part of this FEIS indicates that the bald eagle does not use this area for winter nesting. Apparently, this area of the Missouri River is only a flyway in which the eagles pass through. U.S. Fish and Wildlife Service coordination (February 1, 1989) indicated there is no designated critical habitat for the bald eagle in the project area. The proposed action will not impact the bald eagle.

4.16.2 Pallid Sturgeon

The pallid sturgeon (Scaphiryncus albus) was Federally listed as an endangered species on September 9, 1990. A Draft Recovery Plan prepared under the auspices of the FWS by the Pallid Sturgeon Recovery Team was published in June 1992. The proposed project crosses a reach of the Missouri River that is part of the historic range of the species. The U.S. Fish and Wildlife Service (FWS) indicates that a biological assessment must be prepared to assess project impacts to the species as required by the Endangered species Act of 1973. The FWS recommends that the biological assessment be prepared as part of the FEIS.

4.16.2.1 Biological Assessment

Guidance for preparation of a biological assessment found in 50 CFR 402.12 states that the following should be considered for inclusion in the assessment: a) results of an on-site inspection to determine if the species is present; b) views of recognized experts; c) review of literature and other information; d) analysis of the effects of the proposed action on the species and habitat; and e) an analysis of alternate actions considered for the proposed action. Additional guidance was provided by the FWS Columbia field office and the Fish and Wildlife Research Center, Missouri Department of Conservation. A staff member of the MDC Research Center is on the Pallid Sturgeon Recovery Team, which prepared the Draft Recovery Plan (FWS, 1992). The Draft Recovery Plan was utilized as a primary resource in the preparation of the assessment.

Natural History

The pallid sturgeon has evolved from a group of bony fishes that were prevalent during the Paleozoic Era. The descendants of this group in North America include the paddlefish and the pallid, shovelnose, white, green, Atlantic, shortnose and lake sturgeon. The pallid sturgeon was first described in scientific journals from individuals collected from the Mississippi River in 1905 (Forbes and Richardson, 1905).

The pallid sturgeon can be described as a large, long and slender, bottom-dwelling fish with a flattened, shovel-shaped snout. The mouth is positioned on the under or ventral side of the snout. The pallid sturgeon is very similar in appearance to the smaller and more common shovelnose sturgeon. However, a close examination of the two would reveal various differences. These differences are exemplified by differing number of finrays and length of barbels. The pallid sturgeon is considered to be one of the larger fish species found in the Missouri and Mississippi River basins, reaching reported weights approaching 85 pounds. The maximum weight of documented catch decreases with movement down the historic range from the upper reaches of the Missouri River in Montana and North Dakota through the lower Missouri and on to the Mississippi River. That is, the heavier and larger adult fish are recorded in the upper Missouri, while the smaller adult fish are found in the lower Mississippi River.

The historic range of pallid sturgeon includes the middle and lower Mississippi River, the Missouri River, and the lower reaches of the Platte, Kansas and Yellowstone Rivers. The total range stretches approximately 3,550 miles in thirteen states from Montana to Louisiana (Figure 4.7.1). The current numbers of pallid sturgeon are not well documented. However, it seems to be the consensus that the species has declined throughout its historic range since the species was first described. Presently, the pallid sturgeon is considered one of the rarest fish in the Missouri and Mississippi River basins. Although rare, the species is considered to be widely distributed in the Missouri River and in the Mississippi River below the mouth of the Missouri River. Recent field surveys have not provided substantive information that would change

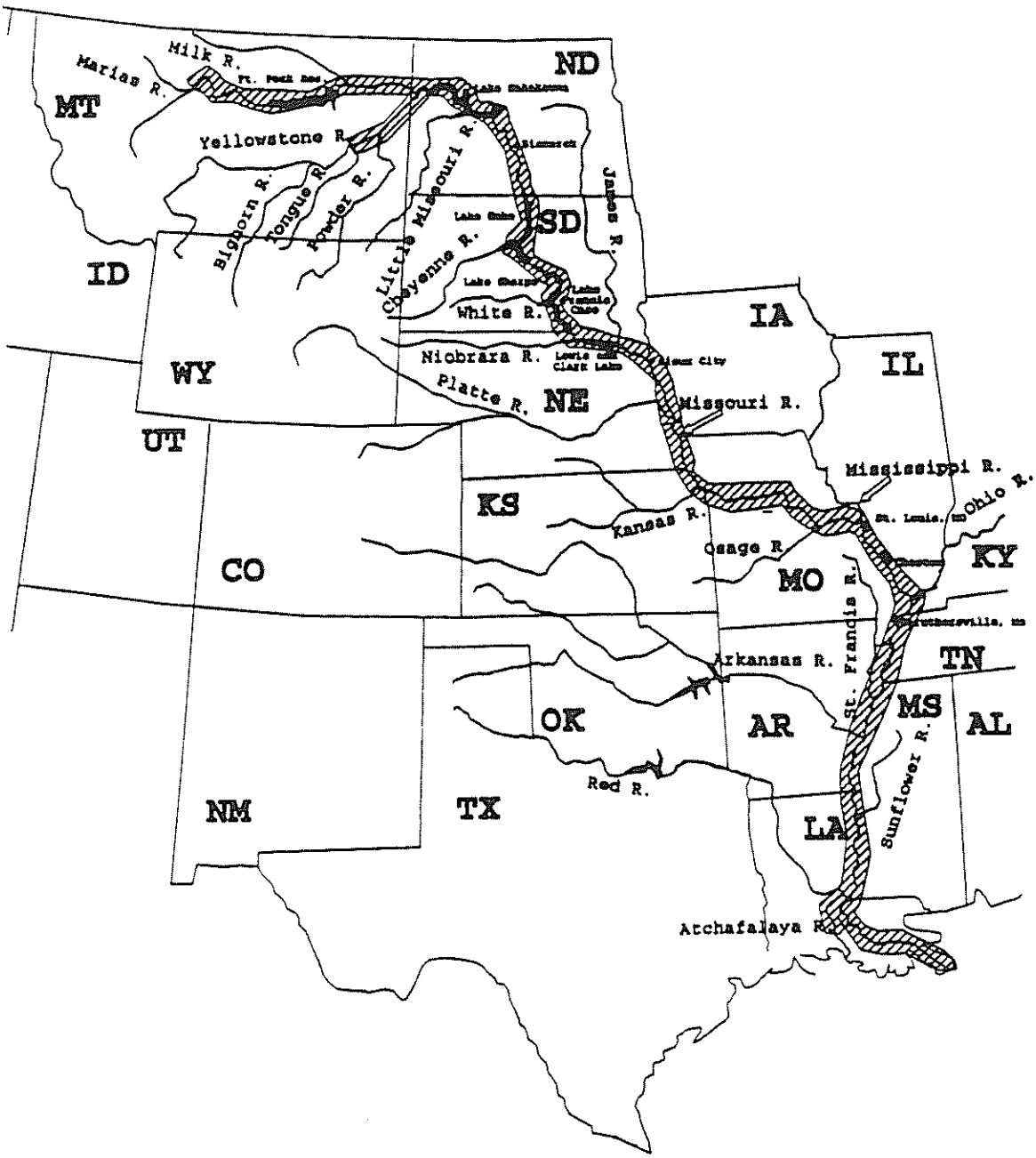
the current estimate of pallid sturgeon distribution and abundance. Most recent sightings on the Missouri River include occurrences in Montana, Lake Sakakawea near Williston, North Dakota, the lower reaches of the Yellowstone River (Montana), Lakes Oahe and Sharpe in South Dakota and the mouth of the Platte River in Nebraska. In the Mississippi River, areas that have hosted recent sightings include Caruthersville, Missouri, Chester, Illinois, and near the Atchafalaya River in Louisiana.

Although the preferred habitat for the pallid sturgeon is not well known, it is believed to favor "large, turbid, free-flowing riverine habitat with rocky substrate" (Galbraith et al, 1988). They are considered to be "well adapted for life on the bottom and inhabit areas of swifter water than does the related but smaller shovelnose sturgeon" (Forbes and Richardson, 1905). Further, the species is reported to favor areas that exhibit strong currents in or near the main river channel. These areas of habitat preference have been found to include deep pools at the downstream end of sidechutes and sand bars. The current velocities found in habitat that is apparently favored by the pallid sturgeon is found throughout its range. The species also favors turbid waters at varying depths depending on the season of the year. Although the species has been described as preferring rocky substrate, individuals have been caught in waters over sandy bottoms. Sand is the most common substrate found in the range of the pallid sturgeon. The species is believed to inhabit the full range of water temperature found on the Missouri and Mississippi Rivers. The species has exhibited no known temperature preferences or intolerances.

Much of what is known about the life history of the pallid sturgeon is gleaned from comparisons drawn from what is known or suspected about the spawning habits of other sturgeon, including the shovelnose. Little specific information is known on reproductive (spawning locations, seasons) of the pallid sturgeon. Shovelnose sturgeon appear to favor spawning over rock, rubble or gravel bottoms in the main river and tributaries of its range. The shovelnose has been noted to spawn in various locations from late May through June and into mid-July. Seasonal fluctuations in riverflow has been associated with the initiation of spawning. Male pallid sturgeon are estimated to reach sexual maturity at seven to nine years, spawning every two to three years. Females reach maturity in 15 to 20 years spawning every three to ten years. The pallid sturgeon feeds primarily on other fish and can typically live to an age of 40 or more years.

Reason for Decline of the Species

The greatest contributing factor of decline in the numbers of pallid sturgeon is believed to be habitat loss. Extensive areas of its habitat have been subject to physical modification. Impacts to habitat include channelization, impoundments (lakes) and altered riverflow regimes. The elimination of islands, chutes and backwater areas by channelizing and stabilizing the Missouri River has had a harsh effect on habitat diversity in general and has affected pallid sturgeon habitat in particular. Habitat in the upper Missouri River has been altered by construction of



Historic range of the pallid sturgeon. —

Final Environmental Impact Statement	Page Avenue Extension St. Charles and St. Louis Counties, Missouri
Draft Pallid Sturgeon Recovery Plan, June 1992 FWS	Figure 4.7.1

several major impoundments. These projects are thought to have had an especially severe impact on certain spawning areas and is worsening conditions in remaining or potential spawning areas. The Mississippi River also has been modified by wing dams and dikes resulting in a more constricted river environment. Species such as the pallid sturgeon that have adapted to life in a turbid river environment which existed before extensive modifications were made are declining in number.

Other factors linked to decreased abundance of the pallid sturgeon include over-harvesting, pollution and hybridization. The pallid sturgeon has been sought historically by fishermen for eggs to be sold as caviar. Some states are now prohibiting the taking of all sturgeon by sport or commercial fishing. Regarding effects of pollution, the pallid sturgeon is a bottom-feeder and therefore it is assumed to be vulnerable to pollutant exposure.

Hybridization between the pallid sturgeon and the shovelnose sturgeon is evident both in the Mississippi and Missouri Rivers. Hybridization is believed to be a fairly recent phenomenon. The cross breeding between the pallid and shovelnose sturgeons, which is considered a threat to maintaining the genetic integrity of the species, may have resulted from increased competition for shrinking amounts of suitable habitat.

No critical habitat for the pallid sturgeon has been identified.

Description of the Proposed Project

The proposed project involves constructing a bridge across the Missouri River in the vicinity of Jane Downing Chute and Island. An on-site inspection of the proposed crossing of the Missouri River by the project was not required by the FWS to address impacts to the pallid sturgeon. Since little is now known concerning locations of populations and spawning areas, it would be difficult to determine if the species is present at the project location.

The area at the river crossing is in the vicinity of Jane Downing Chute. The chute is presently functioning with a greatly diminished water flow because of hydraulic controls (closing structures) placed at the upstream end of the chute. In order for the chute to function more effectively as habitat, a flow-through system is needed to minimize silt deposition. High silt deposition is not conducive to the pallid sturgeon, which is believed to prefer a rocky or sandy substrate maintained by strong currents. Due in part to these considerations, it appears less likely that the Missouri River in the project area would be suitable habitat for the pallid sturgeon without the implementation of habitat restoration measures.

The proposed project will span the Missouri River and associated side channels and back-water areas from the levee on the St. Louis County side of the river to the bluff on the St. Charles County side. However, the placement of bridge piers may be necessary in the area of the Jane Downing

Chute on the St. Louis County side to maintain economical bridge span lengths.

Two alternatives for crossing the Missouri River have been examined in the FEIS. These are associated with the Red Alignment (Selected) and the Green Alignment. The Green Alignment would cross about 16,000 feet of Missouri River base floodplain. The Red Alignment crosses approximately 14,400 feet of base floodplain. The Green Alignment would impact heavily upon residential areas in St. Charles County. Additionally, the Green Alignment would require a much longer span (8,990-foot span on the Green compared to a 3,550-foot on the Red) that would greatly increase the overall cost of the proposed project. When comparing construction costs of the Green and Red Alignments from the Common Point to the Missouri River (including bridges) the Green Alignment is estimated to cost $188.9 million compared to $86.25 million to construct the Red Alignment. The much greater cost of the Green Alignment is attributable to the longer bridge and its navigation span needed to cross the Missouri River. Since the Green Alignment approaches and crosses the regulatory floodway at a skewed angle, the bridge must be made longer to span the floodway. The regulatory floodway is also much wider in the area of the Green Alignment compared to the Red (8,800 feet on the Green; 1,600 feet on the Red). Federal Emergency Management Agency (FEMA) regulations require that the regulatory floodway must be spanned.

Determination of Effect

Measures to conserve pallid sturgeon habitat would be included in the proposed project. The bridge will be constructed in such a manner that will minimize or eliminate impacts to backwater areas and side channels. No roadway fill material will be placed inside the levee on the St. Louis County side of the river.

The bridge will span from the levee to the bluff on the St. Charles County side. Bridge piers will be designed and placed to minimize impacts to chutes and backwater areas. Through coordination with the FWS and MDC, a potential approach has been formulated to provide increased habitat diversity through creative design of bridge piers.

If placement of a bridge pier in Jane Downing Chute is found to be necessary, the pier will be designed through coordination with FWS and MDC. It may be possible to enhance habitat potential for the pallid sturgeon and other riverine species by designing a pier that creates turbulence in the chute. Turbulence would promote scouring and formation of deeper holes downstream of the bridge, which would in turn enhance diversity of habitat and assist in moving deposited silt from the chute.

Regarding cumulative effects, the channelization of the Missouri River and the resultant disruption of predevelopment riverine habitat is believed to be the dominant factor in the decline of the pallid sturgeon. Construction of the proposed project will not add to the impact of past

actions (i.e., channelization) and will not precipitate additional burdens on remaining or potential pallid sturgeon habitat.

Section 4.14.2 in the FEIS addresses the potential for floodplain development and possible impacts to the floodplain of the Missouri River and the pallid sturgeon that future development may cause. Briefly summarized, the Page Avenue Extension is a limited access facility and as such would act to preclude development, except at interchanges. The only interchange will be approximately 10,700 feet from the Missouri River at River Valley Road. Additionally, projected floodplain development is predicted on a 500-year levee unrelated to the proposed project and not currently planned by others. Without that higher level of flood protection, extensive development, including construction of such a levee, would not be permitted without review by the necessary permitting agencies.

Pollution from point and non-point sources that could affect the pallid sturgeon will not occur as a result of the proposed project. The Page Avenue Extension will provide additional capacity to move vehicles more efficiently across the Missouri River, and will provide for a redistribution of total traffic. In that regard, the proposed project in itself will not increase contaminants from the traffic in runoff for the area as a whole. During final design for the Missouri River bridge, the bridge will be designed so contaminant impacts from runoff or spills will be eliminated to the extent practicable.

Based on the above assessment, the proposed project as embodied in the Red Alignment, is not likely to adversely affect the pallid sturgeon. The FWS Columbia Field Office notified MHTD that it concurred that the proposed project would not likely adversely affect the pallid sturgeon, subject to provision identified in their letter of November 16, 1991, which is included in Volume 3, Comments and Coordination.

4.16.3 Sicklefin Chub

Coordination with the Missouri Department of Conservation (MDC) has revealed the potential for the occurrence of animals considered rare in Missouri near the project area. The one species potentially affected is the Sicklefin chub (Hybopsis meeki) which occurs in the Missouri River within 2.0 miles downstream of the proposed project. This fish is rare in Missouri and is a federal candidate for listing as a threatened or endangered species.

4.17 HAZARDOUS WASTE/UNDERGROUND STORAGE TANKS

Hazardous wastes sites within the Page Avenue Extension general project area were identified to avoid any possible disruption to such sites during facility construction. Hazardous wastes as defined by the Environmental Protection Agency (USEPA) are those discarded products which are flammable, corrosive, explosive in reaction, and toxic to humans and animal life. This survey was extended to include disposal sites that were

enumerated as abandoned or uncontrolled sites by the USEPA. Two tracking records were investigated, listing those potential and confirmed contaminated sites. This listing, however, is not final, as many sites have been appealed by the property owners, and the registry lists only sites where hazardous wastes have been disposed. Sites that have been identified as having a potential hazardous substance release on the property are listed in the USEPA Region VIII tracking record, CERCLIS. CERCLIS represents the environmental inventory known as the Comprehensive Environmental Response, Compensation and Liability Information System.

Coordination with Missouri Department of Natural Resources Waste Management Program has resulted in the location of one St. Charles County contaminated site that is within 500 feet of the proposed Green Alignment. The site is the Rustman Bus Service facility, located along Central School Road in an unincorporated area between Route 94 and Route I-70. This site was identified as a suspected dioxin contamination site in 1983. Surface treatment with dioxin contaminated materials was suspected. It was investigated and sampled that same year and results were negative. The U.S. Environmental Protection Agency categorized the waste site as "not detected" for any contaminants.

The 1991 Missouri Annual Report on confirmed, abandoned or uncontrolled hazardous waste disposal sites indicates no other sites in St. Louis or St. Charles Counties adjacent or within any Page Avenue Extension right-of-way.

No commercial, industrial, and agricultural establishments near the project corridor are expected to have hazardous or potentially hazardous materials, except as previously noted.

4.17.1 Underground Storage Tanks

Underground storage tank (UST) systems in the project area contain petroleum products and are associated with gasoline service stations. Leaking USTs or USTs damaged during highway construction can become a definite liability for the owner of the property where the UST is located.

All known establishments with USTs and located within any Page Avenue Extension rights-of-way are listed in Table 4.17-1. The only two routes so listed are the Red and Green Alignments in St. Charles County.

TABLE 4.17-1
UNDERGROUND STORAGE TANKS IN PAGE AVENUE EXTENSION PROJECT AREA

RED ALIGNMENT	LOCATION
1. Mobil	Route 94 and Heritage Landing
2. Amoco	Route N and Route 40/61
3. Texaco	Route 94 and Old Route 94 (tanks are removed, remediation complete)

GREEN ALIGNMENT	LOCATION
1. Amoco	Route 94 and Kisker Road
2. 7-11 Quick Shop	501 West Mexico Road
3. Texaco "Mini-Mart"	401 West Mexico Road (tanks are removed, remediation complete)
4. Huck's "Mini-Mart"	Salt Lick Road and Mexico Road

There are no known UST sites along the Red Alignment, Green-Black Segment, Yellow-Black Segment, Blue Segment or Green Alignment in St. Louis County. In St. Charles County, there are no known UST sites along the Green Dashed Segment or Green-Blue Dashed Segment.

4.17.2 Mitigation

In the event that the underground storage tanks (USTs) are encountered in the implementation of an alignment, removal may be necessary. If the tank has been used since 1974, tank registration with the state is required. Removal of tanks used since 1984 must also be accompanied by soils analysis of the area beneath the tank for determination of potential leaks.

Whether the UST is removed or left in the ground, in both cases, the tank must be emptied and cleaned by removing all liquids, dangerous vapor levels and accumulated sludge. These potentially hazardous actions should be carried out in accord with the regulations cited below. If an UST is left in the ground, it must be filled with a harmless, chemically inactive solid, like sand.

These activities must occur in accordance with Federal regulations in 40 CFR 280.71, .72 and .73; and in Missouri proposed regulations to be in 10 CSR 20-10.071, .072 and .073.

4.18 VISUAL IMPACTS

The Page Avenue Extension will traverse scenic areas of western St. Louis County and eastern St. Charles County as it crosses the Missouri River and its environs. The following visual settings will be impacted: Creve Coeur Lake Memorial Park (CCLMP), the KATY Trail State Park, the Missouri

Bottoms floodplain, agricultural lands, hilly terrain, and diverse residential areas. There will be principally four viewer groups:

- Travelers along the freeway (bluffs area, floodplain, parklands);
- Residents of established neighborhoods, both in St. Louis and St. Charles Counties (bluff area);
- Visitors utilizing recreation facilities in CCLMP, the KATY Trail and other river or floodplain areas; and
- Small contingents of floodplain and upland dwellers and agriculturalists.

4.18.1 Negative Visual Impacts

Primary negative visual impacts of the Page Avenue Extension can be described as follows: disruption of scenic vistas along and below the St. Louis County bluff line by a bridge spanning the wetlands (Red Alignment and Blue Segment only); an elevated highway across St. Louis County's floodplains and its open agricultural fields; a bridge and approach roadway over the Missouri River and onto the St. Charles County bluff line; and visual splintering of residential neighborhoods in St. Louis and St. Charles Counties. Secondary negative visual impacts include possible unsightly development generated by the highway, businesses associated with highways, commercial signage, billboards, litter generated by traffic, etc. The highway structure itself, with metal guardrails, light posts, signs and erosion prevention structures will include adverse visual elements.

4.18.1.1 Creve Coeur Lake Memorial Park (Red Alignment, Green Alignment and Blue/Red Combination)

Creve Coeur Lake Memorial Park is regarded as a scenic, partially passive St. Louis County park. Much of its value as a recreation area depends upon the beauty of its natural resources. Any major transportation facility placed within or adjacent to its physical or visual boundaries will disrupt scenic vistas. The Red Alignment will produce the greatest visual impacts for CCLMP.

For those park users near the portion of the Red Alignment which traverses CCLMP, visual impacts will be prominent. The proposed bridge and elevated roadbed result in permanent structures which are visually intrusive in the passive and natural settings of the park. Obviously, these impacts will be most severe within close proximity and will diminish with distance. In any case, mitigating the visual impacts of any large bridge structure in or near CCLMP repesents a challenge.

4.18.1.2 The Missouri Bottoms Floodplain (All Routes)

As a consequence of the ongoing urban development of St. Louis and St. Charles Counties, vistas of large parcels of open undeveloped land are becoming rare experiences. The placement of a major highway structure will dissect a continuous agricultural, wetland habitat and riverine vista across this floodplain. It constitutes a visual intrusion because it is incompatible with the surrounding floodplain.

4.18.1.3 Agricultural Open Space in St. Louis and St. Charles Counties (All Routes)

Pockets of agricultural open space relieve urban visual congestion. This resource will be diminished by placing a highway through agricultural areas. The negative visual impacts upon this resource will be predominantly apparent from the surrounding bluffs and immediate proximities.

4.18.1.4 Residential Developments in St. Louis and St. Charles Counties (All Routes)

Quiet backyard views of neighboring gardens, tree lines or distant hillsides will be affected by the intrusion of the Page Avenue Extension. Exposed rock cuts, steep sloped earth embankments, areas cleared of vegetation, culverts and erosion control structures, expressway lighting, barriers and signage, right-of-way fencing and sound control barriers will disrupt the existing visual character of residential neighborhoods. The severity of these negative impacts will vary in intensity depending upon the location along each of the alignments.

4.18.1.5 KATY Trail State Park (All Routes)

The KATY Trail State Park is operational along the Missouri River in St. Charles County. It is part of Missouri's State Park system, a goal of which is to preserve and interpret the examples of Missouri's natural landscapes. When completed, perhaps as early as 1994, the trail will provide approximately 200 miles of natural landscapes, vistas, and habitat areas primarily along the Missouri River Valley.

The Page Avenue Extension's crossing of this facility will constitute a visual intrusion. However, in the context of the urbanized areas of St. Charles County that the trail traverses, it already encounters comparable bridge structures at Routes I-70 and I-64 (40/61) as well as railroad bridges.

4.18.1.6 Travelers along the Page Avenue Extension

The Red Alignment, as a rule, will present few negative impacts. This is largely due to the alignment's location over long stretches of existing Highway 94 and Highway N rights-of-way.

The section of the Page Avenue Extension between the Missouri River and Highway 94 generally will occur over existing agricultural or undeveloped open space. The construction of the extension will reduce the amount of open space/agricultural land as viewed from adjacent residential areas. However, it should be noted that with the explosive growth of St. Charles County, it is likely that this land will become developed anyway.

Progressing west, between the Highway 94/Page interchange and Highway N, few visual impacts are likely to occur, other than increasing development.

Beyond the Highway N interchange parallel to Highway K, the corridor will be constructed over generally flat, cultivated agricultural land. Views to the highway will generally be seen by only a small agricultural resident population while views from the roadway will be of open agricultural lands. Both should be pleasant.

Proceeding west from Highway K to Stump Road, the Red Alignment will be located along existing Highway N. The visual impacts to surrounding land uses will be minimal. It is the secondary future development of these more easily accessible areas which present the greatest potential for negative visual impact.

From Stump Road west to Route I-64 (40/61), the roadway will pass through large sections of agricultural land. It is the secondary developments which some day will be built along the roadway which have the greatest potential for producing negative visual impacts.

4.18.1.7 Visual Impacts Mitigation

MHTD will provide the following mitigation to minimize negative visual impacts:

- Utilize techniques which minimize exposed vertical rock cuts. Smooth and cover rock cuts with adequate soil so vegetation can be reestablished, blending the altered ground plane with the existing unaltered ground plane and reducing safety concerns and ongoing maintenance of typical exposed rock cuts.

- Prepare areas within the right-of-way to permit successful revegetation programs.

- Expand rights-of-way as appropriate to minimize apparent dissection/ splintered appearance of remaining residential neighborhoods as viewed from within the neighborhood or roadway corridor, and expand transition zones within the floodplain to minimize foreign appearance of a manmade transportation system.

- Conduct an analysis of existing vegetation to accommodate, preserve and capitalize on mature and semi-mature stands of vegetation wherever they occur within the corridor.

- Establish visual easements along the corridor within the floodplain wetlands and agricultural lands to preserve prominent vistas and views of the open/rural character.

- Establish a comprehensive revegetation program along all segments of the corridor where visual mitigation is required. The program may need to extend beyond the conventional tree replacement formulas.

With regard to the Red Alignment's traversal of CCLMP, specific recommendations have been incorporated into MHTD's Mitigation Plan to minimize the visual impacts of its bridge in the park. This mitigation includes utilizing the fewest piers possible and the smallest piers possible, as well as textured concrete and architectural elements, to create a more visually appealing structure. Also, the bridge is somewhat shorter than its original conception.

Section 601 of the Pipeline Safety Act of 1992 could also impact the design of this bridge. It incorporates some of the Enhancement Plan's bridge mitigation measures and mandates landscaping of the area between the elevated roadway and Creve Coeur Mill Road. Moreover, a design committee appointed by the Governor of Missouri would make recommendations for the area in and around CCLMP.

4.18.2 Positive Visual Impacts

The users of the Page Avenue Extension will experience some positive visual impacts such as newly available scenic vistas of recreational or agricultural open spaces in the region. The placement of the highway in proximity to these resources will afford enjoyment of these vistas. The attractive locale along the bluffline will be easily viewed by traffic traveling on both sides of the Missouri River.

4.19 ENERGY EVALUATION

This Section of the EIS provides a summary of the energy evaluation performed to determine the energy impacts for the No-Build and Build Alternates for the Page Avenue Extension. A detailed discussion of the methodology used and documentation of the direct and indirect (operating, maintenance and construction) energy requirements are presented in a separate Technical Report. Traffic data was provided by MHTD for the base year (1995) and the design year (2015) along with appropriate data from the February 1986 Reconnaissance Report prepared by MHTD.

The traffic data and the energy calculations indicate that traffic diversions created by the various build alternates reduces direct energy consumption and provides a fuel savings to motorists within the roadway network when compared to the No-Build Alternate. As shown in Table 4.19-1, the savings of the various build alternates are sufficient to offset the indirect energy requirements within the roadway network. The calculations for the energy evaluations are based on ADT and route length. With the addition of the Blue, Yellow-Black and Green-Black Segments connected to the Red Alignment, the calculations were reviewed and found to be within $\pm$4% of the Red Alignment, and still less than the No-Build.

TABLE 4-19.1
VEHICULAR ENERGY CONSUMPTION BY ALTERNATIVE
1995 THROUGH 2015

Category of Energy Consumption	No-Build	Red Alignment	Green Alignment	Green-Dashed Alignment	Green-Blue Dashed Alignment
	Annual Averge Vehicular Energy Consumption (10^{12} BTU)				
- Direct Energy for Vehicles	6.75	6.38	6.39	6.44	6.25
- Indirect Energy for Vehicles	8.48	8.00	8.02	8.08	7.85
SUB TOTAL	15.23	14.38	14.41	14.52	14.10
	Incremented Non-Vehicular Energy Consumption (10^{9} BTU)				
- Indirect Energy for Construction	0	178	149	150	152
- Indirect Energy for Maintenance	0	12.0	9.3	9.7	10.0
SUB TOTAL	0	190.0	158.3	159.7	162.0
Total Energy Expended Annually (10^{12} BTU)	15.23	14.57	14.57	14.68	14.26
TOTAL ENERGY IN TERMS OF EQUIVALENT BARRELS OF CRUDE OIL PER DAY	7,200	6,890	6,890	6,940	6,740

Crude Oil - 1.38 x 10^5 BTU/gal x 42 gal/Barrel

The energy savings associated with the various build alternates differs by several percent, ranging from approximately 3.0 to 4.0 million dollars annually based on crude oil prices. In conclusion, the energy impacts of the various build alternates are beneficial when compared to the No-Build Alternate while also improving traffic flow within the roadway network.

4.20 UTILITIES AND PUBLIC SERVICE SYSTEMS

Community facilities and private utility services are vital components of an urban environment. The level and quality of these services varies from place to place, depending upon community needs and available resources. Each of these services must cope with changing service demands. The Page Avenue Extension project area comprises various communities and includes a large array of utility systems. This section reports the impact that the Page Avenue Extension would have upon utilities and public service systems. Table 4.20-1 summarizes major utilities/services impacts by location.

4.20.1 Electric

The Page Avenue Extension project area is serviced by two electric utilities. The Union Electric Company serves St. Louis County and urban areas in St. Charles County. The Cuivre River Electric Co-op Incorporated is a rural electric co-operative serving rural areas of St. Charles County.

4.20.1.1 Union Electric Company

Union Electric (UE) operates and maintains residential, commercial, and industrial electric utilities within each alternate corridor located in St. Louis and St. Charles County. The most widespread facility impact would be the relocation of residential and commercial service within the Page Avenue Extension corridor. The Green Alignment, causing the greatest housing relocation in the project area, would impact localized facility placement the most. Connector lines would be disrupted by separation of serviced neighborhoods, requiring the reworking of electric networks and utility junctures.

Another group of impacts would be to transmission lines, transmission towers and conduits in the project area. The Red Alignment, the Green Alignment or any of their combinations would disrupt conduit cables across service areas. This effect would be most concentrated in St. Louis County.

TABLE 4.20-1
MAJOR UTILITIES/SERVICES IMPACTS LOCATION MATRIX

UTILITY/SERVICE	PROVIDER	LOCATION	ROUTES
Electricity	UE	Utility Corridor	2, 3 & 6
	UE	Creve Coeur Mill Road	1, 4, 5, 7 & 8
	UE	Hemsath & Route 94	1, 2, 3 & 4
	CREC	Kisker & Route 94	5, 6, 7 & 8
Sewerage	MSD	Pump Station (Vicinity)	2, 3 & 6
	MSD	Creve Coeur Mill Road	1, 4, 5, 7 & 8
	Duckett Creek	Greens Bottom/Jungs Station	5, 6, 7 & 8
	Duckett Creek	Greens Bottom/Caulks Hill	7
	Duckett Creek	Dardenne Creek	5, 6, 7 & 8
Water	City of St. Louis	Utility Corridor	2, 3, 5, 6, 7 & 8
	St.L. Co. Wat. Co.	Bennington Place	1 - 8
	St.L. Co. Wat. Co.	Amiot Drive	1, 4, 5, 7 & 8
	St.L. Co. Wat. Co.	Utility Corridor	2, 3 & 6
	St.L. Co. Wat. Co.	Creve Coeur Mill Road	1, 4, 5, 7 & 8
	City of St. Louis	Greens Bottom Road	5, 6, 7 & 8
Natural Gas	Laclede	Jungs Station & Route 94	1, 2, 3, 4 & 8
	Laclede	Kisker Road & Route 94	5, 6, 7 & 8
Telephone	SWB	Greens Bottom Road	5, 6, 7 & 8
	SWB	Caulks Hill Road	5 & 6
	SWB	Towers Road	7
	SWB	Dingledine Road	5, 6 & 7
	SWB	Harvester & Route 94	1, 2, 3, 4 & 8
	SWB	Kisker & Route 94	5, 6, 7 & 8
	SWB	Motherhead & Route 94	1, 2, 3 & 4
Pipelines	Shell	Dingledine Road	5, 6 & 7
	Shell	Harvester & Route 94	1 & 8
	Williams	East of Bridle Hills	5, 6, 7 & 8

NOTE: All routes would produce temporary localized utility/service disruptions at various locations during construction.

KEY TO ROUTES

1. Red Alignment
1-A. (Mitigation Plan) (None)
2. Green-Black/Red Combination
3. Yellow-Black/Red Combination
4. Blue/Red Combination
5. Green Alignment
6. Green-Black/Green Combination
7. Green/Green Dashed Combination
8. Green/Green-Blue Dashed/Red/Green Combination

The major impact would be to a 345 above ground transmission line which originates at the UE substation on Fee Fee Road. It then proceeds westerly through the utility corridor parallel to Greenbough Road to just west of Creve Coeur Mill Road. The Green-Black and Yellow-Black Segments would be placed in the utility corridor right-of-way and would either have to accommodate the transmission line tower structures or require their relocation, incurring a substantial cost. The transmission lines then proceed north along and to the west of Creve Coeur Mill Road. Depending upon which route is utilized in St. Louis County, two to four large transmission towers would likely require relocation. Additionally, it may be necessary to erect one or more new towers in order to accommodate the Green-Black or Yellow-Black Segments. Union Electric representatives have stated technical and financial reservations regarding most aspects of these segments.

In St. Charles County, a potential conflict exists along the Red Alignment at Hemsath Road and Route 94. A proposed transmission line from a future UE substation between Hemsath and Pralle Roads would cross the roadway's right-of-way. UE has expressed concern that their line would be operational before the Red Alignment might be constructed. No other conflicts with UE facilities in St. Charles County occur other than normal residential service connections for any of the possible alignments or combinations.

The types of electric lines in the project area range from 795MCM (345KV) above-ground transmission lines to 50MCM (12KV) local underground residential service in newer residential neighborhoods.

Any route of the Page Avenue Extension might induce new development, particularly in St. Charles County. Any future power needs could be easily met by UE, whether the development was in the Missouri Bottoms floodplain or residential construction increases in St. Charles County (Table 4.20-1).

A particular design concern has been voiced by UE's engineering department. Ideally, UE would like to extend conduit across any Page Avenue Extension bridge crossing the Missouri River. To date, MHTD has made no decision in this regard.

4.20.1.2 Cuivre River Electric Co-Op, Inc.

The Cuivre River Electric Cooperative (CREC) is located in Troy, Missouri. As a rural electric company, Cuivre River cannot expand into urbanized areas. CREC provides electricity to predominantly rural areas in St. Charles County including portions of potential project corridors.

The primary potential impact would occur at the convergence of the Green Alignment and the Red Alignment at Route 94 and Kisker Road. At this intersection CREC has a 161KV transmission line crossing from a substation on Route N to the west.

Secondary impacts would be limited to residential service connections.

4.20.2 Sewerage

The sewerage systems affected by possible routes of the Page Avenue Extension include the Metropolitan St. Louis Sewer District (MSD) in St. Louis County; and the Duckett Creek Sewer District, the City of St. Peters Sewer Department, the City of St. Charles Sewer Department, and the East-Central Missouri Sewer District in St. Charles County.

4.20.2.1 Metropolitan St. Louis Sewer District (MSD)

Metropolitan St. Louis Sewer District (MSD) operates and maintains both sanitary and storm sewers in the St. Louis County portion of the project area. The primary facility impact would be to residential service connections, most numerously along the Green Alignment. MSD operates its Missouri River Sewage Treatment Plant within the project area adjacent to the Missouri River. Near the junction of Creve Coeur Mill Road and St. Louis County Waterworks Road is the MSD Creve Coeur Pump Station, which has a 36" force main leading north along Creve Coeur Mill Road to the Missouri River Sewage Treatment Plant. The Green Alignment and two of its variants as well as the Red Alignment and Blue/Red Combination would have to bridge this main.

The Green-Black/Red and Green Alignments as well as the Yellow-Black/Red Alignment would each impact three MSD feeder lines that serve the pump station and would need to be bridged and/or relocated to the south and east. These lines range from 10" to 48" in diameter.

4.20.2.2 Duckett Creek Sewer District

The largest sanitary sewer system in St. Charles County is provided by the Duckett Creek Sewer District. Its service area generally extends along the Route 94 south corridor between Hemsath Road and Route 40/61 (future Route I-64), and also extends north along State Route N.

The Duckett Creek Sewer District treats the sewage collected at a modern 5 million gallons per day design capacity treatment plant located at the intersection of Jungs Station Road and Greens Bottom Road. This site also provides facilities for the District's administrative offices. Any impacts from induced local development should be within plant capacity.

The Green Alignment, and its St. Charles County variants, would pass about 1,000 feet to the south. Two sewage lift stations would also be in close proximity to the Green Alignment and/or its variants on Greens Bottom Road and Dardenne Creek.

4.20.2.3 City of St. Peters Sewer Department

The City of St. Peters' sewer service for the project area is roughly bordered by the Norfolk and Southern Railroad and Salt River Road to the

north; by Willott Road and Jungermann Road to McClay Road to the south; by Muegge Road to Hackmann Road to the east; and by Route I-70, Salt Lick Road and St. Peters - Cottleville Road to the west.

No treatment plant or other facility disruption would be expected beyond those related to residential service connections.

4.20.2.4 East-Central Missouri Water and Sewer Authority

This entity is a public non-profit corporation formed in 1989 to provide sanitary sewer service in several different sections of the St. Charles County project area. The majority of the sewage collected within the system is treated at nearby municipal facilities. The Green Alignment would make minimal contact with the system at Birdie Hills and Mexico Road, impacting residential service connections only.

4.20.3 Water

The Page Avenue Extension project area in St. Louis and St. Charles Counties is within one of the largest aquifers in the Midwest, the lower Missouri River Valley. This resource makes available an almost unlimited quantity of water which can meet many of the project area's water supply and waste disposal needs. The St. Louis County portion of the project area is serviced by the St. Louis County Water Company. The City of St. Louis' Water Division has extensive treatment and distribution facilities at its nearby Howard Bend Plant with surplus production to supply other communities. It sells water to the Cities of St. Charles and St. Peters. The Missouri Cities Water Company, the St. Charles County Water District #2, and the Cities of St. Charles and St. Peters also provide water for the St. Charles portion of the project area.

4.20.3.1 City of St. Louis Water Division

The City of St. Louis Water Division has a 100-million gallon reservoir in Stacy Park in St. Louis County at Warson and Olive Street Road. Three large conduits, 60" to 72" in diameter, connect its Howard Bend Plant, located on the Missouri River to the Stacy Park Reservoir. These conduits have their own right-of-way in the utility corridor that runs roughly east-west between Fee Fee and Creve Coeur Mill Road. There is some potential overlap with the Green Alignment's right-of-way. This problem probably could be avoided during design and it is probable that the Green Alignment would not be constructed directly over the conduits. However, the Green-Black/Green, Green-Black/Red and Yellow-Black/Red Combinations would utilize varying portions of City of St. Louis Water Division's right-of-way. In these instances, all of the conduits would have to be bridged, encased or relocated, as appropriate.

Correspondence from the Water Division to MHTD (March 6, 1991 and May 30, 1991) attests to the difficulties and great expense relative to the Green-Black and Yellow-Black Segments and these three conduits. Relocation of all three conduits is estimated to cost $7,398,000, not including

engineering, administration, inspection, additional right-of-way, etc. If the conduits were not relocated, but rather bridged, traffic could produce vibrations that would weaken conduit joints. The conduits are roughly 20, 50 and 60 years old. Any failure could cause severe damage to the Page Avenue Extension at that point. Extraordinary design and construction techniques would be necessary to safeguard against such an occurrence.

The City of St. Louis Water Division also provides water to the Cities of St. Charles and St. Peters and in St. Charles County. A conduit from the Howard Bend Plant proceeds north along River Valley Road before crossing the Missouri River. The Green Alignment and its variants would cross this conduit just east of Greens Bottom Road in St. Charles County. This 32" conduit is placed about 48" below the ground surface. Special measures to avoid damage during design and construction would have to be taken.

The City of St. Louis Water Division has no residential service lines anywhere within the project area.

4.20.3.2 St. Louis County Water Company

The St. Louis County Water Company supplies water to its project area customers from its Central County Plant on Hog Hollow Road. This plant, just east-northeast of the City of St. Louis Water Division plant, also takes its water from the Missouri River. Conduits and mains of varying sizes radiate from it to the east and points north and south.

All potential Page Avenue Extension routes would probably require relocation of a 20" main near Bennington Place. The Red Alignment and Blue/Red Combination would also bridge a 36" main along Amiot Drive and, perhaps, a future 12" main to be constructed parallel to Creve Coeur Mill Road. The Green Alignment and its St. Charles County variants would also cross these facilities.

The Green-Black/Red, Green-Black/Green and Yellow-Black/Red Combinations would each make extensive use of the utility corridor that a 36" St. Louis Water Company main shares with other utility lines. These routes would bridge this main twice.

Local service connections would also be disrupted. The Red Alignment would produce the fewest given its limited St. Louis County residential impacts. The Green Alignment and its St. Charles County variants would produce the most.

4.20.3.3 St. Charles County Water District #2

The St. Charles County Water District #2 takes water directly from the alluvium aquifer of the Missouri River for treatment at its St. Charles Weldon Springs facility. Secondary water supply sources include wells drilled by municipalities and St. Charles County Water District #2 to service particular areas. These wells also provide back-up capacity to the primary water source. Water District #2 services the largest

geographical area in St. Charles County. Its boundaries include the area southwest of Route I-70 and Route K north to Warren County. Impacts to Water District #2 facilities would be minimal, occurring along the Red Alignment on the improved Route 94 right-of-way. No disruption to residential service connections should occur.

4.20.3.4 Missouri Cities Water Company

The Missouri Cities Water Company (MCWC) receives its water supply from wells drilled from 10-120 feet in the Missouri River alluvium aquifer. It is treated at the St. Charles County Weldon Springs facility. MCWC has the second largest water service area in the project area. Its primary focus is the area east of Route K to St. Peters Road and the areas south of Route 94 from Route 40/61 to Hemsath Road. A capacity of 16.5 million gallons per day (MGD) is available to its service area. A larger transmission system from Weldon Springs treatment plant to a storage tank on Harvester Road is in place. No impact to this conduit, which parallels Route 94, is expected. Any impacts to MCWC facilities should be limited to disruption of residential service connections by the Green Alignment and its St. Charles County variants.

4.20.3.5 City of St. Peters Water Department

The City of St. Peters Water Department purchases a portion of its water supply from the City of St. Louis Water Division. The purchase contract allows St. Peters to receive a daily maximum of 7.0 million gallons per day (MGD) from St. Louis' Howard Bend Plant. The St. Peters Water Department services areas north of Route 94 to Route I-70. The Page Avenue Extension would produce minimal impacts to its facilities. The only major concern would be potential disruption of the City of St. Louis' conduit to the St. Peters storage facility. Municipalities within St. Charles County have made necessary plans to insure an adequate water supply to meet user demands through this decade. In part, this has been achieved through additional supply from the City of St. Louis Water Division.

4.20.4 Pipelines

The Page Avenue Extension project area is part of a larger metropolitan area. Local industries receive certain petroleum products by way of large underground pipelines. Two such pipelines cross the project area.

4.20.4.1 Shell Products Pipeline

One of the largest refineries in the Midwest is located in Wood River, Illinois. It obtains petroleum from a 22" steel conduit that traverses the project area in St. Charles County from the southwest. Potential construction impacts would occur along the Green Alignment and the Green/Green Dashed Combination at Dingledine Road south of Route 94 as well as along the Red Alignment west of Harvester Road at Route 94.

4.20.4.2 Williams Pipeline

The Williams Pipeline Company provides petroleum-finished products, heating oil and lubricating oil from its St. Peters terminal. Its 8" underground pipeline crosses the St. Charles County portion of the project area. Potential construction impacts could occur along the Green Alignment as it crosses the pipeline east of Birdie Hills Road, south of Route I-70, as well as along the Red Alignment at Route 40/61 and Henke Road.

4.20.5 Telephone

Telephone service in the project area is provided by two telephone companies: Southwestern Bell Telephone in St. Louis County and southeastern St. Charles County; and Continental Telephone Company (Contel) in western St. Charles County. Localized construction-related service disruptions may occur. American Telephone and Telegraph (A.T.&T.) long distance service and data transmission facilities should not be affected in the project area.

4.20.5.1 Southwestern Bell (SWB)

Southwestern Bell (SWB) provides telephone service to all of the St. Louis County area of the project area and half of the project area in St. Charles County. These services are predominantly residential service connections from above-ground pole facilities, or in more recent residential developments, below-ground facilities. In St. Charles County, all potential routes may impact fiber-optic cables placed below ground. These fiber-optic systems are expensive to install and disruption should be minimized where possible. Table 4.20-1 specifies locations.

4.20.5.2 Continental Telephone Company (Contel)

Contel is one of the largest telephone companies in Missouri, providing most of its services to rural areas. There should be few, if any, impacts to its facilities in the project area. Most disruptions would be to residential service connections along Salt Lick and Mexico Roads.

4.20.6 Natural Gas

The project area is serviced by two natural gas utilities: Laclede Gas Company and the St. Charles Gas Company.

4.20.6.1 Laclede Gas Company

The Laclede Gas Company provides natural gas throughout the project area. Service is provided through either cast iron or steel gas mains. Both low and medium pressure gas lines crisscross the project area in a network of 4", 6", and 8" low-pressure gas mains.

The primary impact for Laclede Gas would be residential service connections crossed by all prospective Page Avenue Extension routes. A larger gas main along Missouri Route 94 would be crossed by the Red Alignment west of Jungs Station Road. This same main would be impacted by the Green Alignment and its St. Charles County variants at Kisker Road.

4.20.6.2 St. Charles Gas Company

The St. Charles Gas Company services much of St. Charles County project area with natural gas. The primary Page Avenue Extension impact would be to residential service connections.

4.20.7 Cable Television

There are two primary cable television companies in the project area: Continental Cable Television and TCI Cable Television.

4.20.7.1 Continental Cable Television

Continental Cable Television serves the St. Louis County portion of the project area. There would be little impact to its facilities other than residential service connection disruption during construction.

4.20.7.2 TCI Cable

TCI Cable Television services most of St. Charles County. The primary impact to this utility would be disruption of residential service connections.

4.20.8 Fire Safety

The St. Louis County project area is served by the City of Maryland Heights Fire Department, the Pattonville-Bridgeton Terrace Fire Protection District, the Chesterfield Fire Protection District and the Creve Coeur Fire Protection District. The St. Charles County project area is serviced by six fire protection districts, one volunteer fire department and one municipal fire department (Figure 4.3).

4.20.8.1 St. Louis County Fire Protection

The Maryland Heights Fire Department is responsible for approximately 85 percent of the municipality's developed land. Its boundaries extend from the southern boundary of the community up to the eastern edge of Creve Coeur Lake. The boundary line then ranges northward along the lake up to the railroad tracks before following the tracks to McKelvey Road. The boundary then runs along McKelvey Road to Maryland Heights' northern border. The boundary to the east is the corporate limit, except for a very small section east of Taylor and Edward Avenues which is handled by the Pattonville-Bridgeton Terrace Fire Protection District. The Red Alignment would pass through a small portion of the Maryland Heights Fire Department's service area.

The Pattonville-Bridgeton Terrace Fire Protection District is responsible for all land in the northwest quadrant of Maryland Heights between the Missouri River and the eastern border of Creve Coeur Lake and west along River Valley Drive. The Red Alignment and its variants would cross the southwestern corner of its territory.

The Chesterfield Fire Protection District provides service to Chesterfield as well as a portion of Maryland Heights that contains little development since it is almost all of the Missouri River floodplain. It also is responsible for the southern portion of CCLMP. Each of the possible Page Avenue Extension routes would traverse its service area.

The Creve Coeur Fire Protection District covers only a small section of the project area along the southern edge of Maryland Heights, around Basston Avenue, Bennington Place and Page Avenue. However, each of the Page Avenue Extension alignments or combinations would pass through its territory.

As detailed elsewhere, the Red Alignment would produce the least amount of disruption to the existing St. Louis County local circulation system as compared to the Green Alignment, the Green-Black Segment, Yellow-Black Segment or Blue Segment. This advantage is attributable to the Red Alignment's utilization of its preserved corridor and passage through otherwise non-developed property. This advantage ultimately may translate into potentially quicker fire protection response times than would result with the implementation of any other route, particularly within the Chesterfield Fire Protection District.

4.20.8.2 St. Charles County Fire Protection

St. Charles County fire safety impacts would be minimal or non-existent. They are noted below for each project area service provider.

City of St. Charles Fire Department

None of the Page Avenue Extension routes would be within the City of St. Charles. No impacts.

Cottleville Fire Protection District

This organization protects a large portion of the project area between Route 94 and the Missouri River. All potential Page Avenue Extension routes would pass through it.

Lake St. Louis Fire Protection District

None of the potential Page Avenue Extension routes would traverse its service area.

O'Fallon Fire Protection District

The Red Alignment would pass through its service area but no fire safety impacts of note are anticipated.

St. Charles Fire Protection District

All potential Page Avenue Extension routes would traverse this service area. The Green-Blue Dashed Segment has the greatest potential to interfere with service.

St. Peters Fire Protection District

Only the Green Alignment would pass through this fire protection district. It has the potential to delay service south of Mexico Road. Also, as currently routed, it could displace a new fire station on Salt Lick Road.

4.20.9 Solid Waste Hauling and Disposal

There are five local waste hauling and disposal operations that serve the project area. Possible local route relocations may result from service area disruptions along any Page Avenue Extension route.

4.21 PUBLIC LANDS

Public lands identified in Section 3.17 that would be impacted by the extension of Page Avenue include Creve Coeur Lake Memorial Park (CCLMP), and the KATY Trail State Park.

There is no reasonable build avoidance alternative for the KATY Trail State Park because it crosses nearly the entire state. Every contemplated alternative does cross the KATY Trail State Park. Other bridges and highway facilities pass over sections of the trail in St. Charles County. Therefore, this would not be a unique situation. In order to minimize disruption to the trail, design of the roadway will place any bridge support structures as far away as possible from the trail.

4.21.1 Potential Impacts to the KATY Trail State Park

Relatively minor, secondary impacts to the KATY Trail State Park would result from the Page Avenue Extension Red Alignment, inasmuch as there will be no physical impacts to the trail right-of-way. Any other alternative or other new transportation facility linking St. Louis and St. Charles Counties would produce similar impacts, at least, at other trail locations.

The Page Avenue Extension Red Alignment Missouri River bridge will pass a minimum of 65 feet above the KATY Trail State Park. Bridge piers will be spaced so that none will be in the trail's right-of-way. There will be no physical contact between the bridge and the trail. The walking/biking path from Creve Coeur Lake Memorial Park, included in the mitigation plan,

will leave the Red Alignment near Upper Bottom Road. It then will utilize existing local roads before joining to the KATY Trail State Park. MHTD is committed to insuring all improvements to existing surfaces that will be utilized to link the walking/biking path from Creve Coeur Lake Memorial Park to the KATY Trail State Park will be designed so as to safely accommodate both pedestrian and bicycle traffic.

An aerial easement will be necessary for the Page Avenue Extension's crossing of the KATY Trail State Park. This constitutes a taking and MHTD is committed to appropriate compensation as mitigation. The easement, approximately 185 feet in width, will be necessary for bridge maintenance purposes.

The Page Avenue Extension Red Alignment Missouri River bridge will be an imposing manmade visual element above the KATY Trail State Park. However, in urbanized St. Charles County the trail already passes beneath comparable structures at Route 115, Route I-70 and Route 40/61 (future Route I-64). Similar circumstances exist as well at other locations such as Washington, Hermann, Jefferson City, Rocheport and Boonville, Missouri. Several railroad bridges also span the facility's right-of-way.

Vehicular traffic utilizing the Page Avenue Extension Red Alignment's Missouri River bridge will generate noise audible along the KATY Trail State Park. Again, this circumstance will be comparable to various other St. Charles County locations as well as elsewhere along the trail. MHTD does not believe that the increased noise levels will impair use of the trail.

Current measured noise levels at that point on the KATY Trail State Park where the Red Alignment will cross are 43.0 dBA. This is indicative of a very quiet setting. The Red Alignment, as planned, would pass over the trail at a height of approximately 80 feet above grade.

By 2015, predicted noise levels at this same location will be 54.2 dBA, Leq. Although this represents a major increase of 11.2 dBA over existing conditions, it does not exceed current FHWA criteria for serene and quiet parklands (57 dBA). Noise levels representing increases of over 10.0 dBA can be expected up and down the trail in both directions for approximately 250 to 300 feet. Such increases will be readily perceptible. However, overall noise levels will not preclude use or enjoyment of the trail.

Short-term impacts, probably including brief closures or re-routings of the KATY Trail State Park, may occur during construction of the Page Avenue Extension Missouri River bridge. MHTD is fully aware of the Missouri Department of Natural Resources' (DNR) concerns relative to temporary closures and, therefore, any such actions must be coordinated with and approved by DNR. Existing natural vegetation will be retained, insofar as possible, or otherwise restored. Safety measures will be utilized to prevent trail user injuries from falling objects. Correspondence from DNR regarding these matters is included in Volume 3, Comments and Coordination.

Any new Missouri River crossing, on a bridge structure, between Route I-70 and Route 40/61 from St. Louis County to St. Charles County will cross the KATY Trail State Park. The only possible avoidance alternative would be the No-Build Alternate. However, it cannot provide the amount of service necessary to improve traffic congestion among existing and future Missouri River crossings.

There is no reasonable alternative to the Red Alignment's crossing of the KATY Trail State Park. Any bridge structure for the Red Alignment must span the trail. There is no trail-avoidance option for the Red Alignment or, for that matter, any other bridge structure linking St. Louis and St. Charles Counties in this vicinity.

The Red Alignment's crossing of the KATY Trail State Park in St. Charles County has been much less contentious than its crossing of Creve Coeur Lake Memorial Park. Public comments have been limited to the desirability of providing a multipurpose trail link between St. Louis County's Creve Coeur Lake Memorial Park and the KATY Trail State Park. The Selected Alternate, the Page Avenue Extension Red Alignment, including the Mitigation Plan, is the only assured mechanism for accomplishing this connection. It includes a walking/biking path that will serve this purpose.

Two governmental agencies have expressed concern regarding possible Red Alignment impacts upon the KATY Trail State Park. MHTD and Missouri's Department of Natural Resources (DNR) have ongoing contacts. The U. S. Department of the Interior (DOI) has addressed trail impacts in writing and verbally. Its October 22, 1990 letter to Mr. Gerald J. Reihsen of the Federal Highway Administration (Region 7) notes DOI's concurrence "...that there are no feasible and prudent alternatives to some use of the Missouri River (KATY) Trail ..." (sic). However, the DOI letter notes the use of air rights and possible visual and noise impacts as well as raises the issue of constructive use. The concluding remarks regarding this facility indicate "...no objection to ..." the Page Avenue Extension's use of it along any route provided that specified measures to minimize harm "...are included in the final statement" i.e., the FEIS and this accompanying Section 6(f) Evaluation.

As previously described, no piers of the Selected Alternate's Missouri River bridge will be placed within the KATY Trail State Park. Additionally, as part of the Mitigation Plan, a walking/biking path between CCLMP in St. Louis County and the KATY Trail State Park will be provided by MHTD. This facility will be linked to the KATY Trail State Park via property specially acquired for that purpose.

DOI's October 22, 1990 letter requests that the final statement include the opinion of DNR regarding air rights, visual and noise impacts and construction use relative to the trail. It also recommends "...that the final document include any other measures that may be requested by the management officials including adequate compensation for the taking of air rights." As noted previously, DNR and MHTD have ongoing contacts.

4.21.2 Direct Impacts to CCLMP

Direct impacts to CCLMP in conjunction with the Red Alignment would require the taking of right-of-way through a strip in the southern end of the park that is distant from the active use areas. The Red Alignment would proceed through the wooded area east of the lake and then continue across the southern edge of the lake area elevated on a bridge structure for approximately 2,800 feet. On the western side of CCLMP, the roadway would be elevated on fill material until it crosses Creve Coeur Mill Road.

The direct land use impact would be approximately 37.0 acres (including 11.2 acres for an aerial easement and 25.8 acres of actual right-of-way) within the boundaries of CCLMP. This taking of Section 6(f) land has been addressed through additional coordination discussed in the Section 6(f) Evaluation, included in the FEIS. The construction and operation of a major roadway in this facility will produce a large array of potential impacts.

The Red Alignment has long been the proposed corridor for the extension of Page Avenue. It appeared in various forms in the 1960s and was discussed during requests for federal funding to purchase land for Creve Coeur Lake Memorial Park. St. Louis County has been active in preserving an open corridor from Bennington Place to the park boundary. As discussed in other sections of this document, other alignments and combinations would avoid CCLMP but require a greater numbers of residences to be displaced, increase construction costs, as well as create utility impacts and potential public service delivery problems.

Based upon the fact that the Red Alignment is the Selected Alternate, coordination with the National Park Service, the Missouri Department of Natural Resources and St. Louis County Department of Parks has determined areas for mitigation. The areas are located contiguous to the north and south boundaries of the park. They are included in the mitigation plan required by Section 601 of the Pipeline Safety Act of 1992. Section 601 requires the State of Missouri to enter into an enforceable agreement with the Secretary to implement a project mitigation plan that includes, at a minimum:

A. expansion of the CCLMP in the vicinity of St. Louis, Missouri, by at least fifty percent, through acquisition and addition to the Park of not less than 600 acres of land;

B. development of a walking and bicycle path that is not less than ten feet in width and connects CCLMP to the KATY Trail State Park in St. Charles County, Missouri. The walking and bicycle path will be physically separate from vehicular traffic as it traverses the Missouri River bridge;

C. construction of nature trails in the wooded upland portion of the additions to CCLMP referred to in subparagraph A.;

D. development of a wetland wildlife area that includes lake areas and marshes, trails, observation points, and other environmentally compatible features in CCLMP or in one of the additions to the Park referred to in subparagraph A.;

E. dredging of Creve Coeur Lake to help remedy a chronic siltation problem and to promote fish and wildlife populations;

F. construction of a new lake in one of the additions to the Park referred to in subparagraph A. to help alleviate the recurrence of a chronic siltation problem in a manner that minimizes, to the maximum extent practicable and in accordance with Section 404 of the Federal Water Pollution Control Act (33 USC 1344), the disturbance of any existing wetlands;

G. design and construction of features to minimize the visual and physical impact of the project in the vicinity of the Park, consistent, to the extent practicable, with recommendations of the design committee established in accordance with the terms of Section 601, including:

(i) the use of textured concrete, as appropriate;

(ii) the minimization of bridge pier sizing in the elevated portion of the project;

(iii) the use of a bridge design that is more aesthetically pleasing than standard elevated roadway designs;

(iv) construction of bridge siderails with materials that are effective noise attenuators to reduce operational noise levels near the bridge;

(v) design and construction of a drainage system to prevent contamination of Creve Coeur Lake and Creve Coeur Creek with pollution from roadway runoff;

(vi) landscaping of the area between the elevated roadway and Creve Coeur Mill Road to enhance visual parameters without compromising road user safety; and

(vii) the placement of signs to direct road users to appropriate park entrances and facilities;

H. such other mitigation measures as the Secretary may determine are appropriate to ensure that the environmental benefits of the project mitigation plan exceed the environmental damage associated with the project; and

I. a monetary contribution by the State of Missouri as may be necessary to implement the entire mitigation plan, in an amount not less than $6,000,000, including the payment of not less than $250,000 for facility improvements in the park, and all funds to develop and implement the mitigation plan shall come from non-federal sources of funding.

In addition, the Governor of the State of Missouri shall establish a design committee to develop recommendations concerning design and construction features to minimize the visual and physical impact of the project in the vicinity of the Park. The Committee shall include representatives of local elected officials, regional park officials, local community groups, design professionals, environmental organizations, and business organizations.

4.22 ARCHAEOLOGICAL SITES AND HISTORIC ARCHITECTURE

4.22.1 The Initial Overview

A discussion of the rationale and scope of the initial cultural resources survey conducted for the Page Avenue Extension is found in Section 3.16, Cultural Resources. A preliminary survey was prepared by MHTD staff as a supplement to the DEIS entitled, "An Overview of the Cultural Resources Within the Vicinity of the Page Avenue Extension, St. Louis and St. Charles Counties" (Crampton 1989). Sites of potential historic significance were listed that would be directly impacted by the proposed alternates. Subsequently, during the summer of 1991, MHTD archaeologists conducted systematic and intensive Phase I cultural resource surveys. The areas so surveyed included:

1. the Red Alignment (entire route)
2. the Green Alignment
3. the Green-Black Segment
4. the Yellow-Black Segment
5. the Blue Segment
6. mitigation lands.

4.22.2 Description of Potentially Impacted Sites Identified by Cultural Resources Overview

The cultural resources overview prepared for the Page Avenue project identified a number of historic and prehistoric sites that were in or near the various proposed alternates.

Historic or architectural properties identified include:

"Spring Bend". Also known as the McElhiney-Knowles Estate, this property contains an 1832 stone and brick home, several outbuildings, and an one-story log, ranch-style cabin. The property is listed in the 1963 Missouri Historic Sites Catalogue (Caldwell, 1963). It is located near the Red Alignment.

Captain John Campbell House. This is an 1838 house built by John and Robert Pouree, Scottish marble carvers and stone cutters, for Captain John Campbell, a veteran of the War of 1812. The house is a classical two-story structure with 27-inch thick stone walls. It is located near the Red Alignment.

Prehistoric archaeological sites identified in the cultural resources overview include the following: 23SL116, 23SL118, 23SL488, 23SC20, 23SC437, 23SC495, 23SC530, 23SC604, 23SC609, 23SC654, 23SC655, 23SC656 and 23SC686. Archaeological sites containing both prehistoric and historic remains include 23SC590 and 23SC710. These sites are located in or along the various alternates of the Page Avenue Extension project.

The eligibility of some of these sites have been previously determined. For instance, sites 23SC20, 23SC590, 23SC655 have been determined to not be eligible to the National Register while sites 23SC604 and 23SC609 have been determined to be eligible. Similarly, several of these sites (including 23SC609 and 23SC20) have been professionally examined.

Site 23SL737 is a historic site located near Creve Coeur Lake. It is the remains of a late 1800s and 1900s recreational facility that included a race track, hotel and restaurant, a dance hall, a riding stable, and a boat rental facility. Only two stables remain on the property. The property has been determined eligible to the National Register. It is located in the Green-Black Segment right-of-way and adjacent to the Green Alignment right-of-way.

4.22.3 Phase I Cultural Resources Survey

During the summer and fall of 1991, MHTD archaeologists conducted a systematic and intensive Phase I cultural resources survey of the proposed Page Avenue project areas. Areas examined include the Red, Blue, Green, Green-Black and Yellow-Black Alignments as well as the mitigation lands in St. Louis County. The purpose of the survey is to locate and identify all previously unreported archaeological sites and potentially significant historical architecture located within the project areas. The survey has been completed for all public lands in the project area and those private properties for which access could be obtained.

A total of 77 previously unreported archaeological sites were located during the Phase I survey. Twenty-four isolated artifacts were located within the project areas. In addition, 21 historical structures and properties were identified as probably older than 50 years and potentially eligible to the National Register of Historic Places.

The previously unreported archaeological sites located during the Phase I survey are summarized in Tables 4.22-1 to 4.22-6. Sites found include six historic sites, 70 prehistoric sites, and one site with both a historic and prehistoric component. Eleven of the sites are in St. Louis County; 66 are in St. Charles County.

TABLE 4.22-1. ARCHAEOLOGICAL SITES AND HISTORIC STRUCTURES LOCATED IN OR NEAR PAGE AVENUE CORRIDORS
MHTD JOB NO. J6U0803

*indicate those properties not impacted by the project
**previously tested or excavated sites
***properties determined eligible to the National Register

ST. LOUIS COUNTY

RED LINE

Archaeological Sites		*Historic Structures*
23SL767		Moore Barn
23SL766		
23SL591		

Mitigation Lands

Archaeological Sites		*Historic Structures*
23SL776	23SL775*	Rosehaven Drive
23SL768*	23SL769*	Schmittel Residence
23SL772*	23SL774*	
23SL771*	23SL771*	
23SL773*		

BLUE LINE

Archaeological Sites	*Historical Structures*
23SL767	Tappmeyer Barn
23SL773	
23SL775	
23SL769	

GREEN LINE

Archaeological Sites	*Historical Structures*
23SL767	Tappmeyer Barn
23SL118	
23SL116	
23SL772	

YELLOW-BLACK LINE

Archaeological Sites	*Historical Structures*
23SL767	Little Lake Golf Course (23SL737)***
23SL118	Tappmeyer Barn
23SL116	

GREEN-BLACK LINE

Archaeological Sites	*Historical Structures*
23SL767	Little Lake Golf Course (23SL737)***
23SL118	Tappmeyer Barn
23SL116	

TABLE 4.22-1. ARCHAEOLOGICAL SITES AND HISTORIC STRUCTURES LOCATED IN OR NEAR PAGE AVENUE CORRIDORS
MHTD JOB NO. J6U0803

ST. CHARLES COUNTY

RED LINE

Archaeological Sites		*Historical Structures*
23SC805	23SC840	McElhiney-Knowles Estate*,***
23SC806	23SC843	Gronefeld Residence*,***
23SC855	23SC827	Hemsath Residence*,***
23SC807	23SC826	Kolkmeyer Residence*,***
23SC812	23SC847	Brinkman Residence*
23SC810	23SC828	Kaplan Residence*
23SC811*	23SC824	Mary Dickherber Residence*,***
23SC809	23SC823	Dennis and Teresa Dickherber Residence
23SC808	23SC822	Capt. John Campbell House*,***
23SC817	23SC488	Genteman Residence
23SC816	23SC838	
23SC813	23SC839	
23SC814	23SC841	
23SC815	23SC842	
23SC820	23SC846	
23SC819	23SC833	
23SC818	23SC832	
23SC821	23SC834	
23SC20**	23SC845	
23SC830	23SC835	
23SC831	23SC836	
23SC829	23SC837	

GREEN-BLUE-DASHED LINE

Archaeological Sites		*Historical Structures*
23SC683*	23SC604	Brinkman Residence
23SC684*	23SC710	1551 Cottleville Road*
23SC685*	23SC880*	Hadley Residence
23SC686*	23SC881	Ohmes Residence*,***
23SC530*	23SC882*	
23SC817	23SC883	
23SC816	23SC495	
23SC813	23SC609**	
23SC814	23SC656	

TABLE 4.22-1. ARCHAEOLOGICAL SITES AND HISTORIC STRUCTURES LOCATED IN OR NEAR PAGE AVENUE CORRIDORS
MHTD JOB NO. J6U0803

GREEN LINE

Archaeological Sites		*Historical Structures*
23SC654	23SC865	Kolkmeier Residence
23SC848	23SC604	1551 Cottleville Road*
23SC849	23SC710	Hadley Residence
23SC850	23SC880*	Ohmes Residence (23SC537)*,***
23SC851*	23SC881	
23SC852*	23SC882*	
23SC853*	23SC883	
23SC854*	23SC495	
23SC864	23SC609**	
23SC867	23SC656	
23SC866		

GREEN-DASHED LINE

Archaeological Sites		*Historical Structures*
23SC859	23SC866	Ostmann Residence*
23SC858	23SC865	Dingledine Residence*,***
23SC857	23SC604	Cottleville Residence*
23SC856	23SC710	Hadley Residence*
23SC860	23SC880*	Ohmes Residence (23SC537)*,***
23SC862	23SC881	
23SC861	23SC882*	
23SC844	23SC883	
23SC863	23SC495	
23SC864	23SC609**	
23SC867	23SC656	

TABLE 4.22-2. PAGE AVENUE
JOB NO. J6U0803
ISOLATED FINDS

ARTIFACT NUMBER	ARTIFACT TYPE	COUNTY	TOPO. SETTING	VISIBILITY	HOW FOUND	LIKELIHOOD OF ADD. REMAINS
I.F. 1	Flake	St. Louis	Flood Plain	Fair	Surface Survey	Low
I.F. 2	Flake	St. Louis	Flood Plain	Poor	Shovel Test	Fair-Low
I.F. 3	Flake	St. Louis	Flood Plain	Poor	Shovel Test	Fair-Low
I.F. 4	Flake	St. Charles	Slope	Good	Surface Survey	Very Low
I.F. 5	Flake	St. Charles	Ridgetop	Good	Surface Survey	Low
I.F. 6	Core	St. Charles	Slope	Good	Surface Survey	Low
I.F. 7	Scraper	St. Charles	Slope	Poor	Shovel Test	Fair-Low
I.F. 8	Flake	St. Charles	Slope	Fair-Good	Surface Survey	Low
I.F. 10	Point	St. Charles	Slope	Fair-Poor	Surface Survey	Good
I.F. 11	Flake	St. Charles	Slope	Good	Surface Survey	Very Low
I.F. 12	Flake	St. Charles	Slope	Good	Surface Survey	Low
I.F. 14	Flake	St. Charles	Slope	Fair	Surface Survey	Fair
I.F. 15	Flake	St. Charles	Hilltop	Fair	Surface Survey	Fair-Good
I.F. 16	Core	St. Charles	Hilltop	Fair	Surface Survey	Fair-Good
I.F. 17	Metal Axe	St. Charles	Slope	Good	Surface Survey	Very Low
I.F. 19	Scraper	St. Charles	Hilltop	Fair	Surface Survey	Low
I.F. 20	Flake	St. Charles	Hilltop	Fair-Good	Surface Survey	Low
I.F. 21	Flake	St. Charles	Hilltop	Poor	Shovel Test	Fair-Good
I.F. 22	Flake	St. Charles	Slope	Fair	Surface Survey	Fair
I.F. 23	Flake	St. Charles	Hilltop	Good	Surface Survey	Low
I.F. 24	Core	St. Charles	Hilltop	Good	Surface Survey	Low

TABLE 4.22-3. PAGE AVENUE HISTORIC STRUCTURES
JOB NO. J6U0803

NAME AND/OR ADDRESS	APPROXIMATE AGE	NATURE OF STRUCTURE	ROUTE/ DISTANCE* CENTERLINE (m)	COMMENTS
Little Lake Golf Course Site 23SL737 (St. Louis County)	Late 19th/ Early 20th Century	Recreational facility	Green 100	NRHP-eligible Partially impacted
Gronefeld Farm 2355 Upper Bottom Road (St. Charles County)	1936	Farmhouse with outbuildings	Red 15	NRHP-eligible Not impacted
Ostman Property Towers Road (St. Charles County)	1905	Farmhouse with outbuildings	Green dashed 130	Not NRHP-eligible Probably not impacted
Hadley Property 1501 St. Peters (Cottleville Road) (St. Charles County)	Late 19th/ Early 20th Century	Farmhouse with outbuildings	Green 0	Not NRHP-eligible To be destroyed
Unknown 1551 St. Peters (Cottleville Road) (St. Charles County)	Late 19th Century	Farmhouse with outbuildings	Green 180	Not NRHP-eligible Probably not impacted
Ohmes Residence 325 Ohmes Road (St. Charles County) (previously recorded as site 23SC537)	Late 19th Century	Farmhouse with outbuildings	Green 250	Only barn NRHP-eligible House is *ca.* 125 yrs old Barn is *ca.* 150 yrs old Not impacted
Kolkmeier Residence 806 Caulks Hill Road (St. Charles County)	*ca.* 1850	Farmhouse with outbuildings	Green 0	Not NRHP-eligible To be destroyed
Tappmeyer Barn - Creve Coeur Mill Road (St. Louis County)	Early 20th Century	Barn	Red 100	Not NRHP-eligible To be destroyed
Schmittel Residence River Valley Road (St. Louis County)	Mid-20th Century	Farmhouse with outbuildings	Red mitigation	Not NRHP-eligible To be destroyed
Dennis and Teresa Dickherber Property (St. Charles County)	1955	farmhouse with outbuildings	Red 150	Not NRHP-eligible To be destroyed

TABLE 4.22-3. PAGE AVENUE HISTORIC STRUCTURES
JOB NO. J6U0803

NAME AND/OR ADDRESS	APPROXIMATE AGE	NATURE OF STRUCTURE	ROUTE/ DISTANCE* CENTERLINE (M)	COMMENTS
Genteman Property Post Road (St. Charles County)	Late 19th/ Early 20th Century	Farmhouse with outbuildings	Red 25	Not NRHP-eligible To be destroyed
Moore Barn River Valley Road (St. Louis County)	1945	Isolated wood or timber frame barn	Red 5	Not NRHP-eligible To be destroyed
The Capt. John Campbell House (St. Charles County)	Early 19th Century	Farmhouse with outbuildings	Red 60	House determined NRHP-eligible Outbuildings not NRHP eligible Only outbuildings will be impacted
Hemsath Property Hemsath Road (St. Charles County)	*ca.* 1870	Farmhouse with outbuildings	Red 15	NRHP-eligible Not impacted
Brinkman Residence Route 94 (St. Charles County)	Late 19th Century	Farmhouse with outbuildings	Red 0	Not NRHP-eligible To be destroyed
Robert Kaplan Trust (St. Charles County)	Late 19th Century	Farmhouse with outbuildings	Red 0	Not NRHP-eligible To be destroyed
McElhiney-Knowles Estate (St. Charles County)	1838	Farmhouse with outbuildings	Red 25	NRHP-eligible Not impacted
Kolkmeyer Property (St. Charles County)	1936	Farmhouse with outbuildings	Red 20	NRHP-eligible Not impacted
Mary Dickherber Property (St. Charles County)	1904	Farmhouse with outbuildings	Red 175	NRHP-eligible Not impacted
Dingledine Property 84 Dingledine Road (St. Charles County)	Mid 19th Century	Farmhouse with outbuildings	Green Dashed 200	NRHP-eligible Not impacted

TABLE 4.22-3. PAGE AVENUE HISTORIC STRUCTURES
JOB NO. J6U0803

NAME AND/OR ADDRESS	APPROXIMATE AGE	NATURE OF STRUCTURE	ROUTE/ DISTANCE* CENTERLINE (m)	COMMENTS
Rosehaven Dr. (St. Louis County)	Early 20th Century	Double family residence with outbuildings	Red mitigation	Not NRHP-eligible To be destroyed

*distance is the distance in meters from the tentative edge of the right of way to the nearest building that has been determined eligible

TABLE 4.22-4. PAGE AVENUE PREVIOUSLY REPORTED SITES JOB NO. J6U0803

SITE NUMBER	SITE AGE	SETTING	ROUTE	DISTANCE TO CENTERLINE(m)	COMMENTS
23SL11	Late Archaic Early Woodland	Slope	Red Green	150	Significance and integrity unknown
23SL118	Prehistoric	Slope	Green	60	Previously destroyed
23SL116	Paleo-Indian Dalton/Early Archaic Late Archaic	Slope	Green	60	Mostly destroyed
23SL591	Late Woodland	Ridgtop	Red	75	Previously destroyed
23SC683	Prehistoric	Slope	Blue-Dashed	60	Most of it previously destroyed
23SC686	Prehistoric/ Historic	Rigetop	Blue-Dashed	0	Extensively disturbed
23SC684	Prehistoric	Ridgetop	Blue-Dashed	60	Extensively disturbed
23SC685	Prehistoric	Ridgetop	Blue-Dashed	60	Partially disturbed Parts are intact
23SC529	Prehistoric	Ridgetop	Blue-Dashed	300	Previously disturbed
23SC531	Prehistoric	Slope	Blue-Dashed	300	Previously disturbed
23SC535	Prehistoric	Ridgetop	Blue-Dashed	250	Previously disturbed
23SC534	Prehistoric	Ridgetop	Blue-Dashed	300	Previously disturbed
23SC530	Prehistoric	Ridgetop	Blue-Dashed	75	Probably destroyed
23SC532	Prehistoric	Ridgetop	Blue-Dashed	230	Previously disturbed
23SC654	Late Archaic	Slope	Green	0	Probably not NRHP eligible
23SC20	Prehistoric	Floodplain	Red	50	Previously tested-not eligible

TABLE 4.22-4. PAGE AVENUE PREVIOUSLY REPORTED SITES JOB NO. J6U0803

SITE NUMBER	SITE AGE	SETTING	ROUTE	DISTANCE TO CENTERLINE	COMMENTS
23SC488	Middle Archaic Early Woodland	Ridgetop Slope	Red	50	Large site
23SC665	Prehistoric	Floodplain	Green	250	Previously determined-not eligible-Destroyed
23SC604	Prehistoric	Floodplain	Green	0	Previously determined-not eligible
23SC710	Late Woodland Historic	Ridgetop	Green	50	Large site
23SC495	Prehistoric	Slope	Green	0	Large site
23SC537	Historic	Ridgetop	Green	320	House is 125 years old Barn is 150 years old
23SC494	Prehistoric	Ridgetop	Green	300	Small site
23SC609	Late Woodland	Hilltop	Green	0	Boschert Site Previously excavated
23SC656	Late Woodland	Ridgetop	Green	275	Partially impacted

TABLE 4.22-5. PAGE AVENUE RECOMMENDATIONS
JOB NO. J6U0803

SITE NO./ FIELD SITE NO.	AGE	SITE SIZE (m^2)	ROUTE/ DISTANCE TO CL (m)	COMMENTS	RECOMMENDATIONS
23SL766 Field Site 1	Prehistoric	3500	Red 40	Partially disturbed hilltop setting Moderate artifact density	P-II Testing
23SL767 Field Site 2	Prehistoric	200	Green 0	Completely destroyed	No further work
23SL768 Field Site 4	Prehistoric	2250	Red Mitigation land-200	Will not be impacted	No further work
23SL769 Field Site 5	Middle Archaic	1500	Red Mitigation land-10	Completely destroyed Hilltop setting Will not be impacted Low artifact density	No further work
23SL770 Field Site 6	Middle-Late Woodland	750	Red Mitigation land-10	Partially disturbed Hilltop setting Will not be impacted	No further work
23SL771 Field Site 7	Prehistoric	75	Red Mitigation land-100	Extensively disturbed Hilltop setting Will not be impacted	No further work
23SC805 Field Site 8	Prehistoric	5000	Red 30	Ridgetop setting Cultivated field	P-II Testing
23SC806 Field Site 9	Prehistoric	7500	Red 0	Ridgetop setting Cultivated field	P-II Testing
23SL772 Field Site 11	Prehistoric	100	Red Mitigation land-100	Completely destroyed Ridgetop setting Will not be impacted	No further work
23SL773 Field Site 12	Prehistoric	700	Red Mitigation land-100	Completely destroyed Ridgetop setting Will not be impacted	No further work
23SL774 Field Site 13	Prehistoric	1000	Red Mitigation land-50	Partially destroyed Ridgetop setting Will not be impacted	No further work

TABLE 4.22-5. PAGE AVENUE RECOMMENDATIONS
JOB NO. J6U0803

SITE NO./ FIELD SITE NO.	AGE	SITE SIZE (m^2)	ROUTE/ DISTANCE TO CL (m)	COMMENTS	RECOMMENDATIONS
23SL775 Field Site 14	Prehistoric	2000	Red Mitigation land-150	Partially destroyed Ridgetop setting Will not be impacted	No further work
23SL776 Field Site 15	Historic	7800	Red Mitigation land	Possible refuse dump Cultivated field High artifact density	P-II Testing Archival research
23SC807 Field Site 16	Prehistoric	5000	Red 100	Ridgeslope setting Cultivated field Very low artifact density	No further work
23SC808 Field Site 17	Prehistoric	11,250	Red 0	Low Ridgetop Cultivated field Partially destroyed Moderate artifact density	P-II Testing
23SC809 Field Site 18	Prehistoric Historic	1000	Red 0	Hillcrest and slope Cultivated field Low artifact density	No further work
23SC810 Field Site 19	Prehistoric	10,000	Red 0	Ridgetop setting Cultivated field	P-II Testing
23SC811 Field Site 20	Historic	625	Red 0	Ridgetop setting Cultivated field Very low artifact density	No further work
23SC812 Field Site 22	Early Archaic	2500	Red 50	Ridgeslope setting Cultivated field Moderate artifact density	P-II testing
23SC813 Field Site 23	Prehistoric	650	Red 70	Ridgeslope setting Cultivated field Low artifact density	No further work
23SC814 Field Site 24	Prehistoric	900	Red 120	Ridgeslope setting Cultivated field Very low artifact density	No further work

TABLE 4.22-5. PAGE AVENUE RECOMMENDATIONS
JOB NO. J6U0803

SITE NO./ FIELD SITE NO.	AGE	SITE SIZE (m^2)	ROUTE DISTANCE TO CL (m)	COMMENTS	RECOMMENDATIONS
23SC815 Field Site 25	Prehistoric	900	Red 100	Ridgeslope setting Cultivated field Low artifact density	No further work
23SC816 Field Site 26	Prehistoric	400	Red 70	Ridgeslope setting Cultivated field Low artifact density	No further work
23SC817 Field Site 27	Historic	5625	Red 0	Ridgetop setting Cultivated field Probably assoc. with standing structure	No further work
23SC818 Field Site 28	Prehistoric	400	Red 60	Ridgeslope setting Partially disturbed	No further work
23SC819 Field Site 29	Prehistoric	5000	Red 60	Ridgetop setting Cultivated field Moderate artifact density	P-II Testing
23SC820 Field Site 30	Prehistoric	625	Red 80	Ridgeslope setting Cultivated field Low artifact density	P-II Testing
23SC821 Field Site 31	Prehistoric	5000	Red 0	Ridgetop setting Cultivated field	P-II Testing
23SC822 Field Site 33	Late Archaic Late Woodland	5000	Red 0	Ridgetop setting Cultivated field High artifact density	P-II Testing
23SC823 Field Site 34	Prehistoric	2500	Red 30	Ridgeslope setting Cultivated field Moderate artifact density	P-II Testing
23SC824 Field Site 35	Prehistoric	1250	Red 0	Ridgeslope setting Cultivated field Partially impacted Low artifact density	No further work
23SC826 Field Site 36	Prehistoric	100	Red 0	Floodplain setting Cultivated field Very low artifact density	No further work

TABLE 4.22-5. PAGE AVENUE RECOMMENDATIONS
JOB NO. J6U0803

SITE NO./ FIELD SITE NO.	AGE	SITE SIZE (m^2)	ROUTE DISTANCE TO CL (m)	COMMENTS	RECOMMENDATIONS
23SC827 Field Site 37	Prehistoric	10,000	Red 100	Ridgetop setting Cultivated field Moderate artifact density	P-II Testing
23SC828 Field Site 38	Prehistoric	25	Red	Ridgetop setting Cultivated field Very low artifact density	No further work
23SC829 Field Site 39	Prehistoric	375	Red 0	Ridgetop setting Cultivated field	P-II Testing
23SC830 Field Site 40	Prehistoric	1250	Red 0	Ridgetop setting Cultivated field Low artifact density	P-II Testing
23SC831 Field Site 41	Prehistoric	375	Red 100	Hillslope setting Cultivated field Very low artifact density	P-II Testing
23SC832 Field Site 42	Prehistoric	6200	Red 0	Hillslope setting Cultivated field Moderate artifact density	P-II Testing
23SC833 Field Site 43	Prehistoric	600	Red 0	Ridgetop setting Cultivated field	No further work
23SC834 Field Site 44	Prehistoric	625	Red 0	Hilltop setting Cultivated field	P-II Testing
23SC835 Field Site 45	Prehistoric	100	Red 0	Hilltop setting Cultivated and eroded field Very low artifact density	No further work
23SC836 Field Site 46	Historic	900	Red 0	Hilltop setting Cultivated field Moderate artifact density	Possible P-II Testing Archival research

TABLE 4.22-5. PAGE AVENUE RECOMMENDATIONS
JOB NO. J6U0803

SITE NO./ FIELD SITE NO.	AGE	SITE SIZE (m^2)	ROUTE/ DISTANCE TO CL (m)	COMMENTS	RECOMMENDATIONS
23SC837 Field Site 47	Historic	2500	Red 0	Hilltop setting Cultivated field Moderate artifact density	Possible P-II Testing Archival research
23SC838 Field Site 48	Prehistoric	50	Red 20	Hillslope setting Cultivated field Very low artifact density	No further work
23SC839 Field Site 49	Prehistoric	625	Red 0	Hillslope setting Cultivated field Low artifact density	No further work
23SC840 Field Site 50	Woodland	1875	Red 20	Hilltop setting Cultivated field Partially disturbed High artifact density	P-II Testing
23SC841 Field Site 51	Prehistoric	625	Red 30	Hillslope setting Cultivated and eroded field Low artifact density	No further work
23SC842 Field Site 52	Prehistoric	100	Red 50	Hilltop setting Cultivated field Very low artifact density	No further work
23SC843 Field Site 53	Prehistoric	2500	Red 40	Ridgeslope setting Cultivated field Low artifact density	P-II Testing
23SC844 Field Site 55	Prehistoric	900	Green Dashed 100	Ridgetop setting Cultivated field Moderate artifact density	P-II Testing
23SC845 Field Site 56	Prehistoric	50	Red 50	Hilltop setting Cultivated field Very low artifact density	No further work

TABLE 4.22-5. PAGE AVENUE RECOMMENDATIONS
JOB NO. J6U0803

SITE NO./ FIELD SITE NO.	AGE	SITE SIZE (m^2)	ROUTE DISTANCE TO CL (m)	COMMENTS	RECOMMENDATIONS
23SC846 Field Site 57	Historic	2500	Red 50	Hilltop setting Cultivated field Moderate artifact density	Possible P-II Testing Archival research
23SC847 Field Site 58	Prehistoric	450	Red 0	Ridgetop setting Cultivated and eroded field	No further work
23SC848 Field Site 59	Prehistoric	100	Green 270	Ridgetop setting Cultivated field Will not be impacted	No further work
23SC849 Field Site 60	Late Archaic	2500	Green 260	Ridgetop setting Cultivated field Will not be impacted	No further work
23SC850 Field Site 61	Prehistoric	1800	Green 70	Ridgetop setting Cultivated field	P-II Testing
23SC851 Field Site 62	Prehistoric	1200	Green 0	Ridgetop setting Cultivated field	P-II Testing
23SC852 Field Site 63	Prehistoric	875	Green 50	Ridgetop setting Cultivated field Moderate artifact density	P-II Testing
23SC853 Field Site 64	Prehistoric	100	Green 150	Ridgetop setting Cultivated field Low artifact density	P-II Testing
23SC854 Field Site 65	Prehistoric	400	Green 180	Ridgetop setting Cultivated field Will not be impacted	No further work
23SC855 Field Site 66	Woodland	700	Red 0	Ridgetop setting Cultivated field Low artifact density	P-II Testing
23SC856 Field Site 67	Prehistoric	3500	Green Dashed 0	Ridgetop setting Cultivated field Moderate artifact density	P-II Testing

TABLE 4.22-5. PAGE AVENUE RECOMMENDATIONS
JOB NO. J6U0803

SITE NO./ FIELD SITE NO.	AGE	SITE SIZE (m^2)	ROUTE/ DISTANCE TO CL (m)	COMMENTS	RECOMMENDATIONS
23SC857 Field Site 68	Late Archaic	900	Green Dashed 0	Ridgetop setting Cultivated field	P-II Testing
23SC858 Field Site 69	Prehistoric	5000	Green Dashed 0	Ridgetop setting Cultivated field Moderate artifact density	P-II Testing
23SC859 Field Site 70	Prehistoric	2000	Green Dashed 120	Ridgetop setting Cultivated field	P-II Testing
23SC860 Field Site 71	Prehistoric	5500	Green Dashed 60	Ridgetop setting Cultivated field Moderate artifact density	P-II Testing
23SC861 Field Site 72	Prehistoric	15,000	Green Dashed 120	Ridgetop setting Cultivated field Moderate artifact density	P-II Testing
23SC862 Field Site 73	Prehistoric	500	Green Dashed 180	Ridgetop setting Cultivated field	P-II Testing
23SC863 Field Site 74	Prehistoric	5000	Green Dashed 20	Slope setting Cultivated field	P-II Testing
23SC864 Field Site 75	Late Woodland	7500	Green 80	Ridgetop setting Cultivated field	P-II Testing
23SC865 Field Site 76	Prehistoric	625	Green 60	Ridgetop setting Cultivated field Very low artifact density	No further work
23SC866 Field Site 77	Prehistoric	300	Green, Green Dashed 150	Ridgetop setting Cultivated field Very low artifact density	No further work

TABLE 4.22-5. PAGE AVENUE RECOMMENDATIONS
JOB NO. J6U0803

SITE NO./ FIELD SITE NO.	AGE	SITE SIZE (m^2)	ROUTE/ DISTANCE TO CL (m)	COMMENTS	RECOMMENDATIONS
23SC867 Field Site 78	Prehistoric	5000	Green Dashed 60	Slope setting Cultivated field Moderate-High artifact density	P-II Testing
23SC880 Field Site 79	Prehistoric	700	Green	Hilltop setting Cultivated field	P-II Testing
23SC881 Field Site 80	Prehistoric	5000	Green	Hillslope setting Cultivated field Low artifact density May continue into woods	P-II Testing
23SC882 Field Site 81	Prehistoric	2500	Green	Hillslope setting Cultivated field Low artifact density May continue to hilltop	P-II Testing
23SC883 Field Site 82	Prehistoric	2000	Green	Terrace setting Cultivated field Low artifact density	P-II Testing

TABLE 4.22-6

Page Avenue (Job No. 6-U-D-803) Frequencies of artifact classes recovered by site.

SITE NUMBER/ F.S. NO.	FREQUENCIES												
				CORES*		DECORT. FLAKES*		INTERIOR FLAKES*		SHATTER*				
	POINTS	OTHER BIFACES	FLAKE TOOLS	Count	(Weight)	Count	(Weight)	Count	(Weight)	Count	(Weight)	GRDST.	POTTERY	HISTORIC MATERIAL
23SL766 F.S. 1[a]			1			1	(11)	37	(102)	7	(77)			
23SL766 F.S. 1[b]						20	(84)	36	(87)	5	(14)			
23SL767 F.S. 2[a]			1	1	(182)	1	(7)	1	(1)					
23SL768 F.S. 4[a]	1	1	3			3	(13)	55	(71)	9	(28)			
23SL769 F.S. 5[a]	1			1	(90)	1	(8)	3	(3)					
23SL770 F.S. 6[a]			1	1	(9)	2	(52)	33	(51)	9	(16)		4	
23SL770 F.S. 6[b]						1	(3)	3	(3)	1	(1)			
23SL771 F.S. 7[a]						2	(6)							
23SC805 F.S. 8[a]	1		3	1	(22)	7	(24)	25	(28)	8	(36)			
23SC806 F.S. 9[a]	1	2				2	(17)	11	(38)	4	(37)			

TABLE 4.22-6 (cont'd)

. Page Avenue (Job No. 6-U-D-803) Frequencies of artifact classes recovered by site.

SITE NUMBER/ F.S. NO.	FREQUENCIES												
	POINTS	OTHER BIFACES	FLAKE TOOLS	CORES* Count	CORES* (Weight)	DECORT. FLAKES* Count	DECORT. FLAKES* (Weight)	INTERIOR FLAKES* Count	INTERIOR FLAKES* (Weight)	SHATTER* Count	SHATTER* (Weight)	GRDST.	POTTERY	HISTORIC MATERIAL
23SC806 F.S. 9[b]		1	1			14	(247)	17	(54)	7	(95)			
23SL772 F.S. 11[a]								2	(4)					
23SL773 F.S. 12[a]						2	(23)	12	(8)	3	(4)			
23SL774 F.S. 13[a]			1	1	(68)	2	(18)	11	(25)	2	(3)			
23SL775 F.S. 14[a]				1	(138)	1	(37)	15	(26)	8	(47)			
23SL776 F.S. 15[a]														49-Ceramic 17-Glass 12-Metal Flatware
23SC807 F.S. 16[a]				1	(76)	1	(10)	1	(1)	1	(2)			
23SC808 F.S. 17[a]			1	5	(776)	3	(84)	7	(17)	6	(15)			
23SC808 F.S. 17[b]			6	6	(2076)	20	(368)	23	(43)	5	(50)			

TABLE 4.22-6 (cont'd)
Page Avenue (Job No. 6-U-D-803) Frequencies of artifact classes recovered by site.

SITE NUMBER/ F.S. NO.	FREQUENCIES												
	POINTS	OTHER BIFACES	FLAKE TOOLS	CORES* Count	CORES* (Weight)	DECORT. FLAKES* Count	DECORT. FLAKES* (Weight)	INTERIOR FLAKES* Count	INTERIOR FLAKES* (Weight)	SHATTER* Count	SHATTER* (Weight)	GRDST.	POTTERY	HISTORIC MATERIAL
23SC809 F.S. 18[a]								4	(6)					15 Ceramic
23SC810 F.S. 19[a]		2		2	(549)	2	(9)	7	(5)	3	(14)			
23SC811 F.S. 20[a]														2-Glass 2-Ceramic
23SC812 F.S. 22[a]	1	1		1	(23)	6	(37)	60	(108)	12	(11)			1-Ceramic
23SC813 F.S. 23[a]						1	(6)	4	(25)	3	(5)			
23SC814 F.S. 24[a]		1												
23SC815 F.S. 25[a]						2	(11)	5	(19)	1	(55)			
23SC816 F.S. 26[a]						3	(8)	6	(10)					
23SC817 F.S. 27[a]														15-Ceramic 5-Glass
23SC818 F.S. 28[a]								4	(8)	2	(1)			

TABLE 4.22-6 (cont'd)

Page Avenue (Job No. 6-U-D-803) Frequencies of artifact classes recovered by site.

SITE NUMBER/ F.S. NO.	FREQUENCIES												
	POINTS	OTHER BIFACES	FLAKE TOOLS	CORES* Count	CORES* (Weight)	DECORT. FLAKES* Count	DECORT. FLAKES* (Weight)	INTERIOR FLAKES* Count	INTERIOR FLAKES* (Weight)	SHATTER* Count	SHATTER* (Weight)	GRDST.	POTTERY	HISTORIC MATERIAL
23SC819 F.S. 29[a]						7	(29)	33	(56)	11	(24)			
23SC820 F.S. 30[a]								4	(13)	2	(2)			
23SC821 F.S. 31[a]		1	1	1	(94)	3	(15)	8	(19)	1	(6)			
23SC822 F.S. 33[a]	4	4	10	5	(699)	25	(432)	323	(1140)	94	(893)			
23SC823 F.S. 34[a]		2	1	3	(508)	6	(41)	24	(87)	7	(21)			
23SC824 F.S. 35[a]						1	(8)	16	(38)	8	(42)			
23SC826 F.S. 36[a]						1	(10)	1	(5)					
23SC827 F.S. 37[a]		2	4	2	(134)	21	(221)	45	(186)	30	(196)	1-Hamstn		
23SC828 F.S. 38[a]								3	(1)					
23SC829 F.S. 39[a]						1	(7)	12	(17)	1	(9)			

TABLE 4.22-6 (cont'd)

Page Avenue (Job No. 6-U-D-803) Frequencies of artifact classes recovered by site.

SITE NUMBER/ F.S. NO.	FREQUENCIES													HISTORIC MATERIAL
	POINTS	OTHER BIFACES	FLAKE TOOLS	CORES* Count	CORES* (Weight)	DECORT. FLAKES* Count	DECORT. FLAKES* (Weight)	INTERIOR FLAKES* Count	INTERIOR FLAKES* (Weight)	SHATTER* Count	SHATTER* (Weight)	GRDST.	POTTERY	
23SC830 F.S. 40[a]				2	(170)			2	(8)	4	(8)			
23SC831 F.S. 41[a]								3	(5)	1	(11)			1-Ceramic
23SC832 F.S. 42[a]	1	5	1	1	(353)	4	(93)	45	(110)	19	(55)			
23SC833 F.S. 43[a]				2	(177)			4	(7)	1	(6)			
23SC834 F.S. 44[a]		2		1	(142)			8	(104)	3	(16)			
23SC835 F.S. 45[a]								4	(3)					
23SC836 F.S. 46[a]														31-Glass 2-Metal 39-Ceramic
23SC837 F.S. 47[a]						1	(1)	1	(3)					1-Brick 2-Mortar 4-Metal 1-Plastic 1-Fuse 4-Ceramic 61-Glass

TABLE 4.22-6 (cont'd)

Page Avenue (Job No. 6-U-D-803) Frequencies of artifact classes recovered by site.

SITE NUMBER/ F.S. NO.	FREQUENCIES												
	POINTS	OTHER BIFACES	FLAKE TOOLS	CORES* Count	CORES* (Weight)	DECORT. FLAKES* Count	DECORT. FLAKES* (Weight)	INTERIOR FLAKES* Count	INTERIOR FLAKES* (Weight)	SHATTER* Count	SHATTER* (Weight)	GRDST.	POTTERY	HISTORIC MATERIAL
23SC838 F.S. 48[a]			1					1	(11)					
23SC839 F.S. 49[a]						2	(16)	4	(16)	4	(16)			
23SC840 F.S. 50[a]			1	4	(313)	8	(82)	28	(43)	16	(25)		1	
23SC841 F.S. 51[a]						1	(3)	4	(4)					
23SC842 F.S. 52[a]								1	(2)	1	(1)			
23SC843 F.S. 53[a]	1							4	(7)					1-Ceramic
23SC20[a]						1	(4)	3	(1)					
23SC844 F.S. 55[b]		2		1	(210)	7	(93)	20	(19)	4	(11)			
23SC845 F.S. 56[b]								2	(3)	1	(9)			

TABLE 4.22-6 (cont'd)

Page Avenue (Job No. 6-U-D-803) Frequencies of artifact classes recovered by site.

SITE NUMBER/ F.S. NO.	FREQUENCIES													
	POINTS	OTHER BIFACES	FLAKE TOOLS	CORES* Count	CORES* (Weight)	DECORT. FLAKES* Count	DECORT. FLAKES* (Weight)	INTERIOR FLAKES* Count	INTERIOR FLAKES* (Weight)	SHATTER* Count	SHATTER* (Weight)	GRDST.	POTTERY	HISTORIC MATERIAL
23SC846 F.S. 57[b]														7-Glass 33-Ceramic 1-Metal 1-Brick
23SC847 F.S. 58[b]			1			4	(94)	8	(24)	2	(51)			
23SC848 F.S. 59[b]						3	(4)	8	(14)	2	(9)			
23SC849 F.S. 60[b]		3	2	1	(76)	13	(186)	21	(42)	6	(6)			
23SC850 F.S. 61[b]						12	(131)	29	(49)	5	(102)			
23SC851 F.S. 62[b]		1				3	(7)	14	(16)	7	(15)			
23SC852 F.S. 63[b]	1			1	(78)	10	(109)	19	(56)	4	(17)			
23SC853 F.S. 64[b]				1	(56)	3	(18)	1	(1)	1	(2)			
23SC854 F.S. 65[b]		1				1	(14)	15	(17)	1	(5)			

TABLE 4.22-6 (cont'd)

Page Avenue (Job No. 6-U-D-803) Frequencies of artifact classes recovered by site.

SITE NUMBER/ F.S. NO.	FREQUENCIES												
	POINTS	OTHER BIFACES	FLAKE TOOLS	CORES* Count	CORES* (Weight)	DECORT. FLAKES* Count	DECORT. FLAKES* (Weight)	INTERIOR FLAKES* Count	INTERIOR FLAKES* (Weight)	SHATTER* Count	SHATTER* (Weight)	GRDST.	POTTERY	HISTORIC MATERIAL
23SC855 F.S. 66[b]	1					2	(4)	3	(6)	6	(23)			
23SC856 F.S. 67[b]		3				17	(182)	11	(14)	9	(31)			
23SC857 F.S. 68[b]	1			1	(483)			2	(3)					
23SC858 F.S. 69[b]			4	1	(59)	14	(118)	21	(46)	4	(73)			
23SC859 F.S. 70[b]				1	(47)	6	(57)	10	(11)	5	(34)			
23SC860 F.S. 71[b]		1	3	4	(312)	10	(240)	14	(47)			1-HAMSTN.		
23SC861 F.S. 72[b]		5	2	5	(496)	29	(377)	74	(141)	20	(255)			
23SC862 F.S. 73[b]			1	1	(19)	2	(16)	6	(24)					
23SC863 F.S. 74[b]		2		1	(38)	8	(124)	3	(4)	1	(3)			
23SC864 F.S. 75b	1					15	(112)	7	(7)	4	(211)			

TABLE 4.22-6 (cont'd)

Page Avenue (Job No. 6-U-D-803) Frequencies of artifact classes recovered by site.

SITE NUMBER/ F.S. NO.	FREQUENCIES													
	POINTS	OTHER BIFACES	FLAKE TOOLS	CORES* Count	CORES* (Weight)	DECORT. FLAKES* Count	DECORT. FLAKES* (Weight)	INTERIOR FLAKES* Count	INTERIOR FLAKES* (Weight)	SHATTER* Count	SHATTER* (Weight)	GRDST.	POTTERY	HISTORIC MATERIAL
23SC865 F.S. 76[b]			1					2	(3)					
23SC866 F.S. 77[b]						1	(3)	1	(1)					
23SC867 F.S.78[b]	1	3	1	1	(71)	12	(162)	11	(35)	3	(15)	1-Hem		
23SC880 F.S. 79[b]		1				2	(21)	2	(3)	9	(85)			
23SC881 F.S. 80[b]						4	(8)	10	(8)	6	(108)			
23SC882 F.S. 81[b]						1	(2)	2	(2)	1	(5)			
23SC883 F.S. 82[b]						1	(14)	4	(3)	1	(18)			

*-number/combined weight in grams

[a]-summer collection

[b]-fall collection

The Phase I cultural resources survey also located a number of isolated artifacts. In all, 24 isolated finds were recovered with 3 being found in St. Louis County and 21 from St. Charles County (Table 4.22-2). All but one of the finds may represent the only artifact located at a locus or they be the only artifact recovered from a larger assemblage due to poor visibility at a small, ephemeral site. When feasible, the locations of isolated finds have been reexamined when there was improved surface visibility. No additional remains have been found at some locations while additional artifacts were found at other loci resulting in the isolated find being reclassified as a site. While additional isolated finds may be reclassified as sites upon further examination, it is most likely that those sites will be small in size and contain limited remains.

The Phase I survey also identified 21 historic structures or groups of structures located in or near the project area that were believed to be 50 years in age or older and thus potentially eligible to the National Register of Historic Places. All of the project areas in all proposed alignments in both St. Louis and St. Charles Counties were surveyed for these properties. Properties located both within as well as in the general vicinity of proposed alignments were included. Table 4.22-3 lists and describes these structures. Historical and descriptive information and photographs for each property were compiled and submitted to MDNROHP for their evaluation.

MDNROHP has largely completed the evaluation of the 21 historic structures and groups of structures submitted for determination of eligibility to the National Register of Historic Places. Of the properties submitted for their evaluation, MDNROHP has determined the Little Lake Golf Course (23SL737) in St. Louis County is potentially eligible to the National Register of Historic Places. The St. Louis County properties of Rosehaven Drive, Tappmeyer Barn, Moore Barn and Schmittel Residence have been determined not eligible to the National Register. MDNROHP has determined that the St. Charles County properties of McElhiney-Knowles Estate, Gronefeld Farm, Hemsath Farm, Kolkmeyer Property, Dingledine Property, Mary Dickherber Farm, Capt. John Campbell House and the Ohmes Farm are eligible to the National Register. The Kaplan Trust property has been determined potentially eligible. The Brinkman Farm, Dennis and Teresa Dickherber Property, Genteman Property, Kolkmeyer Residence, Ostmann Property, 1551 Cottleville Road Property, and Hadley Property in St. Charles County have been determined not eligible.

Properties determined eligible to the National Register are described below:

McElhiney-Knowles Estate. This St. Charles County estate includes an 1838 stone and brick house, a 1937 rustic log house, and outbuildings. SHPO determined the property was eligible under criterion C and the "Architecture" and possibly "Social History" areas of significance. The property is near the Red Route. MHTD will construct a retaining wall to maximize the distance of the highway from the structure. In addition,

plantings will be located along the edge of the right-of-way to provide visual and noise screening.

Gronefeld Farmstead. The Gronefeld property includes a 1936 residence, barn and several outbuildings. The property was determined eligible using criterion A and "Agriculture" area of significance. The property is near the Red Route. The Upper Bottom Road intersection has been redesigned to increase the distance between the outbuildings and the highway. Plantings will be used to provide noise and visual screening.

Hemsath Farmstead. The Hemsath Farmstead includes a pre-Civil War house and late 19th to early 20th century agricultural outbuildings. It was determined eligible to the National Register using criterion C and "Agriculture" area of significance. The property is near the Red Route. MHTD will attempt to maximize the distance between the significant buildings on this property and the highway. Plantings will be used for visual and noise screening.

Kolkmeyer Farmstead. The Kolkmeyer Farmstead includes two brick outbuildings associated with a mid 19th-century log cabin that has since been removed and an early 20th century farm house and associated agricultural outbuildings. SHPO determined the property was eligible using criterion A and the "Agriculture" area of significance. The property is near the Red Route. MHTD has redesigned the relocated Route 94 outer road to increase the distance between the highway and the buildings. Plantings will provide noise and visual screening.

Dingledine Farmstead. The Dingledine Farmstead consists of an 1869 residence and unattached smokehouse, an 1830s log structure, and a large barn of unknown age. The farmstead was determined eligible using criterion A and the "Agriculture" area of significance. The property is near the Green Dashed Route.

Mary Dickherber Farmstead. The Mark Dickherber Farmstead includes a house dating from about 1904, several barns and outbuildings from the same period, and several more recent outbuildings. SHPO determined the property was eligible using criterion A and the "Agriculture" area of significance. The property is near the Red Route. Relocation of the highway and ramps to increase their distance to the property was discussed with SHPO but it was determined that such redesign was not warranted. Planting will be used to provide sound and visual screening.

Captain John Campbell House. The Captain John Campbell House is an 1838 stone structure built by Scottish stone masons. The residence is described as one of the best crafted houses in rural St. Charles County. Numerous, more recent and non-significant agricultural outbuildings are located on the property. This property is near the Red Route. MHTD will construct a retaining wall along Page Avenue in this area to increase the distance between the highway and the residence. Plantings will be located along the edge of the right-of-way. In addition, MHTD will redesign and

relocate existing Route N to the north of the residence so as to increase its distance to the property.

Ohmes Farmstead. The Ohmes property includes a circa-1870 barn and house. The barn but not the house was determined eligible as representing a "late 19th Century braced-frame barn" and reflecting aspects of both the Midwest three-portal barn type and the German bank barn. It was determined eligible using criteria A and C and the "Agriculture" area of significance. This property is near the Green Route.

Site 23SL737 - Little Lake Golf Course. The Little Lake Golf Course, St. Louis County, is the remains of a late 19th-early 20th century recreational facility. Only two of the original buildings remain on the property. This site was determined eligible to the National Register under criterion A and the "Entertainment/Recreation" area of significance. The property is near the Green, Green/Black and the Blue Routes.

Table 4.22-4 lists MHTD evaluations of the previously unreported archaeological sites that were located during the Phase I survey. A recommendation of either Phase II archaeological testing or no further investigation is made for each of the 77 sites found. This recommendation is based on a preliminary evaluation of site significance based on information from the Phase I survey. Those sites recommended for Phase II testing are those believed to potentially contain undisturbed subplowzone cultural deposits.

The potential for intact cultural deposits is based on a series of factors including the nature and quantity of cultural deposits observed on the surface, the site setting, and the nature of historic activities that have taken place in the area. It is anticipated that small sites with few artifacts have limited and shallow cultural deposits that are more likely to have been extensively or completely displaced through various historic activities. A site's topographic setting also affects the probability of intact cultural deposits being present. Sites located on hilltop, ridgetop or slope setting are less likely to contain deep and potentially intact cultural deposits. Soils generally are lost at a greater rate than they are formed. Cultural deposits in these settings are increasingly exposed rather than buried and protected. In contrast, sites located at the base of slopes or in floodplain settings have an increased possibility of being buried through alluvial processes.

Finally, the largest single factor in determining whether a particular site retains intact cultural deposits is the nature and extent of various historic activities and development that has occurred in the area. Whereas certain agricultural activities will have a limited impact on the remains present, other activities such as construction or development-related activities may completely disturb or remove any cultural remains present and destroy the site's integrity. Artifacts at several of the sites located during the survey were found only in backdirt from various construction activities, clearly these sites have been destroyed and are not recommended for further investigations.

MHTD already is redesigning portions of the proposed highway plans to avoid impact to those historic structures that have been determined eligible or potentially eligible to the National Register of Historic Places by MDNROHP. It is expected that no eligible structures will be taken or adversely affected.

4.22.4 Listing of Resources Affected by or Near Various Page Avenue Extension Routes

Table 4.22-1 lists the known archaeological sites and historically or architecturally significant structures that will be impacted by construction of the various routes. This table distinguishes between those properties near a particular project corridor and those in the vicinity. The table does not list historic structures that DNR has determined to not be eligible to the National Register of Historic Places.

4.22.5 MHTD Consultation with the SHPO

The SHPO has been fully informed of the progress, findings, and recommendations resulting from both the initial MHTD cultural resources overview and subsequent Phase I cultural resources survey of the proposed Page Avenue Extension project. These communications have addressed the prehistoric archaeological sites, historic archaeological sites, and standing architectural structures identified as being in or near various project corridors. The SHPO has formally determined the eligibility and significance of standing architecture identified by these surveys. MHTD has consulted with the SHPO and successfully developed a mitigation plan that will minimize or avoid any effects to those properties identified as being eligible to the National Register of Historic Places. In addition, SHPO has signed a Memorandum of Agreement addressing these significant cultural resources. A copy of this executed Memorandum of Agreement for the Proposed Red Route of the Page Avenue Extension is included in Comments and Coordination, Volume 3.

4.22.6 Conclusions

The Phase I cultural resources survey for the proposed Page Avenue Extension project has been completed to the extent possible. This survey located a large number of prehistoric sites and historic architectural structures. It is apparent that all of the proposed alternates will directly impact at least some of the cultural resources identified as potentially having historic significance. While the significance of architectural remains has been assessed, determination of the significance of many of the archaeological sites will require Phase II testing.

Although their significance is not yet established, it appears that the impact or potential impact to archaeological resources identified thus far can be mitigated through archaeological data recovery. All of the alternates also are located near architectural structures that have been determined eligible or potentially eligible to the National Register of Historic Places. In almost all cases, consultation with MDNROHP has

determined that minor redesign of the highway in those locations will avoid impact to the structures. The only exception is the Little Lake Golf Course, Site 23SL737 -- this property will be taken by the Green Route. Its current status is "potentially eligible" to the National Register of Historic Places.

As a cautionary note, not all of the project areas in St. Charles County have been surveyed as yet. It is probable that additional archaeological sites will be found. It is less likely, but still possible, that additional historic structures will be identified. The Page Avenue survey has surveyed all routes for historic structures. Any older building not identified by this survey most likely has been modified extensively and hidden under a more recent facade. Such alterations would jeopardize and potentially lessen that structure's significance. Also, many of the archaeological sites and the isolated find locations should be revisited when there is better surface visibility. This should permit the recovery of additional artifacts including culturally diagnostic artifacts, thus allowing the age of the sites to be determined.

In conclusion, all proposed alignments in St. Charles County will encounter a relatively large number of cultural resources. It is unlikely, however, that a significantly different or alternate route through this area would encounter substantially fewer resources.

4.22.7 Recommendation

The Red Alignment is recommended, since for reasons other than historic resources, it is the most viable. MHTD, with the cooperation of SHPO, has developed a plan to avoid and minimize impacts to any structure determined significant and eligible to the National Register. This plan includes minor highway redesign and other efforts to maximize the distance between significant properties and the proposed highway. With this plan, no building determined to be significant by SHPO will be demolished or relocated by this project. Furthermore, a concerted effort will be made to increase public access to several of these properties and to use plantings to screen these properties from the proposed highway. While a relatively large number of prehistoric archaeological sites will be affected by this project, all can be mitigated through data collection and none requires preservation in place. Similar and potentially even greater numbers of prehistoric sites can be expected to be encountered elsewhere in this area and by any other relocation of this project.

4.23 SECONDARY DEVELOPMENT IMPACTS

Secondary impacts associated with the Page Avenue Extension are located in St. Louis County and St. Charles County. In addition to the Page Avenue Extension, the associated direct and secondary impacts associated with the Earth City Expressway Extension are described. Additional information regarding floodplain development scenarios is included in Section 4.14.

The Red Alignment is the Selected Alternate. Its mitigation plan for Creve Coeur Lake Memorial Park is one of its integral elements. The Red Alignment's beneficial impacts will be increased by the mitigation program.

4.23.1 Secondary Land Use Impacts - Page Avenue Extension

Section 4.1.2 estimates primary direct land use impacts of various possible configurations of the Page Avenue Extension. This "footprint," as it were, can be determined with high reliability for each route via field surveys and preliminary design work.

Much more problematic are future secondary social, economic and environmental impacts that induced development might produce. Induced development includes a whole host of highway-related phenomena as varied as new "fast-food" restaurants, or office buildings, or regional shopping centers, etc., strategically located near interchange sites. It also includes new residential subdivisions, or industrial/office parks, or recreation facilities, etc. that may be some miles away from the proposed route but would indirectly owe their existences to the new roadway.

Some brief generalizations or assumptions can be made regarding secondary impacts of the Page Avenue Extension that can be differentiated for St. Louis and St. Charles Counties. In St. Louis County, secondary impacts due to induced development are likely to be minimal until flood protection at the "500-year" level is provided for some or most of the large agricultural floodplain acreage that comprises most of the St. Louis County portion of the project area. This would be true no matter what route might be implemented.

By the time the Page Avenue Extension becomes operational, almost all of the land in the upland areas in St. Louis County will have been developmentally "filled-in". However, there could be some highway-related development pressure in the vicinity of the Bennington Place interchange. On the St. Louis County floodplain, no substantial development can or will take place until flood protection measures equal to the Riverport or Earth City developments downstream, i.e. "500-year" levees and related drainage systems, are in place. It is predictable that construction of a Page Avenue Extension, particularly in conjunction with the Earth City Expressway Extension, would increase demands for enhanced flood protection for a large percentage of the St. Louis County floodplain. However, as the Kansas City District of the Corps of Engineers indicated in its August 9, 1990 letter to MHTD the "majority of the remaining Missouri River floodplain area cannot be protected by levees which afford any substantial degree of flood protection, due to the resulting increases in upstream water surface profiles" beyond allowable regulatory limits.

If sufficient flood protection were provided, development of the St. Louis County floodplain would be probable, but not assured, within any particular timeframe. The slow site absorption rate experienced for the Earth City area may be instructive in this regard. In any case,

commercial development, and some industrial development related to possible new railroad spurs, would be more likely than large-scale residential development. The development of St. Louis County agricultural floodplain would immediately benefit the current landowners as well as taxing authorities such as the Parkway School District and the City of Maryland Heights. Negative impacts would include the loss of floodplain, wetlands, productive croplands and natural resource areas.

The possibility for increased flood protection by construction of a levee along the Missouri River has been suggested by several interested parties, in particular the Howard Bend Levee Association. One proposal brought forward for discussion has been the idea of placing the Page Avenue Extension at existing grade level for the section that crosses St. Louis County's floodplain area. Per this concept, the roadway would be elevated on fill to the level for 100-year flood protection only as it approached the levee and crossed the Missouri River.

Proponents of the above concept indicate that any construction money saved by placing Page Avenue Extension mostly at grade, rather than on fill material above the 100-year flood protection level (a difference of approximately 12 feet vertically) could be used to fund levee improvements. However, by law, road funds for this project cannot be used for levee construction.

However, even if funds were available, further analysis indicates that only a portion of the Page Avenue Extension Red Alignment in this location could be constructed near existing grade. After coming down from the bluffs east of Creve Coeur Lake Memorial Park (CCLMP), the roadway would be elevated over the wooded area, the southern end of the lake, and the parkland west of the lake. The road would remain elevated in order to provide sufficient vertical clearance above Creve Coeur Mill Road and more importantly provide 23' vertical clearance over the railroad tracks on the western side of Creve Coeur Mill Road. The road could then descend to existing grade level for a distance of approximately 4,000 feet. Although this could save approximately $1-1.5 million in construction costs, it could only occur if flood protection measures were available to protect the lowered roadway. The costs of providing such flood protection would be considerably more than the apparent "savings."

In St. Charles County, the cumulative potential for a wide spectrum of induced development from any alignment of the Page Avenue Extension would be very great. This is underscored by ongoing vigorous growth of St. Charles County without the Page Avenue Extension. Any project that reduces travel time and frustration crossing the Missouri River would facilitate, and probably accelerate, new development throughout the project area and beyond in St. Charles County. Initially, this would mean additional residential projects in St. Charles County. Ultimately, it would yield more commercial and economic development in St. Charles County as these activities "catch-up" with a population historically dependent upon employment in St. Louis County and the City of St. Louis.

Long before the first phase of the Page Avenue Extension initially links Route I-270 to Route 94, induced development will begin to occur in anticipation of this event in St. Charles County. Local governmental entities will begin to experience new service demands before the flow of new tax revenues can fully fund such demands. School districts may be particularly impacted in this regard. All of this will occur against the backdrop of the steady urbanization of St. Charles County's remaining agricultural lands. Local plans will help shape the new development, but pressures for new development will, in turn, also shape local plans.

The more localized effects of the Page Avenue Extension would be basically dependent upon which alignment or combination is built. The amount and nature of induced development would be a function of the length of the route, the numbers and placements of interchange sites, the creation of service roads and the existing levels of development of the various route segments prior to construction. Of course, this would take place within the contexts of the local and national economies and business cycles. Per these parameters, the probable amounts of induced development vary markedly. It is reasonable to suppose, however, that the Red Alignment or its combinations would, overall, induce more development than the Green Alignment or its combinations.

4.23.2 Secondary Land Use Impacts - Earth City Expressway Extension

As noted earlier, there is no funding for the extension of the Earth City Expressway at this time and, as a result of voter disapproval for taxes to generate funds for this project, it is unlikely that St. Louis County will proceed with this project by the year 2015. Nevertheless, because of its classification as a pending potential project, the secondary land use impacts in association with the Page Avenue Extension must be considered. Direct land us impacts, based upon the most recent data, would be:

0.3	Acre RES (Residential)
30.7	Acres COM (Commercial)
142.0	Acres OTH (Other and Existing ROWs)
173.0	Acres TOTAL

Future secondary land use, social, economic and environmental impacts that induced development might produce are generally difficult to predict. In this instance, however, there would appear to be two basic alternative futures relative to induced development and the Earth City Expressway Extension. This concept previously has been advanced by the Comprehensive Plan (1987) of the City of Maryland Heights.

The Earth City Expressway Extension project area alternative futures are not predicated upon the existence of the Earth City Expressway Extension, the Page Avenue Extension, or both in combination. The critical issue is how much additional flood protection, if any, might be provided for the natural floodplain. Only when the context of flood protection is defined can secondary impacts of the Earth City Expressway Extension be forecast. Relative to induced development and secondary impacts, the Earth City

Expressway Extension, or any other roadway, are comparatively minor factors compared to project area flood protection.

Upstream of Riverport's 500-year flood protection system, existing flood controls basically comprise agricultural levees that provide, approximately, 25-year flood protection. These levees were breached and most of the floodplain was flooded by the Missouri River as recently as 1986. The threat of such floods, along with floodplain development regulations, make it economically impossible to finance, construct, insure and profitably sell or operate large-scale, non-agricultural or non-recreational new development on most of the floodplain, for now or the foreseeable future. It should be noted that the Earth City Expressway Extension, by itself, would afford little or no additional flood protection. It would be constructed at-grade for almost its entire length.

The first alternative future for the Earth City Expressway Extension project area assumes that flood protection would remain at the current modest levels, except for Riverport. The Earth City Expressway Extension, with or without the Page Avenue Extension, would probably generate little induced development and few secondary impacts. Riverport's development efforts would be enhanced by completion of the roadway. Similarly, the additional traffic could intensify development pressure near the Olive Street Road terminus above the floodplain. Creve Coeur and Arrowhead Airports might also benefit from easier and/or quicker access, as would most floodplain residents. CCLMP could experience additional visitors.

Beyond such localized impacts, however, more widespread effects would probably be negligible. Without sufficient flood protection, there could be no substantive development of the project area floodplain with or without the Earth City Expressway Extension. Above the floodplain, development is already approaching saturation. The Earth City Expressway Extension would represent only a marginal factor inasmuch as most of it would be on the floodplain, one-half mile to a mile away, except for the southern leg where it would leave the floodplain.

Construction of the Earth City Expressway Extension would, predictably, increase demands for greater flood protection throughout the project area floodplain. The same development potential that has been cited for years as justification for more flood protection is also one of the rationales for the Earth City Expressway Extension. The second alternative future assumes increased flood protection for one or more large tracts of floodplain to 500-year levels.

The Earth City Expressway Extension, in the context of increased flood protection, if and when it occurs, would help set the stage for intense development of the project area floodplain. This effect would be heightened in combination with completion of the Page Avenue Extension through the project area. At a minimum, all the secondary impacts of the first alternative future are predictable. More problematic is forecasting <u>market demand</u> if large amounts of western St. Louis County floodplain were

to be flood-protected, easily accessible and otherwise readily available for development.

Earth City is immediately north of the project area along Route I-70. This planned, flood-protected floodplain business park had its genesis almost two decades ago. Its history has included several developers, multiple development strategies, chronic financial problems and a rate of land absorption that has been slower than anticipated. To date, its 1,000 plus acres are only about 50% sold.

South of Route I-70 is Riverport, the second major planned, flood-protected floodplain development to occur in the region. Construction of the 500-year levees that protect this office/commercial/industrial center was highly controversial. Its first structures were completed in early 1989. About 400 acres of developable land remain on the market. McDonnell Douglas Corporation recently formed a joint venture with Sverdrup Corporation to finish this project.

The Earth City Expressway Extension project area floodplain could, theoretically, accommodate a huge expanse of new development. It could be developed for a combination of purposes but commercial, office and industrial uses would probably dominate with some possibility for residential. At recent levels of land absorption, the addition of, for example, 3,000 to 4,500 developable acres of commercial/office/industrial land could satisfy, by itself, a decade's worth or more of demand within the St. Louis Region. At a minimum, this would tend to retard development at other places throughout the area.

On balance, construction of the Earth City Expressway Extension could represent only one element of the preconditions necessary for intense development of the project area. Ultimately, it is probable that substantive development will occur upon the floodplain if and when sufficient flood protection is provided. However, the location, nature, scale and pace of this development cannot be predicted at this time.

4.23.3 Farm Impacts - Earth City Expressway Extension

The total area of land to be converted to highway use as a result of the Earth City Expressway Extension is approximately 173 acres. Of this amount, 159.2 acres are considered prime and unique farmland and 8.1 acres are identified as Statewide and Local Important Farmland. In perspective, this amount represents about 0.14% of available farmland in St. Louis County.

The area in question is routinely farmed with major crops such as corn, wheat, soybeans and various fruits and vegetables.

Within the proposed corridor, three relocations of farm residences would likely be required to implement the project.

4.23.4 Social Impacts/Relocations - Earth City Expressway Extension

The social impacts of the Earth City Expressway Extension would be limited by two factors: the high degree of socio-demographic homogeneity of the project area and the very small number of direct impacts. The immediately impacted population, per the presumed alignment, would be limited to three, probably white, middle-class, middle-income households. No known established concentrations of any subpopulations characterized by race, ethnicity, age, physical disabilities, etc. exist anywhere within the Earth City Expressway Extension project area except for small populations in social service facilities or nursing homes. The presumed alignment of the Earth City Expressway Extension would not come close to impacting any such sites.

The relocations would include:

RES (Residential

3 single-family units

COM (Commercial)

1 recreation complex
1 flower nursery/greenhouse complex

IND (Industrial)

1 (or more) electricity transmission towers

4.23.5 Economic Impacts - Earth City Expressway Extension

Potential economic impacts of the Earth City Expressway Extension would be both immediate and long-term. Immediate economic impacts would coincide with the several years required to acquire required properties as well as design and construct the roadway. During this period, positive economic impacts would be generated by the work and incomes provided as a result of the estimated $17 million construction cost. According to the Missouri Employment Impact Model, approximately 880 jobs would be supported by the direct infusion of the construction dollars into the local economy. This would be even higher when one considers the secondary spin-off of those dollars in the economy and increase in taxes received.

Certain negative economic impacts would begin during the property acquisition phase. As noted elsewhere, it is probable that two businesses, a recreation complex and a flower nursery, would be displaced. If these businesses were not successfully relocated, the closure of either or both would represent a permanent economic loss. Moreover, one or more of the impacted farmsteads might not be workable entities after right-of-way is acquired.

4.23.6 Habitat Impacts - Earth City Expressway Extension

With the construction of the Earth City Expressway Extension, habitat would be converted to roadway use. The direct impacts would be:

Cropland	131.3
Pasture/Hay	11.5
Urban	5.8
Upland Woods	1.4
Grass/Old Field	3.6
Emergent Wetland	1.8
Wetland Woods	17.6
Total	173.0 Acres

Included in these impacts would be the crossing of ten local streams as follows:

- Creve Coeur Creek (six crossings/tributary to Creve Coeur Lake and the Missouri River)
- Fee Fee Creek (one crossing/tributary to Creve Coeur Creek)
- Louiselle Creek (mouth - one crossing/tributary to Fee Fee Creek)
- Unnamed tributaries to Creve Coeur Creek (two crossings)

4.23.7 Upper Creve Coeur Lake - Earth City Expressway Extension

The area known as "Upper Creve Coeur Lake," or in some references as "Old Creve Coeur Lake," is located within and adjacent to the proposed Earth City Expressway Extension corridor south and west of the proposed interchange with the Red Alignment of the Page Avenue Extension. The area is immediately west of the Little Lake Golf and Driving Range complex. It is located within lower elevations that can be further identified by the riprap drainage channel used to keep the area well-drained so current farming activities can continue. Inasmuch as the area is being cultivated on a continual basis there is no wetland vegetation. The Red Alignment has been designed to cause a shift in alignment so that the Earth City Expressway Extension misses this important natural area.

During periods when this portion of the floodplain is flooded from either interior drainage or Missouri River high water, this area will retain, or pool, water. There is photographic and video tape documentation of this area flooded showing an abundance of waterfowl using it October of 1986. The natural depression that results in occasional ponding of water is a remnant of an early oxbow lake that occurred at this location in the mid to late 1800s and early 1900s. Other than the low elevation, the area is not unique nor distinguishable from the adjacent soil types. However, Upper Creve Coeur Lake is an integral part of wetland mitigation for the

Red Alignment. This is detailed in the wetland mitigation plan elsewhere in the FEIS.

4.23.8 Implementation Probability - Earth City Expressway Extension

At this time, there is no reason to believe that the Earth City Expressway Extension will be implemented during the immediate future. It cannot be categorically stated that it, or a comparable facility, will never be constructed. However, the short-term prospects for such a project, at least, are not good. The reasons for this assessment are individually substantial and, collectively, compelling. They include:

1. Lack of Funding. St. Louis County's Department of Highways and Traffic is the governmental agency that would build and operate the Earth City Expressway Extension. However, St. Louis County lacks the funding that would be required to build this road. This circumstance is expected to continue indefinitely.

2. Lack of MHTD Participation. MHTD has no interest in building, operating or funding the Earth City Expressway Extension. Beyond making provisions for a potential Page Avenue Extension/Earth City Expressway Extension interchange, MHTD would have no role in this project's implementation or operation.

3. Page Avenue Extension. To a large degree, any workable alignment of the Earth City Expressway Extension would be a function of the ultimate placement of the Page Avenue Extension, and the prospective interchange, as well as the presence of expanded Creve Coeur Lake Memorial Park and the wetland mitigation areas on the nearby floodplain. Until the Page Avenue Extension is finalized, the Earth City Expressway Extension must wait in abeyance.

4. NEPA Requirements. Federal funding possibly will be required to implement the Earth City Expressway Extension in addition to St. Louis County's share. Accordingly, impacts of the proposed project need to be assessed utilizing procedures established by the National Environmental Policy Act (NEPA). This rigorous process can be time-consuming and produce uncertain results that, potentially, could further delay the project or prompt its abandonment. In any case, the Earth City Expressway Extension's NEPA process cannot proceed until Page Avenue Extension issues are resolved.

On balance, it is reasonable to assume that the Earth City Expressway Extension will not be implemented anytime soon as well as prior to or simultaneous with the Page Avenue Extension.

4.24 CONSTRUCTION IMPACTS

The Page Avenue Extension's construction will be an immense undertaking. The Red Alignment, the Selected Alternate, is over twenty miles long. A wide and complex variety of semi-natural and urbanized environments will

be encountered. Full project implementation will easily require a decade or more of phased activities.

Construction impacts associated with the Selected Alternate, or any other route, will include limited-term noise, air and safety impacts that would be most concentrated in developed areas. Local residents and businesses inevitably will be inconvenienced and bothered by the sounds of construction, airborne dust and grit, temporary reroutings of local circulation systems, possible utility disruptions, etc. typical of large highway projects.

The Page Avenue Extension's Red Alignment will include major bridge structures (CCLMP and the Missouri River), a relatively large bridge across Dardenne Creek and an array of lesser bridges and culverts. The affected waterways, as well as associated wetlands and floodplains, will experience water quality and related wildlife impacts attributable to embankment construction and/or nearby excavation, bridge or culvert construction, construction materials debris, potential local erosion, etc. In general, such impacts will steadily dissipate following the completion of construction activities.

MHTD recognizes the extent and variety of construction-related impacts that can be anticipated during implementation of the Page Avenue Extension. To minimize such impacts, the exhaustive requirements of the Missouri Standard Specifications for Highway Construction (Missouri Highway and Transportation Commission - 1990) will be enforced as well as applicable U. S. Government regulations. MHTD's comprehensive Sediment and Erosion Control Program, recently approved by Missouri's Department of Natural Resources for compliance with Section 402(p) of the Clean Water Act (33 USC 1342) is an Environmental Protection Agency requirement for storm water discharge, will also be operative. Control and mitigation of construction impacts relative to specific areas of concern (i.e., noise and water) are addressed elsewhere in this chapter.

4.25 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 use of resources for it are deemed consistent with the maintenance and enhancement of long-term productivity for the Metropolitan St. Louis. As noted elsewhere, St. Charles County has rapidly increased its population during the recent past. This growth has exceeded the capacity of major infrastructure elements within St. Charles County. Moreover, its connections to the primary employment centers in St. Louis County cannot meet projected needs. Correspondingly, as employment centers develop within St. Charles County, projects such as the proposed action will facilitate improved access to St. Charles County from St. Louis County. This level of development provides the basis for constructing improvements that can facilitate the improved delivery of services to the St. Louis County-St. Charles County area, as well as enhance the quality of life of

local residents as access is improved and travel times are reduced on both sides of the Missouri River.

4.26 ANY IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION

The proposed action will require the expenditure of natural, physical, human and fiscal resources. Land and highway construction materials utilized in construction of the Page Avenue Extension are considered an irreversible commitment.

Land used in the construction of the proposed facility is considered an irreversible commitment during the time period that the land is used for a highway facility. However, if a greater need arises for use of the land, or if the highway facility is no longer needed, the land can be converted to another use. At present, there is no reason to believe such a conversion will ever be necessary or desirable.

Considerable amounts of fossil fuels, labor, and highway construction materials such as cement, aggregate, and bituminous material will be expended. Additionally, large amounts of labor and natural resources are necessary in the fabrication and preparation of construction materials. Generally, these materials are not retrievable. However, they are not in short supply and their use would not have an adverse effect upon continued availability of these resources. Any construction will also require a substantial one-time investment of both State and Federal funds which are not retrievable.

The commitment of these resources is based on the concept that residents in the project area and the larger region will benefit by the improved quality of the transportation system. These benefits will comprise improved accessibility and safety, savings in time, and greater availability of quality services which are anticipated to outweigh the commitment of these resources.

The expansion and enhancement of Creve Coeur Lake Memorial Park will require certain resources, especially open farmland, which could be considered irreplaceable. However, the benefits of improved recreation for the general public of the area outweigh that loss.

4.27 SUMMARY OF IMPACTS

Table 4.27-1 presents a listing of the various Page Avenue Extension alternate segments and the impacts associated with each segment. The Section 6(f) Evaluation provides additional detail and information concerning the impacts associated with the alignment alternatives from Bennington Place to the common point west of Creve Coeur Mill Road. Details of the mitigation program required by Section 601 of the Pipeline Safety Act of 1992 are also included in the Section 6(f) Evaluation.

The primary differences in the impacts associated with the basic Red and Green Alignments can be attributed to two main functional elements. The key elements are the Missouri River crossing locations and the termination of the alignments. The Red Alignment river crossing requires a shorter bridge and produces fewer floodplain impacts. The Green Alignment's bridge occurs upstream of the Red Alignment crossing. Its approaches on both sides of the river require more floodplain. Moreover, the requisite bridge structure is much longer than for the Red Alignment.

The second key element, the terminus of the alignments, affects overall route lengths. The Red Alignment, after crossing the Missouri River and utilizing Route 94's right-of-way, continues through St. Charles County roughly parallel to Route N and terminates at Route 40/61 (future Route I-64). The Green Alignment proceeds from Route 94 to Route I-70, supplanting the existing Route I-70 and Route 79 interchange. The difference in termination points for the Red and Green Alignments affects the total distances of the alignments (14.4-15.5 miles for the Green Alignment and its variants and 20.4 - 21.0 miles for the Red Alignment and its variants).

The differences associated with these two key elements, the bridge crossing location and route termination point, affect the indices of primary impacts. Impacts attributable to the various alternate segments, that can be combined with the primary alignments, Green-Black, Yellow-Black, Blue, Green Dashed, Green-Blue Dashed, are quite localized. The first three are intended to avoid CCLMP. The Green Dashed avoids established St. Charles County population centers. The Green-Blue Segment is a linking element in a hybrid combination of the Green and Red Alignments.

The basic Red Alignment is long but has comparatively few impacts because it avoids concentrated, developed areas. As compared to the Green Alignment and its variants, this is achieved through less costly right-of-way, fewer residential land use takings, minimal displacement of people and similar farmland takings.

Both the Red and Green Alignments impact parkland and, relative to the Red and Blue Alignments, Section 6(f) lands as well. For the Red and Blue Alignments, Creve Coeur Lake Memorial Park (CCLMP) is a property subject to Section 6(f). Parkland for the Green Alignment is CCLMP parkland leased since 1989. The Red Alignment was a planned regional transportation improvement when the land for Creve Coeur Lake Memorial Park was purchased and officially designated as part of St. Louis County's park system. This long-range planning was aided by a preserved corridor, which now leads up to the park. As a result, the Red Alignment residential impact in St. Louis County is less than one-eighth of the residential impact of the Green Alignment. Each of the CCLMP-avoidance segments would produce more St. Louis County residential impacts than the basic Red Alignment.

All alignments and combinations provide for improved traffic levels of service on the existing, and under construction, Missouri River crossings of Route I-70, Route 40/61 and Route 115. Traffic demand will continue to increase for the Missouri River crossings by 2015. Thousands of chronically frustrated commuters believe that the Page Avenue Extension, in fact, has been needed for years.

With its overall lower level of impacts to concentrated developed areas, fewer floodplain requirements and reduced impacts in other categories, the Red Alignment is the Selected Alternate. It is true that the Red Alignment has direct impacts of parkland converted to road use and disruptions to the passive use areas of Creve Coeur Lake Memorial Park. However, the mitigation program required by Section 601 of the Pipeline Safety Act of 1992 will add at least 600 acres to Creve Coeur Lake Memorial Park in addition to other measures. The net result will be a better park, large tracts of environmentally-sensitive land permanently exempt from development and the least overall impacts within local St. Louis County neighborhoods.

The most notable impacts of the CCLMP-avoidance segments are associated with attendant severe community disruption and/or costs necessary to provide a suitable roadway in the utility corridor. Additionally, the Blue Segment's proximity to CCLMP causes noise impacts.

Total construction and right-of-way costs for the Red and Green Alignments are:

Alignment/Combination	Cost
Red	$320,502,000 (includes mitigation plan)
Green	$400,307,000

The park avoidance segment combinations each would cost more than the Red Alignment, in the range of $4-10 million due to the greater right-of-way costs associated with the dense residential development to be crossed. Each of the park avoidance segments would displace many more households. Construction costs for the park avoidance alternates are comparable because the Green-Black and Yellow-Black Segments use the utility corridor, and in order to minimize disturbance to the three large water mains and power transmission towers, would bridge the unnamed tributary to Creve Coeur Creek for approximately 2,300 feet. The Blue Segment would bridge Creve Coeur Creek in roughly the same way as the Red Alignment. Costs for the Green Alignment and its variants are greater due to the longer bridge required to span the Missouri River floodway and higher right-of-way costs in St. Louis and St. Charles Counties.

The Red Alignment impacts 29.64 acres of jurisdictional wetlands. The wetland mitigation plan will allow for replacement of impacted wetlands through enhancement of farmed wetlands at Upper Creve Coeur Lake and the creation of wetlands in areas of prior converted wetland adjacent to Upper

Creve Coeur Lake and through creation of wetlands along the hiking and biking trail from CCLMP to the Missouri River crossing.

4.27.1 Red-Green-Red Alignments, Including Green Subalternates in St. Charles County

At the recommendation of the U. S. Fish and Wildlife Service in their letter of November 2, 1992 alternative alignments incorporating the Red Alignment from Bennington Place to the common point west of CCLMP, the Green Alignment and its alternatives from the common point to Missouri Route 94 in St. Charles County, and the Red Alignment from Route 94 west to U. S. Route 40/61 have been examined. These include alternatives named the Red-Green-Red Alignment, the Red-Green-Green Dashed-Red Alignment and the Red-Green-Blue Dashed-Red Alignment.

All of these alternative alignments would cross the Missouri River on the Green Alignment which is located upstream of the Red Alignment crossing. The proposed bridge for the Red Alignment over the river will be about 3,550 feet long with a minimum clear channel span of 600 feet to accommodate navigation requirements. This bridge would also cross the KATY Trail State Park and is estimated to cost about $70 million.

The river bridge on the Green Alignment would be about 8,990 feet long with a required main channel span of about 1,760 feet and approach spans of approximately 7,230 feet. This bridge is estimated to cost about $170 million. Also, another bridge would be necessary to cross the KATY Trail State Park farther west, adding increased costs to the Red-Green-Red Alignment and its subalternates.

Costs of such alternatives are $81.5 million to $94 million higher than the Red Alignment when costs for the entire alignment alternatives are compared. This is reflected mainly in the tremendous costs of the longer bridge needed on the Green Alignment river crossing.

Another substantial impact caused by the Red-Green-Red Alignment alternatives is the number of residential relocations. Approximately 86 to 159 more households would need to be relocated in St. Charles County if alignments using the Green Alignment river crossing were selected. The Blue Dashed subalternate would require about 17 more commercial relocations than the Red Alignment, the others being about equal to the Red Alignment total of 16. Community disruption would be more for those alternatives.

Projected wetland impacts would be approximately similar for all alignments with the Blue Dashed Alignment having about six less acres than the Red Alignment; the Green Dashed Alignment would have about eight additional acres of wetlands potentially impacted than that for the Red Alignment.

Floodplain impacts vary according to which Green Alignment is incorporated into the Red-Green-Red Alignment river crossing alternatives. In St.

Louis County, the Red Alignment would require about 65 or more acres of floodplain than the Green Alignment. In St. Charles County, the Red-Green-Red Alignment alternatives would require about 43 to 75 more acres in the Missouri River floodplain. The net difference between the two alignments would range from 22 acres less floodplain to 10 acres more floodplain for the Red-Green-Red Alignment and subalternates versus the Red Alignment.

Other impacts shown on Table 4.27-1 would be comparable for the Red Alignment and the Red-Green-Red Alignment alternatives.

One additional consideration is Section 601 of the Pipeline Safety Act of 1992. Section 601 (a) allows the Secretary of the United States Department of Transportation to waive the requirements of Section 138 of Title 23, United States Code, and Section 303 of Title 49, United States Code (commonly known collectively as "Section 4(f)") for the Red Alignment. Use of the Red-Green-Red Alignment and any of its subalternates in St. Charles County would cross the KATY Trail State Park. The opportunity for waiver of Section 4(f) provided in Section 601 would not be applicable to these alignments.

Given the significant increased costs, relocations, similar or greater floodplain impacts and Section 4(f) considerations on the Red-Green-Red Alignment and its subalternates in St. Charles County, the Red Alignment is the Selected Alternate for the proposed action. Meetings and discussions with the U.S. Fish and Wildlife Service and the Missouri Department of Conservation have included consideration of adverse impacts to backwater and side channel areas of the Missouri River possibly caused by the Red Alignment. Design of the Missouri River bridge will be in coordination with those agencies. The intent is to provide a beneficial impact to side channels and increase habitat diversity through appropriate bridge design. The involved agencies have a commitment to see this completed successfully.

TABLE 4.27-1
IMPACT EVALUATION MATRIX

PAGE AVENUE EXTENSION SEGMENT	CONST. COST ($000)	ROW COST ($000)	PRIME FARMLAND (ACRES)	EMERGENT AND WOODED WETLANDS (ACRES)	SECTION 6(f) (ACRES)	FLOOD-PLAIN (ACRES)	RESIDENTIAL RELOCATIONS (HOUSEHOLDS)	COMMERCIAL RELOCATIONS (BUSINESSES)	SCHOOLS	HAZARDOUS WASTE SITES	LAND USE (ACRES) RES	COM	REC	OTHER
Bennington Place to Common Point														
Red-1	61,020	9,882[1]	80.6	27.8	37.0[2]	86.5	20[3]	3[3]	-	-	48.4	-	40.6	70.7
Green-1	57,100	21,500	24.0	8.0	8.1	40.2	168	-	-	-	37.2	-	-	44.7
Blue-1	59,853	15,436	90.6	7.8	-	83.2	75	-	-	-	37.4	-	-	97.7
Green-Black-1	62,503	21,201	104.6	8.6	-	104.0	133	-	-	-	37.5	8.3	4.5	90.9
Yellow-Black-1	64,940	19,315	103.6	17.3	-	104.0	92	-	-	-	29.4	8.3	4.5	96.0
Common Point to Missouri River														
Red-2	86,250	1,200	57.4	17.1	-	54.4	-	-	-	-	-	-	-	64.5
Green-2	188,900	500	28.0	11.4	-	35.8	-	-	-	-	-	-	8.1	93.9
Missouri River to Highway 94														
Red-3	32,000	6,000		3.5	-	3.0	2	2	-	-	2.0	1.4	-	171.2
Green-3	43,457	20,000	40.1[1]	5.0	-	45.9	169	6	-	-	62.6	4.6	-	142.7
Green/Green Dashed	30,833	24,335	71.7	17.6	-	77.5	114	6	-	-	33.0	4.6	-	205.2
Green/Blue Dashed/Red	39,878	16,000	52.1	3.1	-	48.8	96	24	-	-	36.9	5.8	-	286.9
Highway 94 to Route I-70														
Green-4	28,750	40,100	81.3	3.6	-	414.3	227	10	1 (St. Charles Community College)	1	48.2	1.8	-	244.7
Highway 94 to Highway N														
Red-4	30,000	10,500	12.1	-	-	8.6	12	7	-	-	4.8	7.8	-	278.2
Highway N to Route 40/61														
Red-5	71,250	16,000	40.2	4.5	-	245.4	40	5	-	-	10.9	1.3	0.3	585.0

[1] Includes $6,009,000 for mitigation plan required by Section 601.
[2] Mitigation plan for Section 601 requires addition of at least 600 acres to CCLMP.
[3] Includes Mitigation Plan.

References

REFERENCES CITED IN THIS DOCUMENT

Anderson, R., 1965. The Reptiles of Missouri. University of Missouri Press, Columbia.

Audubon, Maria R., 1960. Audubon and His Journals, 2 vols., Dover Publications, Inc. (New York), originally published by Charles Scribners and Sons (1897).

Behler, J. L. and F. W. King, 1979. The Audubon Society Field Guide to North American Reptiles and Amphibians. Alfred A. Knopf, Inc., New York.

City of Lake St. Louis, 1989. The Comprehensive Plan for the City of Lake St. Louis.

City of Maryland Heights, 1987. Comprehensive Plan.

City of O'Fallon, 1985. O'Fallon Year 2000 Comprehensive Plan.

City of St. Peters, 1982. Comprehensive Plan for St. Peters, Missouri.

City of St. Peters, 1987. Comprehensive Plan Supplement.

City of Weldon Spring, 1989. Weldon Spring Comprehensive Plan.

Conant, R., 1975. A Field Guide to Reptiles and Amphibians. Houghton Mifflin Co., Boston.

Dunstan, T. C., 1989. Page Avenue Extension Wintering Bald Eagle Study. Booker Associates.

Dunstan, T. C., B. R. Eickelschulte, R. G. Harper and D. Scott Hopkins, 1985. Mammal Survey of FAP 408 Corridor from Illinois 79 to Illinois 107, Pike County. Illinois Department of Transportation.

East-West Gateway Coordinating Council, 1984. Long-Range Transportation Plan Highway Component.

East-West Gateway Coordination Council, 1990. Suburban Mobility in St. Charles County.

East-West Gateway Coordinating Council, 1991. St. Louis Systems Analysis for Major Transit Capital Improvements.

Fenneman, N. M., 1946. Physical Divisions of the United States. U. S. Geological Survey Physiographic Committee Map.

Forbes, S. A. and R. E. Richardson, 1905. On a new shovelnose sturgeon from the Mississippi River. Bulletin of the Illinois State Laboratory of Natural History 7:37-44.

Geller, J. Elaine Hardy and David B. Crampton, 1988. The Boschert (23 SC 609) Site: A Late Woodland Extraction Site in the Uplands of St. Charles County, Missouri: Missouri Highway and Transportation Department (Jefferson City).

Gilbraith, D. M., M. J. Schwalbach and C. R. Berry, 1988. Preliminary report on the status of the pallid sturgeon, Scaphirhynchus albus, a candidate endangered species. Department of Wildlife and Fisheries Science, South Dakota State University, Brookings, South Dakota.

Holt, H. Barry, 1987. "Federal Archaeology Today: Survey Requirements and Predictive Alternatives." American Archaeology. Vol. 6, No. 2, pp 131-139.

Howard Bend Levee District, 1988. Plan of Reclamation.

Jackson, Donald (editor), 1962. Letters of the Lewis and Clark Expedition with Related Documents, 1783-1854. University of Illinois Press (Urbana).

Lewis, Meriwether and William Clark, 1902. History of the Expedition Under the Command of Captains Lewis and Clark. Reprint of 1814 edition, Paul Allen (ed.), New Amsterdam Book Co. (New York).

Missouri Highway and Transportation Commission, 1990. Missouri Standard Specifications for Highway Construction.

Missouri Highway and Transportation Department, 1986. Reconnaissance Report, St. Louis-St. Charles Counties, Page Avenue Extension/New Missouri River Crossing. Prepared by MHTD, Division of Surveys and Plans.

Missouri Highway and Transportation Department, 1989. An Overview of the Cultural Resources Within the Vicinity of the Page Avenue Extension, St. Louis and St. Charles Counties. Prepared by MHTD Archaeological/Cultural Resources Staff.

Olson, Edna McElhiney, 1960. Lewis and Clark Slept Here, St. Charles Journal, August 12, 1960.

Quaife, Milo M., 1965. The Journals of Captain Meriwether Lewis and Sergeant John Ordway Kept on the Expedition of Western Exploration, 1803-1806. The State Historical Society of Wisconsin (Madison). Orginally pub. 1916.

St. Charles County, 1973. St. Charles County Master Plan.

St. Charles County, 1978. St. Charles County, Missouri River Crossing Report. Prepared for the Missouri River Bridges Committee by Booker Associates, Inc.

St. Charles County, 1983. Land Use Plan of Unincorporated St. Charles County. Prepared by the East-West Gateway Coordinating Council.

St. Charles County, 1987. St. Charles County Transportation Study. Prepared by the East-West Gateway Coordinating Council.

St. Charles County, 1990. Year 2000 Master Plan.

St. Louis County, 1980. General Plan.

St. Louis County, 1982. Recreation Spaces, Community Places.

St. Louis County, 1983. Creve Coeur Lake Restoration Project.

St. Louis County, 1983. Olive Street Road Study.

St. Louis County, 1985. General Plan Update.

Smith, P. W., 1961. The Amphibians and Reptiles of Illinois. Ill. Nat. Hist. Surv. Bull. 28(1):1-298.

Thurow, G. R., 1981. Description of the biota in the areas of the proposed Illinois River bridge sites for the Central Illinois Expressway (FAP 408), Herpetological Society. Illinois Department of Transportation.

Thwaites, Rueben Gold, 1959. Original Journals of the Lewis and Clark Expedition 1804-1806. 8 vols., Antiquarian Press Ltd. (New York).

U. S. Fish and Wildlife Service, 1992. Pallid Sturgeon - Draft Recovery Plan.

Village of Cottleville, 1989. The Village of Cottleville Land Use Plan.

Weston, D. E. and M. S. Weichman, 1987. Guidelines for Applying the Criteria of the National Register of Historic Places, The Master Plan for Archaeological Resource Protection in Missouri.

Wiley, J. R., 1968. Guide to the Amphibians of Missouri. Missouri Speleology 10(4):128-172.

Wood, W. Raymond, 1982. William Clark's Mapping in Missouri, 1803-1804. Missouri Historical Review. Vol. 76 and 3:241-252.

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