

ROUTE 61, MARION COUNTY, MISSOURI
ROUTE 61 TO SOUTH OF ROUTE 36 (HANNIBAL RELOCATION)
JOB NO. J3P0426

ROUTE 61, RALLS COUNTY, MISSOURI
SOUTH OF ROUTE 36 (HANNIBAL RELOCATION) TO SOUTH OF ROUTE M
JOB NO. J3P0427

FINAL ENVIRONMENTAL IMPACT STATEMENT

Prepared pursuant to 42 USC 4332 (2) (c)
and if applicable 49 USC 303 by the

U.S. Department of Transportation
Federal Highway Administration

and

The Missouri Highway and Transportation Department

08 MAY 1996
Date of Approval

Kenneth W. Buehl
For FHWA

Envir. Spec.
Title

5-13-96
Date of Approval

Joe Mickes
For MHTD

Chief Engineer
Title

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

Mr. Don Neumann
Programs Engineer
FHWA Division Office
P.O. Box 1787
Jefferson City, MO 65102
314/636-7104

Mr. Joe Mickes
Chief Engineer
Missouri Highway & Transportation Department
P.O. Box 270
Jefferson City, MO 65102
314/751-4622

The recommended action is the relocation of U.S. Route 61, consisting of construction of a four-lane, fully-access-limited, divided highway in Marion and Ralls Counties, Missouri, which will be approximately 16 km (10.0 miles) in length. The project will begin at the existing Route 61/24 interchange north of Hannibal, continue southeasterly, and end in the vicinity of the existing Route 61/M intersection south of Hannibal. Other alternatives considered include the no-action alternative, improvement of the existing highway, and other build alternatives. The recommended action will relieve traffic congestion on the existing Route 61 in the Hannibal area, and improve the safety, efficiency, and convenience of the area's road system. This document incorporates a description of the environmental conditions and evaluates the potential impact of each project alternative.

S.1 PROJECT DESCRIPTION

The proposed action involves the relocation of U.S. Route 61 west of Hannibal, Missouri. The relocation is proposed from the vicinity of the existing Routes 61/24 interchange in Marion County north of Hannibal, continuing in a southeasterly direction to the vicinity of the existing Routes 61/M intersection in Ralls County south of Hannibal. The project involves construction of a new, four-lane, fully-limited access, divided highway. The regional project setting is shown in Exhibit S-1, and a more detailed map of the study area for the project is shown in Exhibit S-2.

The No-Action Alternative and a total of four build alternatives and two links, which allow combinations of different segments, were considered for the project and are evaluated in this Final Environmental Impact Statement. The build alternatives range in length from 15.4 km (9.6 miles) to 19.5 km (12.1 miles).

S.2 PURPOSE AND NEED FOR PROJECT

The current facility is inadequate for future traffic levels. Projected traffic counts for Route 61 through Hannibal will result in future peak hour level of service reductions from current Level B and C to unacceptable Level F (see Section 1.4 for a definition of Level of Service). Delays at intersections will increase by more than an order of magnitude. Accident rates, which are similar to statewide average rates and slightly higher than the nationwide average rates for U.S. Routes, will likely increase.

With the exception of the six signalized intersections through Hannibal, Route 61 is currently free-flowing, with no stop signs or stop signals from near the Iowa border to I-70 west of St. Louis [a distance of about 210 km (130 miles)]. The Missouri Highway and Transportation Commission has designated that Route 61 will be upgraded to freeway from north of Hannibal to I-70 near St. Louis, and that it should be evaluated for upgrade to freeway from the Iowa border to north of Hannibal.

FILE: J3P0426 & J3P0427

August 8, 1996

Preliminary Studies

Route 61, Marion and Ralls Counties
MHTD Job Nos. J3P0426 and J3P0427
FHWA-MO-EIS-95-04-F
Record of Decision

Mr. Joseph A. Mickes, P.E., Chief Engineer
Missouri Highway and Transportation Department
Jefferson City, Missouri

Dear Mr. Mickes:

Enclosed is a Record of Decision (ROD) for the subject project. The ROD was signed by Mr. Kenneth Bechtel of our Region Office on July 30, 1996. You may advance the project as appropriate as of the date of signature.

Sincerely yours,

PEGGY J. CASBY

Gerald J. Reihsen, P.E.
Division Administrator

Enclosure
pjc/djs

RECORD OF DECISION

Route 61 Hannibal Relocation, Marion and Ralls Counties, Missouri

Route 24 to South of Route M

Jobs No. J3P0426 and J3P0427

(FHWA-MO-EIS-95-04)

7/30/96
Date of Approval

Kim H. W. Buchholz En. Spec.
For FHWA Title



U.S. Department
of Transportation
**Federal Highway
Administration**

J3P0426
Memorandum

Subject: Record of Decision
Route 61, Marion and Ralls Counties
FHWA-MO-EIS-95-01-F

From: Director, Office of Program Development
Kansas City, Missouri

To: Mr. G. J. Reihsen
Division Administrator (HDA-MO)
Jefferson City, Missouri

Date: July 30, 1996

Reply to
Attn. of: HPD-07

Please find attached the approved Record of Decision (ROD) for the subject project. As requested a copy of this ROD has been directly mailed to Mr. Fred Martin of the Missouri Highway and Transportation Department. You may advance the project as appropriate.

Attachment

Kim Burtel
for Ronald J. Rogers

RECEIVED	
AUG 1 1996	
D.A.	
✓ A.D.A.	<i>[Signature]</i>
✓ P.E.	<i>[Signature]</i>
✓ E.C.	<i>[Signature]</i>
ADM.	
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A. Decision

The Proposed Action is the relocation of U.S. Route 61, consisting of the construction of a four-lane, fully-access-limited, divided highway in Marion and Ralls Counties, Missouri, which will be approximately 16.0 km (9.9 miles) in length. The project will begin at the existing Routes 61/24 interchange north of Hannibal, continue southeasterly, and end in the vicinity of the existing Route 61/M intersection south of Hannibal.

For the proposed action the selected alternative is Alternative F described in the Final Environmental Impact Statement (FEIS). Beginning at the north end of the project, Alternative F follows the alignment of existing U.S. Route 24 for approximately 4.8 km (3.0 miles). For about 3.6 km (2.3 miles) of this distance, it uses the existing Route 24 right-of-way for the northbound lanes. About 3.3 km (2.1 miles) south of the Route 61/24 interchange, a diamond interchange will be built between two existing county roads which currently intersect Route 24. These county roads will be closed at the new route, and will be serviced by the new interchange. At about 5.8 km (3.6 miles) south of the existing Route 61/24 interchange will be a cloverleaf interchange with U.S. Route 36. In the vicinity of the interchange, U.S. Route 36 will be relocated about 500 meters (1700 feet) north of its present location. This local relocation of Route 36 is being coordinated with other proposed Route 36 improvements. The existing U.S. Routes 24 and 36 in the vicinity of the interchange will remain as service roads. Between the Route 36 interchange and the southern terminus of the project, there will be diamond interchanges at State Routes HH and M. The southern terminus is located approximately 600 meters (2,000 feet) south of the existing Routes 61/M intersection.

This improvement on Route 61 is part of the overall effort to improve the "Avenue of the Saints Route." The Avenue of the Saints is a Congressionally designated high priority route on the National Highway System between St. Paul, Minnesota and St. Louis, Missouri. With the exception of the six signalized intersections through Hannibal (which will be avoided by this relocation), Route 61 is currently free-flowing, with no stop signs or stop signals from near the Iowa border to I-70 west of St. Louis [a distance of about 210 km (130 miles)]. The Missouri Highway and Transportation Commission has designated that Route 61 will be upgraded to freeway from north of Hannibal to I-70 near St. Louis, and that it should be evaluated for upgrade to freeway from the Iowa border to north of Hannibal. This study is based on an average right of way width of 90 meters (300 feet) with a median width of 15 meters (48 feet) from inside shoulder to inside shoulder. Right of way widths will vary depending on depth of cut or fill. Right of way will be acquired as necessary for construction. The typical section includes 3-meter (10-foot) outside shoulders, 1.8-meter (6-foot) inside shoulders, and a travelway width of 7.2 meters (24 feet).

B. Alternatives Considered.

The no-action alternative, mass transit alternative, and improvement of existing highway alternative were studied and rejected because they would not satisfy the primary objectives of the project. None of these alternatives would provide the safety, level of service, and system continuity intended by the project.

A total of 17 variations of build alternatives on new locations were developed and studied as a Phase I alternative analysis. Based on the Phase I study, these alternatives were narrowed down to four for detailed study. In addition, two connecting links which allow different combinations of segments of the alternatives were evaluated. The alternative evaluated in detail are, from east to west, Alternatives CW, D, EF, and F.

Alternative CW, the easternmost alternative, is the shortest in terms of new construction, at 15.5 km (9.6 miles). The other three alternatives have common north and south termini; both the north and south termini for Alternative CW are different from the others. The northern terminus is about 1,800 meters (6,000 feet) east of the existing Routes 61/24 interchange. The southern terminus is at Trabue Lane, about 2,700 meters (9,000 feet) north of the southern terminus for the other build alternatives evaluated in detail. The only interchange on Alternative CW is a cloverleaf at U.S. Route 36.

Alternatives D and EF have the same termini as Alternative F. They also have in common with each other and with Alternative F, the diamond interchange at Route M, located about 1,200 meters (4,000 feet) from the southern project terminus. Alternative D is 18.1 km (11.3 miles) long, and Alternative EF, the longest, is 19.5 km (12.1 miles) long. Alternatives D and EF both have cloverleaf interchanges at Route 36 and diamond interchanges at Route HH.

The environmental impacts of the alternatives vary mainly according to their topographic locations. Alternative CW, which is located more in the stream valleys, primarily impacts features associated with stream valleys such as wetlands and floodplains. Alternative F, which is located primarily on the ridge lines, has greater impacts on features associated with the ridge tops, such as prime farmland. The impacts of Alternatives D and EF are similar to each other and generally range between those of Alternative CW and Alternative F.

Alternative CW, with wetlands impacts of approximately 6.6 hectares (16.5 acres), impacts 11 times the wetland area of Alternative F. Alternative D impacts about three times as much wetland area as Alternative F, and Alternative EF impacts 67 percent more wetland area than Alternative F.

Alternative CW, with 8 crossings of Waters of the U.S., has twice as many crossings of Waters of the U.S. as Alternatives D and F. Alternative EF has the fewest, at three crossings.

Alternative CW has the least impact on prime farmland, at 91 hectares (226 acres). Compared to Alternative CW, Alternatives D, EF, and F impact one percent more, 76 percent more, and 110 percent more, respectively.

Alternative F impacts the least amount of wooded area, at 12 hectares (29) acres. Compared to Alternative F, Alternatives D, EF and CW impact 50, 75, and 208 percent more, respectively. Some of the wooded areas may provide seasonal habitat for the endangered Indiana bat.

Alternative F requires two residential relocations. Alternative CW and EF each require four, and Alternative D requires 16 residential relocations. None of the alternatives require relocations of businesses.

Alternative F was selected because it meets the project objectives better than any other alternative evaluated. It is, overall, the least environmentally impacting alternative. It is also the lowest cost alternative.

C. Section 4(f).

The selected alternative has no Section 4(f) involvement.

D. Measures to Minimize Harm.

All practicable measures to minimize harm have been incorporated into the decision for the selected alternative.

The acquisition and relocation program will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

Erosion control measures will be required by job construction specifications to prevent sedimentation. Measures also will be used to prevent pollution caused by construction activities through MHTD's Sediment and Erosion Control Program approved by the Missouri Department of Natural Resources (MDNR).

Farmland impacts have been addressed by locating corridors near property lines as much as feasible, to reduce farm severance. Livestock underpasses will be constructed where feasible.

Wetlands have been avoided to the extent possible. The position of the selected alternative has been chosen to minimize impacts to wetlands. Final mitigation measures, if required, will be decided in coordination with the U.S. Army Corps of Engineers with the assistance of the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the Missouri Department of Conservation.

Floodplain impacts have been reduced by holding right of way requirements to a minimum, and by perpendicular crossings of floodplains. Channel relocations will be minimized, as will road embankments for bridges. Velocity increases of streams at stream crossings will be avoided where feasible.

Trees that are potentially suitable for seasonal Indiana bat habitat will be harvested only during the period from October 1 to April 1.

Any wells found during construction will be sealed to prevent ground water pollution from construction and from future road maintenance.

E. Monitoring Program.

The proposed project will be subject to further review by Federal and State agencies and local units of government. Some permits will need to be obtained. This review and permit process will ensure that the included mitigation measures are implemented.

F. Comments on the Final EIS.

The U.S. Department of Interior reviewed the Final EIS and provided comments on July 10, 1996. They stated that the U.S. Fish and Wildlife Service (Service) had not concurred that the preferred alternative would not adversely affect the federally-listed endangered Indiana bat and recommended that informal consultation be continued or formal consultation be requested with the Service's Columbia Field Office. In a request to continue informal consultation, data supplemental to the Final EIS was provided to the Columbia Field Office and a meeting was held with Service staff to discuss the information. Informal Section 7 consultation on this proposed action was concluded on July 23, 1996, with the Service's concurrence that the improvement projects are not likely to adversely affect the Indiana bat.

The coordination letters are attached to this ROD (MHTD letter to the U.S. Fish and Wildlife Service, dated July 22, 1996; and U.S. Fish and Wildlife Service letter to MHTD dated July 23, 1996).

No other comments on the Final EIS were received.

G. Summary.

The selected alternative is the lowest cost and least environmentally damaging of the build alternatives evaluated for the proposed action. Written responses to the Final EIS are attached. A summary table of impacts is attached.

Table 1
Summary of Impacts

	Alternative CW	Alternative D	Alternative EF	Alternative F
Total Length of Improvement, km (miles)	15.5 (9.6)	18.1 (11.3)	19.5 (12.1)	16.0 (9.9)
Right of Way Requirements, Total hectares (acres)	227 (563)	265 (656)	285 (705)	279 (688)
Prime Farmland Taken, hectares (acres)	91 (226)	92 (227)	160 (395)	191 (473)
Statewide Important Farmland Taken, hectares (acres)	91 (226)	124 (306)	98 (241)	55 (135)
Residential Land Taken, hectares (acres)	4 (9)	16 (40)	4 (11)	5 (12)
Existing Roadway Taken or Occupied, hectares (acres)	4 (10)	12 (30)	5 (13)	16 (39)
Wooded Land Taken, hectares (acres)	37 (92)	21 (53)	18 (45)	12 (29)
Relocations				
Residential	4	16	4	2
Other	0	0	0	0
Noise Impacts (receptors > 65 dBA)	2	5	2	2
Length of Floodplain Crossing, meters (feet)	2,584 (8,480)	816 (2,680)	701 (2,300)	366 (1,200)
Estimated Wetland Area Impacted, hectares (acres)	6.6 (16.5)	1.6 (4.0)	1.0 (2.5)	0.6 (1.5)
Estimated Number of Crossings of Waters of the U.S.	8 crossings	4 crossings	3 crossing	4 crossings
Estimated Construction Cost (\$ millions)	65.8	69.4	75.9	65.3
Est. Construction Cost Impacts on Other Projects (\$ millions)	10.6	3.5	3.5	0



MISSOURI HIGHWAY AND TRANSPORTATION DEPARTMENT

Capitol Ave. at Jefferson St., P.O. Box 270, Jefferson City, MO 65102 Telephone (573) 751-2551 Fax (573) 751-6556

July 22, 1996

Mr. Gary Frazer, Field Supervisor
U.S. Fish and Wildlife Service
Columbia Field Office
608 East Cherry, Room 207
Columbia, MO 65201

Attention: Mr. Mike LeValley

Dear Mr. Frazer:

Subject: Preliminary Studies, Route 61, Marion Co., Route 61 to S/O Route 36
(Hannibal Relocation), Job No. J3P0426 and Route 61, Ralls County,
S/O Route 36 (Hannibal Relocation) to S/O Route M, Job No. J3P0427,
Final Environmental Impact Statement, Threatened and Endangered Species
Coordination

This responds to the U.S. Department of the Interior's (USDI) comments on the Final Environmental Impact Statement (FEIS) for the subject project. In these comments, the USDI stated that the U.S. Fish and Wildlife Service (Service) did not concur that the preferred alternative would not adversely affect the federally-listed endangered Indiana bat. The USDI recommended that informal consultation be continued or formal consultation be requested with your office.

On the behalf of the Federal Highway Administration (FHWA), the Missouri Highway and Transportation Department (MHTD) has developed supplemental data (below) which we believe support a finding that construction of the preferred alternative (Alternative F) will not adversely affect summering Indiana bats in the project area. These data were derived from the field data presented in Appendix B of the FEIS and were discussed with Mr. Mike LeValley and Dr. Paul McKenzie of your staff on July 19, 1996. These supplemental data, and our impact assessment methodology, incorporate the results of recent studies of Indiana bat summer habitat requirements and use which are soon to be included in the Revised Draft Recovery Plan for the Indiana Bat (RDRPIB).

1. Of the build alternatives evaluated in detail, Alternative F will result in the least impact to wetlands (1.5 ac), floodplains (1,200 ft. length), and forested lands (29 ac); all provide potential summer maternity habitat for the Indiana bat.

2. The RDRPIB indicates that the mean nightly foraging area for lactating adult female Indiana bats is considered to be an 850 ac circular area. Given this basis, a series of eight 850 ac circular plots (F-1 through F-8) were centered on the entire alignment length of Alternative F (Exhibit B-2). Of the seven plots ranked as suitable foraging habitat (Table B4-1), a total of 783 ac of forested lands are available to the Indiana bat as habitat. However, only 29 ac of these forested lands will be impacted by Alternative F, representing a negligible loss of foraging habitat. As for potential secondary impacts due to the future presence of the highway, several radio-tracking studies of the foraging ranges of Indiana

Mr. Gary Frazer
July 22, 1996
Page 2

bats have indicated that the presence of even interstate highways in highly urbanized areas (i.e., I-465 and the Indianapolis International Airport, Indianapolis, Indiana) do not constitute barriers to the nightly foraging bouts of Indiana bats.

3. The FEIS (Table B4-2) provides data on the density of potential roost trees (PRTs; defined as live or dead trees containing $\geq 25\%$ exfoliating bark which are ≥ 9 in diameter-at-breast-height) within four of the 850 ac circular plots (F-2, F-4, F-5, and F-8) defined above; plots F-1, F-3, F-6 and F-7 did not contain suitable PRTs. The total number of PRTs available within the four circular plots identified above was calculated by multiplying the density of PRTs/ac by the amount of forested lands within that plot. Therefore, approximately 5,200 PRTs are present within the 512 ac of forested lands within the four plots. Given a mean density of 5 PRTs/ac for these plots, there would be approximately 145 PRTs within the 29 ac of forested lands impacted by Alternative F.

4. Data in the RDRPIB indicate that in northern Missouri a single colony of Indiana bats (from 50 - 100 females) may use 17 different PRTs within their colonies' range. Therefore, within each of the four 850 ac circular plots which contain approximately 5,200 PRTs, an average of 1264 PRTs would still be available to any single colony following the removal of 145 PRTs for Alternative F.

5. As a measure to avoid take of summering Indiana bats, every effort will be made to avoid removing PRTs during the range-wide maternity period of April 1 through September 30. However, if it becomes absolutely necessary to remove PRTs during the maternity period, an inspection of each individual PRT to be removed would be made by MHTD to determine if they are occupied by Indiana bats. No PRT which is found to be occupied by Indiana bats would be removed until after the bats have vacated the roost. In either case, the FWS would be notified immediately if occupied roosts are encountered.

6. In the context of PRT availability on a much broader landscape approach, Marion and Ralls Counties contain 50,000 ac and 61,000 ac of forested lands respectively (Timber Resources of Missouri's Prairie, 1989, USDA, Resource Bulletin NC-117). According to the forest inventory and analysis statistics, almost half of the species of trees which comprise the forests in these counties are the species of trees used most frequently by Indiana bats as maternity roosts. Statistics for the predicted annual mortality rates of these species (26% for red oaks, 9% for hickories, 12% for elm and 21% for cottonwoods) ensure that an ample supply of PRTs will be available in this area in the future. Given an equal distribution of 5 PRTs/ac, there could be approximately 555,000 PRTs available in the forested lands in Marion and Ralls Counties alone, or enough roosts for 32,600 maternity colonies of Indiana bats (based on the use of 17 PRTs/colony reported in the RDRPIB). This would be enough PRTs to support 1.6 million summering Indiana bats (based on 50 females/colony). According to the most recent population estimates from major hibernacula, there are approximately 333,000 Indiana bats known to exist within the entire range of the species.

Mr. Gary Frazer
July 22, 1996
Page 3

Based on these supplemental data, we ask for your concurrence that the proposed action is not likely to adversely affect summering Indiana bats. The FHWA will address the results of our informal Section 7 consultation in the ROD.

Thank you for your assistance related to this matter and your expeditious processing of this request to meet our timetable.

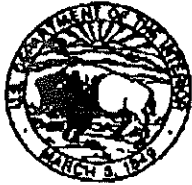
Sincerely,



Gene Gardner
Biological Sciences/Endangered Species Specialist

gg/sw

Copies: Mr. Bob Sfreddo-de
Mr. Dick Jones-3
Mr. Gerald Reihsen-FHWA



IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Fish and Wildlife Enhancement
Columbia Field Office
608 East Cherry Street
Columbia, Missouri 65201

FWS/AES-CMFO

JUL 23 1996

Mr. Gene Gardner
Biological Sciences/Endangered Species Specialist
Missouri Highway and Transportation Department
Capitol Avenue at Jefferson Street
P.O. Box 270
Jefferson City, Missouri 65102

Dear Mr. Gardner:


This responds to your July 22, 1996, letter which provided additional data in support of a finding that the Route 61 improvement project in Marion and Ralls Counties, Missouri was not likely to adversely affect the federally-listed endangered Indiana bat. These data were discussed with Mike LeValley and Dr. Paul McKenzie of my staff on July 19, 1996.

The U.S. Fish and Wildlife Service concurs with your finding based on the additional data and information that you provided. Although up to 29 acres of forested habitat and 145 potential maternity roost trees may be impacted by the project, your analysis shows that an excess of suitable roost trees and foraging habitat currently exists in the project area. Coupled with your original commitment to avoid direct take of bats by prohibiting clearing of occupied roost trees (as discussed in Item 5 of your letter), our concerns are satisfied.

This concludes Section 7 consultation on the proposed action. Should project plans change, or new information become available that would change your conclusion, consultation should be reinitiated with this office.

We appreciate your interest in protection of threatened and endangered species. Please contact Mr. Mike LeValley at (573) 876-1911 if you have any questions or we can provide further assistance.

Sincerely,


Gary D. Frazer
Field Supervisor

bcc: Figg, MDC

MJL:ml:\1541\US61 Marion and Ralls Counties

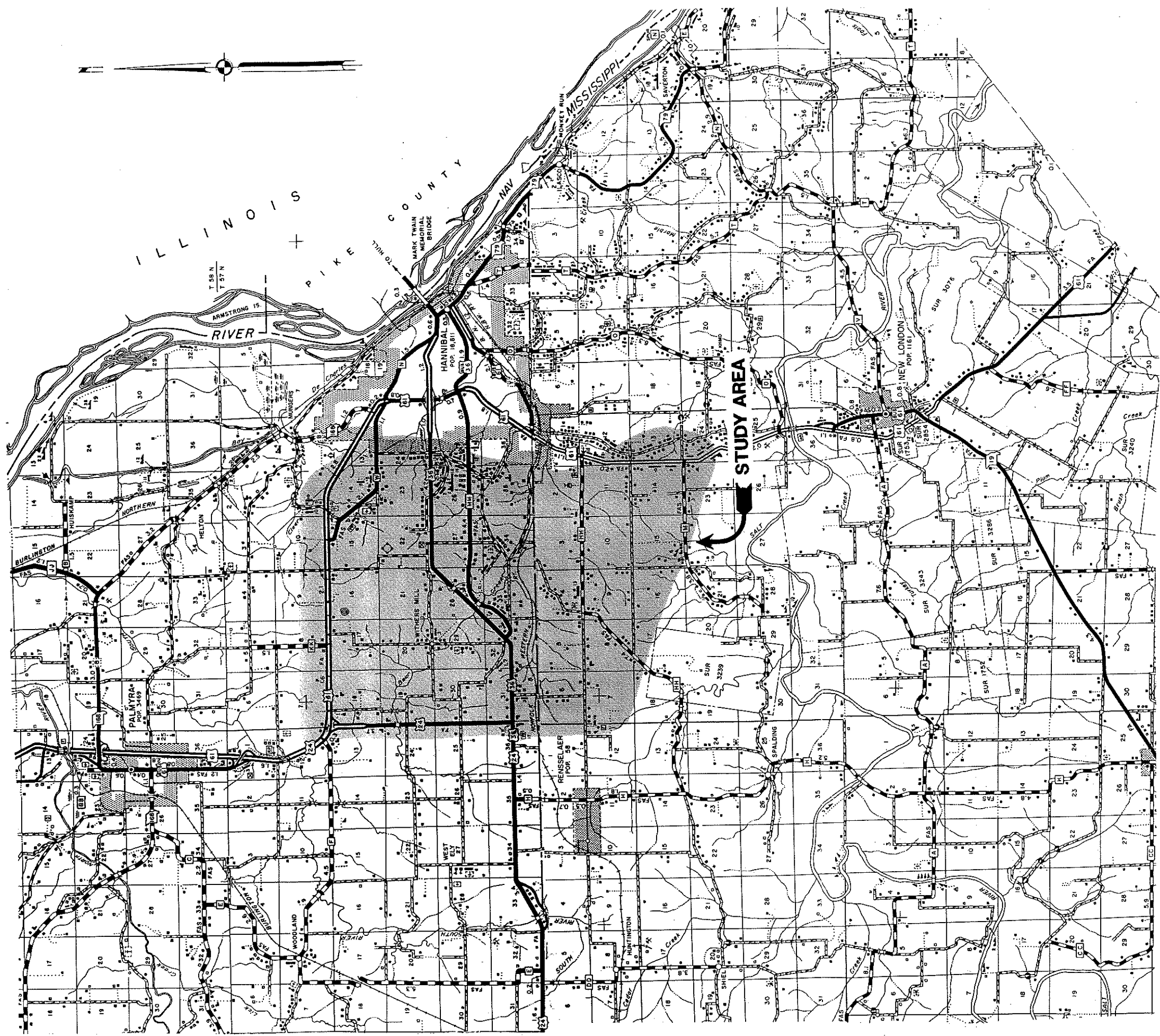
From: Kenneth Bechtel
To: PCasey
Date: 7/1/96 2:30pm
Subject: Draft ROD -- Rt. 61, Marion and Ralls Counties

Peggy,

As we discussed, the draft ROD looks good. After the review period is over (July 15), feel free to submit the Final ROD for approval. We can both use this note to document the project files (in lieu of a memo. back to you).

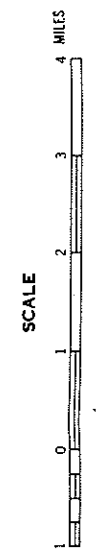
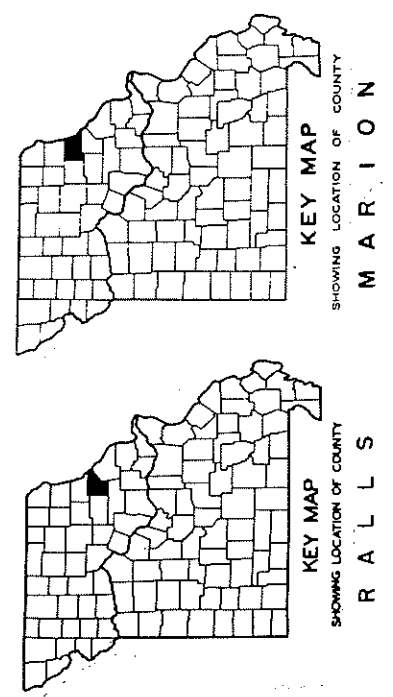
Thanks,

Ken B.

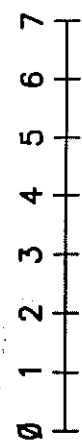


MISSOURI HIGHWAY AND TRANSPORTATION DEPARTMENT
DIVISION OF PLANNING

IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION



POLYCONIC PROJECTION



LEGEND

<p>Private Road</p> <p>Unimproved Road</p> <p>Gravel and Drained Road</p> <p>Soil Surface Road</p> <p>Gravel or Stone Road</p> <p>Blumington Road - Low Type</p> <p>Feeder Road</p> <p>Divided Road</p> <p>City Street</p> <p>Points between which Distances are Measured</p> <p>Interstate Numbered Highway</p> <p>U.S. Numbered Highway</p> <p>State Numbered Highway</p> <p>Designation of Road when Built</p> <p>Federal-aid Primary Highway System</p> <p>Federal-aid Secondary Highway System</p> <p>Railroad Right-of-Way - Separately Operated</p> <p>Railroad Station</p> <p>Railroad Grade Crossing</p> <p>Railroad Above</p> <p>Railroad Tunnel</p> <p>Commercial or Municipal Air Field</p> <p>Military Air Field</p> <p>Landing Area or Strip</p> <p>Open Area and Barge Lines</p> <p>Dock</p> <p>Feeder</p> <p>Feeder</p> <p>Feeder</p> <p>Dam with Lock</p> <p>Dam with Road</p> <p>Wide Stream</p> <p>Narrow Stream</p> <p>Intermittent Stream</p>	<p>Drainage Ditch</p> <p>Marsh or Swamp Land</p> <p>Reservoir, Pond or Lake</p> <p>Levee or Dike</p> <p>Levee or Dike with Road</p> <p>Prayed Ford or Low Water Bridge</p> <p>Bridge - General (span longer than 20 feet)</p> <p>Small Bridges Closely Spaced</p> <p>Drawbridge</p> <p>Suspension Bridge</p> <p>Arch Bridge</p> <p>Steel Truss Bridge</p> <p>City, Town and Village Limits</p> <p>Unimproved Urban Area Line</p> <p>State or Reservation Boundary</p> <p>County Line</p> <p>Civil Township Line</p> <p>Congressional Township Line</p> <p>Section Line</p> <p>Land Grant Survey Line</p> <p>Transmission Line</p> <p>Refuse, Garbage</p> <p>Auto Garbage</p> <p>Scrap Building Material</p> <p>Sanitary Fill</p> <p>Other</p> <p>Correctional Institution</p> <p>Radio or Television Station</p> <p>Scenic Site</p> <p>Small Park</p> <p>Roadside Park</p> <p>Picnic Grounds</p> <p>Playground Ball Field, etc.</p> <p>Bathing Beach or Pool</p> <p>Dune in Thicket</p>	<p>Tourist Court or Motel</p> <p>Camp or Lodge</p> <p>Sanctuary</p> <p>Game Farm or Preserve</p> <p>Country Club or Golf Course</p> <p>Fair Ground or Race Track</p> <p>Farm Unit</p> <p>Dwelling other than Farm</p> <p>Dwellings Closely Spaced</p> <p>Seasonal Dwellings</p> <p>Hotel or Inn</p> <p>Church</p> <p>Church with Cemetery Adjacent</p> <p>Store or Small Business</p> <p>Factory or Industrial Plant</p> <p>Sawmill - Stationary</p> <p>Mine or Quarry</p> <p>Hunery</p> <p>School House</p> <p>Post Office</p> <p>Post Office or Large School</p> <p>Town or Community Hall</p> <p>Mixed Cultural Features Closely Spaced</p> <p>County Home - Farm or Infirmary</p> <p>Pumping Station - Oil or Gas</p> <p>Combined Dwellings and Business</p> <p>Weight Station</p> <p>Forest Ranger Station</p> <p>Forest Lookout Tower</p> <p>SHD Maintenance Shed</p> <p>State Highway Patrol Station</p> <p>County Jail</p> <p>Cemetery</p> <p>Other Cities, Towns and Villages</p>
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REGIONAL PROJECT SETTING
Exhibit S-1



The improvement on Route 61 is part of the overall effort to improve the "Avenue of the Saints Route." The Avenue of the Saints Route is a Congressionally designated high priority route on the National Highway System (NHS) between St. Paul, Minnesota and St. Louis, Missouri.

I-72 from Illinois will terminate at U.S. Route 61 near Hannibal in the future. It may be north of this project area, but it could have an impact on future traffic.

S.3 ALTERNATIVES

The proposed action to construct a new highway is one of several courses of action that were evaluated for satisfying the existing and future transportation demands of the study area.

S.3.1 Alternatives Considered and Eliminated

S.3.1.1 Mass Transit Alternative

Based on the study area's future population and land use projections, use of mass transit substantial enough to affect vehicle use in the Route 61 corridor is unlikely. Furthermore, aside from a Trailways bus route and depot in Hannibal, there is no mass transit system currently in place anywhere in the area. Therefore, the mass transit alternative would not significantly reduce transportation demands on the congested route. As a result, mass transit is not considered a viable alternative.

S.3.1.2 Improvement of Existing Highway Alternative

The improvement of existing highway alternative would involve reconstructing existing Route 61 from a non-limited access roadway to a fully limited access freeway. The Missouri Highway and Transportation Commission has designated that Route 61 will be designed as freeway from north of Hannibal south to Interstate 70 near St. Louis. The alternative of improving the existing route by reconstructing it as a limited-access highway would result in a large amount of disruption and impacts on adjacent properties, particularly through the commercial and industrial areas and adjacent to the schools. The improvement of the

existing highway alternative was rejected primarily because of the great disruption to and impact on the developed area adjacent to the existing route.

A non-limited-access highway would have similar but lesser impacts. However, non-limited-access highways have higher accident rates, increased vehicle operating costs, and increased travel times. All these factors translate into much higher road user costs for non-limited-access highways.

S.3.1.3 Alternatives on New Locations

Based on a literature search and preliminary field reconnaissance, a constraints map was developed for the study area. Using this map, 17 preliminary build alternatives were identified. The preliminary alternatives were evaluated and all but four (plus two links) were eliminated based on comparisons of probable impacts and/or costs. The preliminary evaluation of alternatives is discussed in detail in Section 2.2.

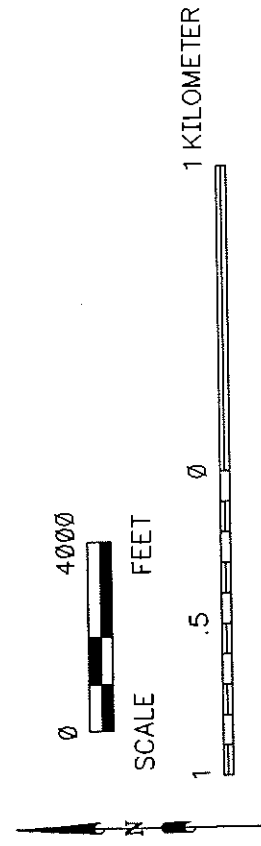
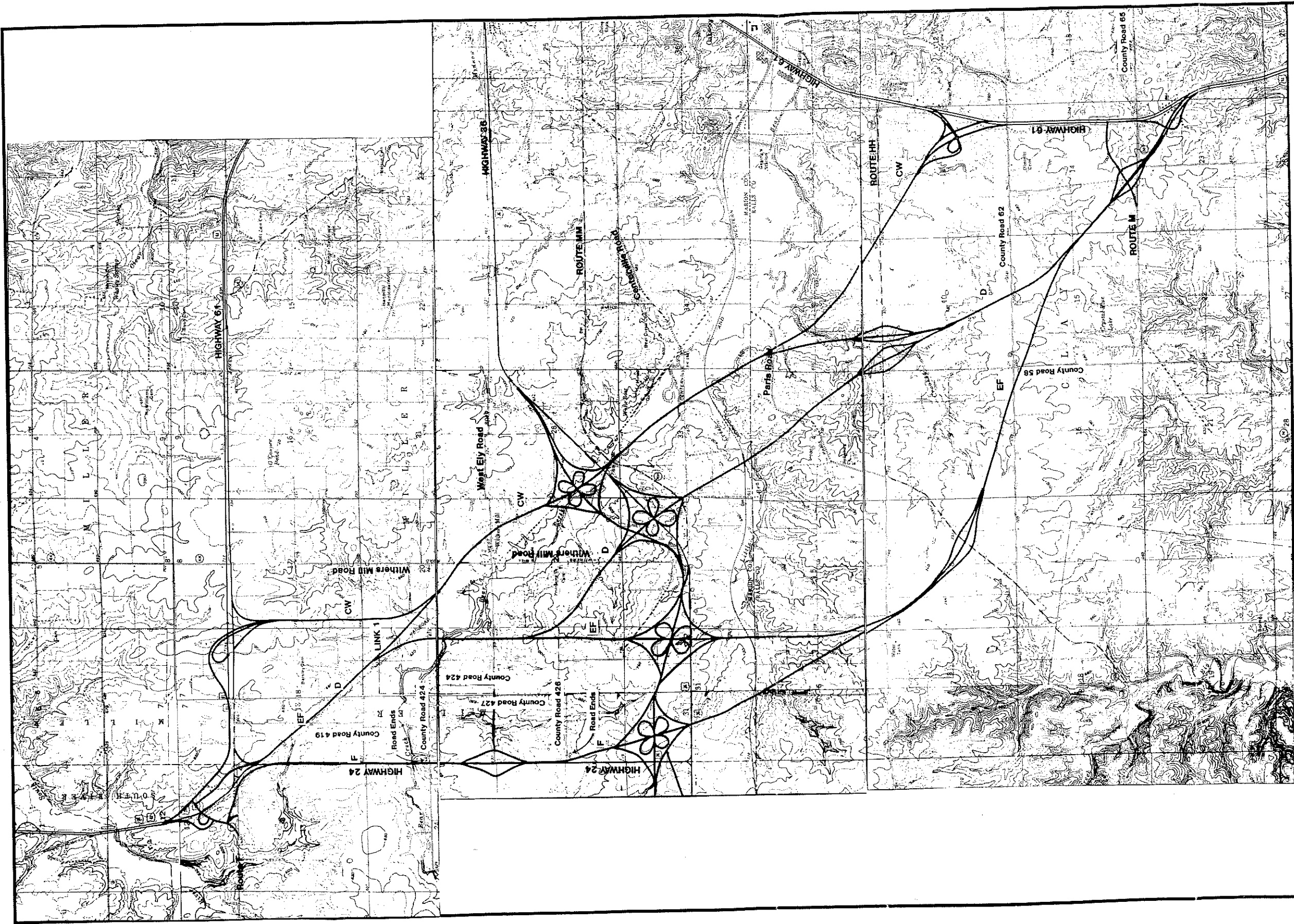
S.3.2 Alternatives for Detailed Study

The four build alternatives and two links selected for detailed study are shown in Exhibit S-3. The No-Action Alternative was also studied in detail.

S.3.2.1 No-Action Alternative

The No-Action Alternative assumes that the relocated Route 61 would not be constructed nor would the existing Route 61 be improved beyond what is currently scheduled.

Evaluations conducted by the Missouri Highway and Transportation Department project that the existing Route 61 through Hannibal will be inadequate to accommodate anticipated traffic volumes for the 2020 design year. Because Route 61 will be four-lane from Minneapolis to St. Louis, heavy truck traffic will be increased through Hannibal. If the relocated Route 61 is not constructed, regional transportation goals for an efficient, safe, easily accessible transportation system cannot be attained because of increased traffic congestion. Increased congestion would increase travel times, vehicle operating costs, and accident rates. Failure



ALTERNATIVES FOR DETAILED STUDY Exhibit S-3

REFERENCE: Drawing taken from U.S.G.S. Quadrangles -
Rensselaer, MO dated 1958, Quincy SW, MO-IL dated 1971,
Palmyra, MO dated 1975 and Hannibal West, MO dated 1971.

to attain regional transportation goals would also inhibit the attainment of economic goals related to industrial and commercial growth. The No-Action Alternative would reduce the design year Level of Service at five of the six major intersections along the existing route to an unacceptable Level F.

The No-Action Alternative would avoid the negative impacts associated with construction of a new highway such as loss of farmland and displacements. However, the No-Action Alternative would not provide a complete, safe, fast, and efficient regional and local transportation system.

S.3.2.2 Build Alternatives

As shown in Exhibit S-3, Alternative CW has different termini than the other three alternatives. Alternative CW begins about 1.8 km (1.1 miles) east of the existing Route 61/24 interchange and terminates about 2.7 km (1.7 miles) north of the existing Route 61/M intersection. Alternatives D, EF, and F all begin at the existing Route 61/24 interchange and terminate just south of the existing Route 61/M intersection. All the alternatives are in areas that are primarily agricultural, with little other development. The alternatives, from east to west (CW to F), move in general from valley to ridge locations. A large portion of Alternative CW is close to Bear Creek, and crosses both Little Bear Creek and Crooked Creek close to their confluences with Bear Creek. Alternative F, on the other hand, is located primarily on drainage divides. Alternative D would result in the shortest overall travel distance for through traffic on Route 61 and Alternative EF would result in the longest overall travel distance.

Relocation of Route 36 at Interchanges

Alternatives CW, D and F each involve the relocation of a section of U.S. Route 36 at the interchange with Route 36. The interchange locations for each of these alternatives were shifted north of the existing Route 36 location to reduce impacts. Relocating Route 36 at Alternative CW avoids the removal of a neighborhood of nine residences and the relocation of Route MM at that neighborhood. Relocating the Alternative D/Route 36 interchange avoids seven residential relocations, potential impacts on wetlands and waters of U.S. due to the necessity to fill a stream channel, and extensive cut and fill due to the unfavorable

location of the interchange at existing Route 36. Relocating the Alternative F/Route 36 interchange avoids three residential relocations and the taking of a truck stop.

Access Control Options

The Missouri Highway and Transportation Commission has designated Route 61 to be upgraded to freeway standards from north of Hannibal south to Interstate 70, and to be considered for upgrade to freeway standards from the Iowa border to north of Hannibal. This project is part of the route that has been programmed for upgrade to freeway.

S.4 ENVIRONMENTAL IMPACTS

The proposed project was developed in response to the need to accommodate existing and projected traffic volumes for the study area. Consequently, the two major beneficial impacts of the action would be: (1) to relieve traffic congestion on the existing Route 61 and (2) to promote fast, safe, and efficient travel within and through the study area.

In addition, because of improved accessibility, the completion of the proposed highway and subsequent change in traffic patterns may encourage economic growth and development in the area. This is an area that has experienced negative growth in the recent past, and is currently growing at a very modest rate.

The impacts of the alternatives vary mainly according to their topographic locations. Alternative CW, which is located more in the stream valleys, primarily impacts features associated with stream valleys such as wetlands and floodplains. Alternative F, which is located primarily on the flat ridge tops of the drainage divides, has greater impact on features associated with the ridge tops, such as prime farmland. For issues related to the natural environment, the impacts of Alternatives D and EF are similar to each other and generally range between those of Alternative CW and Alternative F.

A summary of impacts and estimated costs for each alternative is presented in Table S-1. The build alternatives selected for detailed study and relevant environmental features are shown in Exhibit S-4.

Table S-1
Summary of Major Impacts

Alternative	Estimate of Wetlands & Waters of the U.S. Impacted		Length of Floodplain Crossings, meters (feet)	Prime Farmland Impacted, hectare (acre)	Wooded Area Impacted, hectare (acre)	Relocations	Estimated Cost, millions \$
	Wetland Area in hectares (acres)	Number of Crossings of Water of the U.S.					
Alternative CW	6.6 (16.5)	8 crossings	2,584 (8,480)	91 (226)	37 (92)	4	65.8
Alternative D	1.6 (4.0)	4 crossings	816 (2,680)	92 (227)	21 (53)	16	69.4
Alternative EF	1.0 (2.5)	3 crossings	701 (2,300)	160 (395)	18 (45)	4	75.9
Alternative F	0.6 (1.5)	4 crossing	366 (1,200)	191 (473)	12 (29)	2	65.3

NOTE: Assumes 90-meter (300-foot) wide right-of-way.

S.4.1 Wetlands and Waters of the U.S.

The hectares (acres) of wetland impacts shown in Table S-1 are based on field delineations of the route corridors using the 1987 Corps of Engineers Wetlands Delineation Manual. These data replace the preliminary estimates contained in the Draft EIS, which were based on the worst-case scenario that all National Wetland Inventory (NWI) wetlands, including all farm ponds, are jurisdictional.

S.4.2 Length of Floodplain Crossings

Dimensions are based on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), which show the 100-year floodplain. Floodplain development permits will be required from both Marion and Ralls Counties.

S.4.3 Prime Farmland

Prime farmland is defined by the Natural Resource Conservation Service (formerly Soil Conservation Service).

S.4.4 Wooded Areas

Most of the wooded areas in the project area are considered to be at least marginally suitable as potential summer habitat for the federally endangered Indiana bat. Mitigation consists of harvesting trees that are potentially suitable for seasonal habitat only during the period from October 1 through April 1.

S.4.5 Relocations

The relocations shown are all residential. Because of the rural setting and low population density, social impacts are small for all alternatives.

S.4.6 Other Impacts

Both short-term and long-term water quality impacts resulting from the proposed action are expected to be minimal. Possible construction impacts include increases in sedimentation and turbidity levels of surface water resources. These impacts will be minimized through erosion control measures. MHTD's erosion control program, which has been approved by the Missouri Department of Natural Resources, will be implemented. Long-term impacts from highway construction and maintenance activities include alteration of aquatic habitat and runoff of pollutants. However, based on projected traffic counts and percentages of paved area, impacts from runoff of pollutants are expected to be negligible. Because of its proximity to streams and number of stream crossings, Alternative CW is expected to have the greatest impact on water quality, and Alternative F, the least impact.

Two archaeological sites recorded by the Archaeological Survey of Missouri would be impacted by two of the alternatives: one by Alternative CW, and one by Alternative D. No known archaeological resources will be affected by the preferred alternative. A Phase I archaeological survey has been conducted on the preferred alternative. Two light density prehistoric lithic scatters and one mixed component (prehistoric debitage-historic debris) site were discovered. All three sites have been adversely impacted by agricultural terrace construction and/or prior road construction. The principal investigator has determined the potential for undisturbed buried cultural remains is minimal at the three sites and recommends that project activities be permitted to commence. The Missouri Department of Natural Resources (MDNR) has issued a notice of concurrence that none of the three sites are eligible for inclusion in the National Register of Historic Places (NRHP). The MDNR letter of concurrence is included in Appendix E. The Phase I Report is located in Appendix C.

Eleven structures within the alternative alignments have been evaluated for potential historic significance. The consultant has recommended the eleven structures not be considered eligible for listing in the National Register of Historic Places. MDNR has reviewed the submitted Architectural/Historic Inventory Survey forms and has issued a Cultural Resources Assessment, with the determination that none of the structures are eligible for inclusion in the NRHP. The determination is included in Appendix E.

No known Section 4(f) property will be taken or substantially impacted and no Section 6(f) property will be affected. No structures or other sites on or eligible for listing in the National Register of Historic Places will be impacted.

Coordination efforts were conducted with the U.S. Army Corps of Engineers (COE) to identify and classify stream crossings that may require a Section 404 permit. Maps of the study area were provided to the COE and a field survey of potential Section 404 stream crossings was conducted.

Copies of any Nationwide Permit Predischarge Notifications submitted to the Corps, if necessary, will also be sent to the Missouri Department of Natural Resources, requesting water quality certification in compliance with Section 401 of the Clean Water Act. Also, water quality certification in compliance with Section 401 of the Clean Water Act may be required at some or all of the nationwide permit crossings.

S.5 PREFERRED ALTERNATIVE

The Missouri Highway and Transportation Department has identified Alternative F as the preferred alternative. Of the build alternatives evaluated in detail, Alternative F is the environmentally preferred alternative and the lowest in cost.

The preferred alternative satisfies the project purpose and need as well as any other alternative evaluated. It will relieve traffic congestion on the existing Route 61, and promote fast, safe, and efficient travel within and through the study area.

Of the alternatives evaluated in detail, Alternative F has the least impact on wetlands, floodplains, and wooded land that may provide seasonal habitat for the endangered Indiana bat. It results in the fewest residential relocations and the fewest number of severed farms. Alternative F results in the largest loss of prime farmland of the alternatives evaluated.

It will result in the loss of approximately 0.6 hectare (1.5 acres) of wetlands, 191 hectares (473 acres) of prime farmland, and 12 wooded hectares (29 acres). There will be four crossings of waters of the U.S., with a length of floodplain crossing of approximately 366 meters (1,200 feet); 2 residential relocations, and 11 severed farms.

The preferred alternative is lowest in cost of the build alternative evaluated in detail. In addition, Alternative F saves the cost of a \$3.5 million interchange at Routes 36 and 24, planned as part of the upgrade of Route 36 in the project area. Alternative F eliminates the need for the interchange by incorporating Route 24 into the Route 36/61 interchange.

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Appendix E	Agency Correspondence

List of Reports Available Upon Request

Comparative Assessment of Potential Wetland Impacts for Alternative Highway Corridors, George Butler Associates, February 28, 1995.

Telephone Survey Results, Route 61/36, Woodward-Clyde Consultants, June, 1994.

"Open House" Public Meeting Results, Routes 61/36, Woodward-Clyde Consultants, June, 1994.

Group Meeting Results, Routes 61/36, Woodward-Clyde Consultants, June, 1994.

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PURPOSE OF AND NEED FOR ACTION

1.1 PROPOSED ACTION

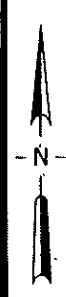
The proposed action is the relocation of U.S. Route 61 west of the City of Hannibal, Missouri. The relocation will extend from the vicinity of the existing Routes 61/24 interchange in Marion County north of Hannibal, continuing in a southeasterly direction to the vicinity of the existing Routes 61/M intersection in Ralls County, south of Hannibal. The proposed action involves construction of a new, four-lane, fully limited access, divided highway. The study area for the project is shown in Exhibit 1-1. U.S. Route 61 is a high priority National Highway System route.

The improvement on Route 61 is part of the overall effort to improve the "Avenue of the Saints Route." The Avenue of the Saints Route is a Congressionally designated high priority route on the National Highway System (NHS) between St. Paul, Minnesota and St. Louis, Missouri.

I-72 from Illinois will terminate at U.S. Route 61 near Hannibal in the future. It may be north of this project area, but it could have an impact on future traffic.

1.2 EXISTING CONDITIONS AND PROJECTED TRAFFIC**1.2.1 Existing Geometrics**

Except for the section through the City of Hannibal between Route N on the north and Route MM on the south, existing Route 61 through the study area is a four lane, median divided highway with 3.6 meter (12 foot) through lanes, a 3-meter (10-foot) outside shoulder and 2.4 meter (8 foot) inside shoulder. The 9 to 18 meter (30 to 60 foot) median is broken at major driveways and at intersections of county and state roadways to allow cross street traffic access to the highway. Some of the more significant median breaks have left turn lanes and/or right turn lanes on Route 61 to remove the turning traffic from the through traffic lanes. Within the study area, all but one of these median breaks is yield controlled for



0 1 KILOMETER

1-2

turning movements and stop sign controlled for the side street movements. The intersection of Paris Gravel Road (Business 61) and Route 61 is currently controlled by a fully actuated eight-phase traffic signal.

As Route 61 approaches the commercial area from the north, the roadway turns into a five-lane roadway. The existing median ends at a secondary access drive into the Huck Finn Shopping Center complex and a two-way left turn lane begins. This lane continues southward through the major intersections of Route 61 with Stardust, Brookside, the U.S. 36 interchange, and Pleasant/Ely. The dual use left turn lane becomes a dedicated left turn lane at the signalized intersections. Within the U.S. 36 interchange area, the eastbound and westbound ramps are only separated by about 90 meters (300 feet). Due to this very short distance, the northbound and southbound left turning vehicles must both utilize the same lane for turns onto U.S. 36. South of Pleasant/Ely, the roadway narrows to a four-lane pavement with no median due to a large bluff on the westside of Route 61 and creek on the east side. Route 61 widens again to a five-lane section at the intersection of Route 61 with Missouri Route MM to accommodate northbound and southbound left turn lanes. This five lane section continues south of Route MM for about 150 meters (500 feet) until it ends and the median section of the roadway again begins. Exhibit 1-2 details the existing lane arrangements at the major intersections along Route 61 between Stardust and Paris Gravel Road/Business 61.

Much of the roadway section within the commercial area is curb and guttered on the outside and lanes are 3.6 meters (12 feet) wide. The portion of the roadway that has only four lane cross-section has a 3-meter (10-foot) outside shoulders on each side. Guard rail is in place through this area on the east side for protection from the steep grade downward into the creek area. The large rock bluff on the west side begins vertically upward about 3 to 5 meters (10 to 15 feet) west of the outside shoulder and is not protected by any guard rail.

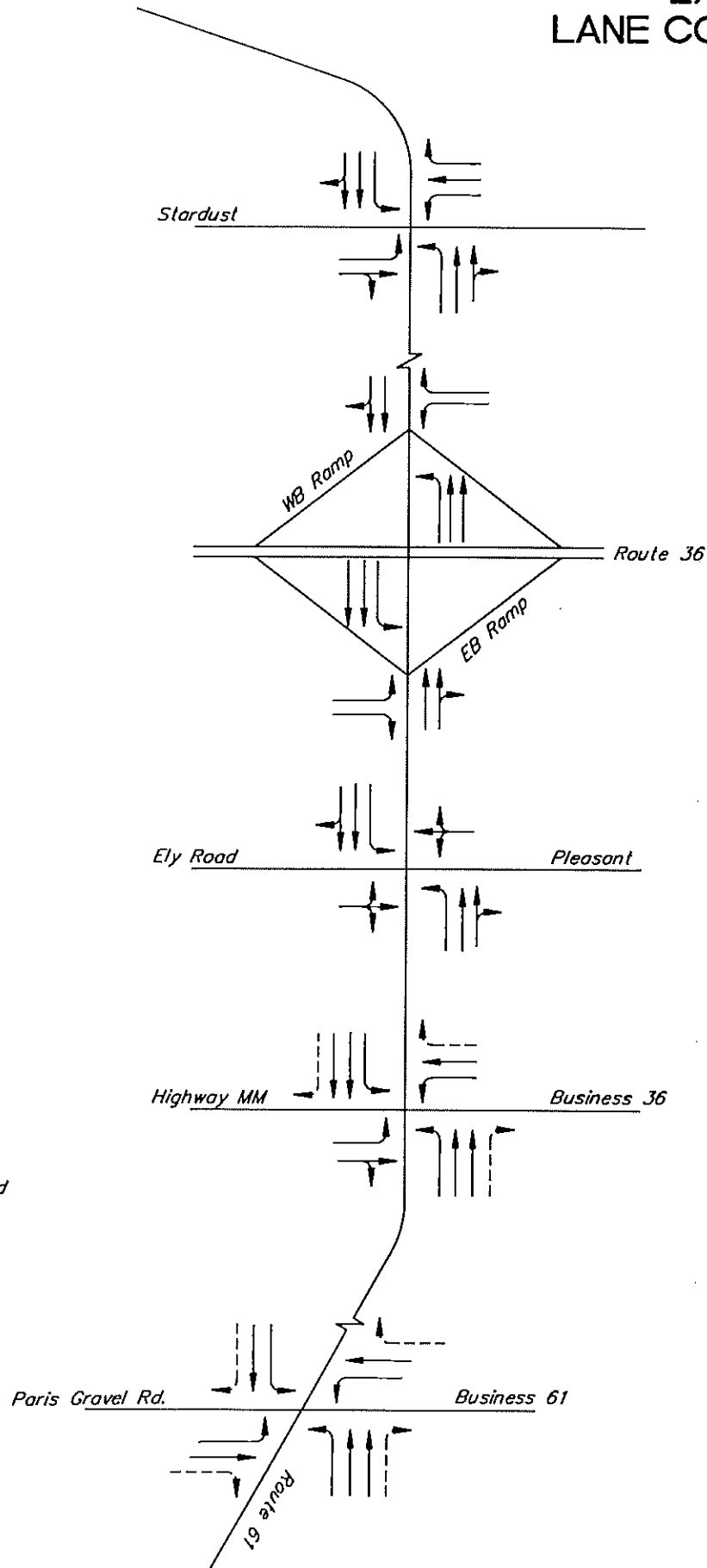
1.2.2 Existing Traffic Volumes

Traffic counts, including turning movements, were obtained at the major intersections along Route 61. The intersections in consideration were Paris Gravel Road (Bus. 61), Highway MM (Bus. 36), Pleasant/Ely, Eastbound U.S. 36 Ramps, Westbound U.S. 36 Ramps, Brookside, Stardust, Mo. Routes N/W, and Mo. Route 168. From the turning movement


EXISTING LANE CONFIGURATION



N.T.S.



LEGEND

 = Yield controlled
Right Turn

counts taken, morning and evening peak hour traffic volumes were determined. Exhibit 1-3 shows the A.M. and P.M. peak hour traffic at each of the signalized intersections along Route 61. As shown on this figure, the P.M. peak hour traffic volumes are significantly greater than those recorded in the A.M. peak period. Based on this information, it was determined that the P.M. peak hour volumes would be used in the analyses as the controlling condition. The existing traffic counts revealed that currently truck traffic is approximately 7 percent of the P.M. peak hour total traffic volume along Route 61. Average Daily Traffic volumes (ADT) for existing conditions along Route 61 are shown on Exhibit 1-4.

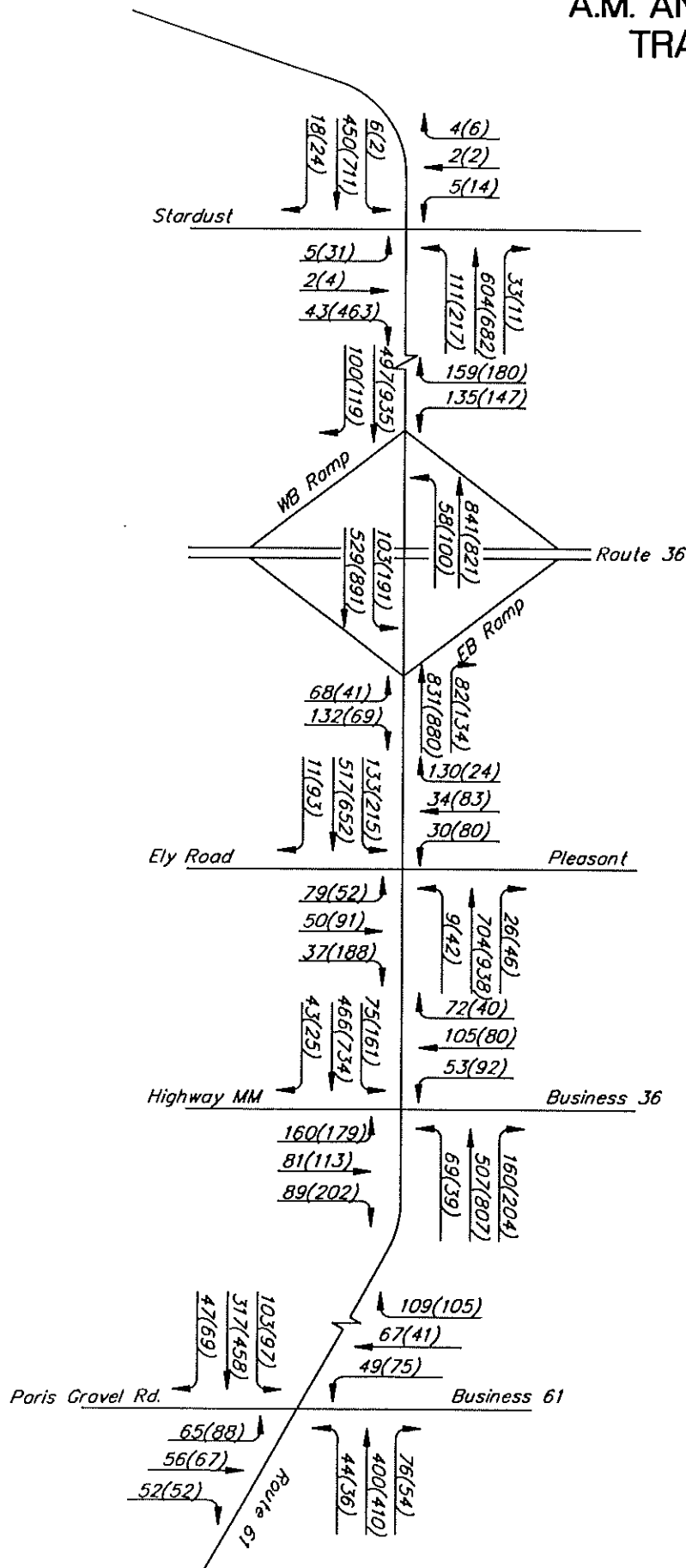
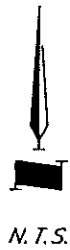
1.2.3 Projected Traffic Volumes

Future traffic volumes were determined based on two different design scenarios, Scenario One being the no-build alternative. The second scenario evaluates effects on traffic volumes with the construction of a relocation west of Hannibal.

Projected P.M. peak hour traffic volumes for future traffic (year 2020) with the no-build alternative were determined based on a 3.5 percent growth factor over the design period for the through movements only on Route 61, and a 2.5 percent growth factor for all remaining movements. Growth factors were determined based on historical information on the growth of traffic on Route 61 and on expected growth of traffic on the proposed relocation supplied by MHTD. Future P.M. peak hour turning movement volumes at signalized intersections on Route 61 and anticipated ADT's for this no-build option can be seen on Exhibits 1-5 and 1-6, respectively. It should be noted that the future traffic volumes developed for the no-build alternative were also analyzed to determine the effects of the potential Traffic Systems Management (TSM) alternatives, such as added lanes or modified traffic controls.

For Scenario Two, it was anticipated that a large portion of the expected Route 61 traffic through Hannibal would be re-routed along the relocation and that the traffic volumes on existing Route 61 would be reduced. The projected P.M. peak hour traffic volumes for existing Route 61 and the relocation were obtained by determining the amount of traffic that will be expected to utilize the relocation and reducing the through traffic on Route 61 by this amount. MHTD provided projected ADT information for the proposed relocation. These projections stated that the peak hour traffic volume is 10 percent of the ADT and that this volume is split directional 55 percent and 45 percent. Based on this information, the future

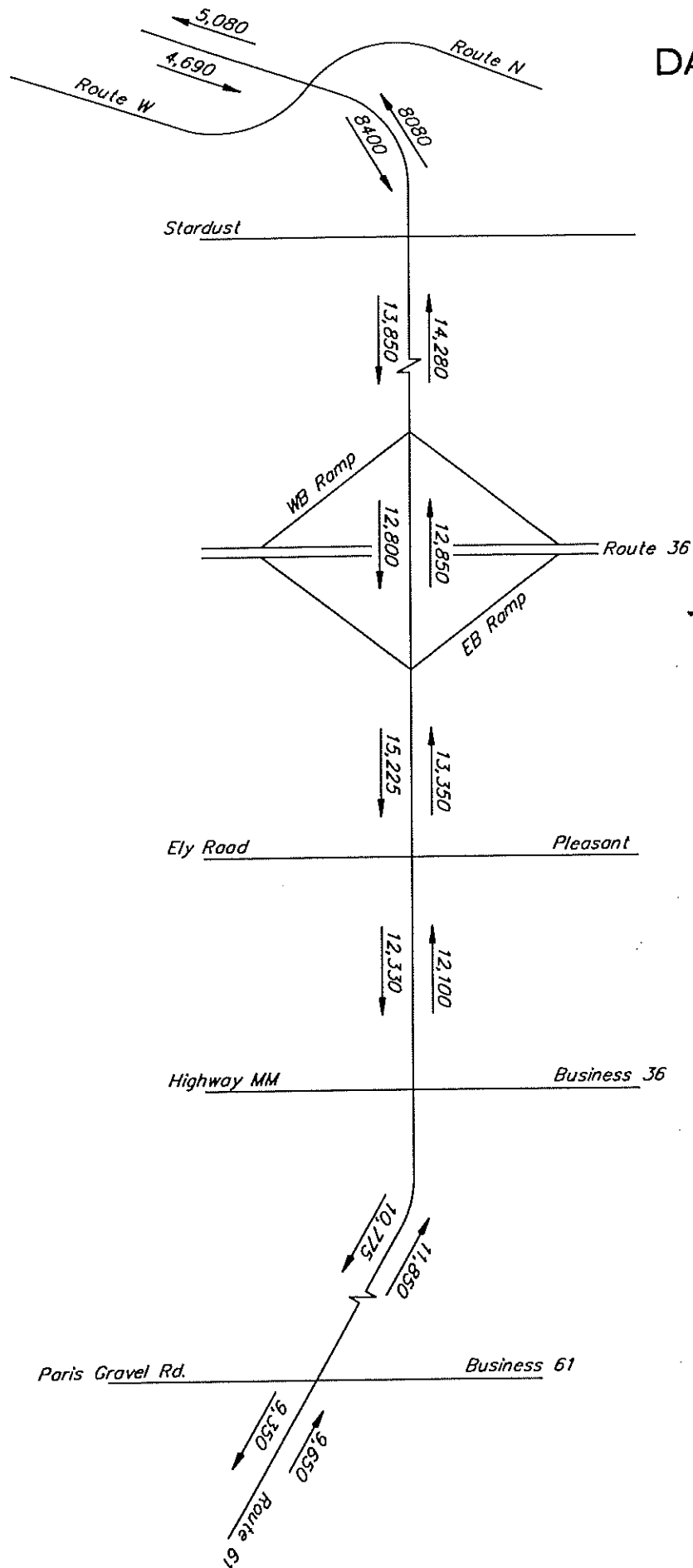
EXISTING A.M. AND P.M. PEAK HOUR TRAFFIC VOLUMES



LEGEND

PM PEAK
AM PEAK

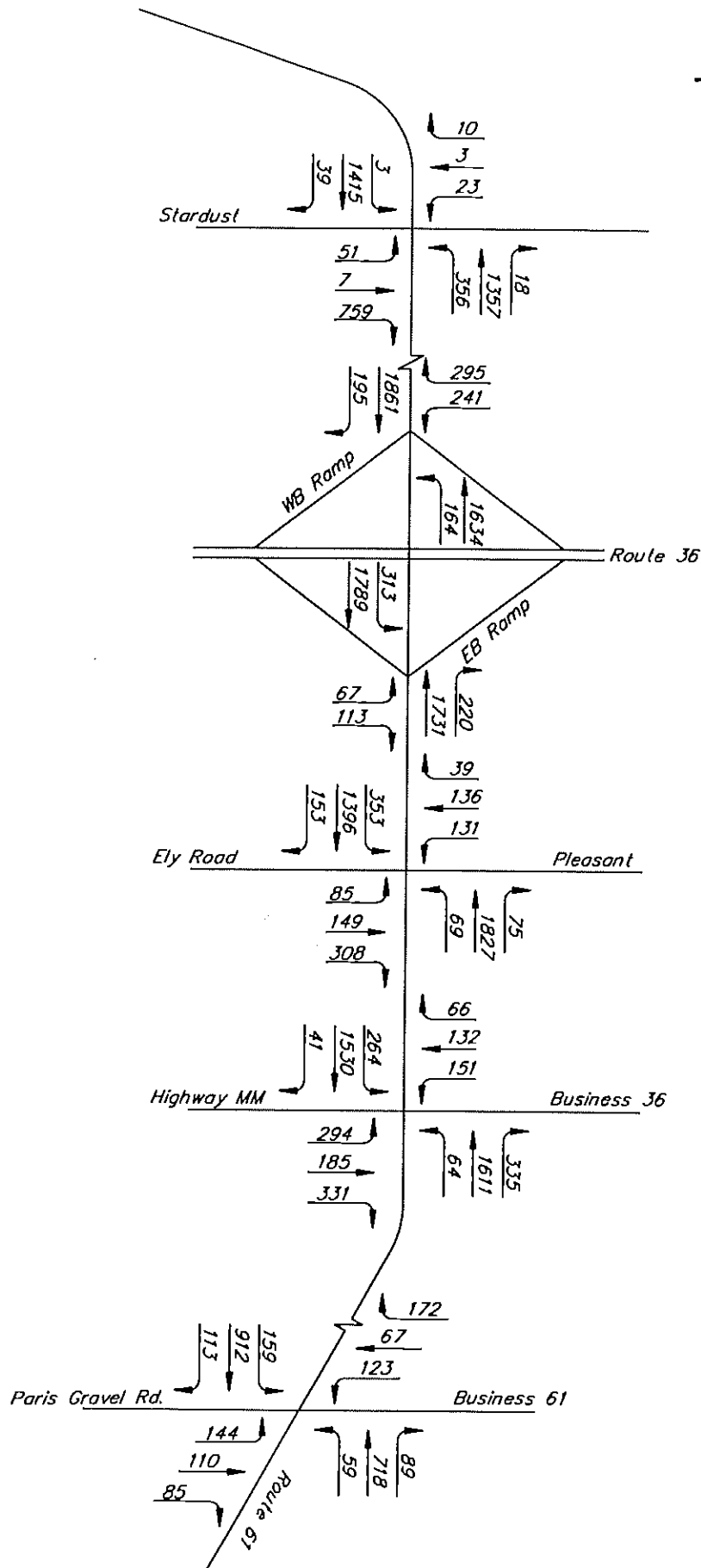
EXISTING DAILY TRAFFIC VOLUMES



YEAR 2020 P. M. PEAK HOUR TRAFFIC VOLUMES (NO-BUILD)



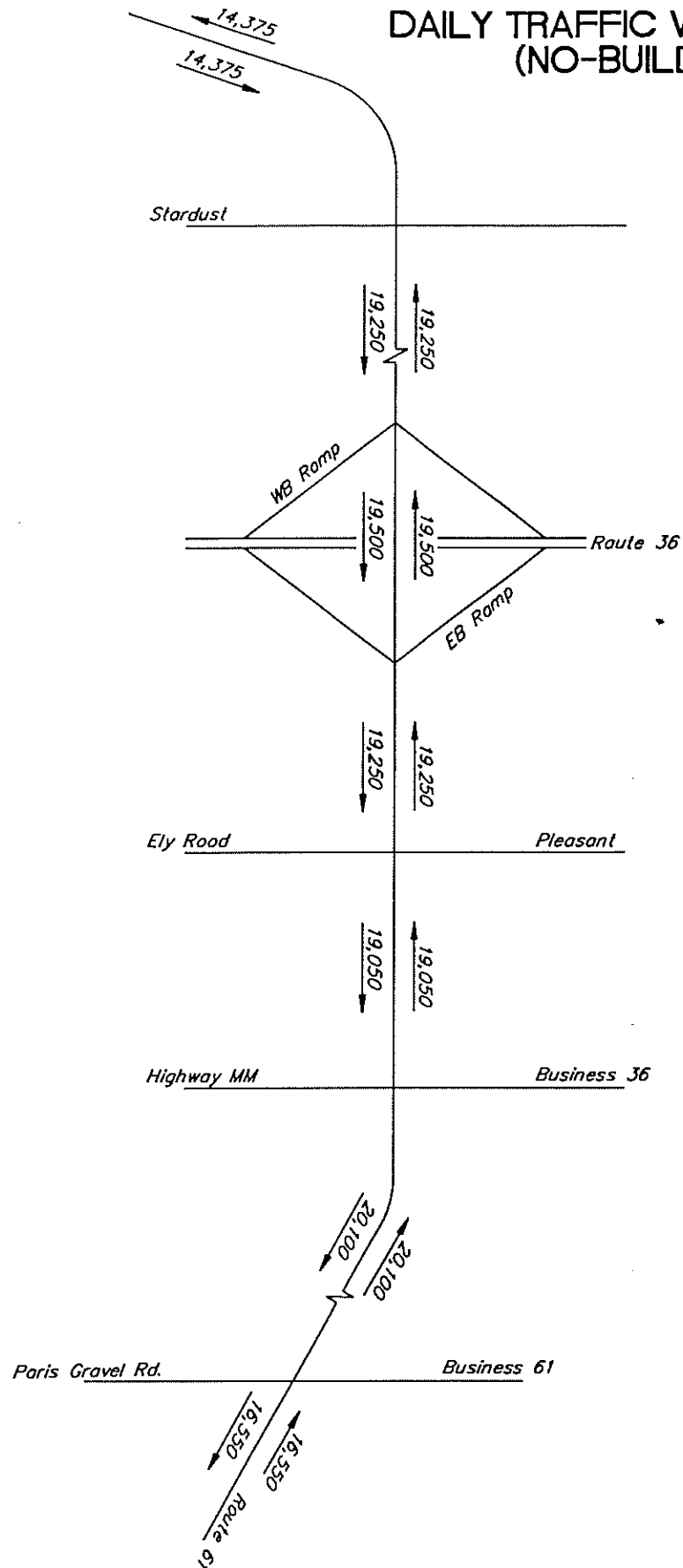
N.T.S.



YEAR 2020 DAILY TRAFFIC VOLUMES (NO-BUILD)



N.T.S.



traffic volumes on existing Route 61 were calculated. Projected P.M. peak hour traffic volumes and ADTs for the relocation option are shown on Exhibits 1-7 through 1-9. The information supplied by MHTD also states that it is expected that truck traffic along Route 61 will be 19 percent of the total average daily traffic volume by the year 2020.

1.3 RELATION TO CURRENT DESIGN STANDARDS

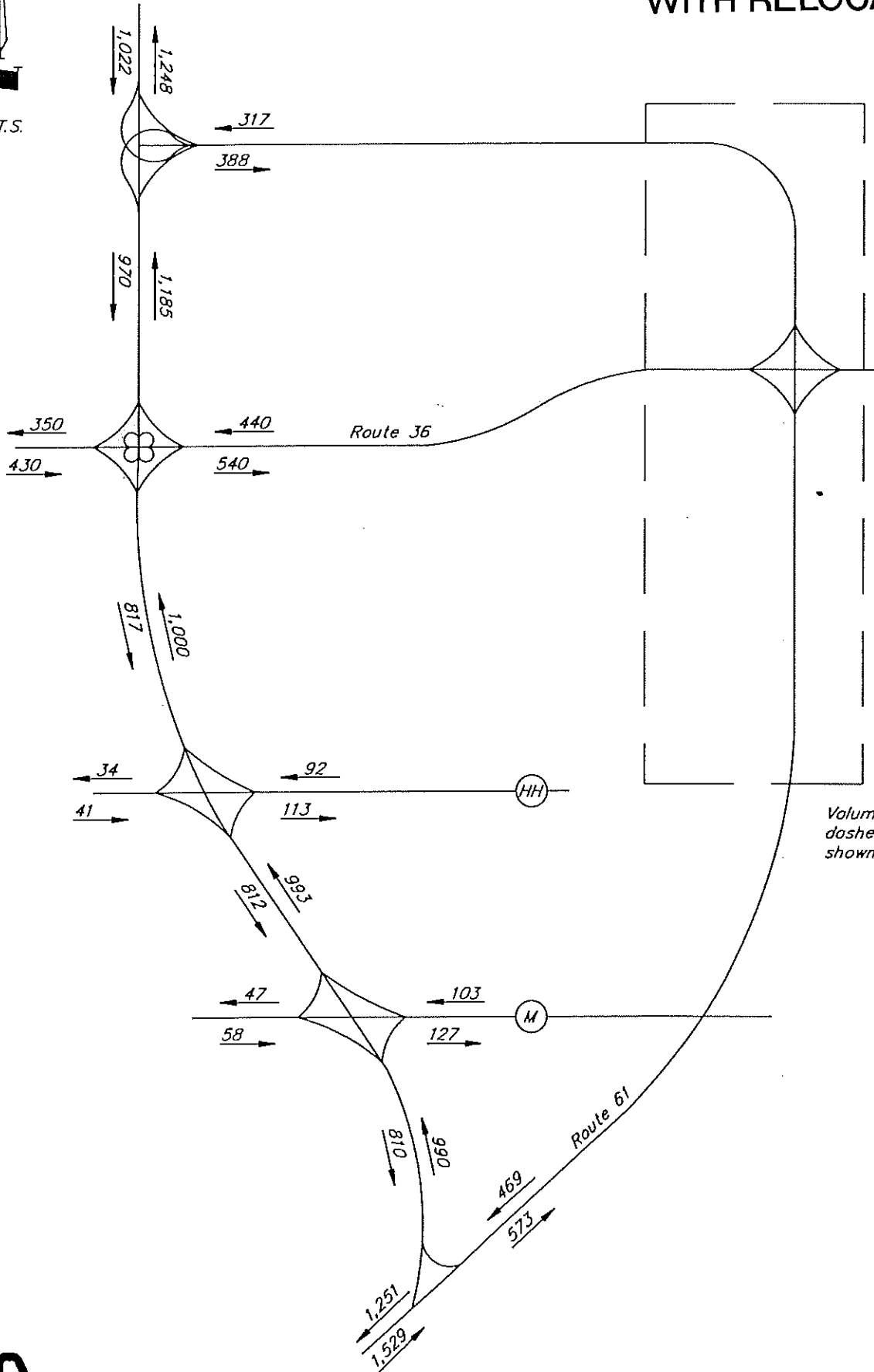
Based on current MHTD design standards, the segment of Route 61 between Routes N/W and Paris Gravel Road/Business 61 should presently include a median that is at least 7.5 to 9 meters (25 to 30 feet) wide, or which provides a raised barrier with a minimum width of 4.2 meters (14 feet). Presently, such a median only exists south of the Route MM intersection where the median is about 18 meters (60 feet) in width.

The intersection of Route 61 with Routes N/W currently does not provide separate left turn lanes. During the A.M. and P.M. peaks, about 100 to 130 vehicles turn left from the southbound through traffic lanes of Route 61 to Route N. With this magnitude of turning vehicles, separate turn lanes should be provided for the turning vehicles to use for slowing and storage to avoid violating driver expectancy for the through traffic on U.S. 61.

1.4 FACILITY OPERATIONS

Existing Route 61 through the commercial area currently operates with traffic signal control at a total of five intersections. As noted above, a sixth signal located at the intersection of U.S. 61 with Paris Gravel Road/Business 61, south of the commercial area, also is controlled by a traffic signal. This signal is located about 2.9 km (1.8 miles) south of the signal at Highway MM and has minimal impact on the traffic flow conditions through the commercial area. The signals at Highway MM, Pleasant/Ely, Eastbound U.S. 36 Ramps, and Westbound U.S. 36 Ramps are operating as actuated, pre-timed signals with lead/lag left-turn phasing. These signals are currently time base coordinated with a 70 second cycle length from 7:00 A.M. to 10:00 P.M. The intersection of Stardust with Route 61 is controlled by a five-phase, actuated traffic signal operating with protected/permissive left-turn phasing for Route 61 traffic. Like Paris Gravel Road, this signal is not part of the coordinated network. The quality of traffic flow, or Level of Service (LOS), is rated from Level A to Level F, based on average vehicle delays. Level A (i.e., delay ≤ 5 seconds/vehicle) represents the

YEAR 2020 P.M. PEAK HOUR VOLUMES WITH RELOCATION



Volumes within
dashed area are
shown on **Exhibit 1-8**

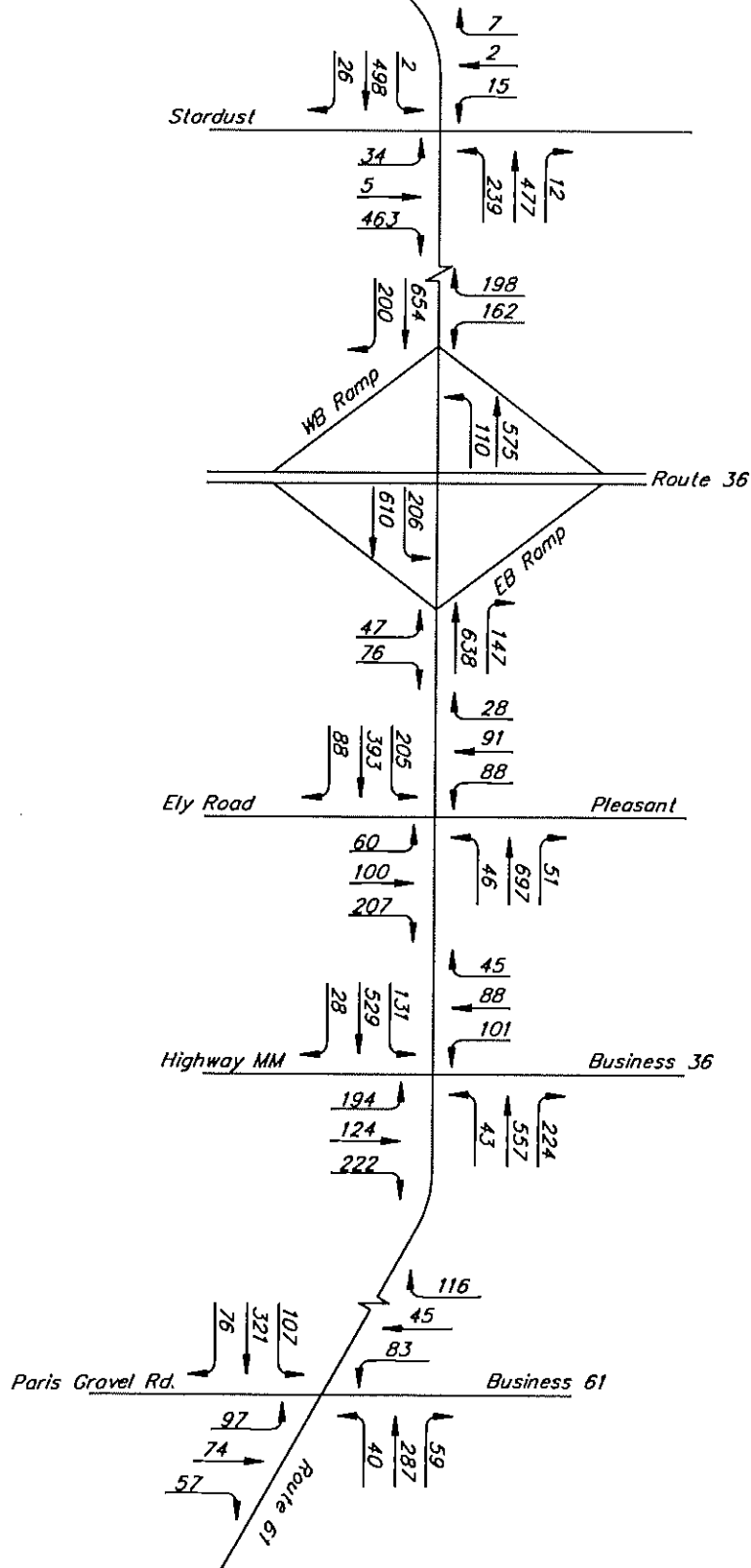


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YEAR 2020 P.M. PEAK HOUR VOLUMES WITH RELOCATION



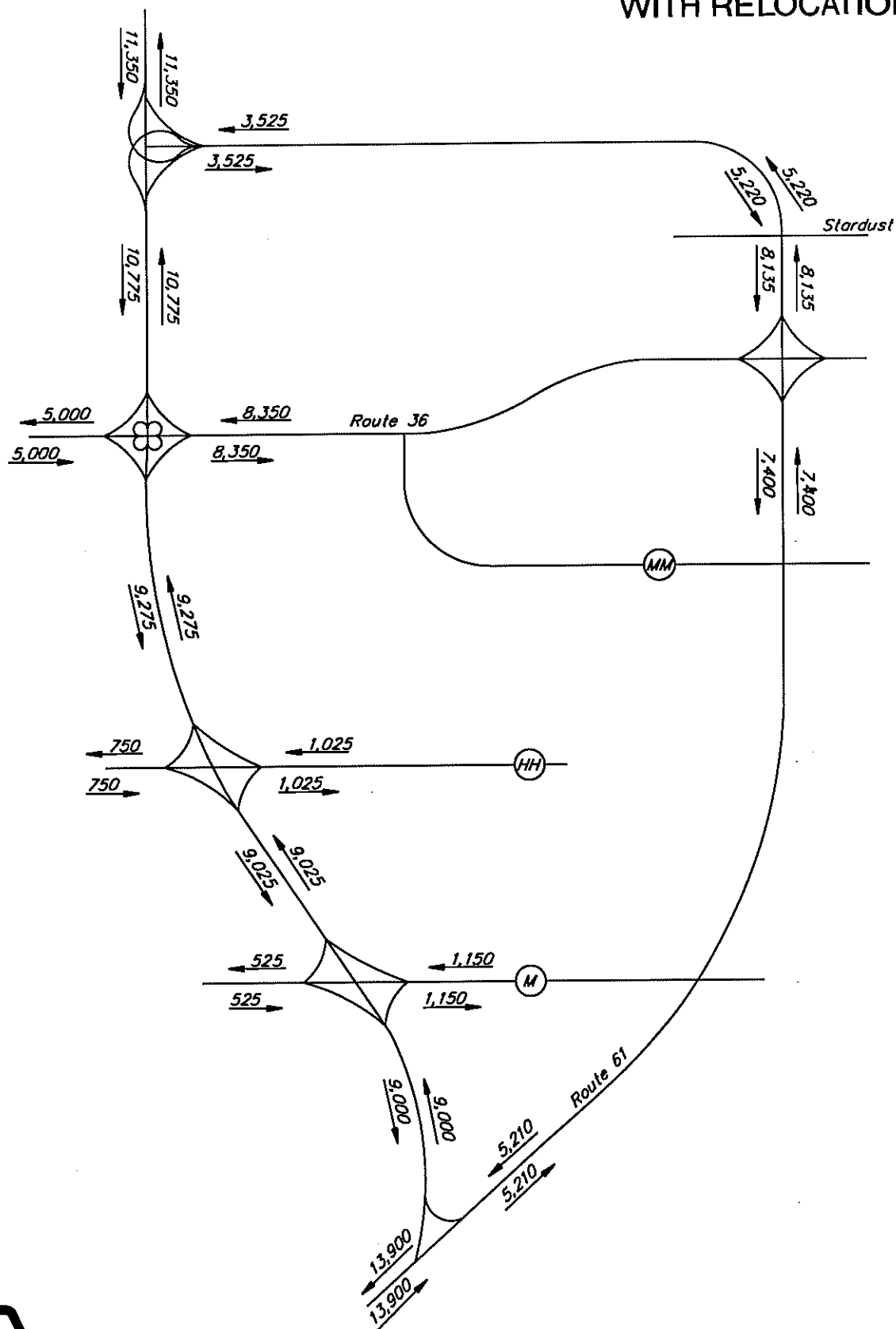
N.T.S.



YEAR 2020 DAILY TRAFFIC VOLUMES WITH RELOCATION



N.T.S.



best condition, when little or no vehicle delay occurs. Level F (i.e., delay >60 seconds/vehicle) represents the worst conditions when traffic demands exceed capacity and resulting vehicle queuing interferes with the operation of other traffic movements at or adjacent to the intersection. Acceptable design Levels of Service are generally either Level C (e.g., with maximum average delays of 25 seconds/vehicle) or Level D (e.g., with maximum average delays of 40 seconds/vehicle).

Intersection capacity analyses were performed at each of the signalized intersections along Route 61 under existing conditions. Analysis indicates that each of the intersections presently operate adequately at an acceptable overall Level-of Service C, or better, with minimal delay. Travel-time and delay studies completed as part of the field investigation of this corridor indicated no areas of major delay or congestion, with the exception of the interchange intersections of Route 61 with U.S. Highway 36, and at the intersection of Route 61 with Pleasant/Ely. These intersections operate very well throughout most of the day with significant delay and congestion only occurring during the peak P.M. period. This congestion is not primarily caused by the traffic volumes or type of traffic signal control, but by the limited separation of these three major intersections. The intersection of Pleasant/Ely is located only about 130 meters (430 feet) south of the Eastbound U.S. 36 Ramp intersection. Similarly, the two ramp intersections are only separated by about 90 meters (300 feet). Northbound and southbound left turning vehicles conflict for use of the single lane available for their use and at times must stop in the through traffic lanes to turn. With this geometric configuration, there is very little room for left turning vehicle storage and at times the areas between these intersections become congested, causing delays.

Intersection capacity analyses were then completed at the signalized intersections with projected future traffic volumes under the no-build alternative with existing geometrics and traffic control. Analysis of the expected traffic flow conditions under this design option indicate that major intersections along the corridor would operate inadequately, with unacceptable Levels of Service F, and significant delays.

Analyses of the relocation option allowed much of the Route 61 traffic to be re-routed and an overall decrease in projected traffic volumes through the commercial district on Route 61. Intersection capacity analysis for this option was also completed. Again, the existing geometrics and traffic signal controls were maintained as they currently exist. Under this

design scenario, each of the signalized intersection would be expected to operate at an acceptable overall Level of Service D or better with minimal delay.

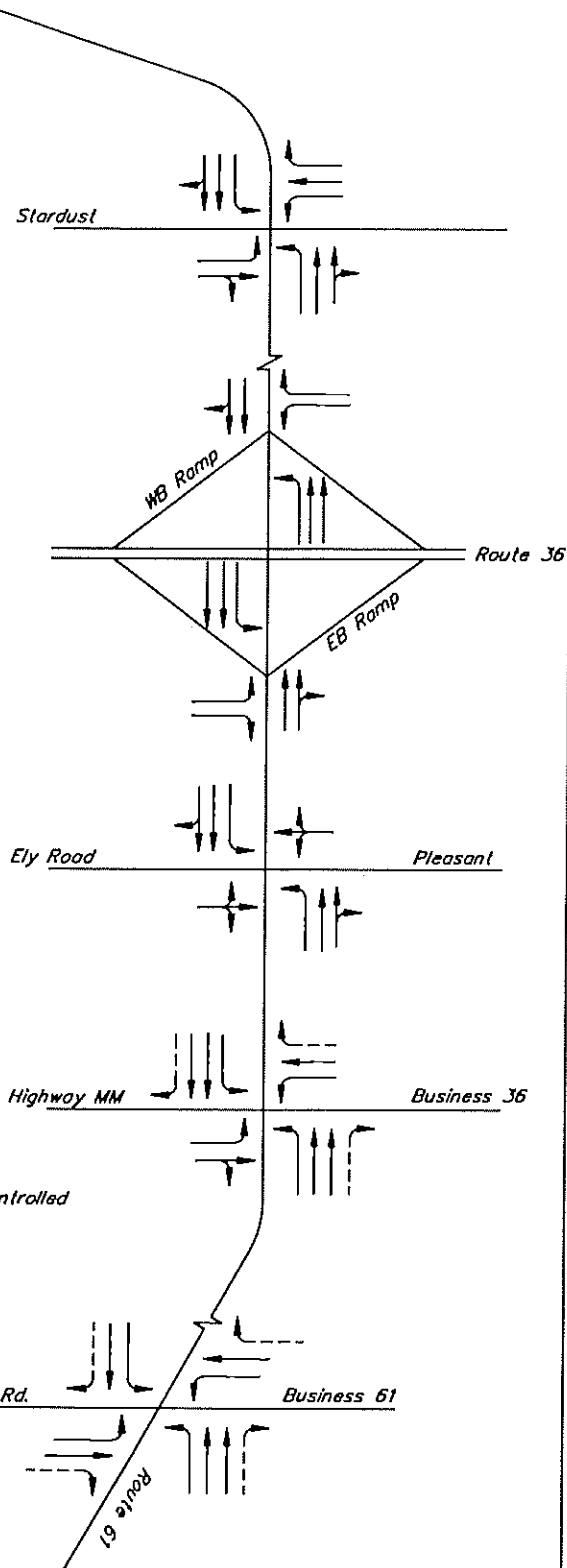
A final design scenario was then reviewed. This scenario involved possible Traffic Systems Management (TSM) improvements. TSM improvements include traffic signal control modifications, signal timing modifications, addition of traffic lanes where possible and other geometric or traffic control improvements that could be made along the existing corridor where practical and possible. The projected traffic volumes for the no-build option (i.e. and the TSM alternative) show that there will be a need for geometric improvements. Current through lanes on the northbound and southbound approaches at the signalized intersections between Highway MM and Route 168 will not provide necessary capacity for the increased traffic volumes. To increase the capacity of these through traffic lanes, an additional through lane on both northbound and southbound approaches was added. Each signalized intersection was reviewed to determine if other, additional geometric improvements would also be required. Additional modifications required to provide necessary capacity include the addition of an eastbound right-turn lane at Stardust, eastbound and westbound left-turn lanes on Pleasant/Ely, and the addition of a westbound through lane and eastbound right-turn lane at Highway MM. A schematic diagram showing existing lane configurations and suggested lane configurations for traffic system management can be seen on Exhibit 1-10.

Along with geometric improvements along Route 61, traffic control modifications must be made to allow adequate operation of the corridor. For traffic system management purposes, it is suggested that a new signal be placed at the intersection of Route 61 with Highway N/W due to the existing high number of accidents and projected high traffic volumes. To eliminate further delay and left-turn accidents throughout the corridor, it is suggested that all permissive left-turn phasing be eliminated and replaced with fully-actuated eight phase with protected only left-turn phasing. TSM analyses indicated a need for signal coordination from the existing signal at Highway MM to the suggested signal at Highway N/W. Currently, the signals from Highway MM to the signal at the Westbound Ramp are coordinated with a 70 second cycle length. For projected P.M. peak hour traffic volumes, and suggested geometric changes, signal coordination software TRANSYT-7F results indicate that a cycle length of 150 seconds be applied. An overall cycle length of this length will require very long left turn storage lengths at many of the signalized intersection.

EXISTING LANE CONFIGURATION



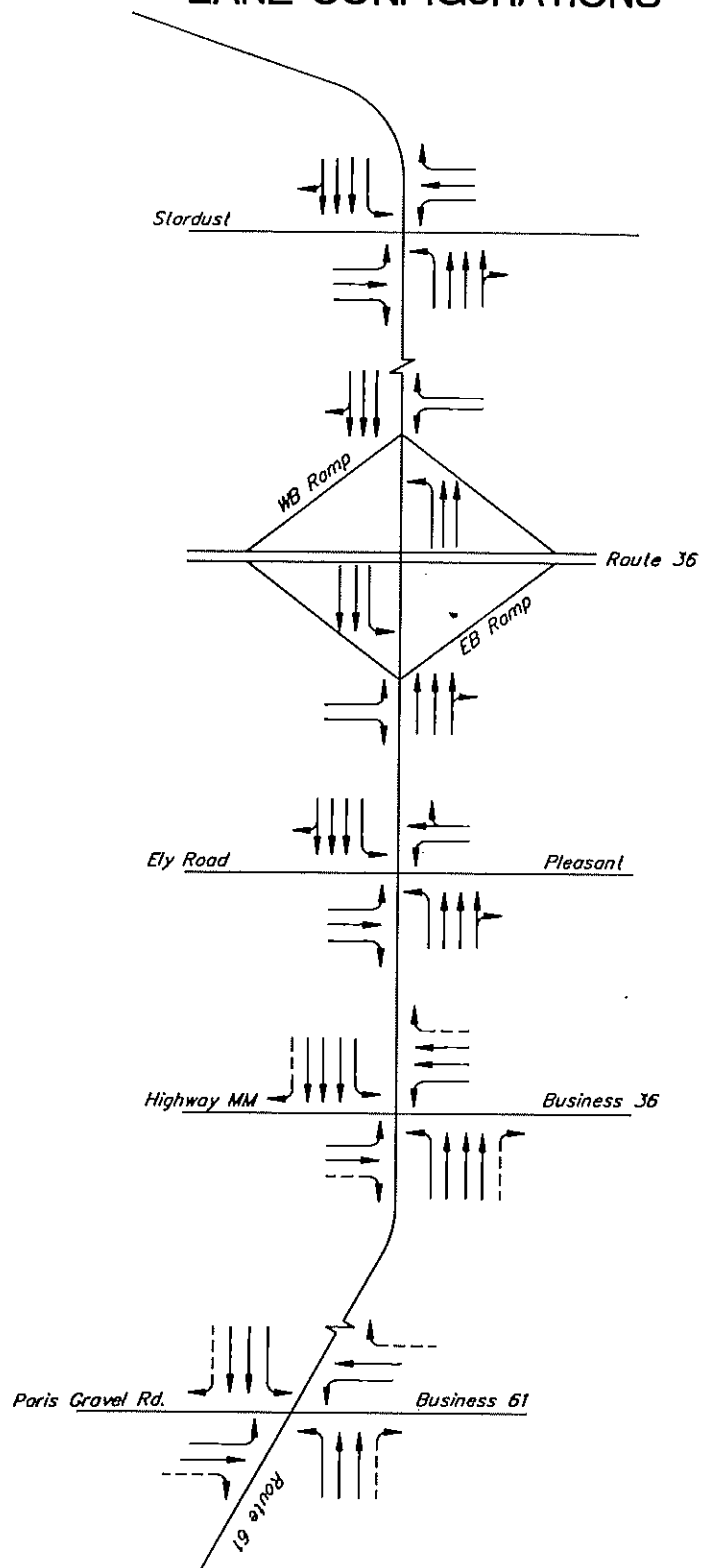
N.T.S.



LEGEND

— = Yield controlled
Right Turn

FUTURE/TSM LANE CONFIGURATIONS



GBA

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Exhibit 1-10

Intersection capacity analyses indicate that with these suggested geometric changes and traffic control modification, the corridor would operate at improved Levels of Service (LOS) when compared to the no-build option. However, most movements at the Pleasant/Ely intersection, and many critical movements at other intersections would be expected to operate at a LOS E or F even with the most optimistic TSM improvements under projected traffic volume demands. The feasibility of many of these geometric improvements is questionable. For example, natural obstructions on either side of Route 61 between Highway MM and Pleasant/Ely would make widening through this area very difficult and very expensive. In addition, the lack of distance between the signalized intersections at Pleasant/Ely, Eastbound U.S. 36 Ramps, and Westbound U.S. 36 Ramps would still provide inadequate northbound and southbound left-turn bay storage lengths. Finally, the land uses and interchange configuration at U.S. 36 would make TSM improvement expensive.

A comparison of the overall Levels of Service at each of the signalized intersections for each of the design options is shown on Table 1-7. Results of the intersection capacity analyses for each signalized intersection are detailed on Tables 1-1 through 1-6. As can be seen on Table 1-7, under the no-build option with projected future traffic volumes, the signalized intersections in the commercial area will all operated very poorly. The TSM alternative would result in improved traffic flow conditions for the projected future traffic volumes on Route 61, but the feasibility of constructing many of the required geometric improvements for this option is questionable. Construction of the proposed relocation will result in the best future traffic flow conditions within the commercial area of Route 61.

1.5 SAFETY

Due to the large amount of traffic, both existing and projected, safety for traffic and pedestrians along the corridor becomes a major concern. Accident data along Route 61 was obtained and reviewed to determine accident rates and high accident locations. Results indicate that for the existing facility, there were 671 accidents along a 21.3 km (13.3 mile) stretch of roadway on Route 61 from Missouri Highway H to U.S. 24 between the years 1989 and 1993. This corresponds to an accident rate of 209.4 accidents per hundred million (10^8) vehicle-miles. State of Missouri accident rates of Missouri Highways are 289.30 accidents/ 10^8 vehicle-miles and accident rates on U.S. Highways are 197.56 accidents/ 10^8

TABLE 1-1

Signalized Intersection Capacity Analysis
P.M. Peak Hour

Route 61 and Stardust

Approach	Existing			Future (no build)			Future with TSM			Future with Relocation		
	Volume	Lanes	Delay	LOS	Volume	Lanes	Delay	LOS	Volume	Lanes	Delay	LOS
Northbound												
Left Turn	217	1	10.70	B	356	1	999.99	F	356	1	58.77	E
Thru	682	2	17.09	C	1357	2	310.24	F	1357	3	12.25	E
Right Turn	11	(1)	-	-	18	(1)	-	-	18	(1)	-	-
Southbound												
Left Turn	2	1	7.46	B	3	1	7.46	B	3	1	41.96	E
Thru	711	2	18.01	C	1415	2	410.23	F	1415	3	46.10	E
Right Turn	24	(1)	-	-	39	(1)	-	-	39	(1)	-	-
Eastbound												
Left Turn	31	1	10.25	B	51	1	10.41	B	51	1	23.76	C
Thru	4	1	25.91	D	7	1	370.47	F	7	1	19.53	C
Right Turn	463	(1)	-	-	759	(1)	-	-	759	1	45.01	E
Westbound												
Left Turn	14	1	10.33	B	23	1	11.43	B	23	1	29.43	D
Thru	2	1	10.05	B	3	1	10.05	B	3	1	19.48	C
Right Turn	6	1	10.08	B	10	1	10.11	B	10	1	19.59	C
OVERALL INTERSECTION:			18.46	C			602.39	F			34.63	D
											16.62	C

(1) Movement shares lane with other movement.

NOTES:

1. Volumes are based on vehicles per hour (vph)
2. Delay is measured in seconds per vehicle

TABLE 1-2
Signalized Intersection Capacity Analysis
P.M. Peak Hour

Route 61 and Route 36 Westbound Ramp

Approach	Existing			Future (no build)			Future with TSM			Future with Relocation		
	Volume	Lanes	Delay	LOS	Volume	Lanes	Delay	LOS	Volume	Lanes	Delay	LOS
Northbound Left Turn Thru	100	1	3.20	A	164	1	4.34	A	164	1	41.65	E
	821	2	4.39	A	1634	2	8.97	B	1634	2	11.74	B
Southbound Thru Right Turn	935	2	15.39	C	1861	2	537.47	F	1861	3	51.90	E
	119	(1)	-	-	195	(1)	-	-	195	(1)	-	-
Westbound Left Turn Right Turn	147	1	20.57	C	241	1	38.24	D	241	1	33.86	D
	180	1	23.23	C	295	1	89.82	F	295	1	35.90	D
OVERALL INTERSECTION:			11.83	B			264.95	F			34.87	D

(1) Movement shares lane with other movement.

NOTES:

1. Volumes are based on vehicles per hour (vph)
2. Delay is measured in seconds per vehicle

TABLE 1-3

Signalized Intersection Capacity Analysis
P.M. Peak Hour

Route 61 and Route 36 Eastbound Ramp

Approach	Existing			Future (no build)			Future with TSM			Future with Relocation		
	Volume	Lanes	Delay	LOS	Volume	Lanes	Delay	LOS	Volume	Lanes	Delay	LOS
Northbound												
Thru	880	2	14.62	B	1731	2	425.44	F	1731	3	22.42	C
Right Turn	134	(1)	-	-	220	(1)	-	-	220	(1)	-	-
Southbound												
Left Turn	191	1	2.83	A	1789	1	10.58	B	1789	1	57.17	E
Thru	891	2	3.17	A	313	2	7.42	B	313	2	6.24	B
Eastbound												
Left Turn	41	1	20.23	C	67	1	20.93	C	67	1	35.72	D
Right Turn	69	1	21.03	C	113	1	24.17	C	113	1	33.68	D
OVERALL INTERSECTION:			9.28	B			201.97	F			18.58	C
											8.12	B

(1) Movement shares lane with other movement.

NOTES:

1. Volumes are based on vehicles per hour (vph)
2. Delay is measured in seconds per vehicle

TABLE 1-4
Signalized Intersection Capacity Analysis
P.M. Peak Hour

Route 61 and Pleasant/Ely

Approach	Existing			Future (no build)			Future with TSM			Future with Relocation		
	Volume	Lanes	Delay	LOS	Volume	Lanes	Delay	LOS	Volume	Lanes	Delay	LOS
Northbound												
Left Turn	42	1	10.53	B	69	1	10.53	B	69	1	53.36	E
Thru	938	2	21.91	C	1827	2	792.71	F	1827	3	76.11	F
Right Turn	46	(1)	-	-	75	(1)	-	-	75	(1)	-	-
Southbound												
Left Turn	215	1	12.78	B	353	1	102.99	F	353	1	371.5	F
Thru	652	2	12.14	B	1396	2	147.38	F	1396	3	16.04	C
Right Turn	93	(1)	-	-	153	(1)	-	-	153	(1)	-	-
Eastbound												
Left Turn	52	(1)	-	-	85	(1)	-	-	85	1	54.70	E
Thru	91	1	49.27	E	149	1	902.45	F	149	1	51.53	E
Right Turn	188	(1)	-	-	308	(1)	-	-	308	1	38.91	D
Westbound												
Left Turn	80	(1)	-	-	131	(1)	-	-	131	1	37.12	D
Thru	83	1	41.31	E	136	1	999.99	F	136	1	30.22	D
Right Turn	24	(1)	-	-	39	(1)	-	-	39	(1)	-	-
OVERALL INTERSECTION:			22.92	C			777.83	F			70.23	F
											35.04	D

(1) Movement shares lane with other movement.

NOTES:

1. Volumes are based on vehicles per hour (vph)
2. Delay is measured in seconds per vehicle

TABLE 1-5

Signalized Intersection Capacity Analysis
P.M. Peak Hour

Route 61 and Highway MM

Approach	Existing			Future (no build)			Future with TSM			Future with Relocation		
	Volume	Lanes	Delay	LOS	Volume	Lanes	Delay	LOS	Volume	Lanes	Delay	LOS
Northbound												
Left Turn	39	1	12.02	B	64	1	12.02	B	64	1	58.74	E
Thru	807	2	20.04	C	1611	2	640.19	F	1611	3	56.79	E
Right Turn	204	1	14.71	B	335	1	21.02	C	335	*	-	-
Southbound												
Left Turn	161	1	10.86	B	264	1	17.29	C	264	1	49.65	E
Thru	734	2	13.31	B	1530	2	189.25	F	1530	3	15.70	C
Right Turn	25	1	9.76	B	41	1	9.89	B	41	1	5.75	B
Eastbound												
Left Turn	179	1	17.78	C	294	1	90.78	F	294	1	46.10	E
Thru	113	1	25.06	D	185	1	229.25	F	185	1	30.05	D
Right Turn	202	(1)	-	-	331	(1)	-	-	331	*	-	-
Westbound												
Left Turn	92	1	18.12	C	151	1	720.32	F	151	1	51.20	E
Thru	80	1	14.88	B	132	1	15.50	C	132	2	55.68	E
Right Turn	40	1	14.55	B	66	1	14.86	B	66	1	20.21	C
OVERALL INTERSECTION:			17.42	C			344.61	F			38.63	D

(1) Movement shares lane with other movement.

* Yield Controlled Right Turn

NOTES:

1. Volumes are based on vehicles per hour (vph)

TABLE 1-6
Signalized Intersection Capacity Analysis
P.M. Peak Hour

Route 61 and Paris Gravel Road

Approach	Existing			Future (no build)			Future with TSM			Future with Relocation		
	Volume	Lanes	Delay	LOS	Volume	Lanes	Delay	LOS	Volume	Lanes	Delay	LOS
Northbound												
Left Turn	36	1	22.24	C	59	1	20.53	C	59	1	20.53	C
Thru	410	2	13.64	B	718	2	16.01	C	718	2	16.01	C
Right Turn	54	*	-	-	89	*	-	-	89	*	-	-
Southbound												
Left Turn	97	1	16.41	C	159	1	30.38	D	159	1	30.38	D
Thru	458	2	8.78	B	912	2	28.83	D	912	2	28.83	D
Right Turn	69	*	-	-	113	*	-	-	113	*	-	-
Eastbound												
Left Turn	88	1	26.38	D	144	1	21.89	C	144	1	21.89	C
Thru	67	1	21.34	C	110	1	34.47	D	110	1	34.47	D
Right Turn	52	*	-	-	85	*	-	-	85	*	-	-
Westbound												
Left Turn	75	1	24.47	C	123	1	20.80	C	123	1	20.80	C
Thru	41	1	19.70	C	67	1	21.34	C	67	1	21.34	C
Right Turn	105	*	-	-	172	*	-	-	172	*	-	-
OVERALL INTERSECTION:			14.35	B			23.87	C			23.87	C

(1) Movement shares lane with other movement.

* Free-Flowing Right Turn

NOTES:

1. Volumes are based on vehicles per hour (vph)
2. Delay is measured in seconds per vehicle

TABLE 1-7
Summary of
Signalized Intersection Capacity Analysis
P.M. Peak Hour

<u>Location</u>	<u>Existing</u>		<u>Future (no build)</u>		<u>Future with TSM</u>		<u>Future with Relocation</u>	
	<u>Delay</u>	<u>LOS</u>	<u>Delay</u>	<u>LOS</u>	<u>Delay</u>	<u>LOS</u>	<u>Delay</u>	<u>LOS</u>
Stardust	18.46	C	602.4	F	34.63	D	16.62	C
Route 36 Westbound Ramp	11.83	B	265	F	22.28	C	11.45	B
Route 36 Eastbound Ramp	9.28	B	202	F	18.58	C	8.12	B
Pleasant/Ely	22.92	C	777.8	F	70.23	F	35.04	D
Highway MM	17.42	C	344.6	F	38.63	D	17.30	C
Paris/Gravel	14.35	B	23.87	C	23.87	C	19.64	C

NOTE:

1. Delay is measured in seconds per vehicle

vehicle-miles. Compared to statewide rates, existing accident rates along Route 61 are similar.

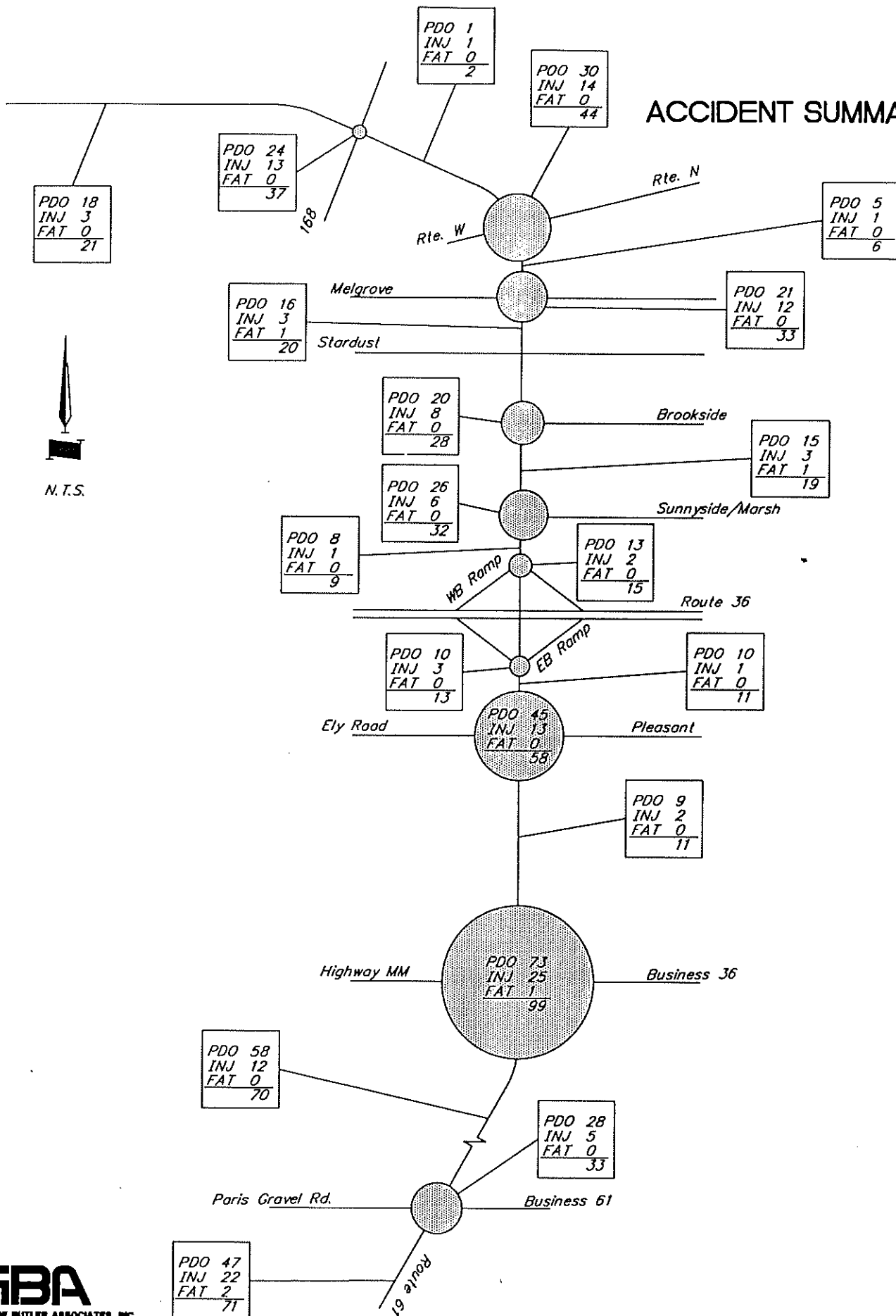
However, there does appear to be some areas on Route 61 through the commercial district where the safety issue is a concern. A schematic representation of accident data on Route 61 can be seen on Exhibit 1-11. The intersection of Route 61 with Highway MM is the highest intersection accident location on this corridor. A total of 99 accidents (73 property damage only, 25 injurious, and 1 fatality) were associated with this intersection between the years 1989 to 1993. High entering traffic speeds and the lack of protected left-turn signal phasing for east and west bound traffic may contribute to this high number of accidents. Similarly, the intersection of Pleasant/Ely with Route 61 has a high number of intersection accidents, 58 in the four year review period. These accidents can most likely be attributed to the lack of east/west left turn lanes and phasing, and the limited separation of this intersection from the U.S. 36 and Route 61 interchange. Another location with a large number of accidents is the intersection at Highway N/W and Route 61. The accidents at this unsignalized location can be attributed to a high number of left-turns being made from both the mainline through traffic lanes and minor streets without the presence of an exclusive left-turn lane.

The Hannibal High and Middle Schools are located on the east side of Route 61 between Stardust and Brookside Streets. The Hannibal School District enforces a "closed-campus" policy throughout the day to minimize student street crossing of Route 61 due to the large traffic volumes and speeds. One of the primary parking areas for students and faculty is accessed directly from Route 61 at the intersection of Brookside. Twenty eight accidents occurred at this intersection in the four year review period. If projected volumes along Route 61 increase to the levels expected for the no-build option, safety related issues in this area will need to be addressed.

1.6 FUEL CONSUMPTION ESTIMATES

To determine estimates of fuel consumption, TRANSYT-7F was utilized to model existing and projected conditions. A traffic network was constructed modeling the existing traffic controls, lane arrangements, and P.M. peak hour traffic volumes. This model was calibrated to reflect the travel times field measured between the signalized intersections along Route 61 through the commercial area. The segments of Route 61 north of the intersections of

ACCIDENT SUMMARY



Route 168 and south of Route MM were modeled to allow through traffic to flow at the posted speed limits. From this existing P.M. peak hour model, the fuel consumption estimates for this period were determined. TRANSYT was then used to generate predicted fuel consumption for other relative traffic volume levels. These fuel consumption values were then used, through a regression analyses, to develop an equation that would predict the daily fuel consumption. This process indicated that the P.M. peak hour generates about 9.46 percent of the daily fuel consumption along Route 61 through the study area.

To determine the fuel consumption for the no-build, the TSM, and the relocation options, the representative predicted traffic volumes, accompanying lane arrangements, and traffic control modifications as previously described were also modeled in TRANSYT. Table 1-8 details the fuel consumption estimates for each of the design scenario. It should be noted that while TRANSYT may or may not predict the absolute amounts of fuel that will be consumed during a specific period, the comparison between various scenarios to determine fuel usage increases or reductions has been shown to be accurate. As can be seen on Table 1-8, the estimates of fuel consumption for the future condition with the relocation has the best fuel usage numbers of any of the future traffic flow conditions.

1.7 SYSTEM LINKAGE

Currently, U.S. Route 61 is free-flowing, with no stop signs or stop signals through Missouri from the Iowa border to I-70 near 4St. Louis, except for the six signalized intersections at Hannibal. In addition, the Missouri Highway and Transportation Commission has designated that Route 61 will be upgraded to freeway from north of Hannibal to I-70 near St. Louis, and that it should be evaluated for upgrade to freeway from the Iowa border to north of Hannibal.

1.8 SUMMARY AND CONCLUSIONS

This analysis indicates that under the no-build alternative, future levels of service along Route 61 through Hannibal will be unacceptable, accident rates are likely to be higher than average, and system linkage will not be provided along Route 61.

Three of the six signalized intersections along Route 61 in the City of Hannibal operate at

TABLE 1-8

Fuel Consumption
P.M. Peak/Daily Rates

Condition	Fuel Consumption Liter/Hr (Gal./Hr)	Vehicle-Miles Traveled Veh-km/Hr (Veh.-mi/Hr)	Consumption Rate Liter per Veh-km/Hr (Gallon per Veh.-mi/Hr)	Fuel Consumption Liter/Day (Gal./Day)
Existing	2,907 (768)	20,160 (12,600)	0.14 (0.06)	30,734 (8,120)
Future - No Build	45,886 (12,123)	39,966 (24,979)	1.15 (0.49)	485,048 (128,150)
Future w/ TSM	24,739 (6,536)	39,966 (24,979)	0.62 (0.26)	261,506 (69,090)
Future w/ Relocation				
Relocation at existing location	3,092 (817)	16,419 (10,262)		32,702 (8,640)
Route 61	3,327 (879)	41,384 (25,865)		35,163 (9,290)
	6,419 (1,696)	57,803 (36,127)	0.11 (0.05)	59,225 (17,930)

a peak hour Level of Service C, and three operate at a peak hour Level of Service B. Delays range from 9 to 18 seconds. The projected future levels of service under the no-build option for five of the six intersections is unacceptable Level F, with delays ranging from 202 to 602 seconds.

Accident rates are currently close to the statewide average for similar roadways, and will probably increase with increased traffic, under the no-build option.

The section of Route 61 through Hannibal is currently the only portion of the route along the 261 km (163-mile) section from the Iowa border south to St. Louis that is not free-flowing.

This chapter discusses the reasonable alternatives under consideration for the proposed project as well as other alternatives which were considered initially but have been eliminated from detailed study. The reasonable alternatives identified in this chapter are the alternatives for which environmental consequences are evaluated in Section 4.0.

Four highway construction alternatives have been selected for detailed study. All of the build alternatives are four-lane divided highways with fully-limited access. In addition, two links have been identified to allow for combinations of alternatives. Also, in accordance with the requirements of the National Environmental Policy Act (NEPA), the No-Action Alternative is evaluated. The No-Action Alternative assumes that no new route will be constructed, and that existing facilities will not be improved beyond what is currently scheduled. Other alternatives were considered but not studied in detail. The discussion of alternatives is as follows:

- Section 2.1: Alternatives (other than construction on new locations) eliminated from detailed study
- Section 2.2: Construction on new locations: Phase I Alternatives Analysis
- Section 2.3: Alternatives for detailed study.

2.1 ALTERNATIVES (OTHER THAN CONSTRUCTION ON NEW LOCATIONS) ELIMINATED FROM DETAILED STUDY

2.1.1 Transportation System Management (TSM) Alternatives

TSM alternatives include changes to maximize the efficiency of the current transportation system, for example, intersection improvements, signal timing, and access control. TSM alternatives are generally not effective (do not meet the project's needs) except in larger

urban areas. TSM alternatives were evaluated for this project and are discussed in detail in Section 1.4. This evaluation indicates that TSM alternatives could result in improved levels of service compared with the no-build alternative alone. With the TSM alternatives, and the no-build option, future levels of service at the six signalized intersections would range from Level C to Level F, compared with existing Levels B and C. (See Section 1.4 for a definition of Level of Service). Because of geometric constraints, the feasibility of the TSM options is questionable.

2.1.2 Mass Transit Alternatives

Like TSM alternatives, transit options, such as bus and rail systems, are usually effective as alternatives to highway projects only in larger, heavily populated urban areas. Mass transit was not considered to be a reasonable alternative for this project for the following reasons. Mass transit would not satisfy the need to eliminate congestion along the existing route. A significant portion of the Average Daily Traffic (ADT) is through traffic and therefore would not be reduced by a mass transit alternative. Mass transit would also not provide the system linkage needed along Route 61. There is no mass transit system to tie in to at either project termini or anywhere in the area. Typically, only urban areas with large central business districts, where the cost of downtown parking is high, and is inconvenient, can create a demand for mass transit.

2.1.3 Improvements to Existing Highway

The existing Route 61 passes through the City of Hannibal and is constrained by development. The route had previously been widened to four lanes. Portions of the roadway are divided except for an approximately 2.7 km (1.7 mile) section which remains undivided primarily because of development close to the highway. This 2.7 km (1.7 miles) bottleneck is the greatest impediment to improving the existing highway. Along this section, there are residential developments and approximately 54 businesses including two shopping centers. The Hannibal public school complex, including the middle school, the high school, the instructional center and the vocational technical center is immediately adjacent to the highway, along about 900 meters (3,000 feet) of the undivided section of the route. There is a city fire department facility along the same section of the route. Immediately north of the undivided section of existing Route 61, the Hannibal-LaGrange College borders the

highway for 300 meters (1,000 feet) on the east, and there is a shopping center on the west. Just south of the undivided section, Huckleberry Park borders the highway for about 1,100 meters (3,700 feet) on the east, and there is a sheltered workshop and medical clinic on the west. At the south end of Hannibal, Westside Industrial Park is adjacent to the highway on both sides. Because of these constraints, this option was eliminated from detailed study.

2.2 CONSTRUCTION ON NEW LOCATIONS - PHASE I ALTERNATIVES ANALYSIS

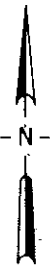
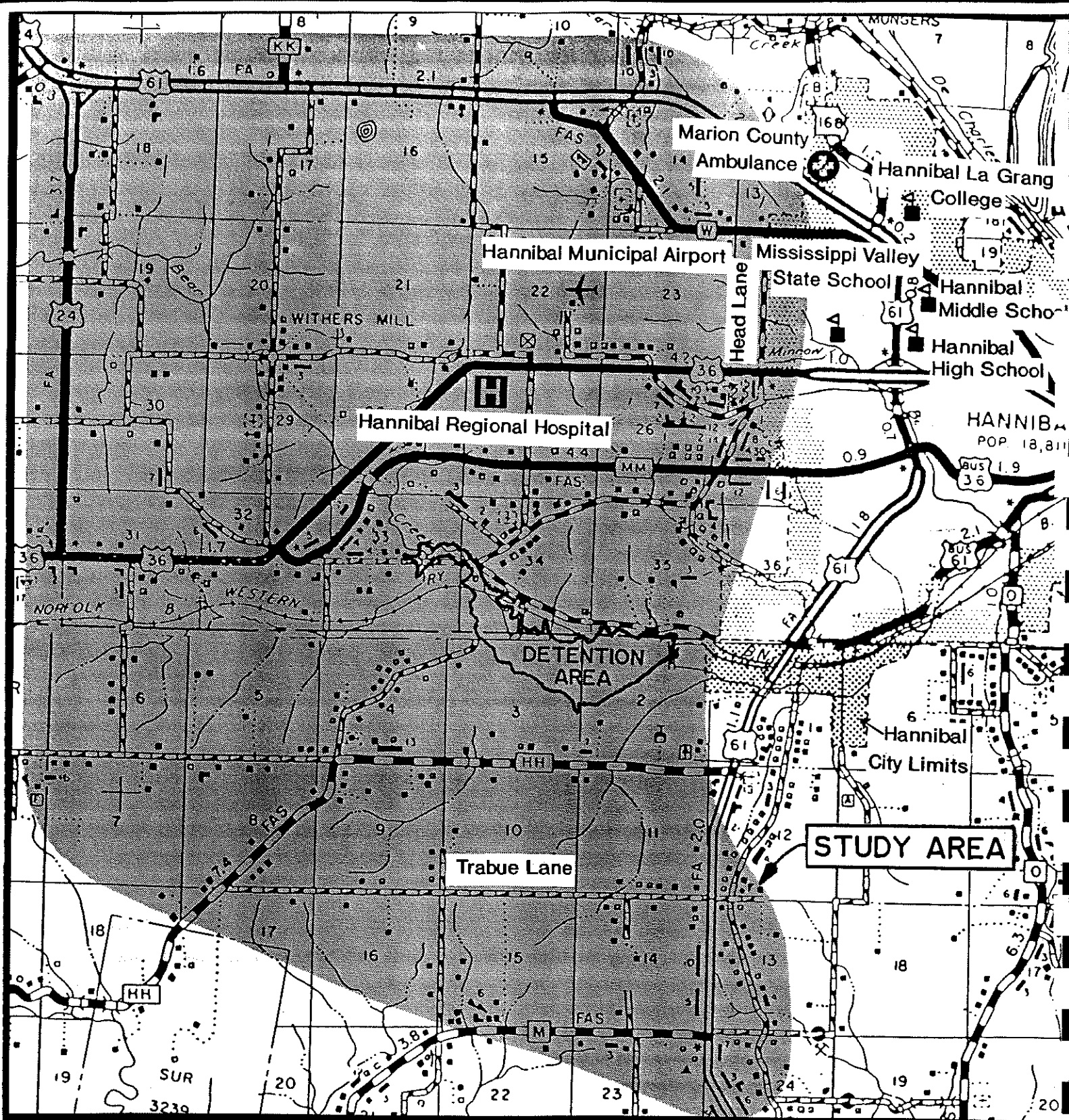
2.2.1 Overview and Summary

This section presents the results of the Phase I Alternatives Analysis for the relocation of U.S. Route 61 around the City of Hannibal, Missouri. The purpose of the analysis was to develop a reasonable number of alternatives for detailed study, that satisfy the project purpose and need. A report consisting of the same information presented in this section, the *Phase I Alternatives Analysis Report*, was made available for public review in September 1994.

The first step in the process of alternatives selection was to identify the study area, shown shaded in Exhibit 2-1. The study area was large enough to provide consideration of a reasonable number of relocation alternatives for Route 61 around Hannibal, and includes logical north and south termini for the project. These termini are at the junction of Route 24 at the north, and near Route M at the south. This study area was presented in the letter of invitation to the agency scoping meeting as well as at the scoping meeting held in May 1994, and at the public information and group meetings held in June 1994.

A literature search was conducted to identify known constraints to and potential impacts on alternative alignments within the study area. The following types of information were obtained and presented on aerial photographs at the public information and group meetings held in June 1994:

- Cemeteries
- Churches, schools, hospitals
- Caves



0 1 MILE

0 1 KILOMETER

PROJECT
STUDY AREA
Exhibit 2-1

- Public parks and other public land
- Known archeological sites
- National Historic Sites
- Wetlands
- Potential endangered species habitat
- Heavily developed areas
- Pipelines
- Areas designated as prime farmland
- Quarries

The public was invited to provide additional information not shown on the maps. Information obtained from the public was verified and added to the aerial photographs. This additional information included the locations of two group houses for the handicapped, a cave, several springs used for water supply, cemeteries, and several sites of potential historic significance. This information is shown in Exhibit S-4 (Summary section).

Using the aerial photographs with the above information plotted, the design team developed a total of 17 alternative alignments through the study area. The objective was to obtain full coverage of the area. The alignments were developed using design principles for freeways that limit such things as sharpness of curves and steepness of grades. These preliminary alternative routes are shown in Exhibit 2-2 (Sheets a through i). These exhibits are located following their descriptions in Section 2.2.2.1 through 2.2.2.17.

Each alternative was described and evaluated based on available information. Table 2-1 summarizes impacts and other data for each alternative. Preceding the table is a sheet of explanatory notes for the issues summarized. Note that quantities shown in the table are not identical to those shown in later analysis; quantities shown in Table 2-1 are preliminary and based on estimated data.

The design team used a comparative analysis to reduce alternatives down to a reasonable number for detailed study. The four build alternatives (plus two "links" to provide more options) selected for detailed study are discussed in Section 2.3.

Explanatory Notes for Issues Listed in Table 2-1

Congestion Relief/Safety

In general, the closer the relocated route is to existing Route 61, the greater will be the relief of congestion and consequent improvement in safety on existing Route 61. While through traffic will take the relocated route, some of the traffic that has a local origin or destination may select the relocated route rather than existing Route 61, if the relocated route is close to the city. This benefit may be offset somewhat by through traffic getting off for services on existing Route 61 if the relocated route is close to the city.

Length

The length shown in the table is the length of the alternative as shown in Figure 1, that is, the distance from that alternative's Route 61 north node to its Route 61 south node. For example, for Alternative A the length is the distance from N-1 to S-2, along Alternative A.

Total Travel

Total travel is measured from a point on Route 61 north to a point on Route 61 south that is common to all the alternatives. Since all the alternatives must pass through N-4 and S-1, the total travel for each alternative is the distance from N-4 to S-1, along that alternative. For example, for Alternative A, the total travel is the length of Alternative A plus the distance from N-4 to N-1 plus the distance from S-2 to S-1.

Number of Structures

This is the number of bridges required, including those for stream crossings and those for crossing other routes.

Prime Farmland

Certain soils are designated as "prime farmland" by the U.S. Soil Conservation Service. Prime farmland soils designation is only relevant if the current land use is agricultural or undeveloped. Developed areas or areas zoned for development are not included.

Stream Crossings

Stream crossings are environmentally important for at least three reasons. First, wetlands in the area are mainly at stream crossings. Therefore, the number and size of stream crossings are relative indicators of wetlands impacts. Secondly, wooded stream corridors provide summer habitat for the endangered Indiana bat. Third, floodplain impacts occur at stream crossings.

Water Quality

Some springs in the area are used for residential and livestock water supplies. Water quality of springs along the route could potentially be affected by construction of the route. Sinkholes may be connected to water supply springs.

Pipeline Crossings

There are several oil pipelines in this area. Because of the expense and potential hazards associated with pipeline crossings, they are avoided where possible. Where they can't be avoided, it is best to cross them at right angles to minimize impact. Cut areas (removal of soil to lower the grade elevations) at pipeline crossings are also avoided because of the necessity of moving the pipeline.

Buildings

These are estimated numbers of buildings that must be removed or relocated. The numbers shown were based on approximate route locations and aerial photos and are not an exact count. They are meant for comparative purposes only.

Wooded Areas

Wooded areas may provide summer habitat for the endangered Indiana bat, as well as habitat for other floral and faunal species.

TABLE 2-1
Summary of Estimated Impacts -- Preliminary Alternatives

Alternative	A	A1	A2	B	C	C West	C1	C2	D	D1	E	E1	E2 East	E2 West	F	E-F	G
Issue																	
Congestion Relief/Safety	Most positive impact	same as A	Less positive than A	Less positive than A	Similar to B	Similar to B	Similar to B	Similar to B	Less positive than A-C	Less positive than A-C	Less positive than A-C	Less positive than A-C	Less positive than A-C	Less positive than A-C	Less positive than A-E	Less positive than A-E	Least positive
Cultural Resources	none known	none known	none known	none known	none known	none known	potential railroad bridges	none known	potential railroad bridges	none known	none known	none known	none known	potential railroad bridges	none known	potential railroad bridges	none known
Economy--Hannibal	Closest to city--least negative impact on existing Route 61 business; but occupies space in area of potential development		Similar to A but less positive	Relatively close/no barriers to development	Similar to B	Similar to B	Similar to B	Similar to B	More negative--farther out and farther south	More negative--farther out and farther south	More negative--farther out and farther south	More negative--farther out and farther south	More negative--farther out and farther south	More negative--farther out and farther south	More negative--farther out and farther south	More negative--farther out and farther south	Most negative
Economy -- General	Good for access to hospital, new and existing industrial parks, and airport		same as A	similar to A	similar to A	Similar to A but farther from new industrial park and airport			Fair access to hospital; relatively far from other developed areas		More negative than D	More negative than D	Similar to D	Similar to D	Similar to D	Similar to G	Least positive--farthest out
Geometrics	Insufficient space for cloverleaf interchange between two approved Route 36 interchanges		Same as A	No improvements in interchange at Route 24	No improvements in interchange at Route 24	No improvements in interchange at Route 24	Improved interchange at Route 24	No improvements in interchange at Route 24	Improved interchange at Route 24	No improvements in interchange at Route 24	No improvements in interchange at Route 24	No improvements in interchange at Route 24	Improved interchange at Route 24	No improvements in interchange at Route 24	No improvements in interchange at Route 24	Improved interchange at Route 24	No improvements in interchange at Route 24
Length: meters (feet)	10,366 (34,000)	10,366 (34,000)	11,738 (38,500)	11,585 (38,000)	10,976 (36,000)	11,280 (37,000)	11,890 (39,000)	10,976 (36,000)	13,720 (45,000)	12,652 (41,500)	14,329 (47,000)	14,268 (46,800)	14,360 (47,100)	13,323 (43,700)	12,195 (40,000)	15,305 (50,200)	12,683 (41,600)
Total Travel: meters (feet)	17,988 (59,000)	17,988 (59,000)	17,378 (57,000)	16,616 (54,500)	16,463 (54,000)	15,549 (51,000)	14,634 (48,000)	14,726 (48,300)	14,329 (47,000)	14,238 (46,700)	14,939 (49,000)	16,402 (53,800)	14,970 (49,100)	14,909 (48,900)	15,793 (51,800)	15,915 (52,200)	16,280 (53,400)
Number of Structures	(one 900 meters [3,000 feet] long)	(one 900 meters [3,000 feet] long)	(one 900 meters [3,000 feet] long)	(one 900 meters [3,000 feet] long)	8 to 9	8 to 9	8 to 9	9 (no major Bear Creek crossing)	8 (no major Bear Creek crossing)	11 (no major Bear Creek crossing)	8 (no major Bear Creek crossing)	9 (no major Bear Creek crossing)	10-11 (no major Bear Creek crossing)	10-11 (no major Bear Creek crossing)	10-11 (no major Bear Creek crossing)	9 (no major Bear Creek crossing)	8 (no major Bear Creek crossing)
Prime Farmland: hectare (acres)	64 (159)	58 (146)	49 (122)	70 (176)	67 (168)	69 (171)	125 (311)	110 (275)	102 (254)	95 (237)	146 (363)	103 (257)	137 (342)	133 (330)	186 (464)	165 (411)	186 (464)
Number of Stream Crossings	1 large, 1 small	1 large, 1 small	1 large	1 large, 2 small	1 large, 2 small	1 large, 3 small	1 large, 3 small	2 small	2 small	2 small	1 small	1 small	1 small	1 small	1 small	1 small	1 small
Water Quality	springs, sinkholes	springs, sinkholes	springs, sinkholes	springs, sinkholes	few springs	few springs	few springs	few springs	few springs	few springs	few springs	few springs	few springs	few springs	few springs	few springs	few springs
Pipeline Crossings	2	2	6	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Buildings	11	10	17	14	6	7	10	5	7	7	4	6	8	6	4	6	3
Wooded Area: hectare (acres)	32 (80)	28 (71)	39 (98)	19 (47)	25 (63)	24 (60)	33 (81)	23 (57)	41 (102)	35 (87)	16 (41)	23 (57)	23 (59)	22 (56)	14 (35)	25 (62)	20 (51)
Other	Large cut at Route 61 south interchange		Better Route 61 south interchange location for cut/fill	Large cut at Route 61 south interchange	Large cut at Route 61 south interchange	Large cut at Route 61 south interchange	Large cut at Route 61 south interchange	Large cut at Route 61 south interchange	Better Route 61 south interchange location for cut/fill	Better Route 61 south interchange location for cut/fill	Better Route 61 south interchange location for cut/fill	Better Route 61 south interchange location for cut/fill	Better Route 61 south interchange location for cut/fill	Better Route 61 south interchange location for cut/fill	Better Route 61 south interchange location for cut/fill	Better Route 61 south interchange location for cut/fill	Better Route 61 south interchange location for cut/fill

**SUMMARY OF ESTIMATED
IMPACTS PRELIMINARY
ALTERNATIVES
TABLE 2-1**

1. The first part of the paper discusses the importance of the study of the history of the United States. It is argued that the study of the history of the United States is essential for a full understanding of the country and its people. The paper then goes on to discuss the various factors that have shaped the history of the United States, including the role of the federal government, the influence of the states, and the impact of the people.

2. The second part of the paper discusses the role of the federal government in the history of the United States. It is argued that the federal government has played a central role in the development of the country, and that its actions have shaped the course of history. The paper then goes on to discuss the various powers of the federal government, including the power to declare war, the power to regulate interstate commerce, and the power to coin money.

3. The third part of the paper discusses the influence of the states in the history of the United States. It is argued that the states have played a significant role in the development of the country, and that their actions have shaped the course of history. The paper then goes on to discuss the various powers of the states, including the power to regulate intrastate commerce, the power to tax, and the power to elect members of the federal government.

4. The fourth part of the paper discusses the impact of the people in the history of the United States. It is argued that the people have played a central role in the development of the country, and that their actions have shaped the course of history. The paper then goes on to discuss the various ways in which the people have influenced the history of the United States, including through the election of representatives to the federal government, through the exercise of the right of free speech, and through the participation in the political process.

This report describes all the preliminary build alternatives evaluated and the criteria used to select the alternatives for further detailed study. The evaluation takes into consideration the previously approved Route 36 study with interchanges near Head Lane, Airport Road, and Route 24. As required by NEPA, the no-build alternative is also studied in detail.

2.2.2 Description of Alternatives

Each alternative is labeled in Exhibit 2-2 (sheets a through i, beginning on page 2-10) which also shows points of intersection (called "nodes") with Route 61 north, Route 61 south, and Route 36. As shown in the figure, nodes at Route 61 north are labeled N-1 through N-4. Node N-1 is about 4 km (2.5 miles) west of the Hannibal city limits. Node N-4 is at the existing Route 61 and 24 interchange. The distance from N-1 to N-4 is about 5.3 km (3.3 miles). The two nodes on 61 south are labeled S-1 and S-2. Node S-2 is about 1.6 km (one mile) south of the Hannibal city limits, and S-1 is about 2.7 km (1.7 miles) south of S-2. The nodes at Route 36 are labeled 36-1 through 36-5. Node 36-1 is about 1.5 km (a little less than a mile) east of the Hannibal Regional Hospital, and Node 36-2 is about 1.6 km (one mile) west of the hospital. Nodes 36-3, 36-4, and 36-5 are about 1.1 km (0.7 mile), 2.7 km (1.7 miles), and 3.9 km (2.4 miles) west of 36-2, respectively.

Because both Routes 36 and 61 will be freeways within the study area, they will be connected with a fully controlled interchange, such as a cloverleaf.

Because of the potential for greater impact, some parts of the study area were intentionally avoided when selecting the preliminary alternatives. Routes further east than Alternative A would have resulted in relatively large numbers of relocated residences. Existing and potential industrial development would be affected if the alignment was further east of the detention area dam. In addition, there are many churches, cemeteries and parks in the area east of Alternative A. There is also an area north of Route 36 and west of the airport that was avoided because of geologic features resulting in there being a large number of sinkholes present. In addition, the hospital area, the airport, and the already approved interchanges on Route 36 were avoided. With the potential for development (in accordance with Marion County's land use plan) at the hospital and the airport, taking land for a highway through these areas would be detrimental to orderly development. Also, the approved interchanges at Airport Road and Head Lane are necessary to provide full access to these areas. Again,

the needed cloverleaf type interchange for Routes 36 and 61 will not provide immediate access to these areas.

The alternatives are described below, in a north to south direction. Please refer back to Table 2-1 for comparison of these alternatives.

2.2.2.1 Alternative A

Alternative A, shown in Exhibit 2-2a, is the easternmost route, and contains nodes N-1, 36-1, and S-2. Through an area presently zoned residential, the route passes east of the airport and the new industrial park located north of the airport. At Route 36, the route passes between the approved interchange near the hospital and the approved interchange at Head Lane. The route then crosses Bear Creek at the dam of the detention area, and rejoins Route 61 at Node S-2.

2.2.2.2 Alternative A1

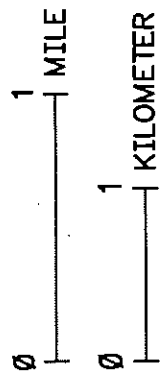
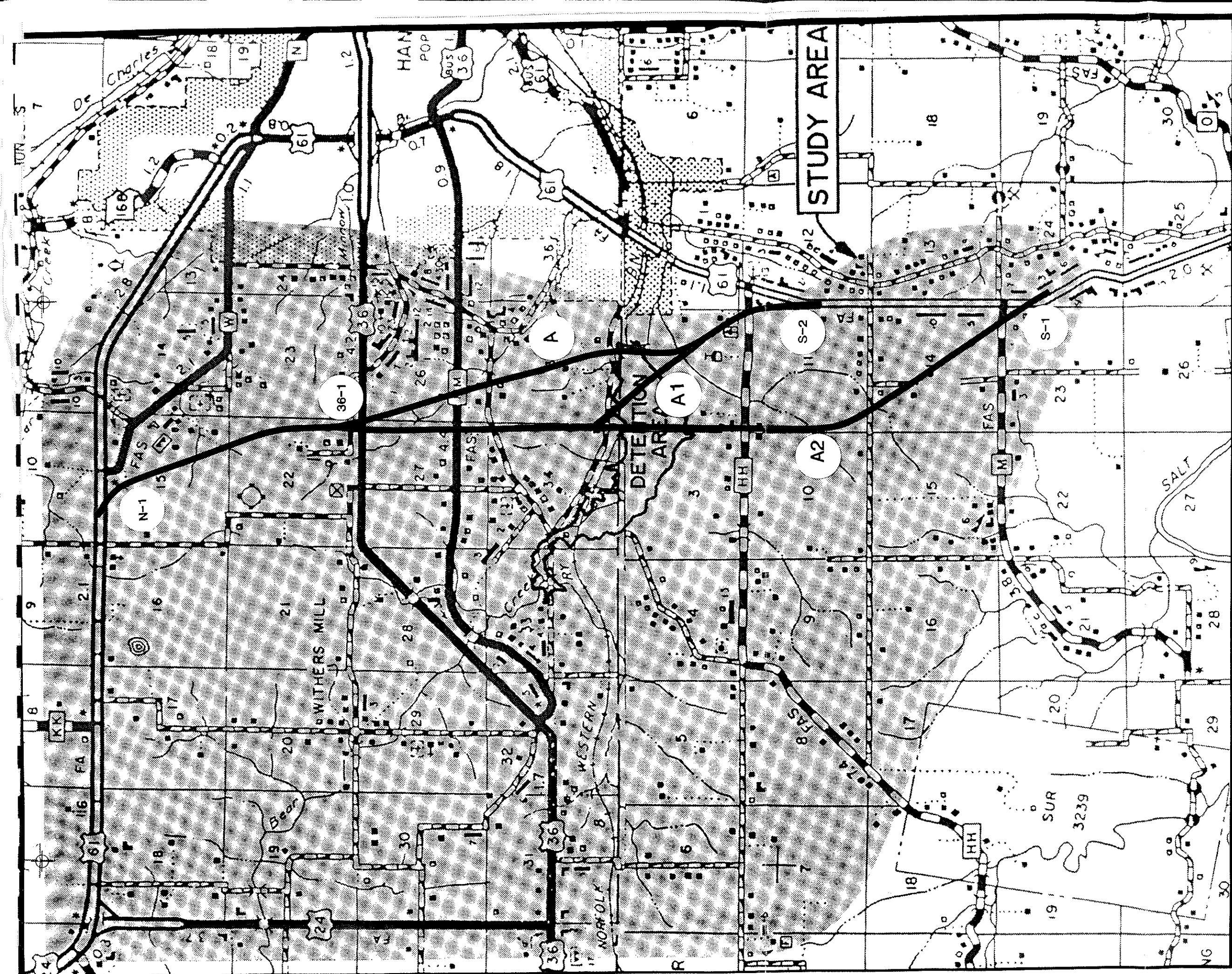
Alternative A1, shown in Exhibit 2-2a, coincides with Alternative A from Node N-1 to Node 36-1. It then continues due south (along the Alternative A2 alignment) to a point just north of the detention area. The route then goes southeast across the detention area, and rejoins Alternate A south of the detention area. It then coincides with Alternate A from that point south to the end at Node S-2.

2.2.2.3 Alternative A2

Alternative A2, shown in Exhibit 2-2a, coincides with Alternative A from Node N-1 to Node 36-1. South of Node 36-1, it coincides with Alternative A1 to a point just north of the detention area. Then the route continues due south, crossing the detention area, and ending at Node S-1.

2.2.2.4 Alternative B

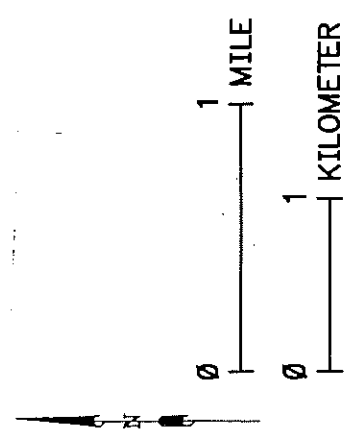
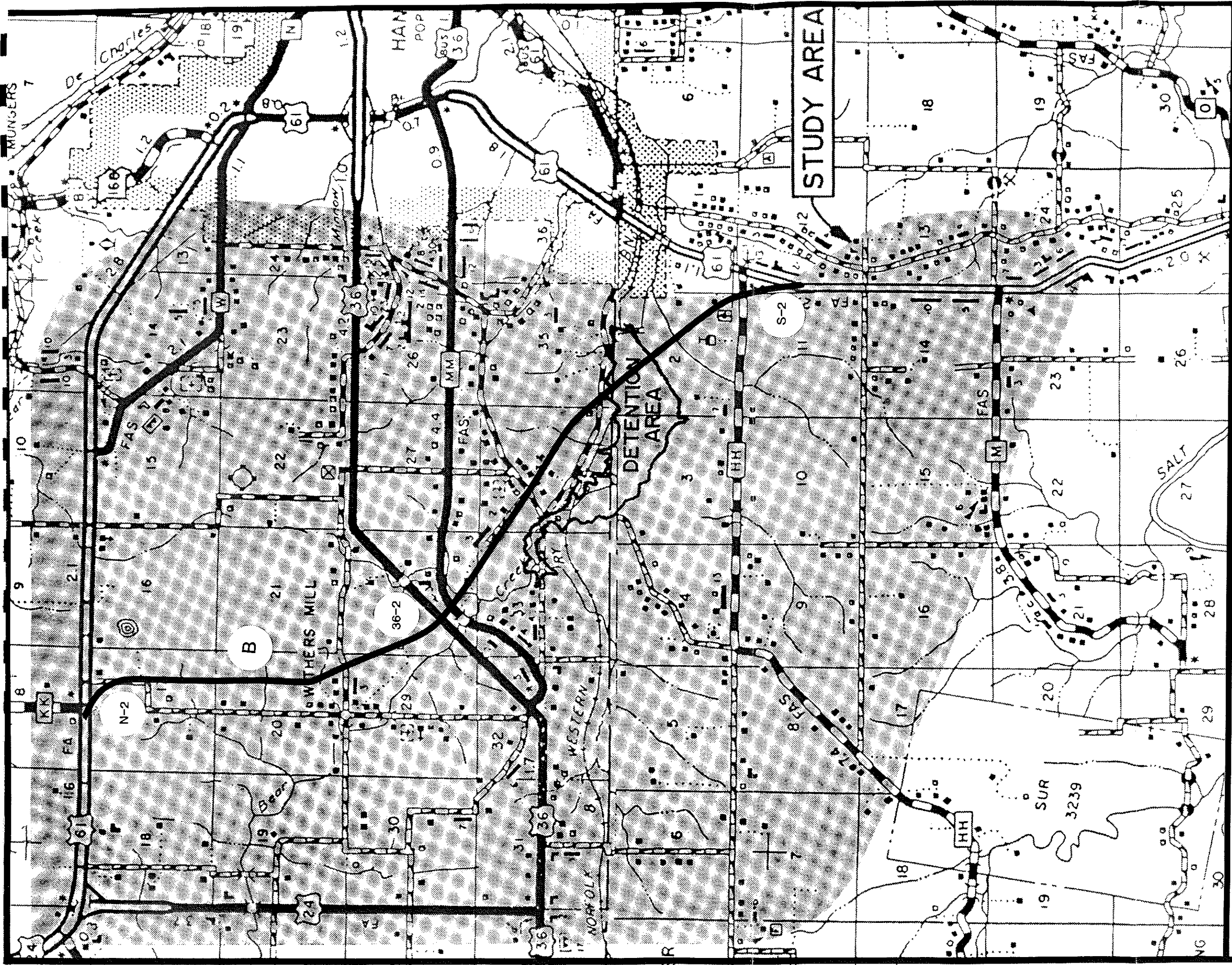
Alternative B, shown in Exhibit 2-2b, begins at Node N-2, then proceeds south, to a point just northeast of Withers Mill. Then it continues in a southeasterly direction, crossing Route



PRELIMINARY
ALTERNATIVES
Exhibit 2-2a

ASMA 10012





PRELIMINARY
ALTERNATIVES
Exhibit 2-2b



36 about 1.6 km (one mile) west of the hospital, at Node 36-2. The alignment then travels along the north side of Bear Creek, crosses the detention area just west of Alternative A, and ends at Node S-2.

2.2.2.5 Alternative C

Alternative C, shown in Exhibit 2-2c, coincides with Alternative B from Node N-2 to Node 36-2. It then travels along the south edge of the detention area, ending at Node S-2. The only difference between Alternatives B and C is that Alternative C avoids the detention area by passing to the south.

2.2.2.6 Alternative CW

Alternative CW, shown in Exhibit 2-2c, coincides with Alternative C except for the northernmost extension. It begins at Node N-3 and joins Alternative C just northeast of Withers Mill and coincides with Alternative C from that point to Node S-2.

2.2.2.7 Alternative C1

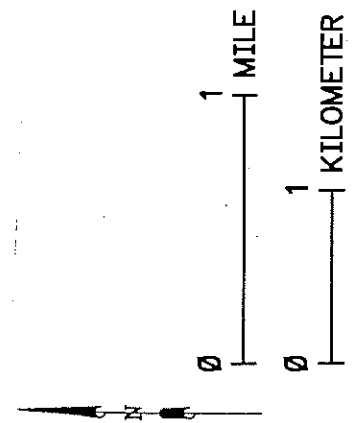
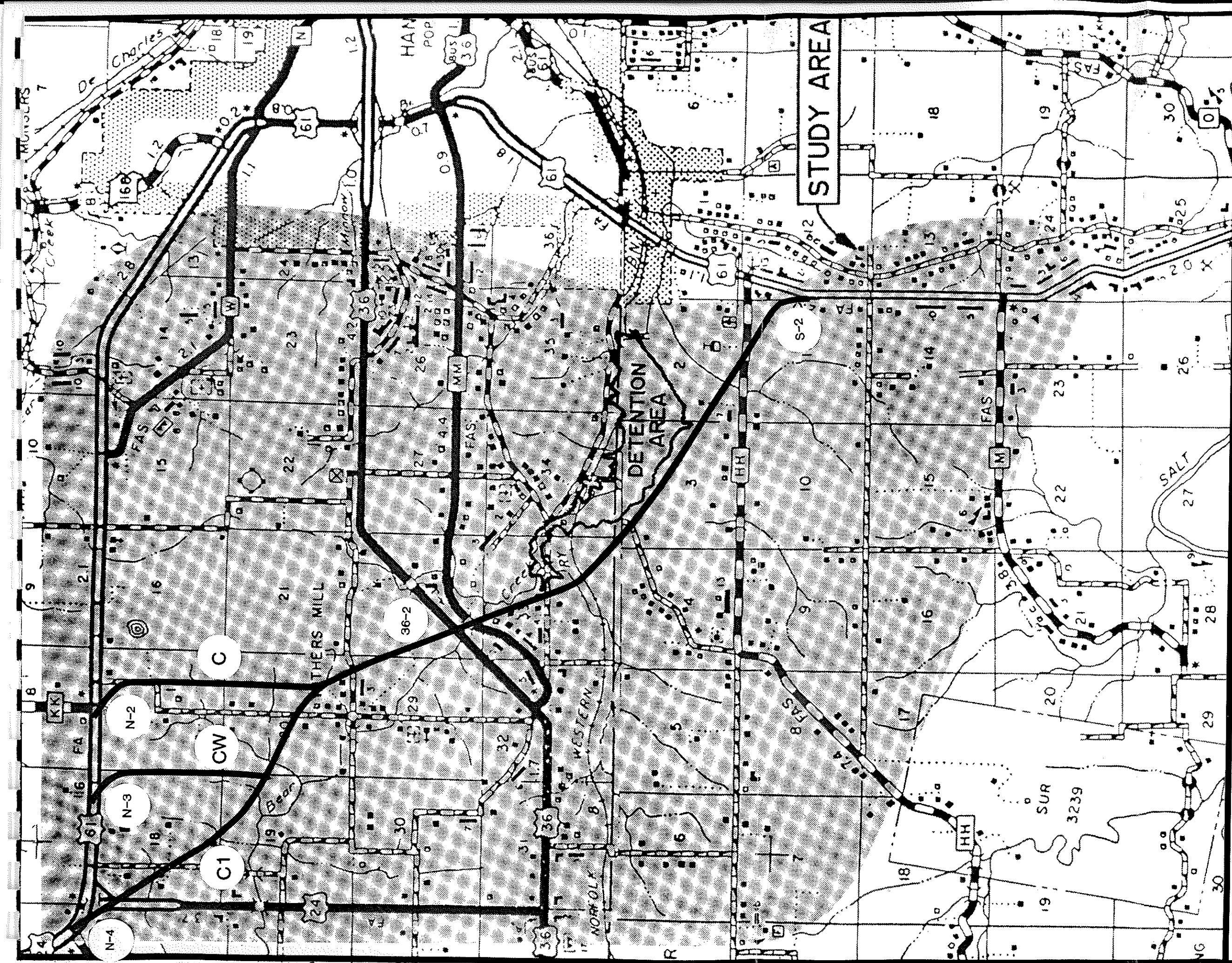
Alternative C1, shown in Exhibit 2-2c, begins at Node N-4, then travels parallel to and east of an abandoned railroad right-of-way to a point just northeast of Withers Mill by way of Link 1. The alignment then coincides with Alternative C from that point to Node S-2.

2.2.2.8 Alternative C2

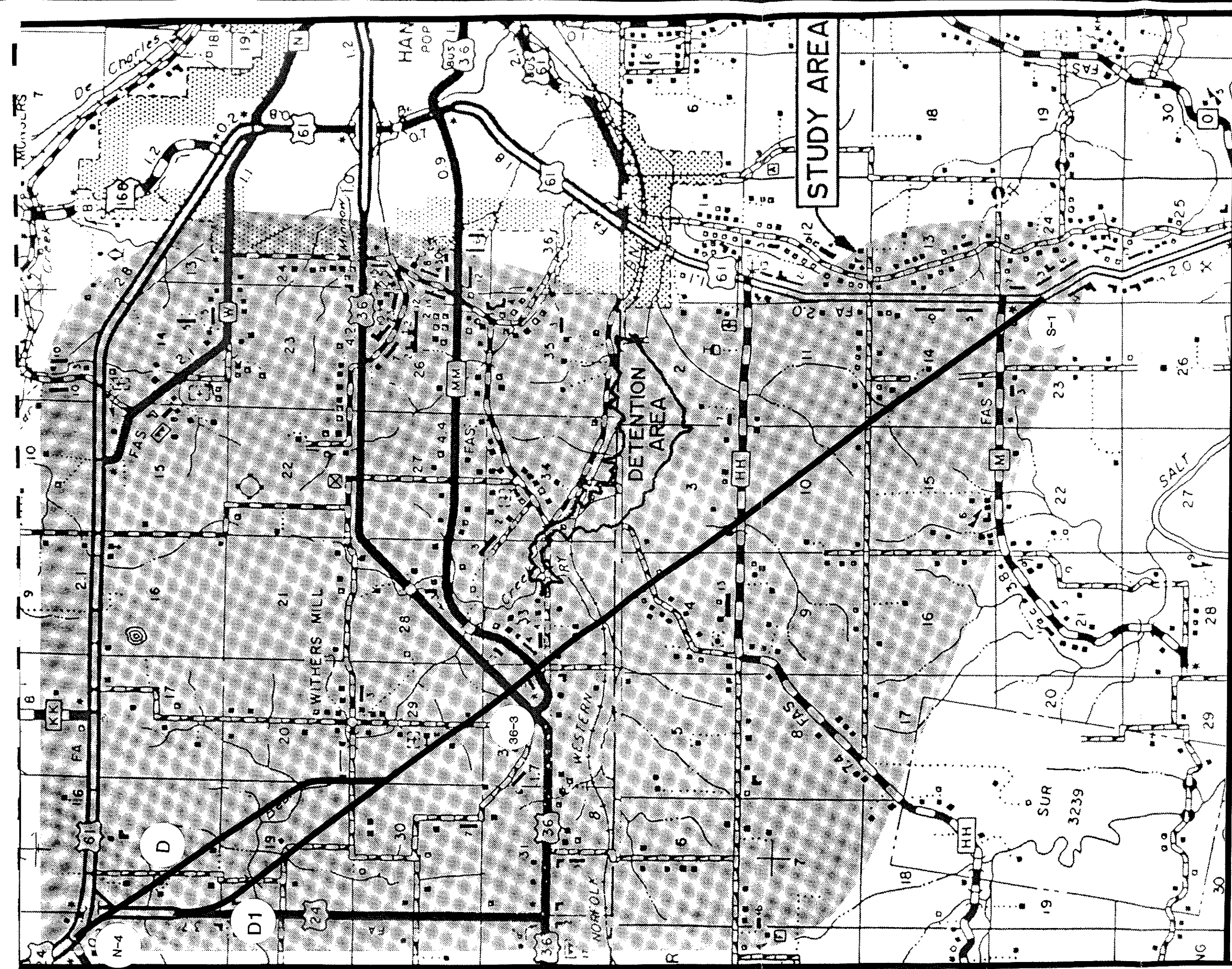
Alternative C2, shown in Exhibit 2-2d, begins at Node N-4, then follows Route 24 south for about 1.6 km (one mile). It then travels southeast to a point just northwest of Node 36-3. Then, crossing Route 36 just north of Node 36-3, it travels southeast to a point where it rejoins Alternative C. From this point on it coincides with Alternative C which ends at Node S-2.

2.2.2.9 Alternative D

Alternative D, shown in Exhibit 2-2e, begins at Node N-4, then travels parallel to and east



PRELIMINARY
ALTERNATIVES
Exhibit 2-2c



PRELIMINARY
ALTERNATIVES
Exhibit 2-2e

of the abandoned railroad right-of-way, the same as Alternative C1. The alignment then splits off from C1 and passes to the west of Withers Mill. Then, in a southeasterly direction, the alignment continues straight, crossing Route 36 at Node 36-3, and ending at Node S-1.

2.2.2.10 Alternative D1

Alternative D1, shown in Exhibit 2-2e, coincides with Alternative C2 from Node N-4 to a point just northwest of Node 36-3. From this point it coincides with Alternative D which ends at Node S-1.

2.2.2.11 Alternative E

Alternative E, shown in Exhibit 2-2f, begins at Node N-4, then follows Route 24 south for a little more than 3.2 km (2 miles). It then travels southeasterly, crossing Route 36 at Node 36-4, and continues straight to Node S-1.

2.2.2.12 Alternative E1

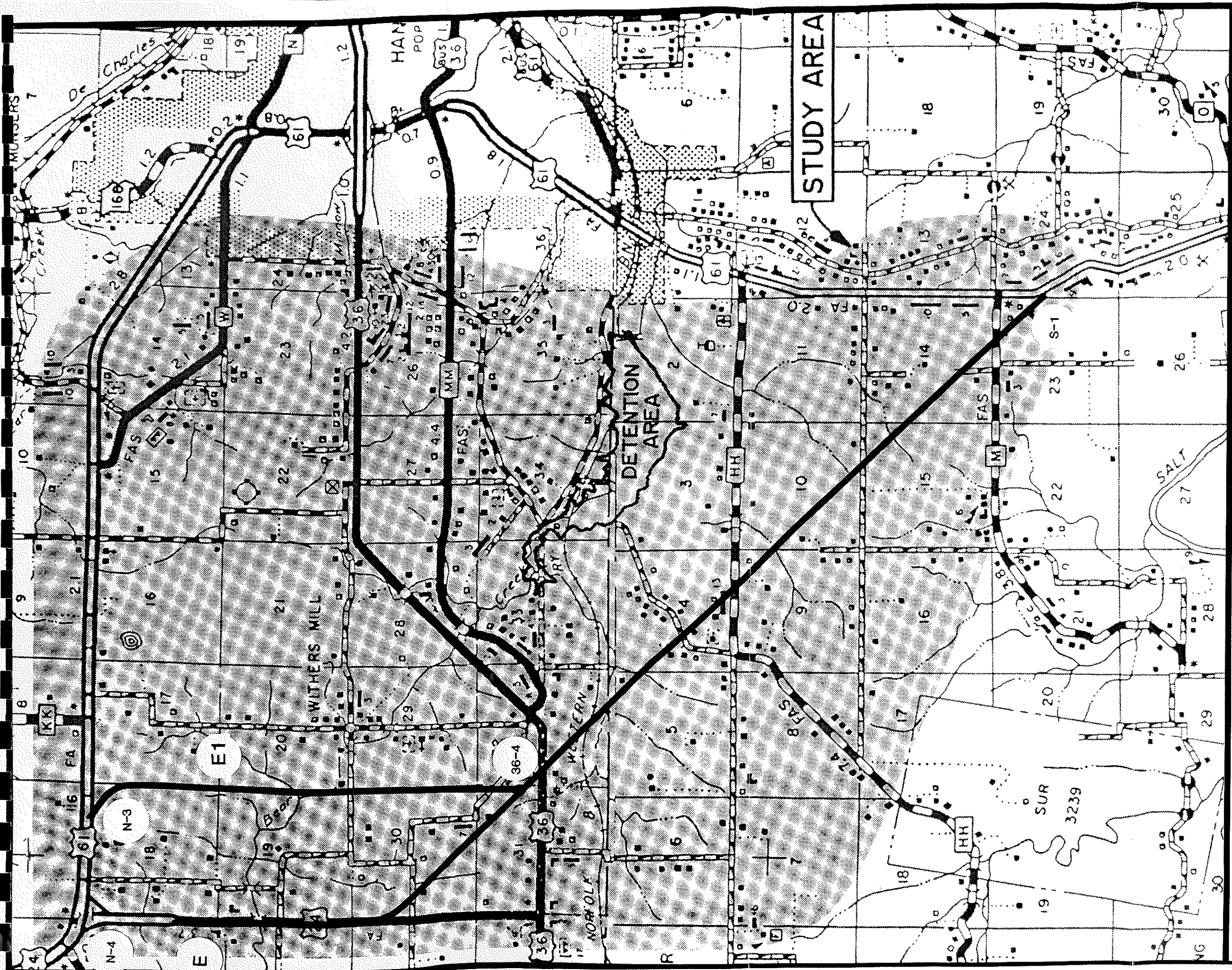
Alternative E1, shown in Exhibit 2-2f, begins at Node N-3, then heads due south, passing west of Withers Mill, and following a north-south transmission line, on the east side of the transmission line right-of-way. It joins Alternative E where it crosses Route 36 at Node 36-4, ending at Node S-1.

2.2.2.13 Alternative E2 East

Alternative E2 East, shown in Exhibit 2-2g, coincides with Alternative D from Node N-4 to Node 36-3. At a point near Route MM it travels due south and then joins Alternative E just south of the Norfolk and Western rail line. The alignment then coincides with Alternative E to Node S-1.

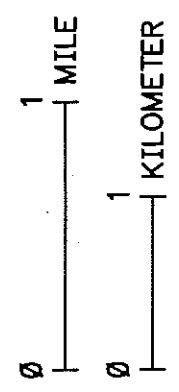
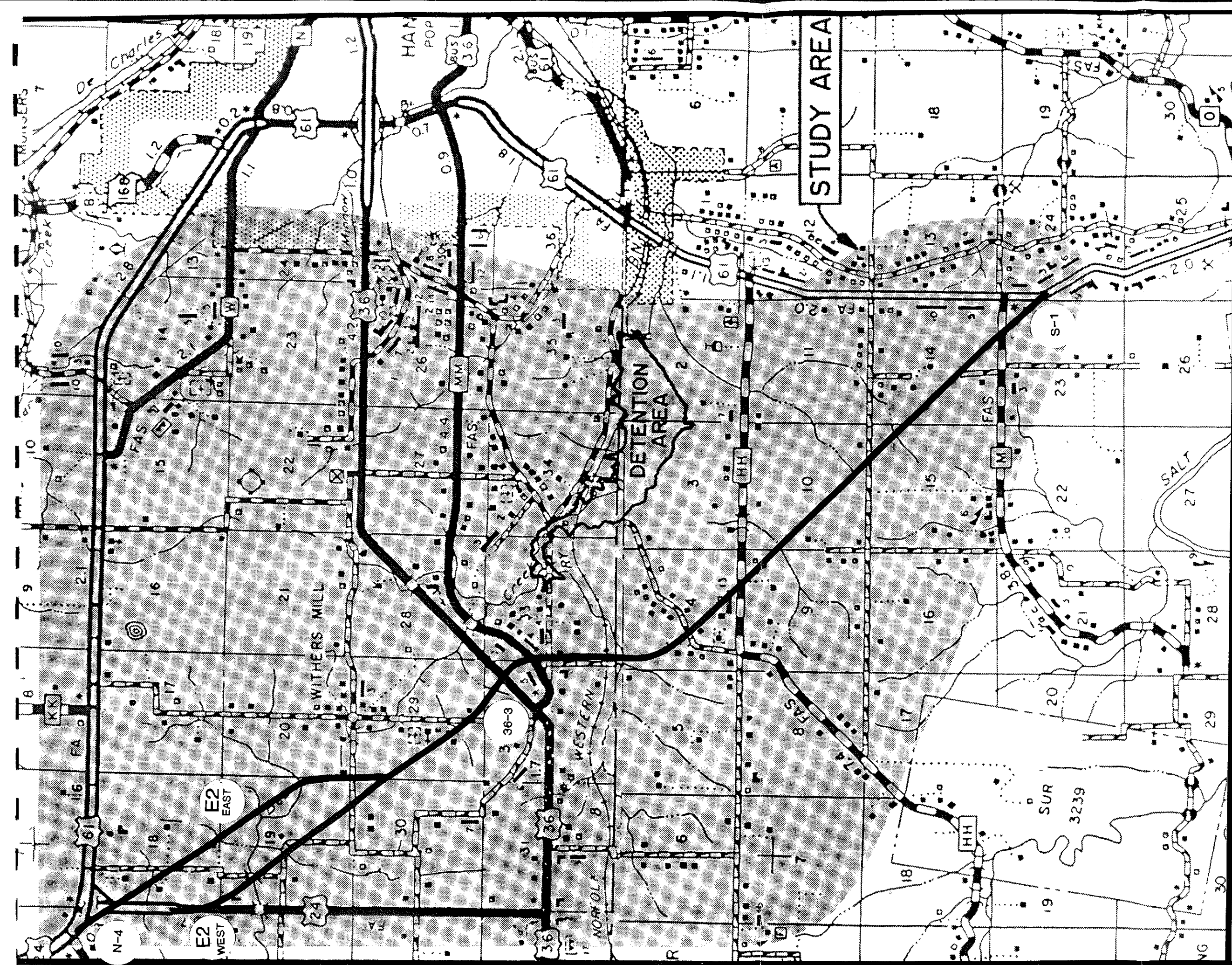
2.2.2.14 Alternative E2 West

Alternative E2 West, shown in Exhibit 2-2g, coincides with Alternative D1 from Node N-4



0 1 MILE
0 1 KILOMETER

PRELIMINARY
ALTERNATIVES
Exhibit 2-2f



PRELIMINARY
ALTERNATIVES
Exhibit 2-2g

to Node 36-3, after which it coincides with Alternative E2 East to Node S-1.

2.2.2.15 Alternative F

Alternative F, shown in Exhibit 2-2h, begins at Node N-4 and follows Route 24 south to a point about 0.8 km (0.5 mile) north of Route 36. Then the alignment travels southeasterly, passing through Node 36-5, crossing Route HH, and continuing to Node S-1.

2.2.2.16 Alternative EF

Alternative EF, shown in Exhibit 2-2h, begins at Node N-4 then follows the abandoned railroad right-of-way to a point about 0.8 km (0.5 mile) west of Withers Mill. The alignment then travels due south, to the east side of a north-south transmission line right-of-way, crossing Route 36 near Node 36-4. Then, continuing south, the alignment joins with Alternative F. It then coincides with Alternative F to Node S-1.

2.2.2.17 Alternative G

Alternative G, shown in Exhibit 2-4i, is the westernmost alternative. Approximately 4 km (2.5 miles) south of Node N-4 this alignment travels slightly to the east, and then due south crossing Route 36 at Node 36-5. From that point south it travels slightly to the west and south of Alternative F, ending at Node S-1.

2.2.3 Selection of Alternatives for Detailed Study

The selection of alternatives for detailed study was done by a process of elimination. Alternatives were compared, and less favorable ones eliminated until a reasonable number was left for detailed study.

2.2.3.1 Evaluation of Alternatives A, A1, and A2

Alternatives A, and A1, and to a lesser extent A2 have the advantage of proximity to Hannibal, but these alternatives have few other attractions. Because of limited access, the highway will provide little opportunity for commercial development. For example, the

FILE: J3P0426 & J3P0427

August 8, 1996

Preliminary Studies

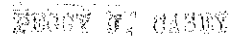
Route 61, Marion and Ralls Counties
MHTD Job Nos. J3P0426 and J3P0427
FHWA-MO-EIS-95-04-F
Record of Decision

Mr. Joseph A. Mickes, P.E., Chief Engineer
Missouri Highway and Transportation Department
Jefferson City, Missouri

Dear Mr. Mickes:

Enclosed is a Record of Decision (ROD) for the subject project. The ROD was signed by Mr. Kenneth Bechtel of our Region Office on July 30, 1996. You may advance the project as appropriate as of the date of signature.

Sincerely yours,



Gerald J. Reihsen, P.E.
Division Administrator

Enclosure
pjc/djs

RECORD OF DECISION

Route 61 Hannibal Relocation, Marion and Ralls Counties, Missouri
Route 24 to South of Route M
Jobs No. J3P0426 and J3P0427

(FHWA-MO-EIS-95-04)

7/30/96
Date of Approval

Kenneth W. Buhla En. Spec.
For FHWA Title



U.S. Department
of Transportation
**Federal Highway
Administration**

Memorandum

Subject: Record of Decision
Route 61, Marion and Ralls Counties
FHWA-MO-EIS-95-01-F

From: Director, Office of Program Development
Kansas City, Missouri

To: Mr. G. J. Reihsen
Division Administrator (HDA-MO)
Jefferson City, Missouri

Date: July 30, 1996

Reply to
Attn. of: HPD-07

Please find attached the approved Record of Decision (ROD) for the subject project. As requested a copy of this ROD has been directly mailed to Mr. Fred Martin of the Missouri Highway and Transportation Department. You may advance the project as appropriate.

Attachment

Ken Burtel
for Ronald J. Rogers

RECEIVED	
AUG 1 1996	
D.A.	
✓ A.D.A.	<i>[Signature]</i>
✓ P.E.	<i>[Signature]</i>
✓ E.C.	<i>[Signature]</i>
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A. Decision

The Proposed Action is the relocation of U.S. Route 61, consisting of the construction of a four-lane, fully-access-limited, divided highway in Marion and Ralls Counties, Missouri, which will be approximately 16.0 km (9.9 miles) in length. The project will begin at the existing Routes 61/24 interchange north of Hannibal, continue southeasterly, and end in the vicinity of the existing Route 61/M intersection south of Hannibal.

For the proposed action the selected alternative is Alternative F described in the Final Environmental Impact Statement (FEIS). Beginning at the north end of the project, Alternative F follows the alignment of existing U.S. Route 24 for approximately 4.8 km (3.0 miles). For about 3.6 km (2.3 miles) of this distance, it uses the existing Route 24 right-of-way for the northbound lanes. About 3.3 km (2.1 miles) south of the Route 61/24 interchange, a diamond interchange will be built between two existing county roads which currently intersect Route 24. These county roads will be closed at the new route, and will be serviced by the new interchange. At about 5.8 km (3.6 miles) south of the existing Route 61/24 interchange will be a cloverleaf interchange with U.S. Route 36. In the vicinity of the interchange, U.S. Route 36 will be relocated about 500 meters (1700 feet) north of its present location. This local relocation of Route 36 is being coordinated with other proposed Route 36 improvements. The existing U.S. Routes 24 and 36 in the vicinity of the interchange will remain as service roads. Between the Route 36 interchange and the southern terminus of the project, there will be diamond interchanges at State Routes HH and M. The southern terminus is located approximately 600 meters (2,000 feet) south of the existing Routes 61/M intersection.

This improvement on Route 61 is part of the overall effort to improve the "Avenue of the Saints Route." The Avenue of the Saints is a Congressionally designated high priority route on the National Highway System between St. Paul, Minnesota and St. Louis, Missouri. With the exception of the six signalized intersections through Hannibal (which will be avoided by this relocation), Route 61 is currently free-flowing, with no stop signs or stop signals from near the Iowa border to I-70 west of St. Louis [a distance of about 210 km (130 miles)]. The Missouri Highway and Transportation Commission has designated that Route 61 will be upgraded to freeway from north of Hannibal to I-70 near St. Louis, and that it should be evaluated for upgrade to freeway from the Iowa border to north of Hannibal. This study is based on an average right of way width of 90 meters (300 feet) with a median width of 15 meters (48 feet) from inside shoulder to inside shoulder. Right of way widths will vary depending on depth of cut or fill. Right of way will be acquired as necessary for construction. The typical section includes 3-meter (10-foot) outside shoulders, 1.8-meter (6-foot) inside shoulders, and a travelway width of 7.2 meters (24 feet).

B. Alternatives Considered.

The no-action alternative, mass transit alternative, and improvement of existing highway alternative were studied and rejected because they would not satisfy the primary objectives of the project. None of these alternatives would provide the safety, level of service, and system continuity intended by the project.

A total of 17 variations of build alternatives on new locations were developed and studied as a Phase I alternative analysis. Based on the Phase I study, these alternatives were narrowed down to four for detailed study. In addition, two connecting links which allow different combinations of segments of the alternatives were evaluated. The alternative evaluated in detail are, from east to west, Alternatives CW, D, EF, and F.

Alternative CW, the easternmost alternative, is the shortest in terms of new construction, at 15.5 km (9.6 miles). The other three alternatives have common north and south termini; both the north and south termini for Alternative CW are different from the others. The northern terminus is about 1,800 meters (6,000 feet) east of the existing Routes 61/24 interchange. The southern terminus is at Trabue Lane, about 2,700 meters (9,000 feet) north of the southern terminus for the other build alternatives evaluated in detail. The only interchange on Alternative CW is a cloverleaf at U.S. Route 36.

Alternatives D and EF have the same termini as Alternative F. They also have in common with each other and with Alternative F, the diamond interchange at Route M, located about 1,200 meters (4,000 feet) from the southern project terminus. Alternative D is 18.1 km (11.3 miles) long, and Alternative EF, the longest, is 19.5 km (12.1 miles) long. Alternatives D and EF both have cloverleaf interchanges at Route 36 and diamond interchanges at Route HH.

The environmental impacts of the alternatives vary mainly according to their topographic locations. Alternative CW, which is located more in the stream valleys, primarily impacts features associated with stream valleys such as wetlands and floodplains. Alternative F, which is located primarily on the ridge lines, has greater impacts on features associated with the ridge tops, such as prime farmland. The impacts of Alternatives D and EF are similar to each other and generally range between those of Alternative CW and Alternative F.

Alternative CW, with wetlands impacts of approximately 6.6 hectares (16.5 acres), impacts 11 times the wetland area of Alternative F. Alternative D impacts about three times as much wetland area as Alternative F, and Alternative EF impacts 67 percent more wetland area than Alternative F.

Alternative CW, with 8 crossings of Waters of the U.S., has twice as many crossings of Waters of the U.S. as Alternatives D and F. Alternative EF has the fewest, at three crossings.

Alternative CW has the least impact on prime farmland, at 91 hectares (226 acres). Compared to Alternative CW, Alternatives D, EF, and F impact one percent more, 76 percent more, and 110 percent more, respectively.

Alternative F impacts the least amount of wooded area, at 12 hectares (29) acres. Compared to Alternative F, Alternatives D, EF and CW impact 50, 75, and 208 percent more, respectively. Some of the wooded areas may provide seasonal habitat for the endangered Indiana bat.

Alternative F requires two residential relocations. Alternative CW and EF each require four, and Alternative D requires 16 residential relocations. None of the alternatives require relocations of businesses.

Alternative F was selected because it meets the project objectives better than any other alternative evaluated. It is, overall, the least environmentally impacting alternative. It is also the lowest cost alternative.

C. Section 4(f).

The selected alternative has no Section 4(f) involvement.

D. Measures to Minimize Harm.

All practicable measures to minimize harm have been incorporated into the decision for the selected alternative.

The acquisition and relocation program will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

Erosion control measures will be required by job construction specifications to prevent sedimentation. Measures also will be used to prevent pollution caused by construction activities through MHTD's Sediment and Erosion Control Program approved by the Missouri Department of Natural Resources (MDNR).

Farmland impacts have been addressed by locating corridors near property lines as much as feasible, to reduce farm severance. Livestock underpasses will be constructed where feasible.

Wetlands have been avoided to the extent possible. The position of the selected alternative has been chosen to minimize impacts to wetlands. Final mitigation measures, if required, will be decided in coordination with the U.S. Army Corps of Engineers with the assistance of the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the Missouri Department of Conservation.

Floodplain impacts have been reduced by holding right of way requirements to a minimum, and by perpendicular crossings of floodplains. Channel relocations will be minimized, as will road embankments for bridges. Velocity increases of streams at stream crossings will be avoided where feasible.

Trees that are potentially suitable for seasonal Indiana bat habitat will be harvested only during the period from October 1 to April 1.

Any wells found during construction will be sealed to prevent ground water pollution from construction and from future road maintenance.

E. Monitoring Program.

The proposed project will be subject to further review by Federal and State agencies and local units of government. Some permits will need to be obtained. This review and permit process will ensure that the included mitigation measures are implemented.

F. Comments on the Final EIS.

The U.S. Department of Interior reviewed the Final EIS and provided comments on July 10, 1996. They stated that the U.S. Fish and Wildlife Service (Service) had not concurred that the preferred alternative would not adversely affect the federally-listed endangered Indiana bat and recommended that informal consultation be continued or formal consultation be requested with the Service's Columbia Field Office. In a request to continue informal consultation, data supplemental to the Final EIS was provided to the Columbia Field Office and a meeting was held with Service staff to discuss the information. Informal Section 7 consultation on this proposed action was concluded on July 23, 1996, with the Service's concurrence that the improvement projects are not likely to adversely affect the Indiana bat.

The coordination letters are attached to this ROD (MHTD letter to the U.S. Fish and Wildlife Service, dated July 22, 1996; and U.S. Fish and Wildlife Service letter to MHTD dated July 23, 1996).

No other comments on the Final EIS were received.

G. Summary.

The selected alternative is the lowest cost and least environmentally damaging of the build alternatives evaluated for the proposed action. Written responses to the Final EIS are attached. A summary table of impacts is attached.

Table 1
Summary of Impacts

	Alternative CW	Alternative D	Alternative EF	Alternative F
Total Length of Improvement, km (miles)	15.5 (9.6)	18.1 (11.3)	19.5 (12.1)	16.0 (9.9)
Right of Way Requirements, Total hectares (acres)	227 (563)	265 (656)	285 (705)	279 (688)
Prime Farmland Taken, hectares (acres)	91 (226)	92 (227)	160 (395)	191 (473)
Statewide Important Farmland Taken, hectares (acres)	91 (226)	124 (306)	98 (241)	55 (135)
Residential Land Taken, hectares (acres)	4 (9)	16 (40)	4 (11)	5 (12)
Existing Roadway Taken or Occupied, hectares (acres)	4 (10)	12 (30)	5 (13)	16 (39)
Wooded Land Taken, hectares (acres)	37 (92)	21 (53)	18 (45)	12 (29)
Relocations				
Residential	4	16	4	2
Other	0	0	0	0
Noise Impacts (receptors > 65 dBA)	2	5	2	2
Length of Floodplain Crossing, meters (feet)	2,584 (8,480)	816 (2,680)	701 (2,300)	366 (1,200)
Estimated Wetland Area Impacted, hectares (acres)	6.6 (16.5)	1.6 (4.0)	1.0 (2.5)	0.6 (1.5)
Estimated Number of Crossings of Waters of the U.S.	8 crossings	4 crossings	3 crossing	4 crossings
Estimated Construction Cost (\$ millions)	65.8	69.4	75.9	65.3
Est. Construction Cost Impacts on Other Projects (\$ millions)	10.6	3.5	3.5	0



MISSOURI HIGHWAY AND TRANSPORTATION DEPARTMENT

Capitol Ave. at Jefferson St., P.O. Box 270, Jefferson City, MO 65102 Telephone (573) 751-2551 Fax (573) 751-6555

July 22, 1996

Mr. Gary Frazer, Field Supervisor
U.S. Fish and Wildlife Service
Columbia Field Office
608 East Cherry, Room 207
Columbia, MO 65201

Attention: Mr. Mike LeValley

Dear Mr. Frazer:

Subject: Preliminary Studies, Route 61, Marion Co., Route 61 to S/O Route 36
(Hannibal Relocation), Job No. J3P0426 and Route 61, Ralls County,
S/O Route 36 (Hannibal Relocation) to S/O Route M, Job No. J3P0427,
Final Environmental Impact Statement, Threatened and Endangered Species
Coordination

This responds to the U.S. Department of the Interior's (USDI) comments on the Final Environmental Impact Statement (FEIS) for the subject project. In these comments, the USDI stated that the U.S. Fish and Wildlife Service (Service) did not concur that the preferred alternative would not adversely affect the federally-listed endangered Indiana bat. The USDI recommended that informal consultation be continued or formal consultation be requested with your office.

On the behalf of the Federal Highway Administration (FHWA), the Missouri Highway and Transportation Department (MHTD) has developed supplemental data (below) which we believe support a finding that construction of the preferred alternative (Alternative F) will not adversely affect summering Indiana bats in the project area. These data were derived from the field data presented in Appendix B of the FEIS and were discussed with Mr. Mike LeValley and Dr. Paul McKenzie of your staff on July 19, 1996. These supplemental data, and our impact assessment methodology, incorporate the results of recent studies of Indiana bat summer habitat requirements and use which are soon to be included in the Revised Draft Recovery Plan for the Indiana Bat (RDRPIB).

1. Of the build alternatives evaluated in detail, Alternative F will result in the least impact to wetlands (1.5 ac), floodplains (1,200 ft. length), and forested lands (29 ac); all provide potential summer maternity habitat for the Indiana bat.

2. The RDRPIB indicates that the mean nightly foraging area for lactating adult female Indiana bats is considered to be an 850 ac circular area. Given this basis, a series of eight 850 ac circular plots (F-1 through F-8) were centered on the entire alignment length of Alternative F (Exhibit B-2). Of the seven plots ranked as suitable foraging habitat (Table B4-1), a total of 783 ac of forested lands are available to the Indiana bat as habitat. However, only 29 ac of these forested lands will be impacted by Alternative F, representing a negligible loss of foraging habitat. As for potential secondary impacts due to the future presence of the highway, several radio-tracking studies of the foraging ranges of Indiana

Mr. Gary Frazer
July 22, 1996
Page 2

bats have indicated that the presence of even interstate highways in highly urbanized areas (i.e., I-465 and the Indianapolis International Airport, Indianapolis, Indiana) do not constitute barriers to the nightly foraging bouts of Indiana bats.

3. The FEIS (Table B4-2) provides data on the density of potential roost trees (PRTs; defined as live or dead trees containing $\geq 25\%$ exfoliating bark which are ≥ 9 in diameter-at-breast-height) within four of the 850 ac circular plots (F-2, F-4, F-5, and F-8) defined above; plots F-1, F-3, F-6 and F-7 did not contain suitable PRTs. The total number of PRTs available within the four circular plots identified above was calculated by multiplying the density of PRTs/ac by the amount of forested lands within that plot. Therefore, approximately 5,200 PRTs are present within the 512 ac of forested lands within the four plots. Given a mean density of 5 PRTs/ac for these plots, there would be approximately 145 PRTs within the 29 ac of forested lands impacted by Alternative F.

4. Data in the RDRPIB indicate that in northern Missouri a single colony of Indiana bats (from 50 - 100 females) may use 17 different PRTs within their colonies' range. Therefore, within each of the four 850 ac circular plots which contain approximately 5,200 PRTs, an average of 1264 PRTs would still be available to any single colony following the removal of 145 PRTs for Alternative F.

5. As a measure to avoid take of summering Indiana bats, every effort will be made to avoid removing PRTs during the range-wide maternity period of April 1 through September 30. However, if it becomes absolutely necessary to remove PRTs during the maternity period, an inspection of each individual PRT to be removed would be made by MHTD to determine if they are occupied by Indiana bats. No PRT which is found to be occupied by Indiana bats would be removed until after the bats have vacated the roost. In either case, the FWS would be notified immediately if occupied roosts are encountered.

6. In the context of PRT availability on a much broader landscape approach, Marion and Ralls Counties contain 50,000 ac and 61,000 ac of forested lands respectively (Timber Resources of Missouri's Prairie, 1989, USDA, Resource Bulletin NC-117). According to the forest inventory and analysis statistics, almost half of the species of trees which comprise the forests in these counties are the species of trees used most frequently by Indiana bats as maternity roosts. Statistics for the predicted annual mortality rates of these species (26% for red oaks, 9% for hickories, 12% for elm and 21% for cottonwoods) ensure that an ample supply of PRTs will be available in this area in the future. Given an equal distribution of 5 PRTs/ac, there could be approximately 555,000 PRTs available in the forested lands in Marion and Ralls Counties alone, or enough roosts for 32,600 maternity colonies of Indiana bats (based on the use of 17 PRTs/colony reported in the RDRPIB). This would be enough PRTs to support 1.6 million summering Indiana bats (based on 50 females/colony). According to the most recent population estimates from major hibernacula, there are approximately 333,000 Indiana bats known to exist within the entire range of the species.

Mr. Gary Frazer
July 22, 1996
Page 3

Based on these supplemental data, we ask for your concurrence that the proposed action is not likely to adversely affect summering Indiana bats. The FHWA will address the results of our informal Section 7 consultation in the ROD.

Thank you for your assistance related to this matter and your expeditious processing of this request to meet our timetable.

Sincerely,



Gene Gardner
Biological Sciences/Endangered Species Specialist

gg/sw

Copies: Mr. Bob Sfreddo-de
Mr. Dick Jones-3
Mr. Gerald Reihsen-FHWA



IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Fish and Wildlife Enhancement
Columbia Field Office
608 East Cherry Street
Columbia, Missouri 65201

FWS/AES-CMFO

JUL 23 1996

Mr. Gene Gardner
Biological Sciences/Endangered Species Specialist
Missouri Highway and Transportation Department
Capitol Avenue at Jefferson Street
P.O. Box 270
Jefferson City, Missouri 65102

Dear Mr. Gardner:

This responds to your July 22, 1996, letter which provided additional data in support of a finding that the Route 61 improvement project in Marion and Ralls Counties, Missouri was not likely to adversely affect the federally-listed endangered Indiana bat. These data were discussed with Mike LeValley and Dr. Paul McKenzie of my staff on July 19, 1996.

The U.S. Fish and Wildlife Service concurs with your finding based on the additional data and information that you provided. Although up to 29 acres of forested habitat and 145 potential maternity roost trees may be impacted by the project, your analysis shows that an excess of suitable roost trees and foraging habitat currently exists in the project area. Coupled with your original commitment to avoid direct take of bats by prohibiting clearing of occupied roost trees (as discussed in Item 5 of your letter), our concerns are satisfied.

This concludes Section 7 consultation on the proposed action. Should project plans change, or new information become available that would change your conclusion, consultation should be reinitiated with this office.

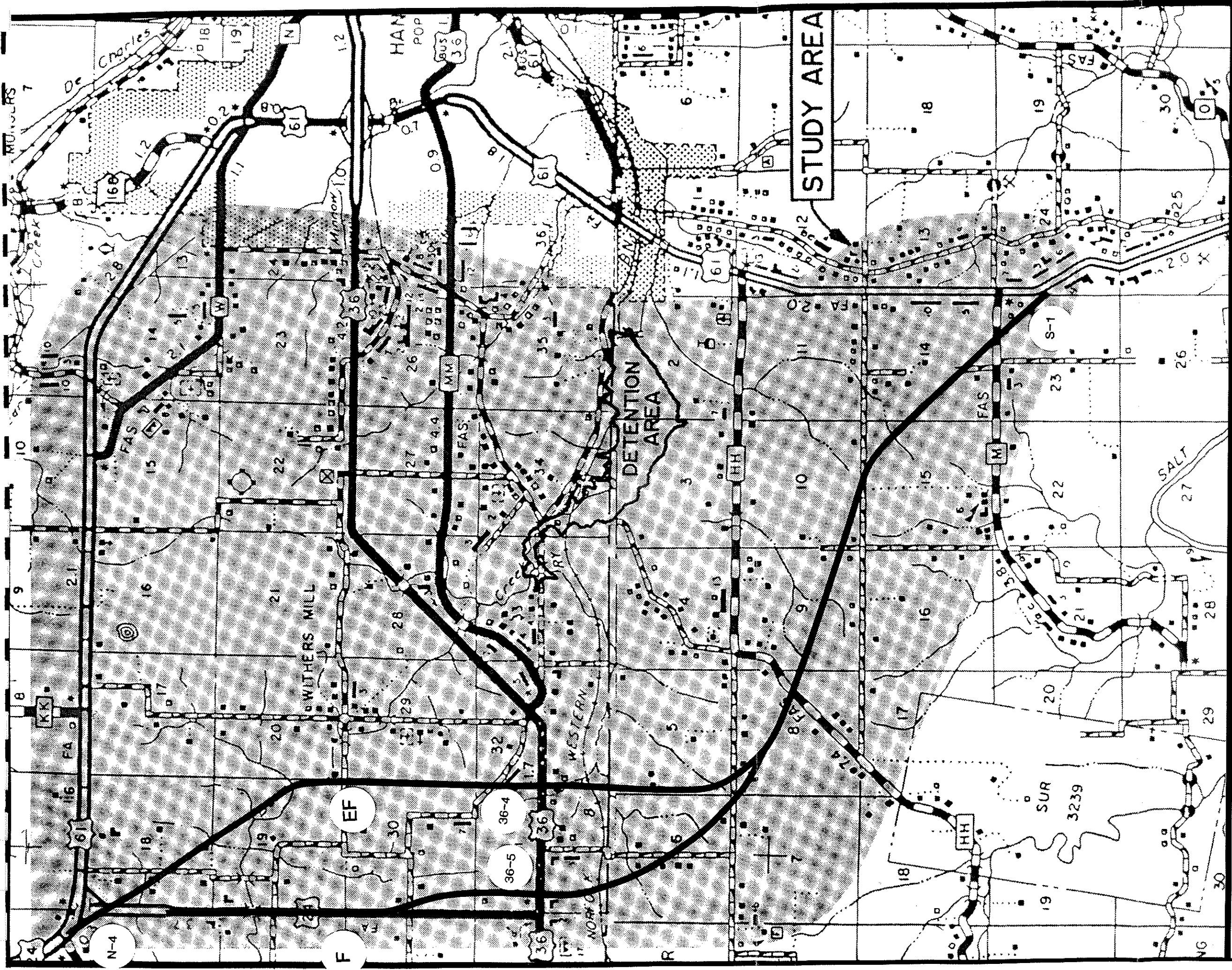
We appreciate your interest in protection of threatened and endangered species. Please contact Mr. Mike LeValley at (573) 876-1911 if you have any questions or we can provide further assistance.

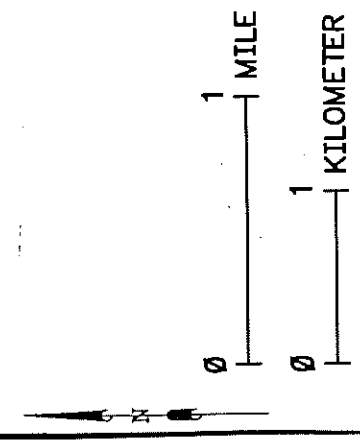
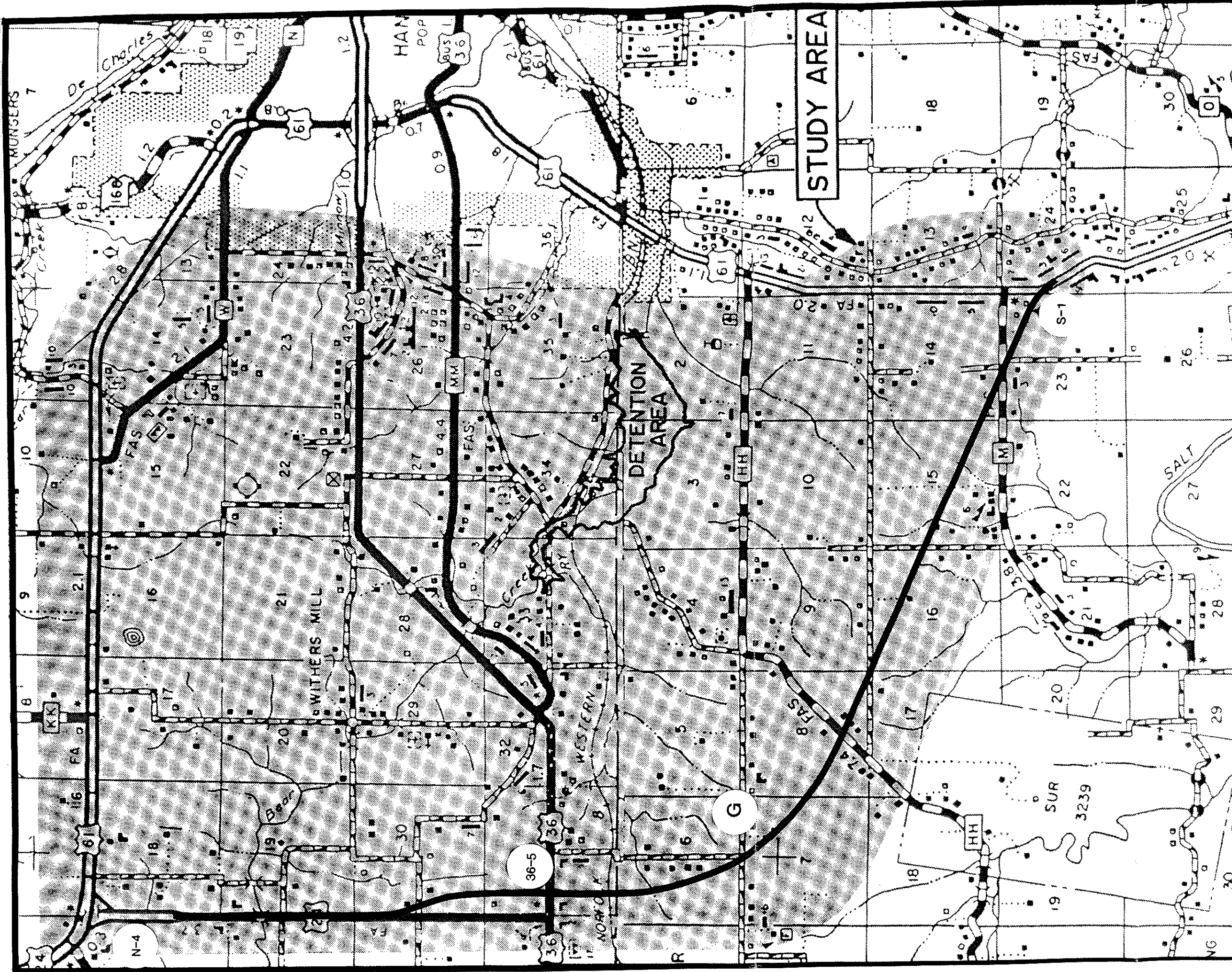
Sincerely,


Gary D. Frazer
Field Supervisor

bcc: Figg, MDC

MJL:ml:\1541\US61 Marion and Ralls Counties





PRELIMINARY
ALTERNATIVES
Exhibit 2-2i

interchange at Routes 36 and 61 will be a no-local-access cloverleaf type. These alternatives have relatively higher numbers of existing buildings and higher potential for wetlands impacts. They have the longest total travel distance and they have the expense of crossing the detention area. They would require approximately 900 meter (3,000 feet) long structures or a large amount of fill and redesign, and acquisition of additional detention area land to compensate for crossing the detention area. Alternative A is shown as being on the dam of the detention area. This would require a large amount of fill, redesign and modification of existing structures, as well as additional wetlands impacts. The primary problem associated with these alternatives is the insufficient room for an interchange between the two approved interchanges on Route 36. The distance between the two approved interchanges on Route 36 at Airport Road and Head Lane is about 2.9 km (1.8 miles). The minimum requirement for spacing of interchanges is 3.2 km (2 miles) in a non-urban area and 1.6 km (1 mile) apart in an urban area. If a third interchange were introduced between these, the spacing would be considerably less than one mile. Alternatives A, A1, and A2 were eliminated.

2.2.3.2 Evaluation of Alternative B

Alternative B is very similar to Alternative C, except that it travels north of, and then through the detention area, whereas Alternative C avoids the detention area by passing south of it. Crossing the detention area represents a large expense and the potential for significant impact because of the very long structure that would be required. Alternative B also has 14 estimated buildings compared to six along Alternative C. Because they are similar, but Alternative C has the above advantages, Alternative B was eliminated.

2.2.3.3 Evaluation of Alternatives C, C1, C2, and CW

Alternatives C, C1 and CW are identical south of the point where they join near Withers Mill. Alternative C begins at Node N-2, CW begins at Node N-3, and C1 begins at Node N-4. The use of Node N-2 requires a larger curve, and has no other apparent advantage over C1 or CW. Alternative C1 has an estimated ten potential relocations, compared to six for Alternative C and seven for Alternative CW. Alternative C1 has no apparent advantages over Alternative CW. Therefore, by comparison with Alternative CW, Alternatives C and C1 were eliminated.

Alternative C2 was compared with Alternative CW. The southern half of both alternatives is similar, but the northern half of Alternative C2 lies west of Alternative CW, and the interchange with Route 36 is also farther west. Since Alternative CW had the advantage of being farther east and closer to the hospital, and in other respects the alternatives were very similar, Alternative C2 was eliminated in favor of Alternative CW.

2.2.3.4 Evaluation of Alternatives D and D1

The D Alternatives are attractive for further study for several reasons. They are the shortest and most direct routes. Like the far western alternatives they have no major stream crossings. However, they also have much less impact on prime farmland than the far western routes. There is negligible difference between Alternatives D and D1 and they are in close proximity to one another. In a comparison of the two, Alternative D1 was eliminated because it is slightly longer and has no apparent advantage.

2.2.3.5 Evaluation of Alternatives E, E1, E2 East and E2 West

Alternatives E and E1 are very similar to D, but less direct and farther away from the hospital. In a comparison with Alternative D they had no apparent advantage and were eliminated.

Alternatives E2 East and E2 West are even more similar to D, using the same node on Route 36. They are also less direct, and in a comparison with Alternative D they had no apparent advantage and were eliminated.

2.2.3.6 Evaluation of Alternatives G and F

Alternative G is similar to F, but farther west. In the southern portion of the study area, Alternative G crosses some large reservoirs, which F does not. In a comparison with Alternative F, Alternative G had the disadvantage of the reservoir crossings and no apparent advantages. Alternative G was therefore eliminated.

2.2.3.7 Evaluation of Alternative EF

Alternative EF was selected as a means of providing a link between the F and D alternatives, and of providing more coverage of the study area. It is also the only alternative which has the most problem-free node on Route 36, Node 36-4. (Nodes 36-2 and 36-3 are both very close to Route MM, and to the developed areas on Route MM. Node 36-5 will require the elimination of a planned approved interchange on Route 36 at Route 24.)

2.2.3.8 Links 1 and 2

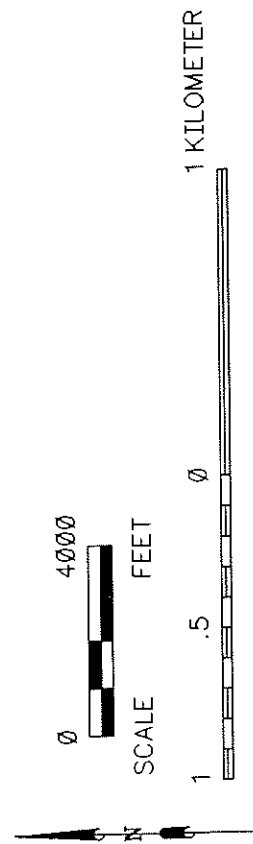
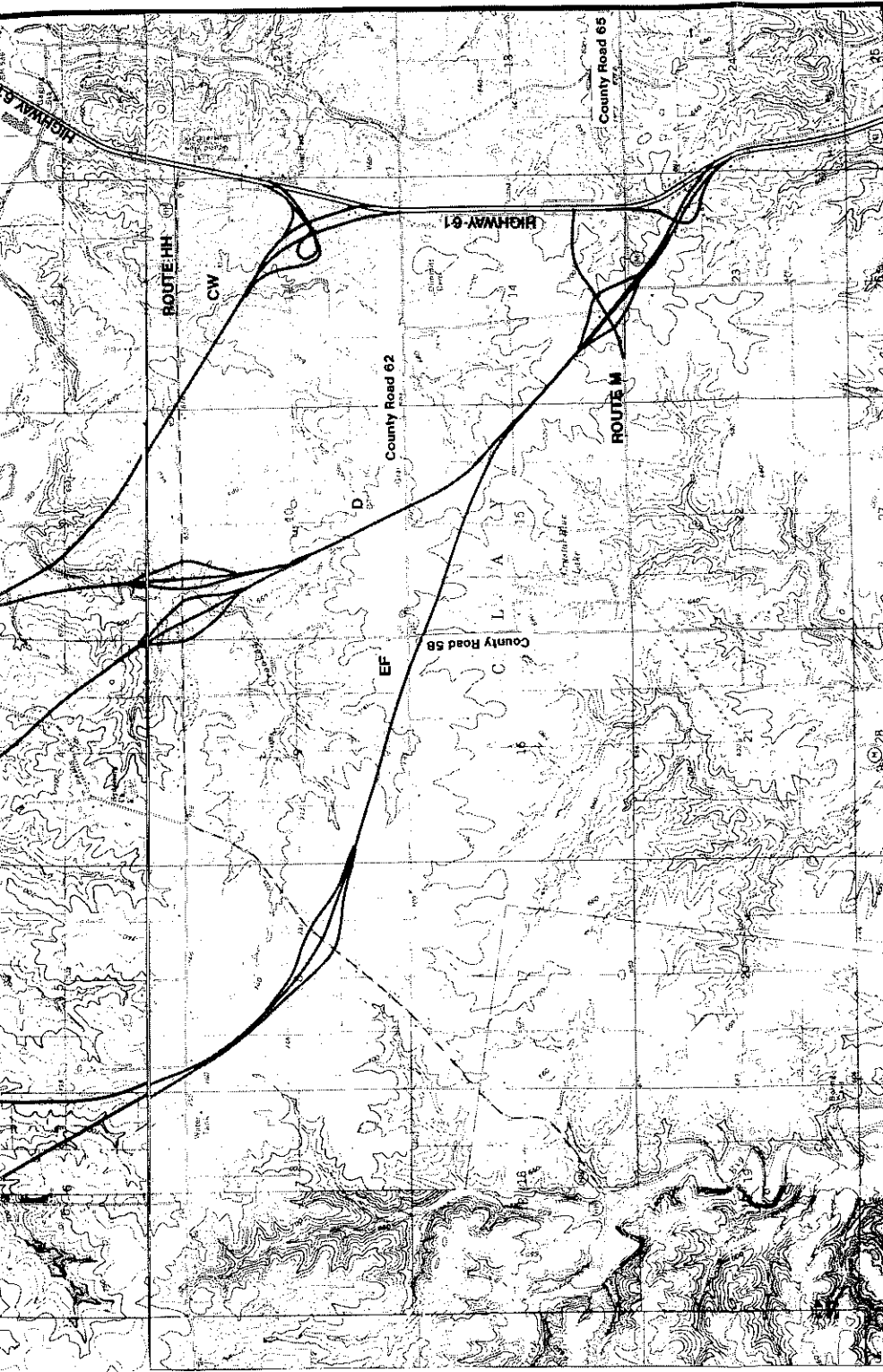
Links 1 and 2, which are segments of eliminated routes, were added to provide more options. Use of the links will allow combinations of the different alternatives.

2.3 ALTERNATIVES FOR DETAILED STUDY

Alternatives CW, D, EF, and F; as well as Links 1 and 2 were selected for detailed study. These alternatives are shown in Exhibit 2-3.

2.3.1 Alternative CW

Alternative CW is the easternmost alternative. The other three alternatives have common north and south termini; both the north and south termini for Alternative CW are different from the others. The northern terminus is about 1,800 meters (6,000 feet) east of the existing Routes 61/24 interchange. The alignment runs due south for about 2,100 meters (7,000 feet). Then, just north of the old railroad grade and about 1,050 meters (3,500 feet) northwest of Withers Mill, it turns toward the southeast, bypassing Withers Mill to the northeast. The alignment is within 300 meters (1,000 feet) of the intersection of Withers Mills Road and West Ely Road at Withers Mill. There will be grade separated crossings at both Withers Mill Road and West Ely Road with both Withers Mill Road and West Ely Road passing over Alternative CW. The only interchange on Alternative CW is with Route 36. As shown in Exhibit 2-3, the interchange is northwest of existing Route 36. North of the Route 36 interchange, Alternative CW lies north and east of Bear Creek. At Route 36, the western portion of the interchange is within the floodplain of Bear Creek. Siting an intersection on Alternative CW with Route 36 was difficult, primarily because Route 36,



REFERENCE: Drawing taken from U.S.G.S. Quadrangles -
 Rensselaer, MO dated 1958, Quincy SW, MO-IL dated 1971,
 Palmyra, MO dated 1975 and Hannibal West, MO dated 1971.

ALTERNATIVES FOR DETAILED STUDY Exhibit 2-3

Route MM, and Bear Creek all converge at this location, and there is development along both Route 36 and Route MM. There is a grade separated crossing at Route MM just south of Route 36. South of the Route 36 interchange Alternative CW is within the floodplain of Bear Creek for about 2,100 meters (7,000 feet). It runs along the northeast side of the creek for about 1,200 meters (4,000 feet), then crosses the creek very close to its confluence with Little Bear Creek. Alternative CW then continues southeasterly on the south side of Bear Creek. There is a grade separated crossing at the Norfolk and Western Railroad (300 meters [1,000 feet] south of the Bear Creek crossing), and another grade separated crossing at Paris Road (900 meters [3,000 feet] south of the railroad). About 450 meters (1,500 feet) south of Paris Road Alternative CW crosses Crooked Creek, at a point about 600 meters (2,000 feet) upstream from its confluence with Bear Creek. Alternative CW then continues southeasterly, with a grade separated crossing at Route HH and a southern terminus on Route 61 at Ralls County Road 62.

2.3.2 Alternative D

Alternative D begins at the existing Routes 61/24 interchange and continues in a southeasterly direction parallel and east of the old railroad grade for about 2,700 meters (9,000 feet). The alignment then travels due south for about 1,500 meters (5,000 feet). Within this segment it crosses Bear Creek and passes west of Withers Mill, about 900 meters (3,000 feet) west of the intersection of Withers Mill Road and West Ely Road, with a grade separated crossing at West Ely Road. After crossing Bear Creek, the alignment follows the ridge on the southwest side of Bear Creek. Along this ridge it continues in a southeasterly direction, with a grade separated crossing at Withers Mill Road and a cloverleaf interchange with existing Route 36. The alignment then continues in a southeasterly direction, going down into the valley of Little Bear Creek, with a grade separated crossing at Route MM and a combined crossing of the Norfolk and Western Railroad and Little Bear Creek, about 1,050 meters (3,500 feet) southeast of Route 36. The alignment continues in a southeasterly direction, coming up out of the valley, with a grade separated crossing at the top of the ridge at Paris Road, about 900 meters (3,000 feet) southeast of the railroad crossing. The alignment follows the ridge for about 600 meters (2,000 feet), then goes into the valley of Crooked Creek, first crossing an intermittent tributary of Crooked Creek, then Route HH, then Crooked Creek which is also only an intermittent stream at the point of crossing. There is a diamond interchange with Route HH. The alignment then continues in a southeasterly

direction, coming up out of the valley, with a grade separated crossing at Ralls County Road 62 at the top of the ridge. Continuing in a southeasterly direction, the alignment follows the ridgetop for about 3,300 meters (11,000 feet), with a grade separated crossing at Route M, to an interchange at existing Route 61 about 3,000 feet south of Route M.

2.3.3 Alternative EF

Alternative EF coincides with Alternative D for approximately 4,500 meters (15,000 feet), from the interchange at Routes 61/24 to a point about 300 meters (1,000 feet) south of the West Ely Road crossing. The alignment then continues due south, following close to the top of the ridge, to the cloverleaf interchange with relocated Route 36, north of the existing Route 36. Just north of the interchange there is a grade separated crossings of Marion County Road 426 over or under existing Route 36. Existing Route 36 will become a service road. The alignment continues in a southeasterly direction into the drainage of Little Bear Creek, with four crossings of intermittent tributaries of Little Bear Creek. Within this drainage area, near the Marion/Ralls County line and about 900 meters (3,000 feet) south of existing Route 36, Alternative EF crosses the Norfolk and Western Railroad. The alignment then travels up out of the valley, with a grade separated crossing of Paris Road near the top of the ridge. For most of the remaining 7,200 meters (24,000 feet) of the route, the alignment travels close to the top of the ridge that forms the drainage divide between Bear Creek and the Salt River. There is one crossing of a small intermittent tributary of Crooked Creek. About 1,200 meters (4,000 feet) southeast of Paris Road there is a diamond interchange at Route HH. The last 2,700 meters (9,000 feet) of Alternative EF coincides with Alternative D.

2.3.4 Alternative F

Alternative F generally stays atop the ridges that form the drainage divide, except where it crosses Bear Creek, two intermittent tributaries of Little Bear Creek, and one intermittent tributary of Crooked Creek. This alignment uses the right-of-way of existing Route 24 for the northbound lanes from the existing Routes 61/24 interchange to a point approximately 750 meters (2,500 feet) north of the existing Routes 36/24 interchange. A new lane will be constructed to the west of existing Route 24 for this portion of Alternative F. The alignment crosses Bear Creek about 2,100 meters (7,000 feet) south of the existing Route 61/24

interchange. A diamond interchange will be constructed between Marion County Road 424 and Marion County Road 426, as shown in Exhibit 2-3. Marion County Roads 424 and 426 will both dead end at Alternative F on the east side. A new east-west roadway will be constructed between the county roads, from the proposed new interchange east for about 460 meters (1,500 feet), to connect with Marion County Road 424. A west outer road will be constructed from the Routes 61/24 interchange to Marion County Road 426, also allowing access to the new interchange between the county roads. The outer road and other changes discussed above are shown in Exhibit 2-3. Approximately 750 meters (2,500 feet) north of the existing Routes 24/36 interchange, Alternative F turns toward the southeast and away from the existing Route 24 alignment. The route continues south to a cloverleaf interchange with Route 36 just northeast of the existing Routes 24/36 intersection. At the south end of the proposed Routes 61/36 interchange, Alternative F crosses existing Route 36, which will be a service road. The alignment then continues in a southeasterly direction, going down into the upper drainageway of Little Bear Creek, and crosses the Norfolk and Western Railroad near the Marion/Ralls County line, about 900 meters (3,000 feet) south of existing Route 36. The alignment then continues in a southeasterly direction, along the upper part of the Little Bear Creek drainage, then travels up out of the valley and crosses Paris Road near the top of the ridge. From this point to the southern terminus, a distance of about 7,200 meters (24,000 feet), Alternative F coincides with Alternative EF.

Alternative F has been identified by MHTD as the preferred alternative based on an assessment of the social, economic, engineering and environmental consequences of the alternative, in combination with public involvement.

2.3.5 Link 1

Link 1 is an approximately 800 meters (2,640 feet) long segment near the northern portion of the project area. This link allows for a combination of Alternative D or EF with Alternative CW. It essentially allows the use of Alternative CW with the northern terminus at the existing Routes 61/24 interchange instead of a terminus to the east.

2.3.6 Link 2

Link 2 is an approximately 2,300 meters (8,000 feet) long segment near the southern portion of the project areas. This link also allows for a combination of Alternative D or EF with Alternative CW. It essentially allows for the use of most of Alternative CW, but with the southern terminus south of Route M rather than at Ralls County Road 62, which is approximately 2.4 km (1.5 miles) to the north.

2.3.7 Changes in Route 36 Alignment

As shown in Exhibit 2-3, all of the alternatives, except Alternative D, require a relocation of Route 36 in the vicinity of the Routes 61/36 interchange. This relocation is proposed primarily to reduce the impacts from the interchange on residences and businesses along existing Route 36. The specific issues related to the relocated section of Route 36 for each alternative are discussed below. Route 36 within the project areas is scheduled to be improved from two lanes to a four-lane, fully-limited-access highway. These improvements were evaluated in an Environmental Assessment and a Finding of No Significant Impact (FONSI) for that project which was issued by the Federal Highway Administration in November 1993. The design for the relocated section of Route 36 within the project area will begin when the Record of Decision for the present project is issued. Impacts resulting from the relocation of Route 36 (other than previously approved relocation) are addressed in this document. Relocated sections of Route 36 are designated according to the corresponding alternative: 36-CW, 36-EF, and 36-F.

2.3.7.1 Alternative CW/36 Interchange (36-CW)

Alternative CW involves relocating about 2.4 km (1.5 miles) of Route 36 from its original approved location. The proposed relocation moves the Alternative CW/Route 36 interchange entirely to the north of existing Route 36. If the interchange had been placed at the approved/existing Route 36 location, it would have obliterated a small neighborhood of about nine houses that is located between Route 36 and Route MM. At the original location, Route 36 and Route MM are only about 120 meters (300 feet) apart along a length of about 540 meters (1,800 feet). The interchange at the approved Route 36 location caused about 720 meters (2,400 feet) of existing Route MM to be within the footprint of the interchange, and

would therefore have required the relocation of Route MM.

2.3.7.2 Alternative EF/36 Interchange (36-EF)

Alternative EF involves the relocation of about 2.4 km (1.5 miles) of Route 36 from its approved location, which is adjacent to its existing location. The Alternative EF/Route 36 interchange is directly north of existing Route 36. There were two major reasons for placing the interchange to the north:

- More favorable topography
- Fewer relocations

First, the topography. The headwaters of a southeast-flowing intermittent tributary to Little Bear Creek lie about 360 meters (1,200 feet) northwest of existing Route 36 at the location of the Alternative EF crossing. Just to the north of Route 36 at this location is a broad, gently sloping hillside. To the south of Route 36 is the valley of the intermittent stream and another stream which it joins. At the proposed Alternative EF/36 interchange location, most of the interchange is on the broad, gentle slope. If the interchange were located at the approved Route 36 location, much of it would be in the stream valley, requiring greater grade changes, and fill in the stream valley with potentially adverse wetland and stream quality impacts.

Secondly, locating the Alternative EF/36 interchange at the approved location would require the relocation of about seven additional residences, several of which are farms with associated structures.

2.3.7.3 Alternative F/36 Interchange (36-F)

The approved improvements on Route 36 include a diamond interchange at Route 24, north of the existing Routes 36/24 intersection. With Alternative F, this interchange would be eliminated and replaced by a cloverleaf interchange to the northeast. This new interchange location also requires relocating the approved Route 36 alignment for about 2.4 km (1.5 miles). Locating the interchange at the approved Route 36 location would have required the relocation of three additional residences (including two farmsteads), and would have

displaced some of the businesses at the existing Route 36, including the truck stop. Because of the nature of this particular business, its relocation could pose some environmental liabilities.

2.4 COST COMPARISON OF ALTERNATIVES

Since all alternatives have some alignment segments that are the same, we divided the alternatives into segments for ease of comparison purposes. Segment designations are shown in Exhibit 2-4. The following Tables 2-2 through 2-8 show the information on each segment used to develop comparison factors and estimated construction cost for the alternatives. Table 2-3 shows which segments are included for each alternative. Table 2-4 provides information on each segment and some factors have been applied to develop construction cost for each segment. These comparison factors include:

- Travel Length - total travel length of each segment from the Route 61/24 interchange to the Route M/61 intersection.
- Construction Length - total length of new construction of a two lane pavement section for each segment.
- Existing Pavement - total length of existing pavement used in the total travel length of each segment.
- Stream Bridges - the number of bridges estimated for stream crossings for each segment.
- Floodplain Crossings - total length of proposed roadway constructed in floodplains for each segment.
- Interchanges - total number and type of proposed interchanges necessary for each segment.
- Structures - total number of structures that are in the proposed 90 m (300 feet) right-of-way for each segment.

Legend



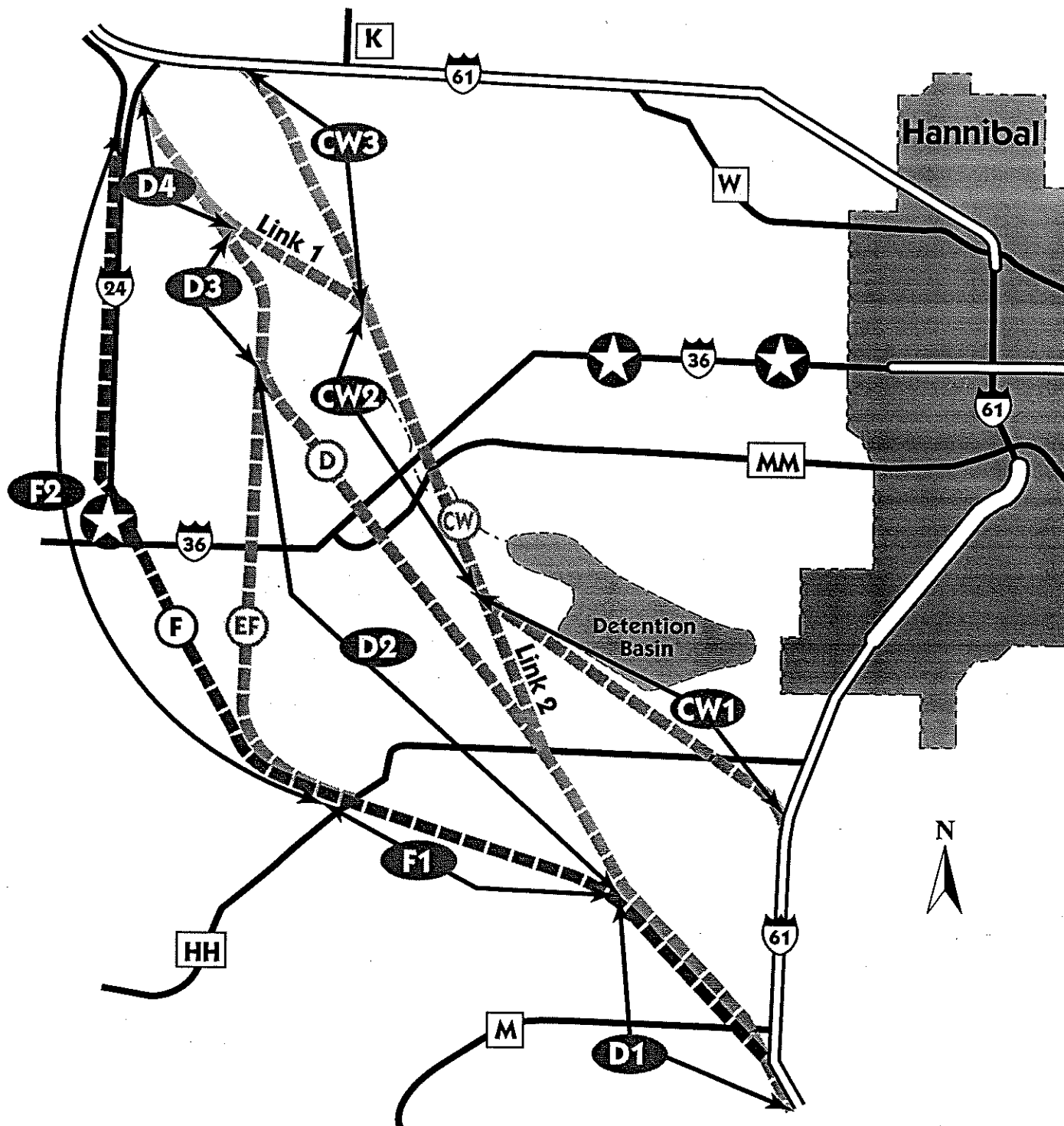
Alternative F (preferred alternative)



Alternate corridors which were studied



Location of previously approved interchange Route 36



Alternative Segments

NOT TO SCALE

Table 2-2

SUMMARY TABLE

ALTERNATE	ESTIMATED COST
CW	\$ 65,778,221.11
D	\$ 69,386,503.00
EF	\$ 75,897,881.30
F	\$ 65,354,665.95

Table 2-3

PROPOSED ROUTE SUMMARY

PROPOSED ROUTE	SECTIONS INCLUDED	TRAVEL LENGTH (1)		CONST. LENGTH (2)		ESTIMATED COST
		(km)	(mi)	(km)	(mi)	
CW	CW1+CW2+CW3	16.44	10.25	30.88	19.25	\$ 65,778,221.11
D	D1+D2+D3+D4	15.11	9.42	36.26	22.60	\$ 69,386,503.00
EF	D1+F1+EF1+D3+D4	16.48	10.27	38.98	28.25	\$ 75,897,881.30
F	D1+F1+F2	16.33	10.18	31.94	19.91	\$ 65,354,665.95
EXISTING 61 (3)		24.37	15.14	0	0	0

(1) Actual Distance Traveled

(2) Mileage Per 2 - Lanes

(3) No Action Alternative

Table 2-4

Highway 61

HWY. SECTION	D1	D2	D3	D4	F1	F2 (3)	EF1	CW1	CW2	CW3	LINK1	LINK2
TRAVEL LENGTH (1)												
kilometers	2.58	8.28	1.91	2.34	5.25	8.50	4.40	6.74	5.15	4.56	0.80	3.50
miles	1.61	5.16	1.19	1.46	3.27	5.30	2.74	4.20	3.21	2.84	0.50	2.18
CONSTRUCTION LENGTH (2)												
kilometers	7.15	16.56	3.82	8.73	10.49	14.29	8.79	8.66	12.79	9.43	1.60	6.99
miles	4.46	10.32	2.38	5.44	6.64	8.91	5.48	5.40	7.97	5.88	1.00	4.36
EXISTING PAVEMENT (2)												
kilometers	0	0	0	0	0	3.53	0.00	5.09	0.00	3.21	0	0
miles	0	0	0	0	0	2.20	0.00	3.17	0.00	2.00	0	0
STREAM BRIDGES												
each	0	2	2	0	0	2	2	6	4	2	2	6
FLOOD PLAIN X-INGS												
kilometers	0	0.16	0.66	0	0	0.37	0	0.08	2.50	0	0	0.30
miles	0	0.10	0.41	0	0	0.23	0	0.05	1.56	0	0	0.19
INTERCHANGES												
clover	0	1	0	0	0	1	1	0	1	0	0	0
diamond	1	1	0	0	1	1	1	0	0	0	0	1
trumpet	0	0	0	1	0	0	0	0	0	1	0	0
other	0	0	0	0	0	1	0	1	0	1	0	0
STRUCTURES												
houses	1	3	0	1	0	1	0	2	1	0	0	0
sheds/barns	4	16	0	7	2	14	6	2	1	0	0	0
PRIME FARMLAND												
hectares	10	16	21	34	63	153	4	11	23	41	8	3
acres	25	40	52	85	155	378	10	26	56	102	20	8
LAND (OTHER USE)												
hectares	34	108	17	0	7	15	79	30	81	10	0	2
acres	84	268	43	0	18	38	196	75	200	25	0	6
BRIDGES												
railroad	0	2	0	0	0	2	2	0	2	0	0	0
highway	2	7	2	2	3	7	7	3	7	2	0	1
OUTER ROADS/CROSS ROADS												
kilometers	0.80	2.41	0.64	0.96	2.57	6.10	0.96	5.28	7.54	3.69	0	0
miles	0.5	1.5	0.4	0.6	1.6	3.8	0.6	3.29	4.70	2.30	0	0
PONDS												
hectares	0	2.6	0	0	1.2	0.9	1.2	0.4	0.8	0.4	0	0.6
acres	0	6.5	0	0	3.0	2.1	3.0	1.0	2.0	1.0	0	1.5
UTILITY CROSSINGS												
each	2	3	0	0	2	1	1	3	0	1	1	1
CULTURAL RESOURCES												
each	1	0	0	0	0	0	0	0	0	0	0	0
POT. HAZ. WASTE												
each	0	0	0	0	0	0	0	0	0	0	0	0
WATER QUALITY IMP.												
each	0	0	0	0	0	0	0	0	0	0	0	0
WETLANDS												
hectares	0	0	2.5	0	0	0.4	0.4	0	6.6	0.6	2.0	0
acres	0	0	6.3	0	0	1.0	1.0	0	16.5	1.6	5.0	0
ESTIMATED COST												
	\$ 12,664,154.10	\$ 32,498,664.20	\$ 7,247,289.90	\$ 16,976,394.80	\$ 17,096,052.30	\$ 35,594,459.55	\$ 21,913,990.20	\$ 18,419,700.86	\$ 28,185,718.25	\$ 19,172,802.00	\$ 2,677,385.00	\$ 15,263,898.60

(1) Actual Distance Traveled

(2) Mileage Per 2 - Lanes

(3) Cost Includes 7" Overlay of N.B. Lanes of Existing Hwy. 24 to be used as N.B. Rte. 61

ALTERNATE 'CW'

HWY. SECTION	CW1*	CW2**	CW3***	TOTAL
TRAVEL LENGTH (1)				
kilometers	6.74	5.15	4.56	16.44
miles	4.20	3.21	2.84	10.25
CONSTRUCTION LENGTH (2)				
kilometers	8.66	12.79	9.43	30.88
miles	5.40	7.97	5.88	19.25
EXISTING PAVEMENT (2)				
kilometers	5.09	0.00	3.21	8.29
miles	3.17	0.00	2.00	5.17
STREAM BRIDGES				
each	6	4	2	12
FLOOD PLAIN X-INGS				
kilometers	0.08	2.50	0	2.58
miles	0.05	1.56	0	1.61
INTERCHANGES				
clover	0	1	0	1
diamond	0	0	0	0
trumpet	0	0	1	1
other	1	0	1	2
STRUCTURES				
houses	2	1	0	3
sheds/barns	2	1	0	3
PRIME FARMLAND				
hectares	11	23	41	74
acres	26	56	102	184
LAND (OTHER USE)				
hectares	30	81	10	121
acres	75	200	25	300
BRIDGES				
railroad	0	2	0	2
highway	3	7	2	12
OUTER ROADS				
kilometers	5.28	7.54	3.69	16.51
miles	3.29	4.70	2.30	10.29
PONDS				
hectares	0.4	0.8	0.4	1.6
acres	1.0	2.0	1.0	4.0
UTILITY CROSSINGS				
each	3	0	1	4
CULTURAL RESOURCES				
each	0	0	0	0
POT. HAZ. WASTE				
each	0	0	0	0
WATER QUALITY IMP.				
each	0	0	0	0
WETLANDS				
hectares	0	6.6	0.6	7.2
acres	0	16.5	1.6	18.1
EST. COST	\$18,419,700.86	\$ 28,185,718.25	\$ 19,172,802.00	\$ 65,778,221.11

(1) Actual Distance Traveled

(2) Mileage Per 2 - Lanes

*Includes Two Major Utility Relocations

**Includes extra Lane on 36

***Includes Interchange "F" & 24

ALTERNATE 'D'

(w/No.1 Interchange @ Rte. "F" & No. 3 Interchange @ Rte. "M")

HWY. SECTION	D1*	D2	D3	D4**	TOTAL
TRAVEL LENGTH (1)					
kilometers	2.58	8.28	1.91	2.34	15.11
miles	1.61	5.16	1.19	1.46	9.42
CONSTRUCTION LENGTH (2)					
kilometers	7.15	16.56	3.82	8.73	36.26
miles	4.46	10.32	2.38	5.44	22.60
EXISTING PAVEMENT (2)					
kilometers	0.00	0.00	0.00	0.00	0.00
miles	0.00	0.00	0.00	0.00	0.00
STREAM BRIDGES					
each	0	2	2	0	4
FLOOD PLAIN X-INGS					
kilometers	0.00	0.16	0.66	0.00	0.82
miles	0	0.10	0.41	0.00	0.51
INTERCHANGES					
clover	0	1	0	0	1
diamond	1	1	0	0	2
trumpet	0	0	0	1	1
other	0	0	0	0	0
STRUCTURES					
houses	1	3	0	1	5
sheds/barns	4	16	0	7	27
PRIME FARMLAND					
hectares	10	16	21	34	97
acres	25	40	52	85	202
LAND (OTHER USE)					
hectares	34	108	17	0	160
acres	84	268	43	0	395
BRIDGES					
railroad	0	2	0	0	2
highway	2	7	2	2	13
OUTER ROADS/CROSS ROADS					
kilometers	0.80	2.41	0.64	0.96	4.81
miles	0.50	1.50	0.40	0.60	3.00
PONDS					
hectares	0	2.6	0	0	2.6
acres	0	6.5	0	0	6.5
UTILITY CROSSINGS					
each	2	3	0	0	5
CULTURAL RESOURCES					
each	1	0	0	0	1
POT. HAZ. WASTE					
each	0	0	0	0	0
WATER QUALITY IMP.					
each	0	0	0	0	0
WETLANDS					
hectares	0	0	2.5	0	2.5
acres	0	0	6.3	0	6.3
EST. COST	\$ 12,664,154.10	\$ 32,498,664.20	\$ 7,247,289.90	\$ 16,976,394.80	\$ 69,386,503.00

(1) Actual Distance Traveled

(2) Mileage Per 2 - Lanes

*Includes Relocated "M" & Relocated 61 S.B. Lanes

**Includes Relocated "F", Relocated 61, & Relocated Conn. "F" to 24

Table 2-7

ALTERNATE 'EF'

(w/No.1 Interchange @ Rte. "F" & No. 3 Interchange @ Rte. "M")

HWY. SECTION	D1*	D3	D4	F1**	EF1***	TOTAL
TRAVEL LENGTH (1)						
kilometers	2.58	1.91	2.34	5.25	4.40	16.48
miles	1.61	1.19	1.46	3.27	2.74	10.27
CONSTRUCTION LENGTH (2)						
kilometers	7.15	3.82	8.73	10.49	8.79	38.98
miles	4.46	2.38	5.44	6.54	5.48	24.30
EXISTING PAVEMENT (2)						
kilometers	0.00	0.00	0.00	0.00	0.00	0.00
miles	0.00	0.00	0.00	0.00	0.00	0.00
STREAM BRIDGES						
each	0	2	0	0	2	4
FLOOD PLAIN X-INGS						
kilometers	0	0.66	0	0	0	0.66
miles	0	0.41	0	0	0	0.41
INTERCHANGES						
clover	0	0	0	0	1	1
diamond	1	0	0	1	1	3
trumpet	0	0	1	0	0	1
other	0	0	0	0	0	0
STRUCTURES						
houses	1	0	1	0	0	2
sheds/barns	4	0	7	2	6	19
PRIME FARMLAND						
hectares	10	21	34	63	4	132
acres	25	52	85	155	10	327
LAND (OTHER USE)						
hectares	34	17	0	7	79	138
acres	84	43	0	18	196	341
BRIDGES						
railroad	0	0	0	0	2	2
highway	2	2	2	3	7	16
OUTER ROADS/CROSS ROADS						
kilometers	0.80	0.64	0.96	2.57	0.96	5.94
miles	0.50	0.40	0.60	1.60	0.60	3.70
PONDS						
hectares	0	0	0	1.2	1.2	2.4
acres	0	0	0	3.0	3.0	6.0
UTILITY CROSSINGS						
each	2	0	0	2	1	5
CULTURAL RESOURCES						
each	1	0	0	0	0	1
POT. HAZ. WASTE						
each	0	0	0	0	0	0
WATER QUALITY IMP.						
each	0	0	0	0	0	0
WETLANDS						
hectares	0	2.5	0	0	0.4	2.9
acres	0	6.3	0	0	1.0	7.3
EST. COST	\$12,664,154.10	\$7,247,289.90	\$16,976,394.80	\$17,096,052.30	\$21,913,990.20	\$75,897,881.30

(1) Actual Distance Traveled

(2) Mileage Per 2 - Lanes

*Includes Relocated "M" & Relocated 61 S.B. Lanes

**Includes Relocated "F", Relocated 61, & Relocated Conn. "F" to 24

***Includes Interchange @ 24 & 36

Table 2-8

ALTERNATE 'F'

(w/No. 1 Alternate @ 24 & 61)

HWY. SECTION	D1*	F1**	F2***	TOTAL
TRAVEL LENGTH (1)				
kilometers	2.58	5.25	8.50	16.33
miles	1.61	3.27	5.30	10.18
CONSTRUCTION LENGTH (2)				
kilometers	7.15	10.49	14.29	31.94
miles	4.46	6.54	8.91	19.91
EXISTING PAVEMENT (2)				
kilometers	0.00	0.00	3.53	3.53
miles	0.00	0.00	2.20	2.20
STREAM BRIDGES				
each	0	0	2	2
FLOOD PLAIN X-INGS				
kilometers	0.00	0.00	0.37	0.37
miles	0	0	0.23	0.23
INTERCHANGES				
clover	0	0	1	1
diamond	1	1	1	3
trumpet	0	0	0	0
other	0	0	1	1
STRUCTURES				
houses	1	0	1	2
sheds/barns	4	2	14	20
PRIME FARMLAND				
hectares	10	63	153	226
acres	25	155	378	558
LAND (OTHER USE)				
hectares	34	7	15	57
acres	84	18	38	140
BRIDGES				
railroad	0	0	2	2
highway	2	3	7	12
OUTER ROADS/CROSS ROADS				
kilometers	0.80	2.57	6.10	9.46
miles	0.50	1.60	3.80	5.90
PONDS				
hectares	0	1.2	0.9	2.10
acres	0	3.0	2.1	5.10
UTILITY CROSSINGS				
each	2	2	1	5
CULTURAL RESOURCES				
each	1	0	0	1
POT. HAZ. WASTE				
each	0	0	0	0
WATER QUALITY IMP.				
each	0	0	0	0
WETLANDS				
hectares	0	0	0.4	0.4
acres	0	0	1.0	1.0
EST. COST	\$ 12,664,154.10	\$ 17,096,052.30	\$ 35,594,459.55	\$ 65,354,665.95

(1) Actual Distance Traveled

(2) Mileage Per 2 - Lanes

*Includes Relocated "M" & Relocated 61 S.B. Lanes

**Includes Relocated "F" & Relocated 61

*** Includes 7" Overlay of N.B. Lanes of Existing Hwy. 24 to be used as N.B. Rte. 61

- **Bridges** - total number of bridges crossing existing roads and railroads for each segment.
- **Outer Roads/Cross Roads** - total length of outer roads and cross roads that are proposed for each segment.
- **Ponds** - total number of ponds that are in the 90 m (300 feet) right-of-way for each segment.
- **Utility Crossings** - total number of major utilities that each segment will be crossing.
- **Cultural Resources** - total number of known cultural resource conflicts with the proposed 90 m (300 feet) right-of-way for each segment.
- **Potential Hazardous Waste** - total number of known hazardous waste sites in conflict with the proposed 90 m (300 feet) right-of-way for each segment.
- **Potential Bat Habitat** - total number of potential area habitat for the Indiana Bat for each segment.
- **Water Quality** - total number of potential water quality problems to be encountered by construction within the 90 m (300 feet) right-of-way for each segment.
- **Prime Farmland** - total number of acres of prime farmland taken by construction within the 90 m (300 feet) right-of-way for each segment.
- **Wetlands** - total number of potential wetlands impacts by construction within the 90 m (300 feet) right-of-way for each segment.
- **Estimated Cost** - total estimated cost allocated for each segment based on road construction, interchanges, bridges, R/W acquisition and utility adjustments.

Tables 2-5, 2-6, 2-7 and 2-8 combine the line segments for the total comparison factors for

each alternative. Table 2-2 is a summary table for the estimated cost of each alternative.

2.5 RIGHT-OF-WAY REQUIREMENTS

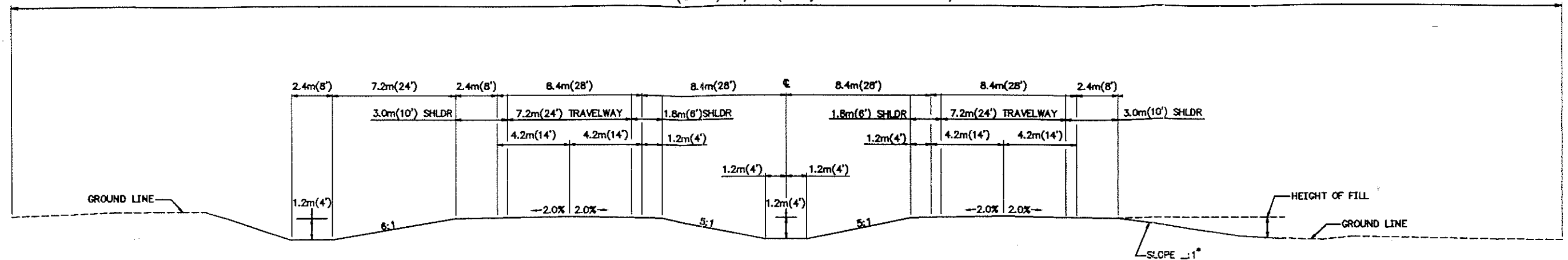
Route 61 has been designated as a freeway by the Missouri Highway and Transportation Commission from Hannibal to Interstate 70. This study is based on an average right-of-way width of 90 m (300 feet) with a median width of 15 meters (48 feet) from inside shoulder to inside shoulder and will be a full-access-controlled, four-lane, divided highway.

Typical sections are shown in Exhibit 2-5. A preliminary strip map for Alternative F is presented in Exhibit 2-6 (Plates, I, II and III).

ROUTE 61

Typical Section

91.4m (300') R/W (Fully Limited Access)**



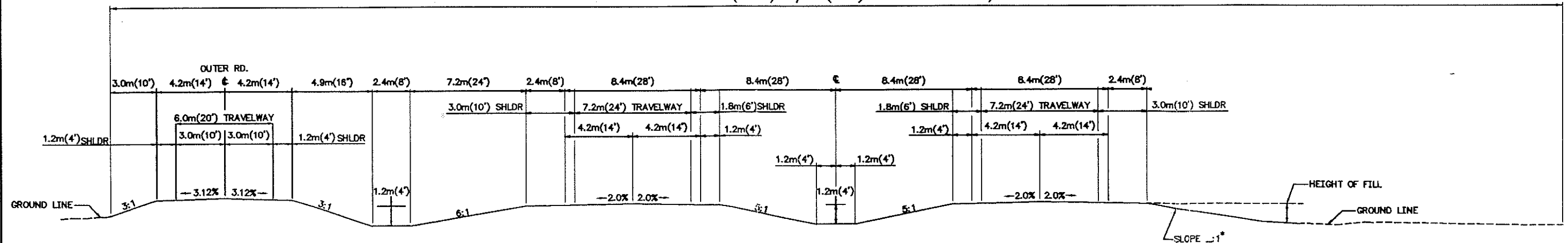
* THE OFFSET FROM TOE OF FILL TO THE SHOULDER POINT SHALL BE A MINIMUM OF 7.2m (24 FEET). THE SLOPE WILL VARY TO MEET THIS REQUIREMENT.

** More or less R/W may be required to satisfy the requirements of the design features of this project

ROUTE 61

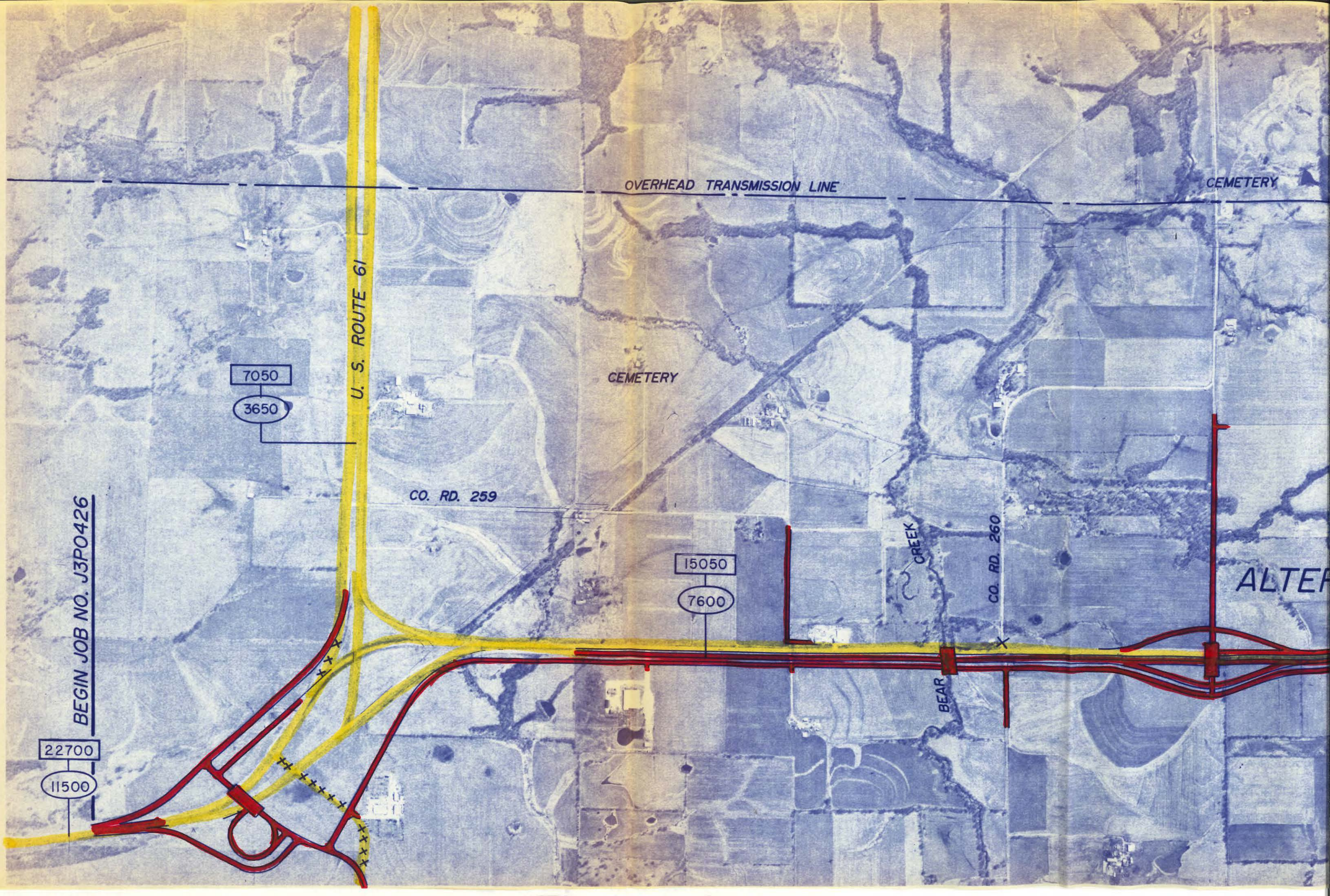
Typical Section w/ Outer Rd.

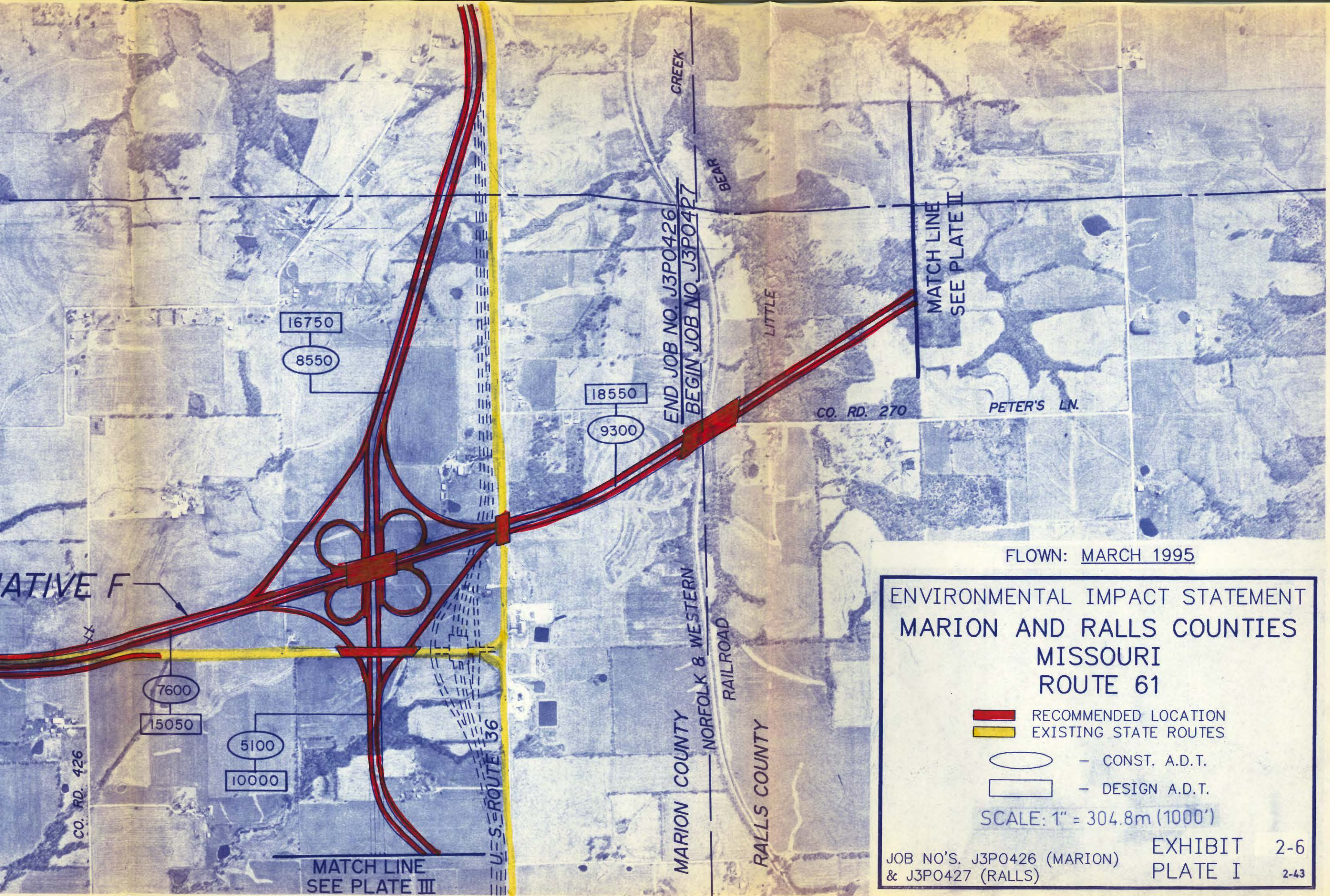
91.4m (300') R/W (Fully Limited Access)**



* THE OFFSET FROM TOE OF FILL TO THE SHOULDER POINT SHALL BE A MINIMUM OF 7.2m (24 FEET). THE SLOPE WILL VARY TO MEET THIS REQUIREMENT.

** More or less R/W may be required to satisfy the requirements of the design features of this project





FLOWN: MARCH 1995

ENVIRONMENTAL IMPACT STATEMENT
MARION AND RALLS COUNTIES
MISSOURI
ROUTE 61

RECOMMENDED LOCATION
EXISTING STATE ROUTES

— CONST. A.D.T.
— DESIGN A.D.T.

SCALE: 1" = 304.8m (1000')

JOB NO'S. J3PO426 (MARION)
& J3PO427 (RALLS)

EXHIBIT 2-6
PLATE I 2-43

MARION COUNTY
RALLS COUNTY

END JOB NO. J3P0426
BEGIN JOB NO. J3P0427

MATCH LINE
SEE PLATE I

CO. RD. 270

PETERS LN.

ALTERNATIVE F

OVERHEAD TRANSMISSION LINE

18550
9300

PARIS RD.

CHURCH & CEMETERY

RENSSELAER RD.

2050
1100

ROUTE HH

400
750

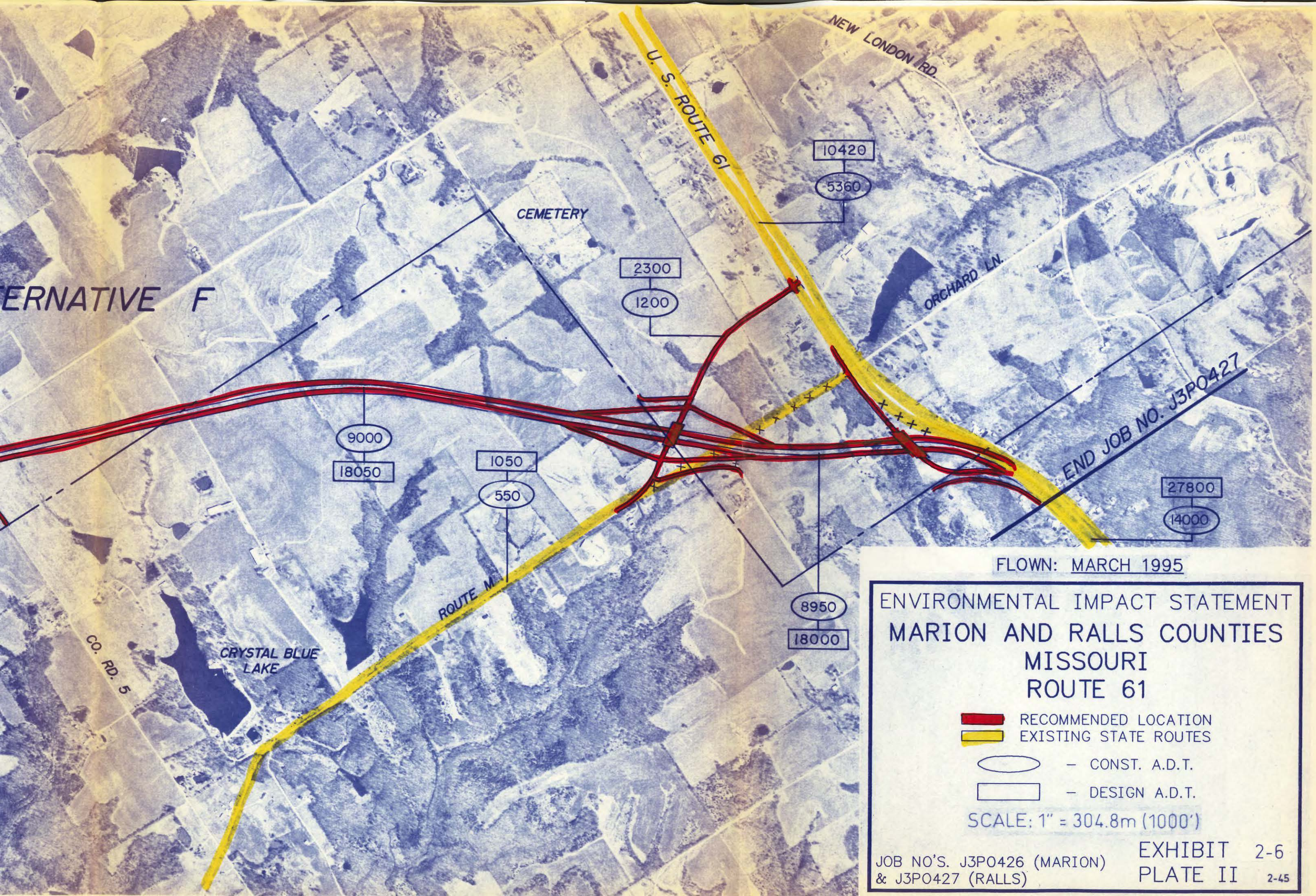
TRABUE RD.

ROUTE HH

CROOKED CREEK

HANNIBAL SCHOOL DISTRICT

A



FLOWN: MARCH 1995

ENVIRONMENTAL IMPACT STATEMENT
MARION AND RALLS COUNTIES
MISSOURI
ROUTE 61

RECOMMENDED LOCATION
EXISTING STATE ROUTES

— CONST. A.D.T.
— DESIGN A.D.T.

SCALE: 1" = 304.8m (1000')

JOB NO'S. J3P0426 (MARION)
& J3P0427 (RALLS)

EXHIBIT 2-6
PLATE II 2-45

CO. RD. 250

U. S. ROUTE 24

MC 271

U. S. ROUTE 36

MATCH LINE
SEE PLATE I

MARION COUNTY
RALLS COUNTY

NORFOLK & WESTERN
RAILROAD

FLOWN: MARCH 1995

ENVIRONMENTAL IMPACT STATEMENT
MARION AND RALLS COUNTIES
MISSOURI
ROUTE 61

 RECOMMENDED LOCATION
 EXISTING STATE ROUTES

 - CONST. A.D.T.
 - DESIGN A.D.T.

SCALE: 1" = 304.8m (1000')

JOB NO'S. J3PO426 (MARION)
& J3PO427 (RALLS)

EXHIBIT 2-6
PLATE III 2-44

This section provides a description of the social, economic, natural and built environments for the area affected by the alternatives evaluated. The regional project setting is shown in Exhibit 3-1. As shown in the exhibit, the project area covers parts of Marion and Ralls Counties. The study area is shown in more detail in Exhibit 3-2.

3.1 LAND USE

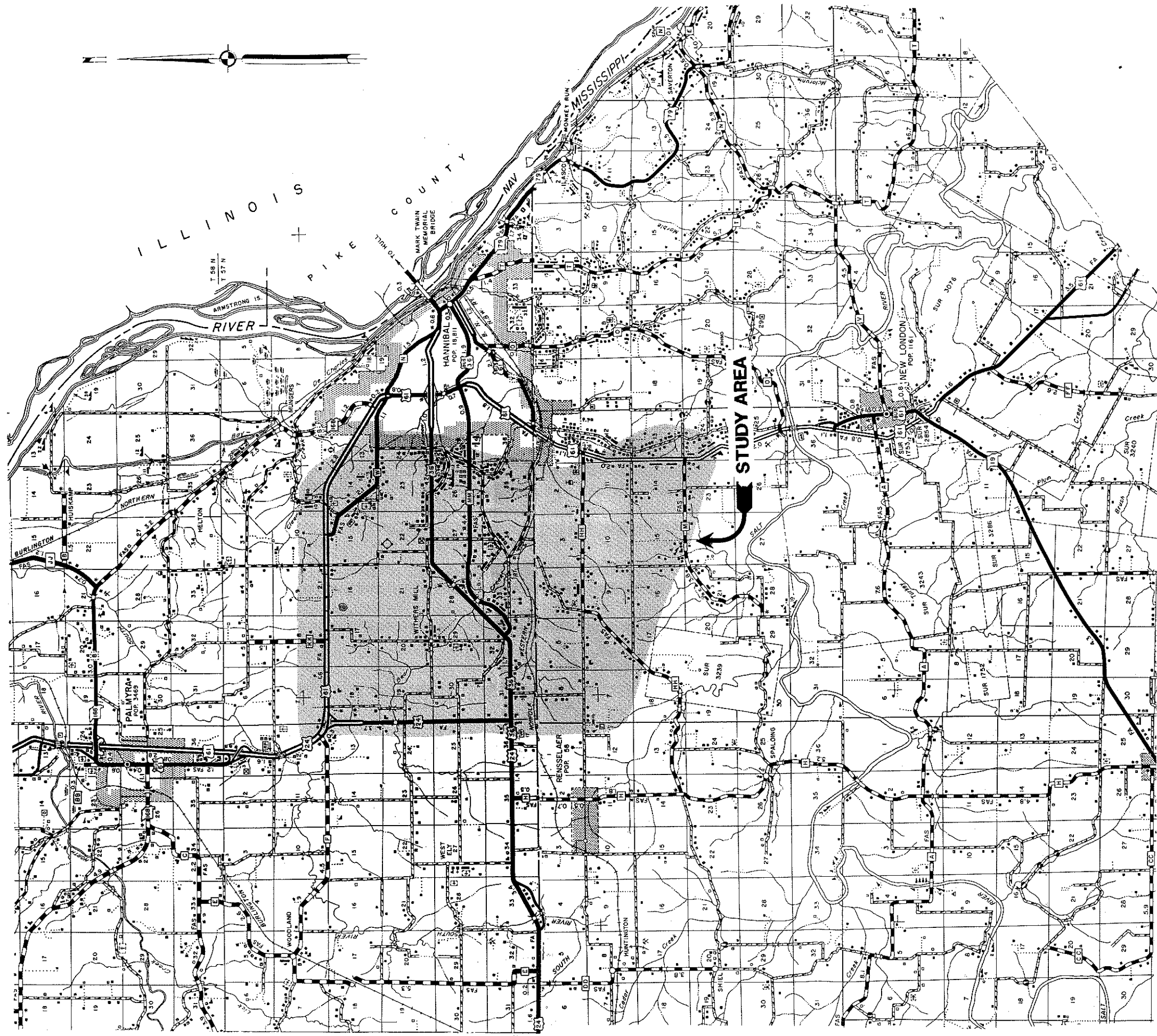
3.1.1 Existing Land Use

Existing land use in the study area is primarily agricultural. Most of the area is either cropland or else former cropland which is fallow. Wooded areas are confined to narrow strips along stream channels and isolated patches of a few tens of hectares (acres) or less. Other major uses, as shown in Exhibit 3-3, include the following:

- The J. Thad Ray Wildlife Area at the northeast edge of the study area,
- The Hannibal Municipal Airport, north of Route 36,
- The Hannibal Regional Hospital, south of Route 36,
- The residential and commercial incorporated area of the City of Hannibal,
- The industrial park at the south end of Hannibal,
- The detention basin on Bear Creek just upstream of the industrial park, and,
- Scattered residential areas along roadways throughout the study area.

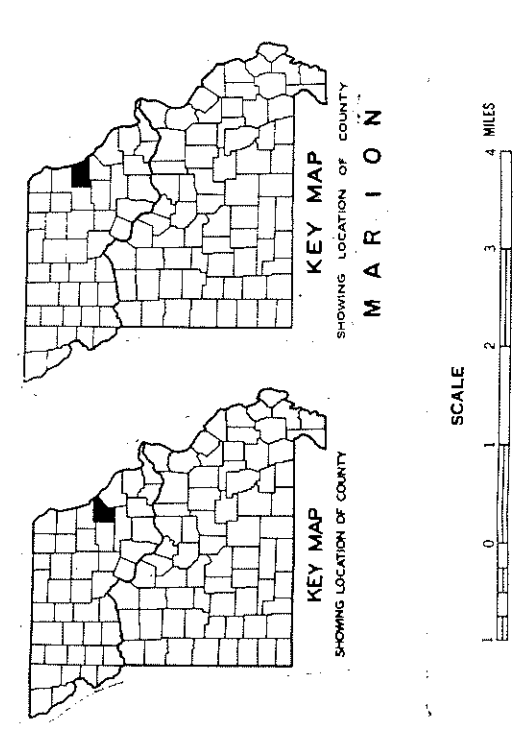
3.1.2 Land Use Planning

The primary planning authorities in the area are the Counties of Marion and Ralls and the City of Hannibal. They have all been contacted regarding their land use plans relative to the project.



MISSOURI HIGHWAY AND TRANSPORTATION DEPARTMENT
DIVISION OF PLANNING

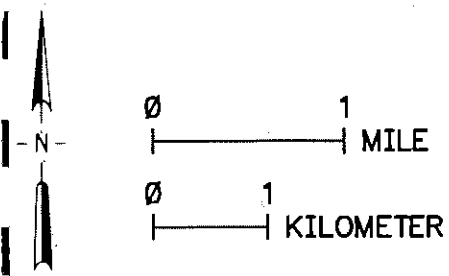
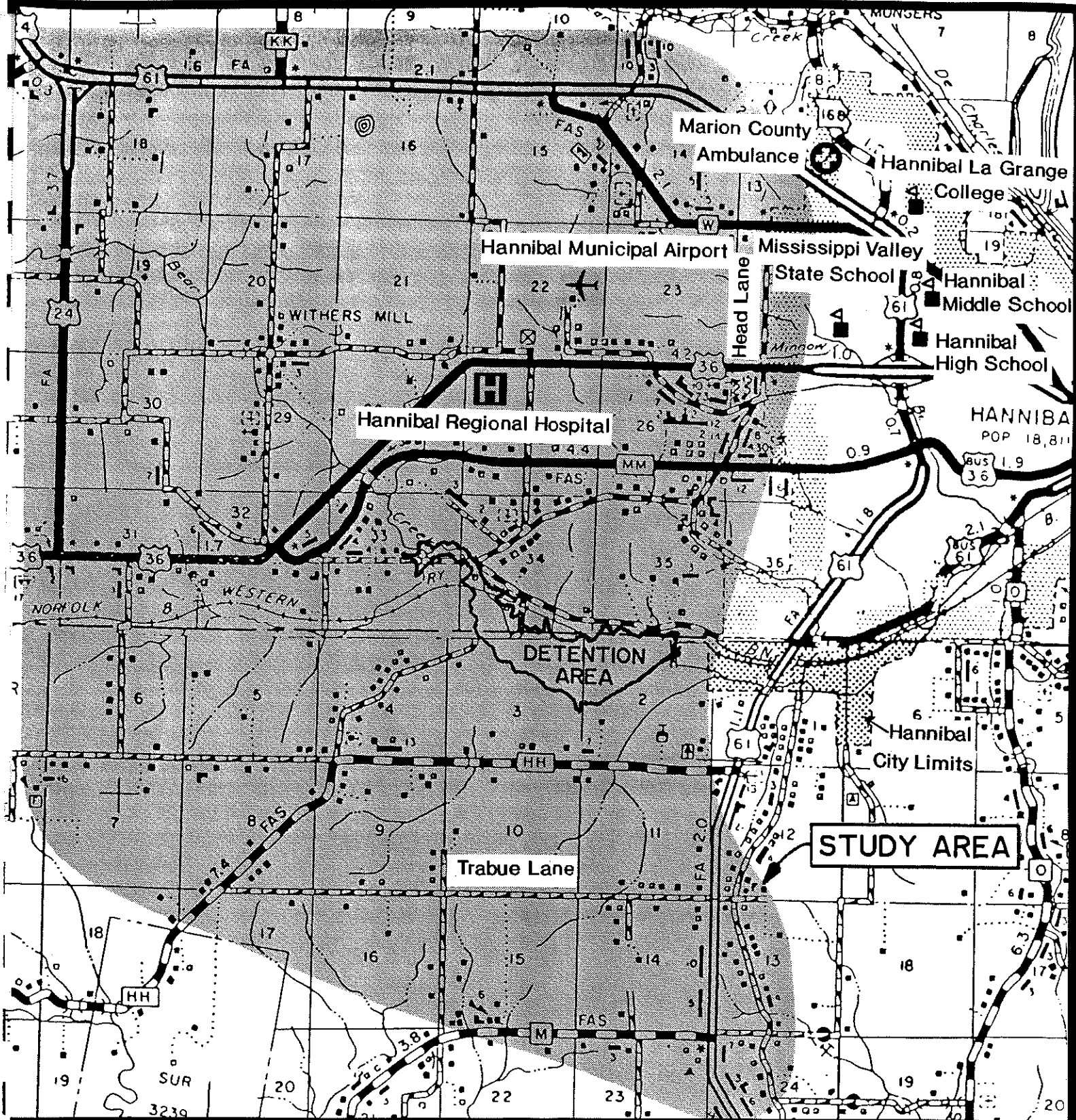
IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION



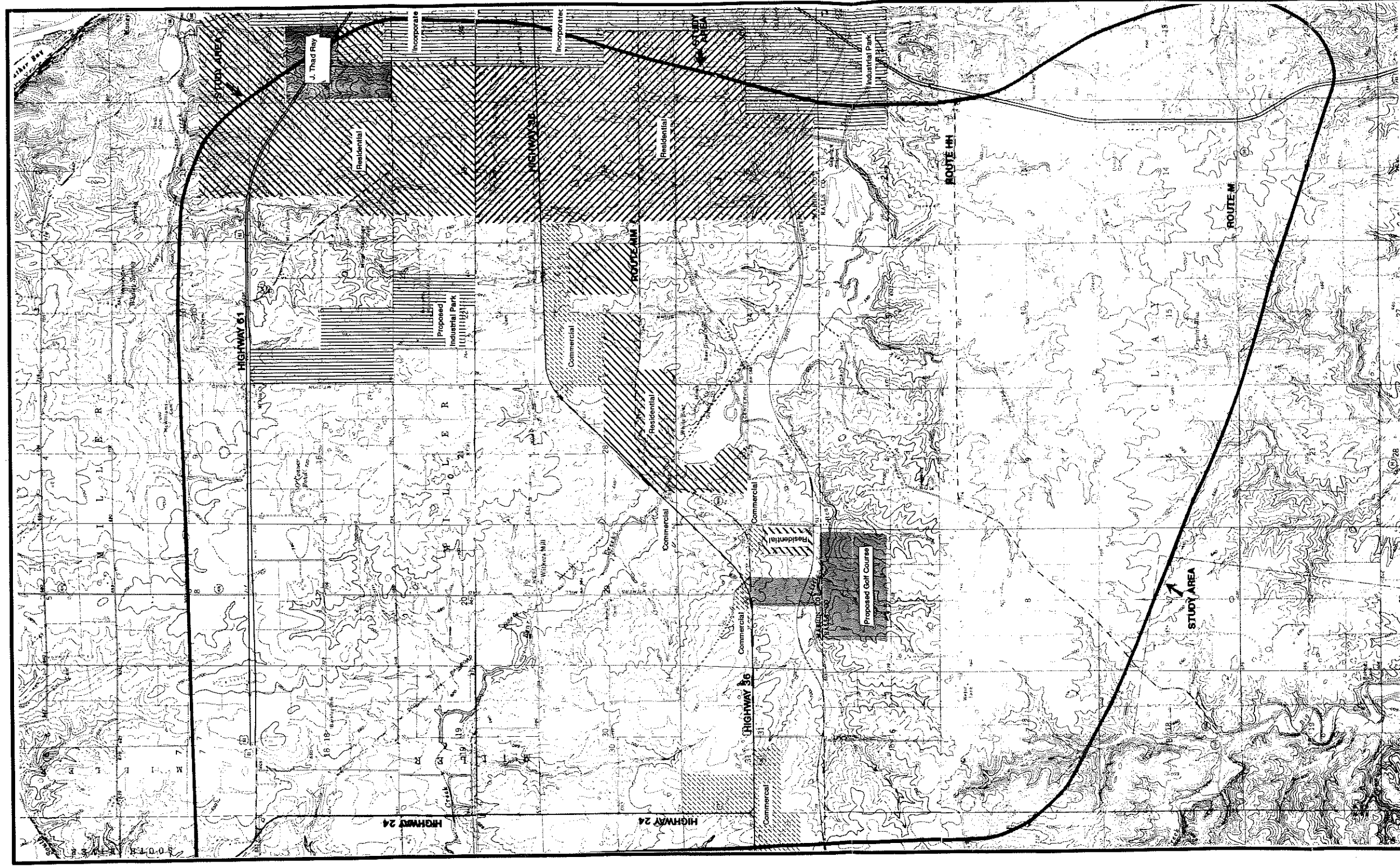
LEGEND

- | | | |
|--|---|---|
| <p>Private Road</p> <p>Unimproved Road</p> <p>Graded and Drained Road</p> <p>Gravel Surface Road</p> <p>Gravel Surface Road - Low Type</p> <p>Paved Road</p> <p>Frontage Road</p> <p>Divided Pavement</p> <p>City Streets</p> <p>Points between which Distances are Measured</p> <p>Interstate Numbered Highway</p> <p>State Numbered Highway</p> <p>State Lettered Highway</p> <p>County Road</p> <p>Federal-aid Primary Highway System</p> <p>Federal-aid Secondary Highway System</p> <p>Railroad - Single Operating Company</p> <p>Railroad - Separately Operated</p> <p>Railroad Station</p> <p>Railroad Grade Crossing</p> <p>Railroad Above</p> <p>Railroad Below</p> <p>Railroad Tunnel</p> <p>Canal or Municipal Air Field</p> <p>Landing Area or Strip</p> <p>Airway Beacon Light</p> <p>Operated Ship and Barge Lines</p> <p>Dock Pier or Landing</p> <p>Ferry, Tr: Tall, FF: Free</p> <p>Navigable Stream</p> <p>Dam</p> <p>Dam with Lock</p> <p>Jam with Road</p> <p>Narrow Stream</p> <p>Intermittent Stream</p> | <p>Drainage Ditch</p> <p>Marsh or Swamp Land</p> <p>Recreation Area or Lake</p> <p>Recreation Area with Dam</p> <p>Levee or Dike</p> <p>Natural Ford</p> <p>Paved Ford or Low Water Bridge</p> <p>Small Bridges Closely Spaced</p> <p>Drawbridge</p> <p>Arch Bridge</p> <p>Truss Bridge</p> <p>City and Village Limits</p> <p>Quadrangle Urban Area Line</p> <p>Park or Reservation Boundary</p> <p>State Line</p> <p>County Line</p> <p>Civil Township Line</p> <p>Congressional Township Line</p> <p>Section Line</p> <p>Land Grant Survey Line</p> <p>Boundary Line</p> <p>Religious Building</p> <p>Auto Graveyard</p> <p>Scrap Metal</p> <p>Scrap Building Material</p> <p>Sanitary Fill</p> <p>Other</p> <p>Correctional Institution</p> <p>Radiotelevision Station</p> <p>Scenic Site</p> <p>Small Park</p> <p>Picnic Grounds</p> <p>Playground Ball Field etc.</p> <p>Bathing Beach or Pool</p> <p>Drive-in Theatre</p> | <p>Township Court at Mouth</p> <p>County Court at Mouth</p> <p>Fish Hatchery</p> <p>Bird Sanctuary</p> <p>Game Farm or Preserve</p> <p>Country Club or Golf Course</p> <p>Fair Ground or Race Track</p> <p>Farm Unit</p> <p>Dwellings closer than Farm</p> <p>Personal Dwelling</p> <p>Seasonal Dwelling</p> <p>Hotel or Inn</p> <p>Church</p> <p>Hospital</p> <p>Church with Cemetery Adjacent</p> <p>Store or Small Business</p> <p>Factory or Industrial Plant</p> <p>Sawmill - Stationary</p> <p>Mill or Quarry</p> <p>School House</p> <p>Post Office</p> <p>Consolidated or Large School</p> <p>Town or Community Hall</p> <p>Mixed Cultural Features Closely Spaced</p> <p>County Home - Farm or Infirmary</p> <p>Pumping Station - Oil or Gas</p> <p>Combined Dwelling and Business</p> <p>Foreman's Quarters</p> <p>Forest Lookout Tower</p> <p>SFD Maintenance Shed</p> <p>State Highway Patrol Station</p> <p>State Capitol</p> <p>County Seat</p> <p>Other Cities, Towns and Villages</p> |
|--|---|---|

REGIONAL PROJECT SETTING
Exhibit 3-1



PROJECT
STUDY AREA
Exhibit 3-2



EXISTING AND PLANNED LAND USE Exhibit 3-3

REFERENCE: Drawing taken from U.S.G.S. Quadrangles -
Rensselaer, MO dated 1958, Quincy SW, MO-IL dated 1971,
Palmyra, MO dated 1975 and Hannibal West, MO dated 1971.

The City of Hannibal has recently annexed a small amount of land to the west of the city, primarily along Route 36. The city has no formal, written land use plans that affect the study area.

Marion County has zoned some parts of the study area either residential or commercial, as shown in Exhibits 3-3. These are generally areas where residential and commercial development is occurring. For instance, the area adjacent to the western city limit Hannibal is zoned residential, consistent with the on-going development there; the area around the hospital is zoned commercial; as is the area at the intersection of Routes 24 and 36, where there is a restaurant and service station. Based on information supplied by the MHTD District 3 office, some major private development is being planned in the study area, such as a proposed industrial park north of the airport and the golf course on Route 36.

Marion County is planning a new north-south arterial roadway west of Head Lane that will have an diamond interchange with Route 36.

Ralls County has no plans within the study area.

3.2 AGRICULTURAL LANDS

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to producing food, feed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. The soils need only to be treated and managed using acceptable farming methods. The moisture supply, of course, must be adequate, and the growing season has to be sufficiently long. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources, and farming these soils results in the least damage to the environment.

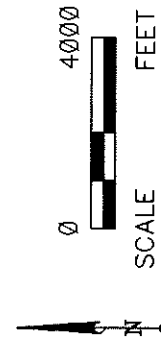
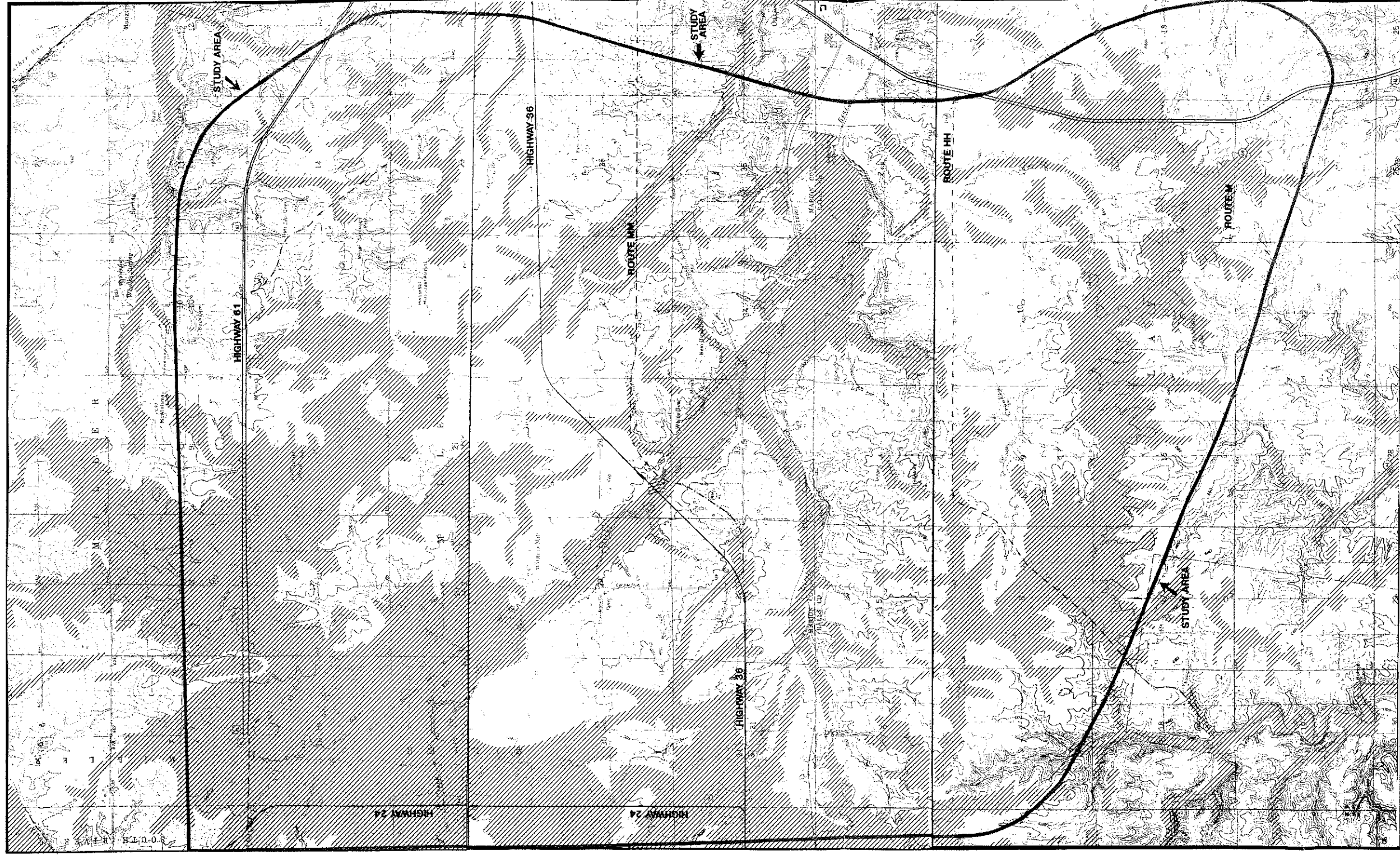
Prime farmland soils may presently be in use as cropland, pasture, or woodland, or they may be in other uses. They either are used for producing food or fiber or are available for these uses. Urban or built-up land and water areas cannot be considered prime farmland. Urban or built-up land is defined as any contiguous unit of land 4 hectares (10 acres) or more in size that is used for nonfarm uses including housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards,

airports, sanitary landfills, sewage treatment plants, and water control structures. Prime farmland soils usually get an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not subject to frequent flooding during the growing season. The slope ranges mainly from 0 to 5 percent.

Soils that have a high water table or are subject to flooding may qualify as prime farmland soils if the limitations are overcome by drainage or flood control. In this investigation, it is conservatively assumed that effective flood control is in place for all prime farmland soils with high water tables.

Approximately 48 percent of the land in Marion and Ralls Counties is classified as prime farmland by the Natural Resources Conservation Service (NRCS, formerly Soil Conservation Service). A large portion of the study area is in prime farmland, as shown in Exhibit 3-4. Farmland soils of statewide importance are soils in addition to prime farmlands in Missouri that are of statewide importance for the production of food, feed, fiber, forage, and oilseed crops. Most of these soils occur on slopes steeper than 5 percent or are frequently flooded. They mostly include soils in Capability Classes II, III, and IV that do not qualify for prime farmland. Capability classes are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

- Class I soils have few limitations that restrict their use.
- Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.
- Class III soils have severe limitations that reduce the choice of plants or the require special conservation practices, or both.
- Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.



REFERENCE: Drawing taken from U.S.G.S. Quadrangles -
Rensselaer, MO dated 1958, Quincy SW, MO-IL dated 1971,
Palmira, MO dated 1975 and Hannibal West, MO dated 1971.

PRIME FARMLAND Exhibit 3-4

- Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.
- Class VI soils have severe limitations that make them generally unsuitable for cultivation.
- Class VII soils have very severe limitations that make them unsuitable for cultivation.
- Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

3.2.1 Soils

In Marion and Ralls Counties, the soils formed in four principal kinds of parent material, alone or in combinations. These four kinds are material that weathered from bedrock, material deposited by glacial ice, material deposited by wind (loess), and material deposited by water (alluvium). Of less importance is colluvium, which was transported short distances downslope by the action of water and gravity. The residual material is mainly from limestone and shale. Glacial material, which was deposited by ice, consists mainly of clay, silt, sand, gravel, stones, and a few boulders. Much of the glacial till was moved long distances, but some of it is of local origin. Loess is the most extensive parent material in Marion and Ralls Counties. The principal source of the loess was the flood plain of the Mississippi River following the retreat of the last glacier. The parent material of the soils on flood plains is alluvium. Reflecting the diverse origins and the varying speeds of flowing water, this material has a great range in texture and in chemical and mineralogical composition.

Following is a list of the various types of surface soils that have been mapped in the project area and a description of each:

Armstrong loam (Statewide Important). The Armstrong series consists of deep, moderately well drained, slowly permeable soils on uplands. Armstrong soils were derived from paleosols that formed in glacial till. The slopes range from 5 to 14 percent.

Belknap silt loam (Prime Farmland). The Belknap series consists of deep, somewhat poorly drained, moderately slowly permeable soils on bottom lands. Belknap soils formed in silty alluvium. The slopes range from 0 to 2 percent.

Blase silty clay (Prime Farmland). The Blase series consists of deep, somewhat poorly drained soils on terraces. Blase soils are slowly permeable in the upper part and moderately permeable in the lower part. They formed in clayey alluvium over loamy and silty alluvium. The slopes range from 0 to 2 percent.

Cedargap silt loam (Statewide Important). The Cedargap series consists of deep, well drained, moderately rapidly permeable soils on bottom lands. Cedargap soils formed in silty alluvium that had a high content of chert fragments. The slopes range from 0 to 2 percent.

Edina silt loam (Prime Farmland). The Edina series consists of deep, poorly drained, very slowly permeable soils on uplands. Edina soils formed in thick loess. The slopes range from 0 to 2 percent.

Fatima silt loam (Prime Farmland). The Fatima series consists of deep, moderately well drained, moderately permeable soils on bottom lands. Fatima soils formed in silty alluvium. The slopes range from 0 to 2 percent.

Gosport silty clay loam (No particular importance). The Gosport series consists of moderately deep, moderately well drained, very slowly permeable soils on uplands. Gosport soils formed in residuum of acid shale. The slopes range from 9 to 20 percent.

Goss cherty silt loam (No particular importance). The Goss series consists of deep, well drained, moderately permeable, cherty soils on uplands. Goss soils formed in residuum of cherty limestone. The slopes range from 15 to 30 percent.

Leonard silt loam (Statewide Importance). The Leonard series consists of deep, poorly drained, slowly permeable soils on uplands. Leonard soils formed in thin loess and pedisidiment. The slopes range from 5 to 9 percent.

Marion silt loam (Prime Farmland). The Marion series consists of deep, somewhat poorly drained, very slowly permeable soils on terraces. Marion soils formed in loess. The slopes range from 2 to 5 percent.

Menfro silt loam (Prime Farmland, 2 to 5 percent slopes; Statewide Importance, 9 to 14 percent slopes). The Menfro series consists of deep, well drained, moderately permeable soils on uplands. Menfro soils formed in thick loess. The slopes range from 2 to 35 percent.

Mexico silty clay loam (Prime Farmland). The Mexico series consists of deep, somewhat poorly drained, very slowly permeable soils on uplands. Mexico soils formed in loess or in silty material that was less than 10 percent sand. The slopes range from 2 to 5 percent.

Moniteau silt loam (Prime Farmland). The Moniteau series consists of deep, poorly drained, slowly permeable soils on bottom lands. Moniteau soils formed in silty alluvium. The slopes range from 0 to 2 percent.

Putnam silt loam (Prime Farmland). The Putnam series consists of deep, poorly drained, very slowly permeable soils on uplands. Putnam soils formed in deep loess. The slopes range from 0 to 2 percent.

Smileyville silt loam (Prime Farmland). The Smileyville series consists of deep, poorly drained, slowly permeable soils on uplands. Smileyville soils formed in loess. The slopes range from 2 to 7 percent.

Weller silt loam (Prime Farmland). The Weller series consists of deep, moderately well drained, slowly permeable soils on uplands. Weller soils formed in loess. The slopes range from 2 to 5 percent.

Winfield silt loam (Statewide Importance). The Winfield series consists of deep, moderately well drained, moderately permeable soils on uplands. Winfield soils formed in thick loess. The slopes range from 5 to 14 percent.

There is no farmland in Missouri classified as unique.

3.3 SOCIAL ENVIRONMENT

3.3.1 Cities, Towns and Communities

As shown in Exhibit 3-1, and summarized below, there are four incorporated communities in the general vicinity of the project area. Rensselaer was not included as an incorporated area in the 1990 census, and the population shown is from the Ralls County Highway Map.

Incorporated Area	1990 Census Population	Nearest Distance to Study Area
Hannibal	18,004	Partially within study area
Palmyra	3,371	3.7 km (2.3 mi) north
Rensselaer	58	2.4 km (1.5 mi) west
New London	988	4.8 km (3 mi) south
Source: County Road Maps - Marion and Ralls Counties, MHTD		

Withers Mill is a very small unincorporated community consisting of several homes and is located entirely within the study area. It is shown in Exhibit 3-1, and is located at the intersection of two county roads, north of Route 36 and east of Route 24. There are also small communities consisting of several houses each located along state and county roads throughout the study area.

3.3.2 Transportation System

3.3.2.1 Highways

There are three U.S. highways within the study area: Routes 61, 36, and 24. Route 61 is a four-lane divided highway through the study area except for a 2.7 km (1.7 mile) section within the Hannibal city limits. This is a four-lane undivided segment, as shown in Exhibit 3-1. Route 61 extends from the northwest corner of the study area to the southeast corner, as shown in Exhibit 3-2.

Route 36 extends east-west across the study area, and is currently a two-lane roadway. There are plans for widening Route 36 to a four-lane divided roadway with freeway standards. The location study for the portion of Route 36 within the study area for this project is complete and preliminary plans have been developed. These plans include two interchanges to be located between the Regional Hospital and the Hannibal city limits (see Exhibit 3-2). One of the interchanges is immediately east of the hospital to service the hospital and the Hannibal airport. The second planned interchange is less than 3.2 km (2 miles) east, near Head Lane. The exact location has not been established and is contingent upon Marion County plans for north/south arterial roadway located west of Head Lane. If the arterial roadway is constructed, the interchange will be at the arterial roadway rather than at Head Lane.

At the northwest corner of the study area Route 24 and Route 61 are coincident. Route 61 then continues due east and Route 24 heads south.

As shown in Exhibit 3-2, there are several state routes within the study area. From north to south they are:

- Route W, which enters the City of Hannibal near the northeast portion of the study area.
- Route MM, which begins at Highway 36 near the middle of the study area and continues east into the City of Hannibal.
- Route HH, an east-west route which ends at Highway 61.
- Route M, an east-west route which also ends at Highway 61, near the southeast corner of the study area.

As shown in Exhibit 3-1, Highway 61 is the only north-south thoroughfare through the Hannibal area; the other routes are primarily east-west, except for the north-south portion of Route 24 at the west side of the study area.

There are many county roads within the study area which are primarily gravel.

3.3.2.2 Railways

There is an active Norfolk & Western rail line that runs east-west across the study area, south of Highway 36 and north of Route HH, as shown in Exhibit 3-2. It enters the city limits of Hannibal at the industrial park located at the south end of town. There are no other railways in the study area.

3.3.2.3 Airports

The Hannibal Municipal Airport is the only public airport in the study area and is located in the north central part of the study area, about 0.8 km (0.5 miles) north of Highway 36 (Exhibit 3-2). The airport has chartered air service but no scheduled commercial airline flights. According to the booklet, "Hannibal, America's Hometown," published by the Hannibal Chamber of Commerce, the airport plans to expand its runway to 1,600 meters (5,500 feet) to serve larger aircraft.

3.3.2.4 Waterways

The Mississippi River, a major route for barge traffic, borders Hannibal on the east. There are no other navigable waterways in the vicinity.

3.3.2.5 Bus Service

Bus service is available to Hannibal. There is a Trailways depot on Business Route 61, about 2 km (1.2 miles) east of the intersection of existing Route 61 and Business Route 61.

3.3.3 Demographics

3.3.3.1 Population

Historic population data for Marion and Ralls County are summarized in Table 3-1. As shown in the table, both counties experienced small population declines between 1980 and 1990, while the state experienced a small increase. There have been dramatic differences in population trends for the area compared to the state since 1900. While the population of

Table 3-1

Historic Population Data¹

	Population 1900	Population 1980	Population 1990	Estimated Population 1995 ³	Percent Change 1900-1990	Percent Change 1980- 1990
Marion Co.	26,331	28,638	27,682	27,870	5.1	-3.3
Ralls Co.	12,287	8,984	8,476	8,876	-31.0	-5.7
Northeast Region ²	311,564	203,692	189,075		-39.3	-7.2
Missouri	3,106,665	4,916,766	5,117,073		64.7	4.1

1 Source: U.S. Department of Commerce (USDC), Bureau of the Census, except for 1995 estimated data.

2 The Missouri State Census Data Center includes the following 16 counties as the Northeast Region: Putnam, Sullivan, Linn, Scuyler, Adair, Macon, Randolph, Scotland, Knox, Shelby, Monroe, Clark, Lewis, Marion, Ralls, and Pike.

3. Source: Claritas Corporation. Provided through the University of Missouri Office of Social and Economic Data Analyses (UM-OSEDA).

the state increased by about 65 percent between 1900 and 1990, the population of the Northeast Region declined by about 39 percent, and Ralls County by about 31 percent. Marion County experienced a small increase. According to the University of Missouri's *Social and Economic Profile for the Northeast Region* (1992), a major contributor to the population decline in the region "was the severe economic conditions affecting agriculture and rural communities."

The population of Marion County, which has the relatively large town of Hannibal, has not declined as much as Ralls County, which is primarily rural. About 77 percent of the population of Marion County in 1990 was located in either Hannibal (65 percent) or Palmyra (12 percent). Only twelve percent of the 1990 population of Ralls County was located in New London, which is the largest incorporated area in that county.

Both counties experienced a net outward migration between 1980 and 1990, as did the state of Missouri as a whole. Interestingly, the net migration from the state, taken as a percent of total population, was greater than for either county, even though both Marion and Ralls County lost population and the state gained population. However, the death rate, as a percent of population was greater for both counties than for the state as a whole.

3.3.3.2 Age Distribution

Percent population by age groups is summarized in Table 3-2. Both counties have a higher percent of population under age 18, as well as, over age 65, than does the state as a whole. The percent age 18 to 64 is considerably smaller for both counties and for the Northeast Region. This is largely due to the out-migration of young adults. According to the *Social and Economic Profile*, "the region has traditionally been an agricultural region with few employment opportunities for younger people."

Table 3-2

Age Distribution¹

	Percent Under Age 18	Percent Age 18-64	Percent Age 65 and over
Marion Co.	27.2	54.8	17.9
Ralls Co.	26.5	56.8	16.7
Northeast Region ²	24.9	56.5	18.6
Missouri	25.7	60.3	14.0

¹ Source: USDC, Bureau of Census

² The Missouri State Census Data Center includes the following 16 counties as the Northeast Missouri Region: Putnam, Sullivan, Linn, Scuyler, Adair, Macon, Randolph, Scotland, Knox, Shelby, Monroe, Clark, Lewis, Marion, Ralls, and Pike.

3.3.3.3 Minority Populations

Missouri minority populations tend to be concentrated in metropolitan areas. As shown in Table 3-3, the percent minority population for all categories of minorities for both Marion and Ralls county and the Northeast Region is much smaller than the percent for the state as a whole. The only minority population that comprises more than one percent of the total population is African Americans, with 4.5 percent for Marion County and 1.9 percent for Ralls County. These are well below the overall statewide percentage of 10.7.

3.3.3.4 Ethnic Origin

As shown in Table 3-4, the majority of the population of both Marion and Ralls Counties are of western European origin. Of those who reported an ancestry other than American, the only origin which exceeded 10 percent in Marion County was German, at 35 percent of the population. In Ralls County, German ancestry was also the highest reported, at 28 percent, followed by Irish at 13 percent and English at 11 percent.

3.3.3.5 Religion

Although no specific data were available, it appears that, based on race, national origin, and the types of religious structures in the area, the predominant religions are various Christian denominations. All the churches in the study area represent Christian faiths.

3.3.3.6 Handicapped Population

There are two group homes located with the study area for the mentally and/or physically handicapped. One home is near the Hydesburg Church on Paris Road, and the other home is at the eastern boundary of the study area, on Skyview Estates, just inside the Hannibal city limits. Locations of both group homes are shown in Exhibit 3-5.

3.3.4 Housing Characteristics

As shown in Table 3-5, the percent of owner occupied housing units in Ralls County is considerably above the state average, and in Marion County it is slightly above the state

Table 3-3

Minority Population, 1990¹

	Percent White	Percent African America n	Percent Native American	Percent Asian	Percent Other	Minorities as a Percent of Total Population
Marion Co.	94.7	4.5	0.2	0.4	0.1	5.3
Ralls Co.	98.1	1.6	0.2	0.07	0.02	1.9
Northeast Region ²	96.4	2.9	0.2	0.2	0.1	3.6
Missouri	87.7	10.7	0.4	0.8	0.4	12.3

¹ Source: USDC Bureau of Census.

² The Missouri State Census Data Center includes the following 16 counties as the Northeast Missouri Region: Putnam, Sullivan, Linn, Scuyler, Adair, Macon, Randolph, Scotland, Knox, Shelby, Monroe, Clark, Lewis, Marion, Ralls, and Pike.

Table 3-4

National Origin, 1990 -- First Ancestry Reported¹

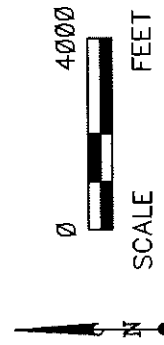
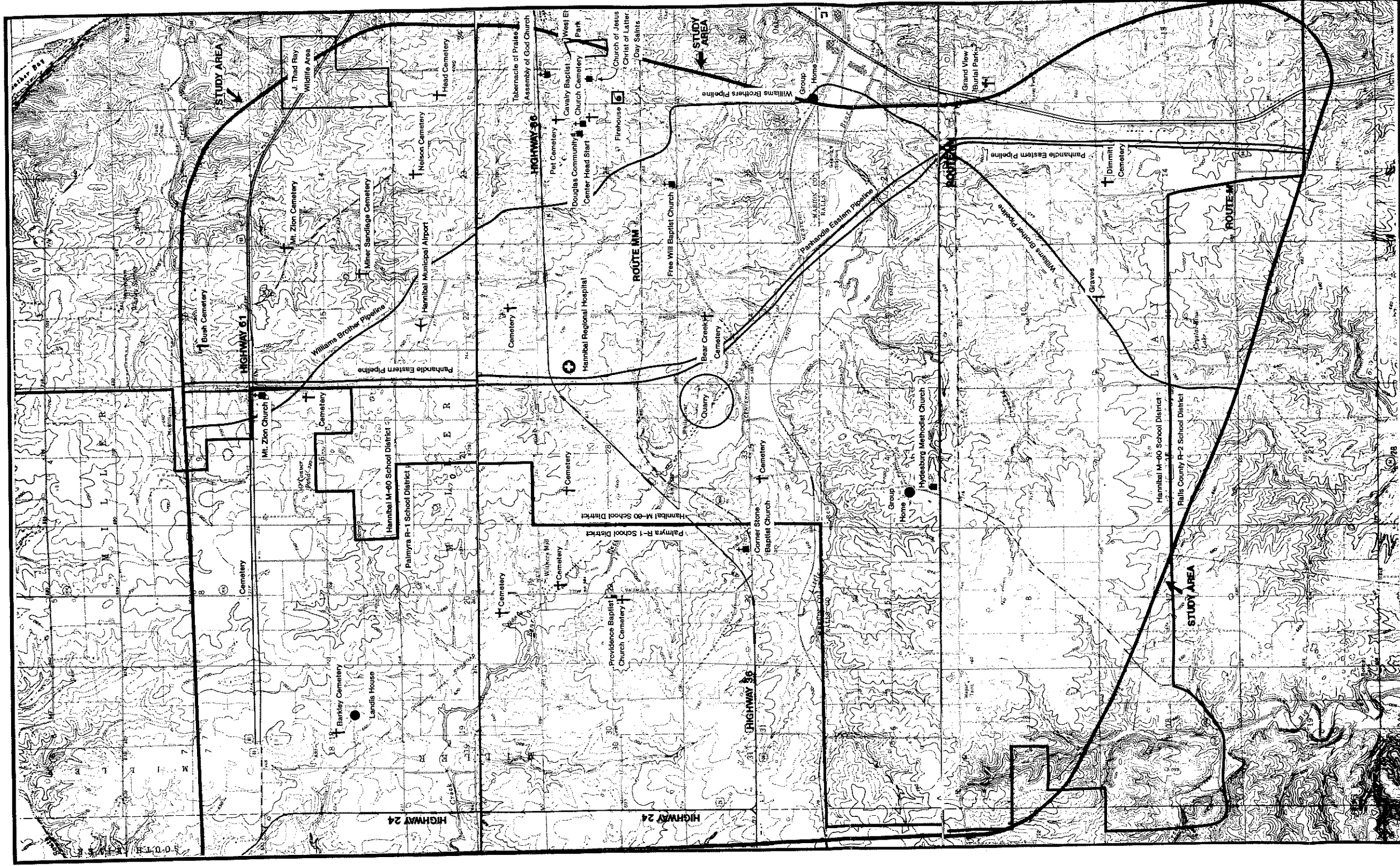
First Ancestry Reported	Percent of Total Population	
	Marion County	Ralls County
Dutch	2.0	1.8
English	8.8	11.0
French (except Basque)	2.0	2.5
German	35.0	28.1
Irish	9.6	12.5
Italian		1.0
Scotch Irish	2.2	2.6
Scottish	1.0	
Swedish		1.2
U.S. or American	12.0	14.1
Race/Hispanic Orig. Grp.	7.7	3.9
Other	5.0	2.8
Unclassified; not reported	14.6	18.5

¹ Source: USDC Bureau of Census.

Table 3-5

Housing Units, 1990 -- Occupied, Rented, and Vacant¹

	Total Housing Units ²	Percent Owner Occupied	Percent Renter Occupied	Percent Vacant	Percent Seasonal
Marion Co.	12,026	61.7	27.5	10.1	0.7
Ralls Co.	3,766	68.8	16.9	12.3	2.0
Northeast Region ³	83,927	63.3	23.8	11.0	2.0
Missouri	2,199,129	61.3	27.9	8.3	2.5
¹ Source: USDC Bureau of Census ² Estimated housing units, 1995: Marion County, 12,199; Ralls County, 3,988. Source: Claritas Corporation through UM-OSEDA. ³ The Missouri State Census Data Center includes the following 16 counties as the Northeast Missouri Region: Putnam, Sullivan, Linn, Scuyler, Adair, Macon, Randolph, Scotland, Knox, Shelby, Monroe, Clark, Lewis, Marion, Ralls, and Pike.					



1 KILOMETER

STUDY AREA FEATURES Exhibit 3-5

REFERENCE: Drawing taken from U.S.G.S. Quadrangles -
Rensselaer, MO dated 1958, Quincy SW, MO-IL dated 1971,
Palmyra, MO dated 1975 and Hannibal West, MO dated 1971.

average. Conversely, the percent of renter occupied housing is well below the state average in Ralls County and slightly below in Marion County. The differences between the counties are probably due to a higher prominence of rental housing in the City of Hannibal than in the rural areas, since, according to the *Social and Economic Profile*, rental housing is more prominent in counties with large towns.

Table 3-5 also shows the percent of vacant and seasonal housing. Predictably, both Marion and Ralls County, which lost population during the 1980s, have a higher percent of vacant housing than does the state as a whole, which experienced a small population gain.

3.3.5 Neighborhoods

Neighborhoods have built up adjacent to the Hannibal city limits at the west side of town along most of the public roadways that enter the town. These are essentially a part of the community of Hannibal.

Withers Mill is a separate community at the crossroads of West Ely and Withers Mill Roads, along Bear Creek, and had at one time been a railroad depot. The railroad was removed in the 1950s. The community consists of several homes clustered near the crossroads.

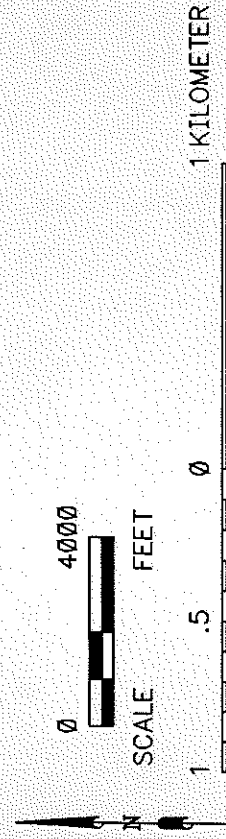
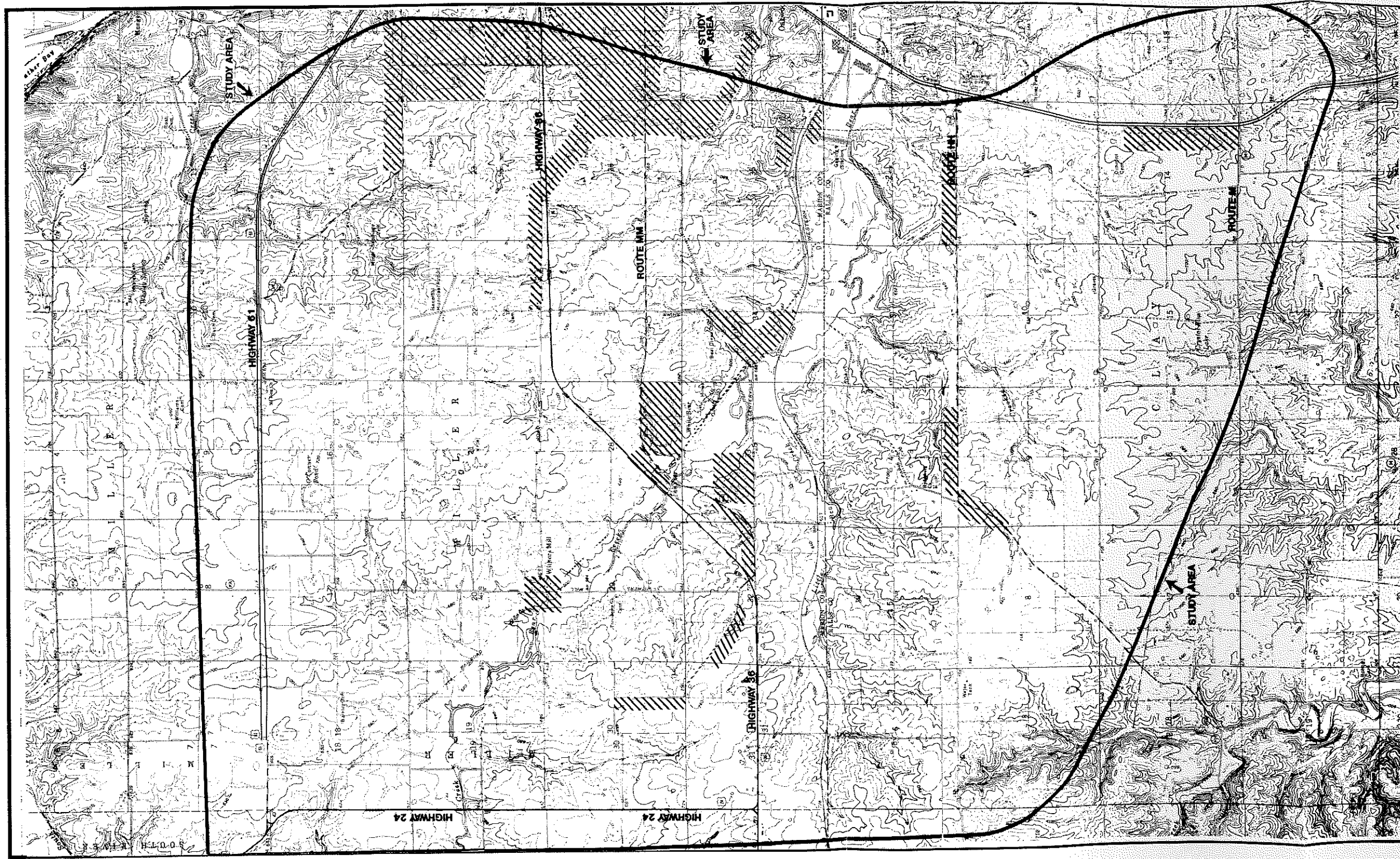
Other neighborhoods in the study area consist of groups of several homes closely lining a roadway. These areas of residential development are shown in Exhibit 3-6.

Based on visual observation, all the neighborhoods described appear to be middle to lower middle income. No minority neighborhoods were observed.

3.3.6 Public Facilities and Services

3.3.6.1 Schools and School Districts

As shown in Exhibit 3-4, there are portions of three school districts in the study area: Hannibal M-60, Palmyra R-1, and Ralls County R-2. Most of the study area is in the Hannibal M-60 School District, with the northwest portion in the Palmyra R-1 District, and only a small area in the south section in the Ralls County R-2 District. There is only one



AREAS OF RESIDENTIAL DEVELOPMENT Exhibit 3-6

REFERENCE: Drawing taken from U.S.G.S. Quadrangles -
Rensselaer, MO dated 1958, Quincy SW, MO-IL dated 1971,
Palmyra, MO dated 1975 and Hannibal West, MO dated 1971.

school within the study area boundaries, Douglas Community Center Head Start, located on West Ely Road near the east edge of the study area. The Hannibal M-60 School District has only one high school and one middle school. These are both located on existing Route 61 in Hannibal, just north of Route 36, as shown in Exhibit 3-2. The Hannibal Vocational Technical School and the Instructional Center are also located near the high school. There are also six elementary schools in the Hannibal M-60 District. These are all located within the city limits of Hannibal.

All schools in the Palmyra R-1 School District are located in the town of Palmyra. The Ralls County R-2 School District has an elementary school in New London and one in Center. The Junior and Senior High Schools are located on Route 19, south of the study area.

Mississippi Valley State School for the severely handicapped is located just outside the study area, north of Route 36 and west of Route 61. It is one of 32 such schools in the state and has a student population of 38.

Hannibal-LaGrange College, a private college, is located on Route 61 just south of Route 168, as shown on Exhibit 3-2.

There are several other smaller private schools in the vicinity, all located within the Hannibal city limits.

3.3.6.2 Hospitals and Nursing Homes

The Hannibal Regional Hospital is the only hospital in the study area. This hospital services a six-county area in Missouri and Illinois, consisting of Marion, Ralls, Monroe, Shelby, Lewis, and Pike Counties in Missouri; and Pike County in Illinois. The 105-bed general hospital was opened in March 1993 and replaced the regional hospital in the City of Hannibal. The only expansion currently planned by the hospital is an addition for medical office space to the north, between the existing hospital building and Route 36.

The hospital does not have its own ambulance service, and is served by Marion County Ambulance Service, located on Route 61 just north of the Route 168 junction, in the City of Hannibal (Exhibit 3-2). The closest similar hospital facility is in Quincy, Illinois, about

40 km (25 miles) north. There are a number of nursing homes in the general vicinity, but none are located within the study area.

3.3.6.3 Fire and Police Service

The Hannibal Municipal Fire Department serves only the City of Hannibal, a small portion of which is included in the study area. The area west of the city limits has a rural fire department that consists of volunteers from the city fire department, the only difference being that they do not drive city trucks. When a fire occurs outside the city limits, the firefighters drive to the rural firehouse on Centerville Road about 300 meters (1,000 feet) north of Route MM, near the east edge of the study area, as shown on Exhibit 3-5. Here they pick up trucks housed at the fire house. The only purpose of the rural fire house is to house these trucks. The cities of Palmyra, New London, and Monroe City have the same arrangements, but their rural fire houses are all located within their city limits. People living outside the city limits have a choice about which fire department they want to use. They register with the fire house of their choice and pay an annual fee for service.

The Hannibal Municipal Police Department also serves only the City of Hannibal. The county sheriff departments service the area outside the city limits. The Marion County Sheriff's offices are located in Hannibal and Palmyra, and the Ralls County Sheriff's office is in New London.

3.3.6.4 Churches and Cemeteries

The following churches are located within the study area and are shown in Exhibit 3-4:

- Providence Baptist Church
- Tabernacle of Praise Assembly of God Church
- Cavalry Baptist Church
- Cornerstone Baptist Church
- Hydesburg Methodist Church
- Free Will Baptist Church
- Church of Jesus Christ of Latter Day Saints

There are also approximately 19 cemeteries, mostly small, located within the study area.

There is one large cemetery, Grand View Burial Park, located just outside the study area on Route 61 near Route HH (Exhibit 3-5).

3.3.6.5 Parks, Recreational Areas and Other Public Lands

There is one neighborhood park within the Hannibal city limits located in the study area. The Bear Creek baseball field is located on Paris Road at Bear Creek. The J. Thad Ray Memorial Wildlife Area, about 50 hectares (120 acres) owned by the Missouri Department of Conservation, is along both sides of Route 61 north of Route W in the northeast corner of the study area.

A listing of the parks in the study area receiving funding under Section 6(f) of the Land and Water Conservation Act Fund was provided by MHTD. There are six Section 6(f) parks in Marion County, all of which are located in either the cities of Hannibal or Palmyra. Only one of the City of Hannibal's neighborhood parks, West Ely Park, shown on Exhibit 3-5, is located within the study area. Contacts at the City of Hannibal were uncertain as to whether West Ely Park has ever received 6(f) funding. There are two parks in Ralls County receiving 6(f) funding, both are outside the study area. One is in the City of Perry, and one in the City of New London.

3.3.6.6 Utilities

The entire study area is serviced by the Ralls County Water District, except for the area north of Route 61 and east of the Routes 61/24 interchange. This area is serviced by the Marion County Water District. The Ralls County Water District purchases all of its water from the City of Hannibal, which uses the Mississippi River as a source. The Marion County Water District purchases its water from Clarence Cannon, which uses the Clarence Cannon reservoir as a source, and from the City of Palmyra, which gets its water from wells in the Mississippi River floodplain.

Water usage by housing units for Marion and Ralls Counties is summarized in Table 3-6. As shown in the table, 89 percent of housing units in Marion County get water from a public or private utility company, compared to 63 percent for Ralls County. The lower number for

Table 3-6

Source of Water by Housing Unit, 1990¹

	Public System or Private Company	Individual Drilled Well	Individual Dug Well	Other Source
Marion Co.	89%	7%	1%	3%
Ralls Co.	63%	21%	6%	10%

¹ Source: USDC Bureau of Census.

Ralls County is probably a reflection of the more rural nature of Ralls County. Rural households are more likely to have individual water supplies. Since the study area is primarily rural, it may more closely resemble the distribution for Ralls County. "Other sources" (shown on Table 3-6) would include cisterns and springs. Springs are discussed in Section 3.7.2.

The City of Hannibal has a municipal waste water treatment plant which services the city and some outlying areas west of the city, extending as far west as the hospital on Route 36. Apparently the majority of the residents and businesses in the study area have private waste disposal systems such as septic tanks.

There are three major underground pipelines in the study area: two owned by Panhandle Eastern and one gasoline/diesel pipeline owned by Williams Brothers (Exhibit 3-5).

3.3.7 Mines and Quarries

There is one abandoned room-and-pillar limestone quarry located along Bear Creek near the center of the study area (Exhibit 3-5). There are several other operating and abandoned limestone quarries in the vicinity, but outside the study area.

3.4 ECONOMY

3.4.1 Income

Income data is summarized in Tables 3-7 and 3-8. As shown in Table 3-7, more than half of all households in the Northeast Region had income of less than \$20,000 (compared to 34 percent nationally); and only 9 percent had incomes of \$50,000 or more (compared to 30 percent nationally). Median household income for both Marion and Ralls County, shown in Table 3-8, is higher than for the Northeast Region as a whole, but well below the state median. As shown in the table, both counties experienced significant declines in median household income from 1979 to 1989, compared with a small increase for the state. Ralls County has a smaller percentage of the population below the poverty level than does the state, whereas the northeast region and Marion County have higher percentages of population below the poverty level than the state as a whole.

Table 3-7

Percent of Households in Each Income Category, 1989¹

	Less than \$10,000	\$10,000 to \$19,999	\$20,000 to 49,999	\$50,000 or more
Marion Co.	22.1	24.5	43.7	9.7
Ralls Co.	19.4	24.4	45.1	11.0
Northeast Region ²	25.5	25.5	39.9	9.1
Missouri	17.7	20.2	43.1	19.0
United States	16	18	37	30

¹ Source: USDC Bureau of Census.

² The Missouri State Census Data Center includes the following 16 counties as the Northeast Missouri Region: Putnam, Sullivan, Linn, Scuyler, Adair, Macon, Randolph, Scotland, Knox, Shelby, Monroe, Clark, Lewis, Marion, Ralls, and Pike.

Table 3-8

Median Household Income and Percent of Population Below Poverty Level, 1989¹

	Median Household Income, 1989²	Percent Change in Median Household Income, 1979-1989 (inflation adjusted)	Percent of Population Below Poverty Level, 1989
Marion Co.	\$21,420	-8.2	16.3
Ralls Co.	\$22,070	-14.0	11.2
Northeast Region ³	\$18,795	-6.6	17.6
Missouri	\$26,362	1.0	13.0

¹ Source: USDC Bureau of Census.

² Estimated average household income for 1995: Marion County, \$35,955; Ralls County, \$38,755. Source: Claritas Corporation through UM-OSEDA.

³ The Missouri State Census Data Center includes the following 16 counties as the Northeast Missouri Region: Putnam, Sullivan, Linn, Scuyler, Adair, Macon, Randolph, Scotland, Knox, Shelby, Monroe, Clark, Lewis, Marion, Ralls, and Pike.

3.4.2 Labor Force and Employment

The unemployment rate in 1991 was 6.3 percent in Marion County, 7.4 percent in Ralls County, and 6.6 percent for the State of Missouri as a whole.

Although land in the project area is primarily agricultural, farm workers make up only 5 percent of the total employment in Marion County (864 of 16,382 workers). In Ralls County, farm workers make up 22 percent of the total employment (734 of 3,520 workers). Total employment is much greater in Marion County than Ralls County because of employment opportunities in the City of Hannibal. The most important industries, in terms of employment, in Marion County in 1990 were services (24 percent of non-farm employment), manufacturing (24 percent), government (13 percent), transportation and public utilities (11 percent), and retail trade (11 percent). In Ralls County, where farming is more prevalent, manufacturing accounted for 25 percent of nonfarm employment, followed by services (21 percent), government (18 percent), and transportation and public utilities (13 percent).

In Marion County, employment in manufacturing expanded from 16 percent of the work force to 24 percent between 1980 and 1990. In Ralls County, employment in manufacturing declined from 65 percent of the work force to 25 percent in the same decade.

3.4.3 Major Industries and Employers

The major employers in the area, with most recent employment data are:

- American Cyanamid (manufacturing), 580 employees
- Hannibal Regional Hospital, 550 employees
- Dura Automotive (manufacturing), 505 employees
- Hannibal Public Schools, 485 employees
- Pet, Inc. (manufacturing), 480 employees

American Cyanamid is located on Route 168 north of Hannibal. Dura Automotive and Pet, Inc. are both located along existing Route 61 at the south end of Hannibal.

Tourism accounted for 1,125 jobs in Marion County in 1991 and 768 jobs in Ralls County,

according to the Missouri Division of Tourism. The major tourist attractions in Marion County are associated with the Mark Twain boyhood home in downtown Hannibal. The major tourist attraction in Ralls County is Mark Twain Lake, a portion of which is in the far western area of the County.

3.5 AIR QUALITY

The Clean Air Act of 1970 required the adoption of National Ambient Air Quality Standards (NAAQS). In response to the Act, the Environmental Protection Agency has promulgated NAAQS for sulfur oxides, nitrogen dioxide, particulate matter 10 microns or less in size (PM₁₀), carbon monoxide, lead, and ozone. The NAAQS are health-based standards for maximum acceptable concentrations of these pollutants in the air. States are divided into geographic regions called Air Quality Control Regions (ACQRs), and each region is assessed for compliance with the standards. The vehicle for implementation of the standards is the State Implementation Plan (SIP), which defines the actions the state will take to attain and maintain compliance for those NAAQS. Under the Clean Air Act and subsequent amendments, each state's transportation plans are specifically required to comply with the SIP.

The study area is in the Northern Missouri Intrastate ACQR, and does not exceed any NAAQS. There are no transportation control measures that apply to this region, and therefore no actions are required for conformity with the SIP.

3.6 NOISE

Most of the study area is a relatively quiet rural area. The major source of noise within the study area is from motor vehicles operating on the existing roadways. Noise levels are generally greater on the U.S. routes because of higher traffic volumes, greater operating speeds and larger numbers of trucks.

3.7 WATER RESOURCES AND GEOLOGIC SETTING

3.7.1 Surface Water

Most of the study area lies in the Bear Creek watershed; Bear Creek flows northwest to southeast across the study area and empties into the Mississippi River in the south part of the City of Hannibal, about 5.6 km (3.5 miles) east of the study area.

According to records from the U.S. Geological Survey (USGS), since 1939 the average stream flow for Bear Creek at Hannibal is 0.1 cubic meters per second (m^3/s) (3.4 cubic feet per second [cfs]), with a maximum recorded flow of about 180 m^3/s (6,500 cfs), and a minimum of no flow.

There is a detention dam on Bear Creek just outside the city limits of Hannibal, about 1,100 meters (3,500 feet) upstream from the Bear Creek crossing on Route 61. There is no reservoir under normal conditions; the purpose of the dam is for temporary detention of flood waters. The detention storage area covers approximately 180 hectares (440 acres). There are two USGS gaging stations on Bear Creek; one immediately upstream of the detention dam and one about 1,100 meters (3,700 feet) downstream of the dam.

The City of Hannibal waste water treatment plant formerly discharged to Bear Creek downstream from the study area; it now discharges directly to the Mississippi River. No water treatment intakes along Bear Creek have been identified. The only water quality data available from the Missouri Department of Natural Resources files is from downstream and immediately upstream of the former City of Hannibal waste water treatment plant discharge.

The Missouri Department of Conservation surveyed the aquatic resources of Bear Creek and Little Bear Creek in 1990. Little Bear Creek also lies within the study area. Eighteen species of fish were collected. Substrate type at all four sampling locations was primarily gravel, with some sand. This level of species diversity and substrate type indicate these are high quality streams.

In the north-central part of the study area is a karst area, meaning that there is no appreciable surface runoff away from it, and that the runoff enters sinkholes which drain to the subsurface. There are more sinkholes in the area adjacent to and outside the karst area,

but they are contained within the watersheds of the streams. Some of the sinkholes in this area have ponds, the largest of which is O'Conner Pond, which covers about 5 hectares (13 acres) (Exhibit 3-7). It is impossible to determine underground drainage patterns from topography, they do not necessarily follow surface drainages. Underground water may discharge as springs or into streams in the area.

There are numerous reservoirs in the study area, primarily farm ponds of a few hectares (acres) or less in size. In the southern part of the study area, within the Salt River watershed, are four larger reservoirs ranging from about 4 to 8 hectares (10 to 20 acres). The largest is Crystal Blue Lake, as shown in Exhibit 3-7.

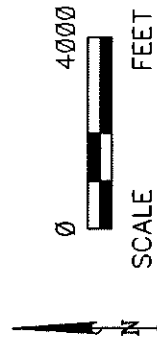
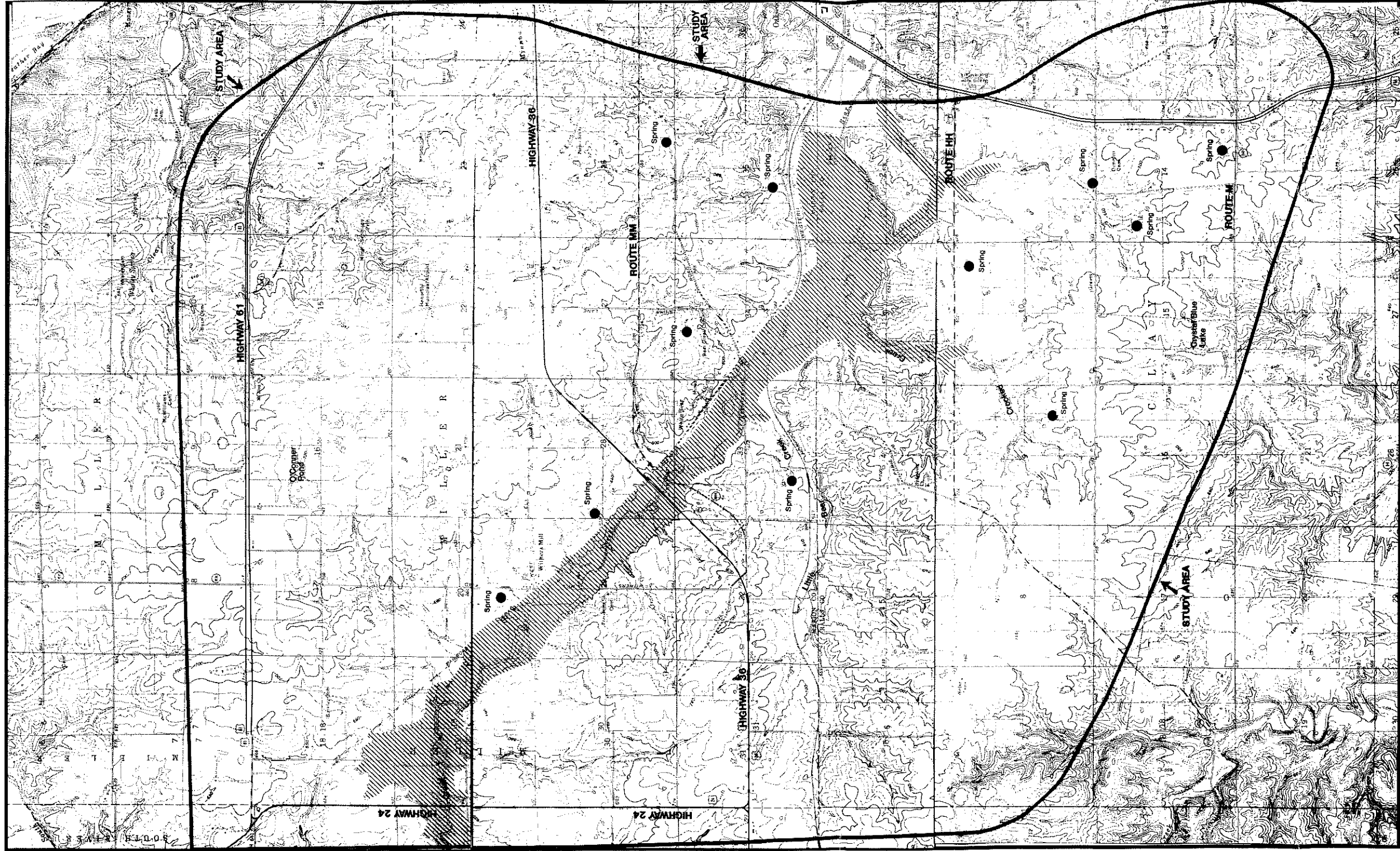
3.7.2 Ground Water

Ground water in the study area is not used as a public water supply source; however wells are used to supply some individual households and farms. There are a number of springs in the area, some of which are used for water supply. Locations of springs that have been identified are shown in Exhibit 3-7. All springs shown were identified through contact with local residents. There may be other springs in the study area that have not been identified.

3.7.3 Geologic Setting

The study area is in a region of gently rolling hills that had been covered by glaciers tens of thousands of years ago. The soil cover is developed on the clay, silt, sand and gravel left by the glaciers. There are few rock exposures in the study area. Probably the most notable rock exposure in the vicinity is the limestone bluff on the west side of existing Route 61 north of Route MM in Hannibal.

The bedrock in the area consists primarily of limestone. There are a number of caves in the vicinity, but only one, White Bear Cave, has been identified in the study area. What is locally referred to as "White Bear Cave" is actually a limestone quarry, but the quarry apparently intersected a natural cave. Information on caves in the area was obtained from the Missouri Speleological Survey (MSS). At the request of the MSS, no cave locations are shown on the maps.



SPRINGS AND FLOODPLAINS Exhibit 3-7

REFERENCE: Drawing taken from U.S.G.S. Quadrangles -
Rensselaer, MO dated 1958, Quincy SW, MO-IL dated 1971,
Palmyra, MO dated 1975 and Hannibal West, MO dated 1971.

Surface bedrock along all the proposed routes is composed of the Devonian age Callaway, Grassy Creek and Saverton Formations and the Mississippian age Louisiana, Hannibal and Burlington Formation. The Callaway is a lithographic to fine grained limestone with some sandstone, siltstone and shale. It can vary greatly in thickness but has a maximum thickness of nearly 70 feet. The Grassy Creek and Saverton are dark gray to light gray, fissile, silty shales with a combined thickness ranging from 10 to 75 feet. The Louisiana is a gray, lithographic limestone to yellowish-brown dolomite. Thickness ranges from 15 to 50 feet. The Hannibal is a bluish-gray to yellowish-brown claystone to siltstone. Thickness often approaches 100 feet. The Burlington is a fossiliferous, light-gray to white, medium to coarsely crystalline limestone with considerable chert. Maximum thickness is approximately 200 feet. Some preglacial valleys filled with drift may be encountered.

Surficial materials along the proposed routes included alluvium, loess, till, residuum, terrace material, and often bedrock. Alluvium forming the valley floors along Little Creek and Bear Creek consists of clayey, sandy silt with some sand and gravel. Loess forms a veneer along the ridge tops and the upper part of the valley slopes. Thickness varies but may approach several feet in upland areas and thins rapidly downslope. Glacial till thickness is highly variable but thicknesses greater than 20 to 30 feet are rare. The till is composed of sand, clay and silt with minor amounts of igneous, metamorphic and sedimentary pebbles and cobbles with few boulders. Residuum, in minor amounts, is found in a few localities principally near areas of thin till and Mississippian bedrock. A terrace is present along Bear Creek near Withers Mill and bedrock exposures will be encountered along Crooked Creek, Little Creek, and Bear Creek.

Geologic hazards along the proposed routes are related to properties of the bedrock and surficial materials. Deep cuts in the loess and glacial till may be prone to sliding and slumping. The same condition may exist if there are deep cuts in the Grassy Creek, Saverton, and Hannibal Formations. In addition these same units may create problems with road stability. Road construction in areas underlain by the Burlington Limestone will, almost certainly, encounter karst features. These features may include sinkholes (especially near the northern terminus), an irregular bedrock surface, solution enlarged joints, and caves. All wells acquired during property acquisition or encountered during construction will need to be plugged in accordance with requirements of the Missouri Water Well Drillers Law.

Mineral resources impacted by the proposed construction include limestone and shale.

Limestones in the Callaway and Burlington Formations have potential for use as high specification aggregate, agricultural limestone and also cement and lime manufacture. Shales in the Grassy Creek and Saverton Formations and often in the Hannibal Formation have been found suitable for the manufacture of structural clay products and lightweight aggregate in laboratory tests.

3.8 WETLANDS AND VEGETATION

3.8.1 Wetlands

Waters of the U.S. are wetlands, streams, lakes, and similar areas as they apply to the jurisdictional limits of the authority of the U.S. Army Corps of Engineers (COE) under the Clean Water Act. The definition of Waters of the U.S. is provided in Title 33, Part 328.3 of the Code of Federal Regulations (CFR). For the purpose of this Report, the term wetlands refers to those wetlands which meet the regulatory definition at 33 CFR 328.3, and the term waters of the U.S. means all areas which meet the definition, including jurisdictional wetlands.

Preliminary wetland identification methods follow the guidelines presented in the COE 1987 *Wetland Delineation Manual*. The preliminary wetland identification consisted of a review of existing wetland information; consultation with the COE; and an on-site wetland identification during September, 1994. Preliminary wetland information was obtained from Natural Resource Conservation Service (NRCS); U.S. Fish & Wildlife Service (USFWS) National Wetland Inventory (NWI) Maps; U.S. Geological Survey topographic maps; and official Marion and Ralls county highway maps. Natural Resource Conservation Service county soil surveys, county hydric soils lists, and Food Security Act farmed wetlands information were gathered and compared with USFWS NWI maps to identify areas of potential jurisdictional wetlands. A wetland identification was performed on-site by Carol Kuhn of George Butler Associates, Inc. in September, 1994. The results of the on-site wetland identification were combined with the existing NRCS, USFWS, and COE information to further define potential jurisdictional wetlands. The results of the off-site delineation and preliminary on-site wetland identification were combined to obtain a preliminary estimate of the jurisdictional waters of the U.S., including wetlands, within the proposed alternative corridor segments. A conservative approach was taken during this preliminary assessment. Nearly all areas identified on NWI maps as wetlands and all areas

mapped by NRCS as hydric soils or as wetlands are included as potential jurisdictional waters of the U.S.

The project study area consists of gently to moderately undulating uplands and narrow, shallow, eroded stream channels. The majority of the land is agricultural, with some shrubby or wooded areas. Bear Creek, Little Bear Creek, and Crooked Creek are the only named waterways in the alternative corridors. These waterways and their unnamed tributaries are part of the Bear Creek watershed, which eventually drains into the Mississippi at Hannibal. The following subsections summarize existing general information regarding soils, hydrology, and vegetation within the project study area.

3.8.1.1 Soils

For the purpose of this EIS, the terms *soil*, *soil map unit*, and *soil series* are used in the same manner as in USDA Soil Conservation Service Agricultural Handbook No. 436, *Soil Taxonomy, A Basic System of Soil Classification for Making and Interpreting Soil Surveys*, 1975.

Soil is used as a general term which refers to the collection of natural bodies on the earth's surface, containing living matter and supporting or capable of supporting plants. This report uses the term soil in reference to hydric soils, which are those soils that, in an undrained condition, are saturated, flooded, or ponded long enough during a growing season to develop an anaerobic condition that supports the growth and regeneration of hydrophytic vegetation (7 CFR 527.5, Part 12 Final Rule, Conservation Provisions of the Food Security Act of 1985).

A soil series consists of soils which have profiles that are nearly alike. All soils of a series have horizons which have similar compositions, thicknesses, and arrangements. A soil map unit as depicted on a soil map represents an area on the landscape in which a specific soil series or group of series is dominant, although inclusions of other soil series may occur within that map unit. The map unit is identified and named according to the classification of the dominant soil and soils. For example, Marion silty loam is a soil series in Marion and Ralls Counties, and the Marion silty loam map unit is used to depict on the soil survey map those areas which contain the Marion silty loam series as a dominant series.

Table 3-9 identifies hydric soils mapped in the proposed corridors, as identified by the NRCS in the Hydric Soils List of Marion County, Missouri (NRCS, 1990a) and the Hydric Soils List of Ralls County, Missouri (1990b) (see Appendix D for locations of corridor segments). A hydric soil is a soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation. Both county lists reflect local soil conditions, and have eliminated several soils which are listed on the state and national hydric soil lists because they do not meet the hydric soil criteria in these counties. Hydric soils within the project corridors are limited to scattered small areas of Marion and Moniteau silty loams. Marion silty loam is identified as hydric due to inclusions of Chariton silty loam, which is frequently saturated. Chariton inclusions comprise approximately 10% of the Marion silty loam map unit. Therefore, wetland delineations will have to be performed at Marion silty loam locations to determine if hydric soil conditions are present. For the purpose of this wetlands analysis of alternative corridors, the assumption was made that areas mapped as Marion silty loam are hydric, although it is likely that only a small percentage is hydric. Moniteau silty loams are frequently saturated and therefore are classified as hydric soils. Moniteau soils have few inclusions; most areas mapped as Moniteau probably consist of this hydric soil.

3.8.1.2 Hydrology

Topographic maps and soil surveys indicate that the rivers and streams in the project area are located in narrow valleys or are deep channels cut into upland soils. Narrow flood plains are associated with these waterways. With the potential exception of areas mapped as Marion silty loam or Moniteau silty loam, no soils in the project corridors possess indicators of wetland hydrology [somewhat poorly drained with a water table equal to 0.0 meter (0.0 foot) from the surface during the growing season; or poorly drained or very poorly drained and having either a water table equal to 0.0 meter (0.0 foot) during the growing season if textures are coarse sand, sand, or fine sand in all layers within 7.8 cm (20 inches); or at less than or equal to 15 cm (0.5 foot) from the surface during the growing season if permeability is equal to or greater than 15 cm (6.0 inches)/hour in all layers within 51 cm (20 inches); or a water table at less than or equal to 0.30 meter (1.0 foot) from the surface during the growing season, if permeability is less than 15 cm (6.0 inches)/hour in any layer within 20 inches] (Federal Register Vol. 60, No. 37, February 24, 1995, P. 10349).

<p>Table 3-9 Hydric Soils</p>						
County	Alternative Corridor Segment	Map Unit Symbol	Map Unit Name	Hydric Portion	Hydric Composition	Hydric Criterion
Marion	D3	22B	Marion silty loam	Chariton silty loam, inclusions	10%	2B2
Marion	CW3, Link 1	25	Moniteau silty loam	Moniteau	90%	2B2

3.8.2 Vegetation

The study area is located in the Eastern Section of the Glaciated Plains Natural Division of Missouri (Nelson, 1987). Forests in this Division are eastern deciduous woodlands dominated by oak and hickory. Potential natural vegetation of the project study areas and adjacent land is prairie/forest mosaic (Nelson, 1987). Schroeder (1982) identifies presettlement prairies within the project study area in uplands between Rensselaer and South River. Land use trends have eliminated most of the presettlement vegetation from the project study area. Current dominant vegetation in non-agricultural areas consists of typical disturbance tolerant upland woody species such as honey locust (*Gleditsia triacanthos*), juniper (*Juniperus virginiana*), white oak (*Quercus alba*), and Siberian elm (*Ulmus pumila*). Wooded drainages such as South River contain slippery elm (*Ulmus rubra*), green ash (*Fraxinus pennsylvanica*), shingle oak (*Quercus imbricaria*), box elder (*Acer negundo*), and sycamore (*Platanus occidentalis*).

Table 3-10 lists vascular plants identified during the preliminary wetland identification.

3.9 WILDLIFE

Marion and Ralls Counties are in a geographic region that is a transition zone between the prairie and the Ozark Border. This region is characterized by a variety of vegetative types and soils which provide a profusion of edge growth that is excellent cover for wildlife. Originally, the area was a mixture of woodland and prairie. Today about half the land area is classified as land suitable for cultivated crops and the rest is grassland or woodland or is in other uses. There are large populations of deer, raccoon, muskrat, opossum, coyote, beaver, striped skunk, gray fox, mink, and squirrels. There are small populations of woodcocks, quails, pheasants, and bobcats. There is a good population of songbirds.

Table 3-10 Vascular Plants Identified During September, 1994 Preliminary Wetland Identification		
Scientific Name ¹	Common Name ²	NLPSOW ³ Indicator Status
TREES		
<i>Acer negundo</i> L.	box elder	FACW-
<i>Celtis occidentalis</i> L.	hackberry	FAC-
<i>Fraxinus pennsylvanica</i>	green ash	FACW
<i>Gleditsia triacanthos</i> L.	honey locust	FAC
<i>Juglans nigra</i> L.	black walnut	FACU
<i>Juniperus virginiana</i> L.	red cedar	FACU
<i>Maclura pomifera</i> (Raf.) Schneid.	Osage orange	FACU
<i>Platanus occidentalis</i> L.	American sycamore	FACW
<i>Quercus alba</i> L.	white oak	FACU
<i>Quercus imbricaria</i> Michx.	shingle oak	FAC-
<i>Quercus rubra</i> L.	northern red oak	FACU
<i>Ulmus rubra</i> L.	slippery elm, red elm	FAC
SHRUBS		
<i>Rhus glabra</i> L.	smooth sumac	N/L
<i>Rosa multiflora</i> Thunb.	multiflora rose	FACU
<i>Symphoricarpos orbiculatus</i> Moench.	coral berry (buckbrush)	FACU
HERBACEOUS PLANTS & WOODY VINES		
<i>Ambrosia artemisiifolia</i> L.	common ragweed	FACU
<i>Ambrosia trifida</i> L.	giant ragweed	FAC+

Table 3-10 Vascular Plants Identified During September, 1994 Preliminary Wetland Identification

Scientific Name ¹	Common Name ²	NLPSOW ³ Indicator Status
<i>Andropogon virginicus</i> L.	broomsedge	FAC-
<i>Apocynum cannabinum</i> L.	dogbane	FAC
<i>Campsis radicans</i> (L.) Seem	trumpet vine	FAC
<i>Carduus nutans</i>	musk thistle	N/L
<i>Cirsium vulgare</i>	thistle	FACU-
<i>Convolvulus sepium</i> L. (<i>Calystegia sepium</i> (L.) R.Br)	hedge bindweed	FAC
<i>Daucus carota</i>	Queen Anne's lace	N/L
<i>Elymus virginicus</i> L.	Virginia wild rye	FACW-
<i>Festuca arundinacea</i> Schreb.	tall fescue	FACU+
<i>Festuca elatior</i> L.	meadow fescue	N/L
<i>Iva annua</i> L.	annual sumpweed	FAC
<i>Ludwigia palustris</i> (L.) Ell.	water purslane	OBL
<i>Parthenocissus quinquefolia</i> (L.) Planch.	Virginia creeper	FAC-
<i>Phleum pratense</i>	timothy	FACU
<i>Physalis longifolia</i> Nutt.	ground cherry	NL
<i>Polygonum hydropiperoides</i>	swamp smartweed	OBL
<i>Polygonum virginianum</i>	Virginia knotweed	FAC
<i>Sambucus canadensis</i> L.	American elderberry	FACW-
<i>Smilax tamnoides</i> L. var. <i>hispida</i> Muhl. ex Torr.	bristly greenbrier	FAC
<i>Solanum carolinense</i> L.	horse nettle	FACU-
<i>Spartina pectinata</i> Link	prairie cordgrass	FACW+
<i>Toxicodendron radicans</i> (L.) Kuntze	poison ivy	FAC+

Table 3-10 Vascular Plants Identified During September, 1994 Preliminary Wetland Identification

Scientific Name ¹	Common Name ²	NLPSOW ³ Indicator Status
<i>Tridens flavus</i> (L.) Hitchc.	tall redtop	N/L
<i>Trifolium repens</i> L.	white clover	FACU+
<i>Vitis cinerea</i> Engelm.	grayback grape	FACW-
<i>Vitis riparia</i> Michx.	riverbank grape	FACW-

¹Scientific names from Steyermark, J. *Flora of Missouri*, 1963.

²Common names from *Flora of Missouri*. If none provided by the *Flora*, then *National List of Plants that Occur in Wetlands, North Central (Region 3) (Reed, 1988)* used.

³Wetland indicator status taken from *National List of Plants that Occur in Wetlands, North Central (Region 3)*.

OBL = obligate wetland species

FACW = facultative wetland species

FAC = facultative species

FACU = facultative upland species

UPL = upland species

NL = not listed

NI = no indicator status yet assigned

+ and - = at the higher end (+) or the lower end (-) of the particular category.

(For example, FACW+ = tending toward OBL

FACU- = tending toward FAC.)

3.10 FLOODPLAINS

Floodplains are a valuable resource of the study area. These areas perform many of the same functions as wetlands including flood desynchronization, wildlife habitat, food chain support, nutrient retention and removal, and erosion control (sediment trapping and bank stabilization). Flood desynchronization and erosion control are closely related functions that are important during storm events. The dissipation of storm water over the floodplains reduces flow velocity and results in the retention of water-carried silt and the desynchronization of storm water.

Flood boundaries shown for Marion County are based on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), which show the 100-year floodplain. FIRM maps were not available for Ralls County, but Flood Hazard Boundary Maps (FHBM) are available. The main stream in this region of the routes is Bear Creek with its 100-year flood boundary generally about 460 m (1,500 ft) wide. There are local variations of Bear Creek width of about a 100 meters (about 300 feet), and a detention basin on this stream built by the COE just upstream of U.S. Highway 61 and south of Hannibal.

Other than the Bear Creek flood boundary, the only other flood boundaries mapped by FEMA are narrow segments less than about 150 meters (500 feet) wide along Crooked Creek and two intermittent streams just south and east of the detention basin. These areas are also shown in Exhibit 3-7.

3.11 THREATENED, ENDANGERED AND RARE SPECIES

Correspondence with the U.S. Fish and Wildlife Service and the Missouri Department of Conservation disclosed no known federally-listed or proposed threatened or endangered species, or designated or proposed critical habitat, within the project area of influence.

3.11.1 Definitions

3.11.1.1 Federal Status

The federal status is derived from the provisions of the federal Endangered Species Act, which is administered by the U.S. Fish and Wildlife Service. The Endangered Species Act

provides federal protection for plants and animals listed as Endangered or Threatened. A "federally-listed" endangered species is considered to be in danger of extinction throughout its range, and a federally-listed threatened species is considered threatened throughout its range.

3.11.1.2 Missouri Status

The state status is determined by the Missouri Department of Conservation (MDC) under Constitutional authority. Rule 3CSR10-4.111 of the *Wildlife Code of Missouri* and certain state statutes apply to state listed species. The "state-listing" of endangered indicates survival in Missouri is in immediate jeopardy. The status of rare listing indicates present in small numbers. If environment worsens, rare status in Missouri could deteriorate to endangered.

3.11.2 Prairie Dandelion

The MDC reported one known occurrence of the state-listed rare *Microseris cuspidata* (prairie dandelion), from 1984, near the southwest edge of the study area. This occurrence of the prairie dandelion was also noted in the MDC *East-Central Natural Features Inventory* dated 1986, which included Ralls County. (The inventory lists the species as *Agoseris cuspidata*; the scientific name was changed to *microseris cuspidata* since the inventory was published).

3.11.3 Indiana Bat

3.11.3.1 Previous Sitings in Marion County

The MDC indicated that the wooded areas near water sources in the project area may provide summer habitat for the federally-listed endangered *Myotis sodalis* (Indiana bat). The MDC indicated that there was only one location in Marion or Ralls counties where an Indiana bat had been identified in 1978. This siting was at a location in western Marion County, about 27 km (17 miles) west of the project site.

3.11.3.2 Sitings Within Study Area

During the field survey to evaluate potential summer habitat for the Indiana bat, sitings of Indiana bats were made in a quarry within the project area. The quarry is located on the east side of Bear Creek, between Route MM and Centerville Road, and is shown in the middle of Exhibit 3-5.

The quarry was visited on August 2, 1994 by Dr. Michael Harvey and Woodward-Clyde personnel. A cluster of bats was located in a natural dome ceiling approximately 60 m (200 feet) inside the mine. The cluster size was estimated at 1.5 m x 1.5 m, or about 400 bats. Identification of the bats was not possible at this time due to inaccessibility. Other bats noted in the mine during this visit were eight Pipestrelles (*Pipistrellus subflavus*) and three Big Brown bats (*Eptesicus fuscus*).

The investigators returned to the mine on August 4, 1994 with James Gardner of the Missouri Highway and Transportation Department. Mr. Gardner concurred with the previous estimate of 400 bats in the cluster. Nine of these bats were plucked from the cluster; seven were identified as Little Brown bats (*Myotis lucifugus*) and two were identified as Indiana bats. This ratio would yield an estimate of approximately 90 Indiana bats for the cluster. All nine of the identified bats were males, thus indicating a bachelor colony.

The owner of the mine stated that a cluster of bats was commonly present during the winter months. On December 28, 1994, James Gardner and Rick Clawson visited the mine and counted 22 Indiana bats. Additionally they noted 300 - 400 Little Brown bats and 46 Pipestrelles. They also noted past (historical) use by Gray bats although none were noted during any of the visits to the mine.

3.11.3.3 Potential Habitat

This section summarizes the affected environment with respect to the federally-listed endangered Indiana bat. The environment is discussed in detail in Appendix B. Wooded areas with access to a water supply in this area are considered to be potential summer habitat for the endangered Indiana bat, as discussed above. The current population of Indiana bat is estimated at less than 400,000 individuals. Although the Indiana bat is considered a cave-dwelling species, most caves are unsuitable for Indiana bat habitation. During the winter,

85 percent of the known population of Indiana bat hibernates in only seven caves or mines in Missouri, Indiana and Kentucky. In mid- to late spring, the female Indiana bat leaves the hibernation cave/mine and goes to their summer maternity roost. Several summer roosting sites have been discovered in Indiana, Illinois, Kentucky, Missouri, Ohio, and Michigan. The "typical" Indiana bat summer habitat is wooded floodplains or uplands in proximity to perennial streams. Within these areas, optimal roosts are found beneath the exfoliating bark of dead trees, beneath naturally exfoliating bark of living trees, *e.g.* shagbark hickory, or in cavities of dead trees. Most of the study area is cleared for agriculture or development. However, throughout the study area there are wooded areas associated with stream corridors and steep slopes that are apparently unsuitable for crop farming. Water is also readily available due to the presence of Bear Creek and numerous farm ponds. Much of the wooded area is suitable as both foraging and roosting habitat for the Indiana bat. Habitat suitability is discussed in detail in Appendix B.

3.11.4 Other Features

A review of MDC Natural Features Inventories for the area did not indicate any natural features within the study area considered "significant" by the MDC, other than the one occurrence of the prairie dandelion, discussed above. The inventories reviewed were the *Addition to the Eight-County Natural Features Inventory* dated 1983, which included Marion County; and the *East-Central Natural Features Inventory* dated 1986, which included Ralls County. The following categories of natural features were evaluated: natural areas, endangered species habitat, relict species habitat, geologic areas, natural study areas, unique feature areas, and aquatic areas.

Because a project can sometimes influence features outside the immediate geographical area, natural features identified in the inventories for the surrounding area were reviewed. Almost all the features considered significant by MDC are associated with either the Salt River or the Mississippi River; none will be impacted by this project.

3.12 ARCHAEOLOGICAL AND HISTORIC RESOURCES

Appendix C contains a discussion of the prehistoric and historic background of the study area derived from an intensive and thorough review of available records and literature. The records review included an examination of the resources at the Archaeological Survey of

Missouri (ASM) and the Missouri Department of Natural Resources Historic Preservation Program (MDNR-HPP) Library. In addition, historic and archival records on file at various state, county, and city libraries and offices were examined, including government land office records, plat books, county atlases, photographs, aerial photographs, USGS topographic maps, and land ownership maps. The records review identified multiple archeological sites, historic structures, and historic bridges recorded within, adjacent to, or in the vicinity of the proposed preferred and alternative project alignments. In addition, potentially significant historical sites were identified.

3.12.1 Archeological Resources

A description of the generally accepted cultural sequence relative to northeastern Missouri and the resultant nature of archeological remains in the project vicinity, derived from the extant literature, is provided in Appendix C. Based on a review of ASM site forms and extant archeological report information pertaining to the area being investigated, it is apparent that the discovery of prehistoric sites will be most likely in those areas of uplands or ridgetops overlooking perennial sources of water. Thus, it appears that slope and lowland or floodplain settings in the project area will have the least probability of site discovery. All of the ASM site forms referred to for archeology sites located within the project area indicate cultural affiliation as *unknown prehistoric*, except for those sites that included a historic component.

Only two recorded archeology sites are located within or adjacent to the proposed alternative alignments. Site 23MA164, recorded December 4, 1990, is a low density scatter of chert debitage and core fragments located in Section 28, T57N, R5W. Site size is recorded as 100 meters x 20 meters. The site was not assessed according to National Register of Historic Places (NRHP) eligibility criteria at the time of recording. The site is located in the vicinity of the interchange of Highway 36 and alternative alignment CW. Based on a limited surface examination by the cultural resource investigator, the site does not appear to meet criteria for NRHP listing.

Site 23RA128, is recorded as an "Archaic site - Hannibal Complex type site." The location is reported as Section 4, T56N, R5W. Scant information was provided in the site file and the site was not assessed according to NRHP eligibility criteria at the time of recording. This site is located within proposed alternative alignment D and, based on a limited surface

examination by the cultural resource investigator, warrants further investigation relative to NRHP eligibility.

3.12.2 Architectural Resources

Appendix C discusses the historic background of the project area. The architectural investigations included a review of county assessor files, site visits, and interviews with owners, when possible. There is only one structure within the study area that is listed in the NRHP, The Landis House, which is located 760 meters (2500 feet) southeast of the Highway 61/24 interchange, as shown in Exhibit 3-5. In addition, eleven structures which appear to be 50 or more years old have been identified within the proposed alternative project alignments. Following is a brief description of each, including their relationship to a particular alignment.

- RR3 Box 193, New London, 63459. T56N, R5W, Section 23. Mid-1920s salt box residence. Poor condition interior and exterior. Alternative alignment F-EF-D.
- T56N, R5W, Section 14. Rural location. 1940s pumphouse. Poor condition. Alternative alignment F-EF-D.
- RR3 Box 131, New London, 63459. T56N, R5W, Section 9. 1930s farm residence and outbuildings. Good condition. Alternative alignment F-EF.
- RR1 Box 205, Hannibal, 63401. T56N, R5W, Section 8. 1940s-1950s barn. Good condition. Alternative alignment F-EF.
- RR2 US36, Palmyra. T57N, R5W, Section 1. Barn, date not recorded. Good condition. Alternative alignment F.
- RR1 Hwy 61, Palmyra. T57N, R6W, Section 12. 1880s house, 2 outbuildings. Good condition. Alternative alignment F-EF

- RR3 Box 165, Hannibal. T56N, R5W, Section 4. 1920s farm house. Good condition. Alternative alignment D.
- RR2 Box 222, Hannibal. T57N, R5W, Section 32. 1940s residence, now used for storage. Alternative alignment D (US36 interchange).
- RR1 Hannibal. T56N, RW5, Section 11. 1940s residence. Good condition. Alternative alignment CW.
- T56N, R5W, Section 10. Rural location. 1940s residence. Good condition. Alternative alignment CW.
- RR 1 Box 282A, Hannibal. T56N, R5W, Section 10. 1940s residence. Good condition. Link connecting alternative alignment CW and alternative alignment D.

3.12.3 Historical Bridges

MHTD has completed a Service Ratings for Bridges for both Ralls and Marion Counties. The survey lists the bridges by name and includes information pertaining to type, span, age, stream crossing, and construction firm. There are no recorded bridges within or adjacent to the proposed alternative project alignments.

3.12.4 Historical Resources

The intent of the historical investigation is to identify sites that would not typically be included in archeological or architectural surveys. Such sites may include historical trails, roads, residences, or cemeteries. One site in the project area is the roadbed of the defunct Hannibal and St. Joseph Railroad, chartered in 1847 to traverse Missouri and completed February 13, 1859. The existence of the railroad is significant for the part it played in the development of the western frontier, including transportation, marketing, trade, and travel. The railroad was also significant relative to the movement of troops during the Civil War. This particular railroad roadbed is further significant as the first mail allegedly carried by the Pony Express traveled from Palmyra to St. Joseph over its tracks. The roadbed will be impacted by the proposed project alignments. Other potentially significant sites in the project area include abandoned cemeteries and grave plots. There are no readily identifiable

cemeteries or grave plots within or adjacent to the proposed alternative project alignments.

3.13 POTENTIAL HAZARDOUS WASTE SITES

A search was conducted to identify both regulated and unregulated hazardous waste sites within the study area that could impact selection of alternatives. Hazardous waste as used in this context is hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA). It cannot be disposed of as nonhazardous solid waste, and there are also special rules regarding its storage, transportation, and treatment.

The first step in the process was to review databases that contain information about records of both the U.S. Environmental Protection Agency (USEPA) and the Missouri Department of Natural Resources (MDNR).

The Federal databases reviewed include:

- *National Priority List (NPL)* - Uncontrolled or abandoned hazardous waste sites identified for priority remedial actions under the Superfund program.
- *Comprehensive Environmental Response, Compensation, and Liability Act List (CERCLA)* - Sites which have been investigated or are currently being investigated for the release or threatened release of hazardous substances.
- *Facility Index System (FINDS)* - Sites which EPA has investigated, reviewed or been made aware of in connection with various federal regulatory programs.
- *Resource Conservation and Recovery Act List (RCRA)* - Sites which report generation, storage, transportation, treatment or disposal of hazardous waste.
- *Emergency Response Notification System List (ERNS)* - Sites of reported releases of oil and hazardous substances. The database

contains information from spill reports made to federal authorities including the EPA, the US Coast Guard, the National Response Center and the Department of Transportation.

- *Open Dump List* - Sites that do not comply with the EPA Criteria for Classification of Solid Waste Disposal Facilities and Practices.
- *Dockets List* - A compilation of civil judicial enforcement actions filed by the Department of Justice on behalf of the EPA against violators of federal environmental statutes.
- *Resource Conservation and Recovery Act Administrative Tracking System List (RAATS)* - Sites which tracks and records RCRA Section 3008 Compliance Orders and Orders on Consent for the EPA Office of Waste Programs Enforcement.

The state databases reviewed include:

- *State Priority List (SPL)* - A list of the Federal Superfund NPL sites in Missouri. This list includes an inventory of facilities subject to investigations concerning likely or threatened releases of hazardous substances from those facilities.
- *Leaking Underground Storage Tank List (LUST)* - An inventory of leaking underground storage tanks.
- *Underground Storage Tank List (UST)* - An inventory of registered underground storage tanks (aboveground tanks are reported when included on this list).
- *Solid Waste List* - A database of the solid waste facilities within the state. This database also includes recycling facilities and solid waste processing facilities.

Only three sites contained in the databases were in the study area. One of these is the MFA facility on Route 24 between Routes 61 and 36. These three sites were all existing

businesses, and will be avoided by the route alternatives even if there was no concern about potential hazardous waste issues.

In addition, a few more sites of concern were identified in the study area, based on initial reconnaissance work and information from the public. These are as follows:

- A large junkyard at the abandoned quarry at Bear Creek
- A small junkyard at the northwest corner of Route 61 and Ralls County Road 62. A truck stop at the intersection of Routes 24 and 36

This information was used in constraints mapping, for preliminary selection of alternative routes. When alternatives were selected for detailed study, they were first evaluated as 300-meter (1,000 foot) wide corridors; actual routes were developed within those corridors. Preliminary surveys of the corridors were conducted, by making observations from all public roadways with the corridors. Based on this information alternative alignments were adjusted to avoid these sites. No additional sites of concern were identified.

3.14 VISUAL ENVIRONMENT

Most of the study area consists of agricultural crop land, with narrow wooded corridors along stream channels. Relief is generally moderate, with rolling hills. The scenery is typical of much of the agricultural midwest.

4.1 LAND USE IMPACTS

4.1.1 Right-of-Way Required by Land Use Category

Table 4-1 indicates the lengths of each alternative and the right-of-way requirements by each land use category. The information shown assumes a uniform 90-meter (300-foot) right-of-way, with additional right-of-way requirements at interchanges. The actual right-of-way requirements will vary, depending on grade changes and outer road requirements. In areas where outer roads are not required and the roadway grade is close to existing grade, right-of-way requirements may be less than 90 meters (300 feet). In areas where there are large cuts or fills and/or outer roads required, right-of-ways requirements may be greater than 90 meters (300 feet).

As shown in Table 4-1, Alternative EF has the largest total right-of-way requirements at approximately 285 hectares (705 acres), and Alternative CW has the least right-of-way requirement at approximately 227 hectares (563 acres). Total farmland requirements ranged from a high of approximately 258 hectares (636 acres) for Alternative EF, to a low of 182 hectares (452 acres) for Alternative CW. The largest loss of prime farmland results from Alternative F (191 hectares [473 acres]), and the least from Alternative CW (91 hectares [226 acres]). More details of farmland requirements are included in Section 4.2.1. Residential land taken is greatest for Alternative D, at approximately 16 hectares (40 acres). All other alternatives are similar, and range from 4 to 5 hectares (9 to 12 acres). The larger requirement for Alternative D is due primarily to the residential land at the Routes 61/36 interchange. The area of existing roadways and existing roadway right-of-way located within the area required for the Route 61 right-of-way ranges from a high of 16 hectares (39 acres) for Alternative F to a low of 4 hectares (10 acres) for Alternative CW. The higher value for Alternative F is due to the usage of the existing Route 24 right-of-way. In most cases, the roadways will not be taken, but will be used as outer roads or will remain in place at grade separated crossings. Wooded land impacted ranges from a high of 37 hectares (92 acres) for Alternative CW to a low of 12 hectares (29 acres) for Alternative F.

<p style="text-align: center;">Table 4-1 Estimated Right-of-Way Requirements by Land Use</p>					
	Alternative CW	Alternative D	Alternative EF	Alternative F	
Total Length of Improvement, km (miles)	11.9 (7.4)	15.2 (9.5)	15.2 (9.5)	16.5 (10.2)	
Right-of-Way Requirements ¹					
Prime Farmland Taken, hectares (acres)	91 (226)	92 (227)	160 (395)	191 (473)	
Statewide Important Farmland Taken, hectares (acres)	91 (226)	124 (306)	98 (241)	55 (135)	
Residential Land Taken, hectares (acres)	4 (9)	16 (40)	4 (11)	5 (12)	
Existing Roadway Taken or Occupied, hectares (acres) ²	4 (10)	12 (30)	5 (13)	16 (39)	
Wooded Land Taken, hectares (acres)	37 (92)	21 (53)	18 (45)	12 (29)	
Total Right-of-Way Requirements, hectares (acres)	227 (563)	265 (656)	285 (705)	279 (688)	
<p>Notes: ¹ Assumes 90-meter (300-foot) right-of-way requirements except for additional requirements at interchanges. ² Roadway is not necessarily taken; also includes grade separated roadway and associated existing right-of-way remaining in place within the new right-of-way</p>					

Exhibit 4-1 shows the alternatives with respect to Marion County zoning and proposed developments in the area. As shown, the alternatives have little impact on planned land use. Alternative CW bisects an area zoned residential, and Alternative F displaces some commercial zoned property at the Route 36 interchange.

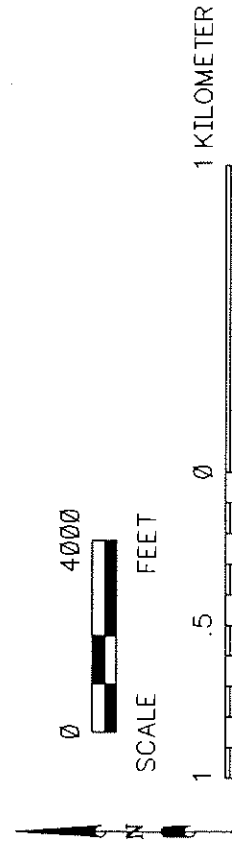
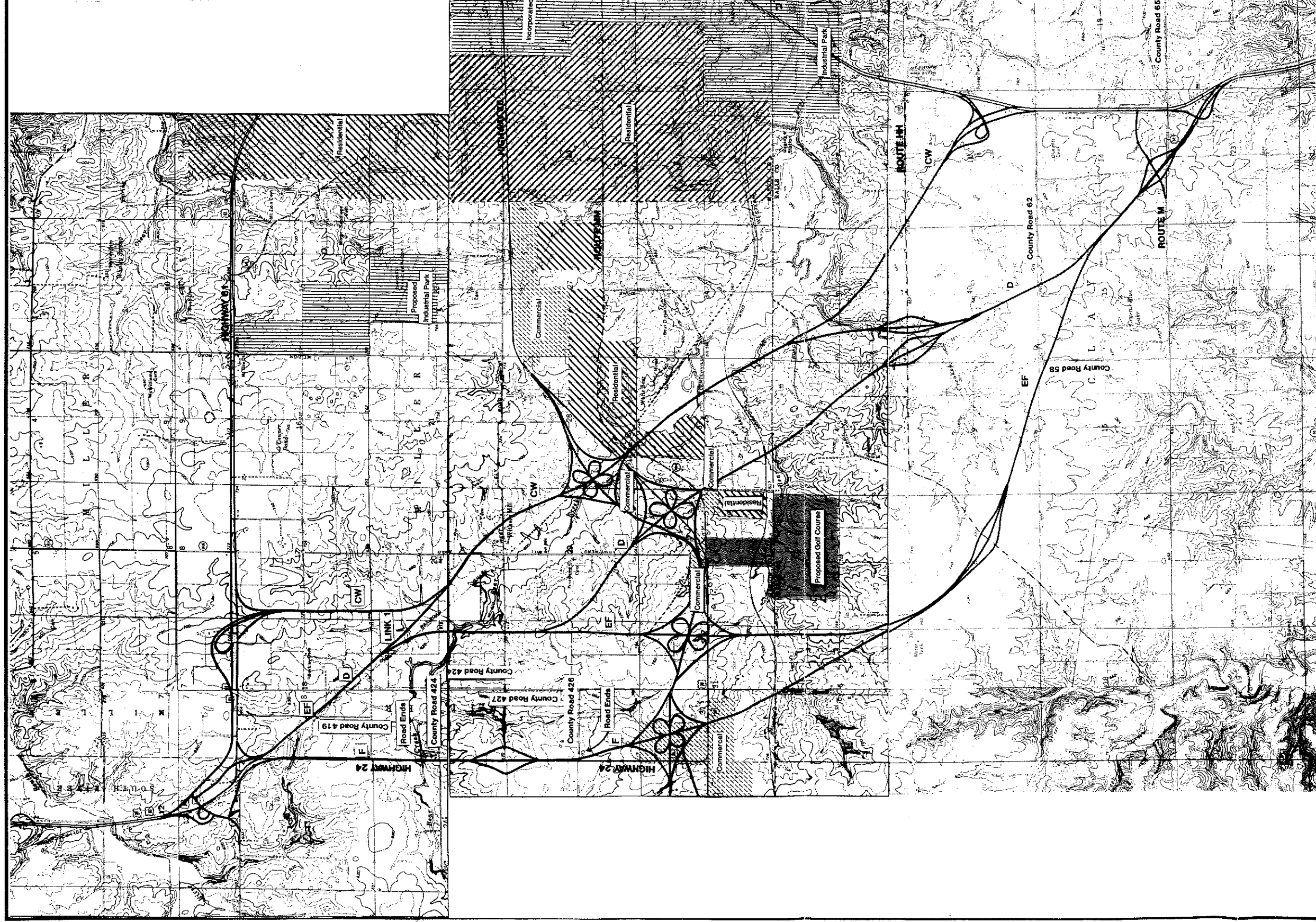
The no build alternative does not require additional land.

4.1.2 Land Use Changes as a Result of the Project

It is impossible to accurately predict future development as a result of a highway project. The project area is currently in a state of economic and population contraction. If this trend continues, any new development associated with the relocated Route 61 that does occur will probably be in one of the following categories:

- Development that occurs at the expense of existing development, for example, a new service station that takes much of the business of a service station on existing Route 61.
- Development that occurs as a result of the projected increased traffic on Route 61.
- Development from a source currently outside the study area, attracted by, among other things, improved accessibility.

Any of the build alternatives are likely to result in new commercial development outside the existing incorporated areas. Since the route is proposed as a freeway with limited access, new development is most likely to occur at interchanges, except that the Routes 61/36 will not encourage development because it will be a fully-controlled, cloverleaf type, freeway-to-freeway interchange. Any of the build alternatives may encourage new industrial providing improved access to sites currently served only by local roads, and by providing development in the area by improved access to the rest of the region. The improved access may enhance the industrial importance of the area and make the area more desirable for warehousing and distributional development.



REFERENCE: Drawing taken from U.S.G.S. Quadrangles -
 Rensselaer, MO dated 1958, Quincy SW, MO-IL dated 1971,
 Palmyra, MO dated 1975 and Hannibal West, MO dated 1971.

EXISTING AND PLANNED LAND USE Exhibit 4-1

Alternative CW offers the least encouragement to new development, because no new accessible interchanges are proposed. If Alternative CW is selected, the most likely locations for development encouraged by the new route construction are along existing Route 61, on the Hannibal sides of the Alternative CW proposed junctions with existing Route 61 (on the south side of the northern junction, and on the north side of the southern junction). There is already considerable mixed residential/commercial development at the southern terminus of Alternative CW, but the area of the northern terminus is undeveloped, and is primarily prime farmland.

Alternatives D and EF are similar in their encouragement of new development. Both have the same northern terminus, the same southern terminus, and the same proposed interchange at Route HH. The Route HH interchange may be an attractive location for new commercial or industrial development. As with Alternative CW, the northern and southern interchanges would not be directly accessible, and new development that may occur in the area would be limited to existing Route 61 on the Hannibal sides of the interchanges. Similarly to Alternative CW, there is already considerable mixed commercial and residential development at the southern terminus, and the northern terminus is primarily in undeveloped prime farmland. For both alternatives the interchange at HH is in a rural farm area with scattered residences along Route HH. The HH interchange location for Alternative EF is in prime farmland; for Alternative D it is in farmland that is not prime.

Alternative F has an additional proposed interchange for Marion Routes 424 and 426. The proposed interchange location is currently rural and located in prime farmland. Routes 424 and 426 are minor arteries with light traffic; however, development may be encouraged at this interchange because it is only about 1.6 km (1 mile) from the proposed Routes 61/36 interchange.

Adverse impacts due to development would be limited because the route would be designed as a fully limited access freeway. Development would mainly occur at accessible interchanges.

The no build alternative is not expected to result in land use changes.

4.1.3 Consistency of the Alternatives with Local and Regional Comprehensive Land Use Plans

None of the build alternatives conflict with Marion County zoning, which is the only formal land use plan in the project area. The no build alternative does not conflict with land use plans.

4.1.4 Local Government Policies Relative to Growth

Marion and Ralls County officials, as well as the local congressional representative, have expressed support for the project. Hannibal City officials have been contacted, but have not made official comment.

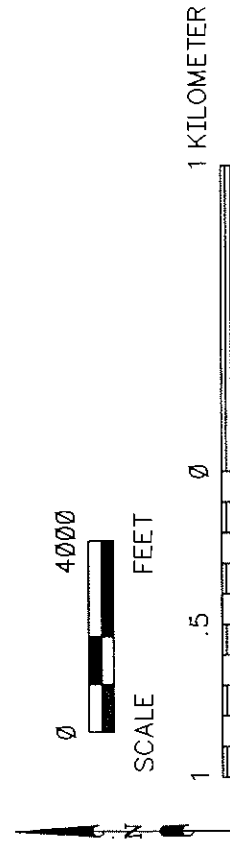
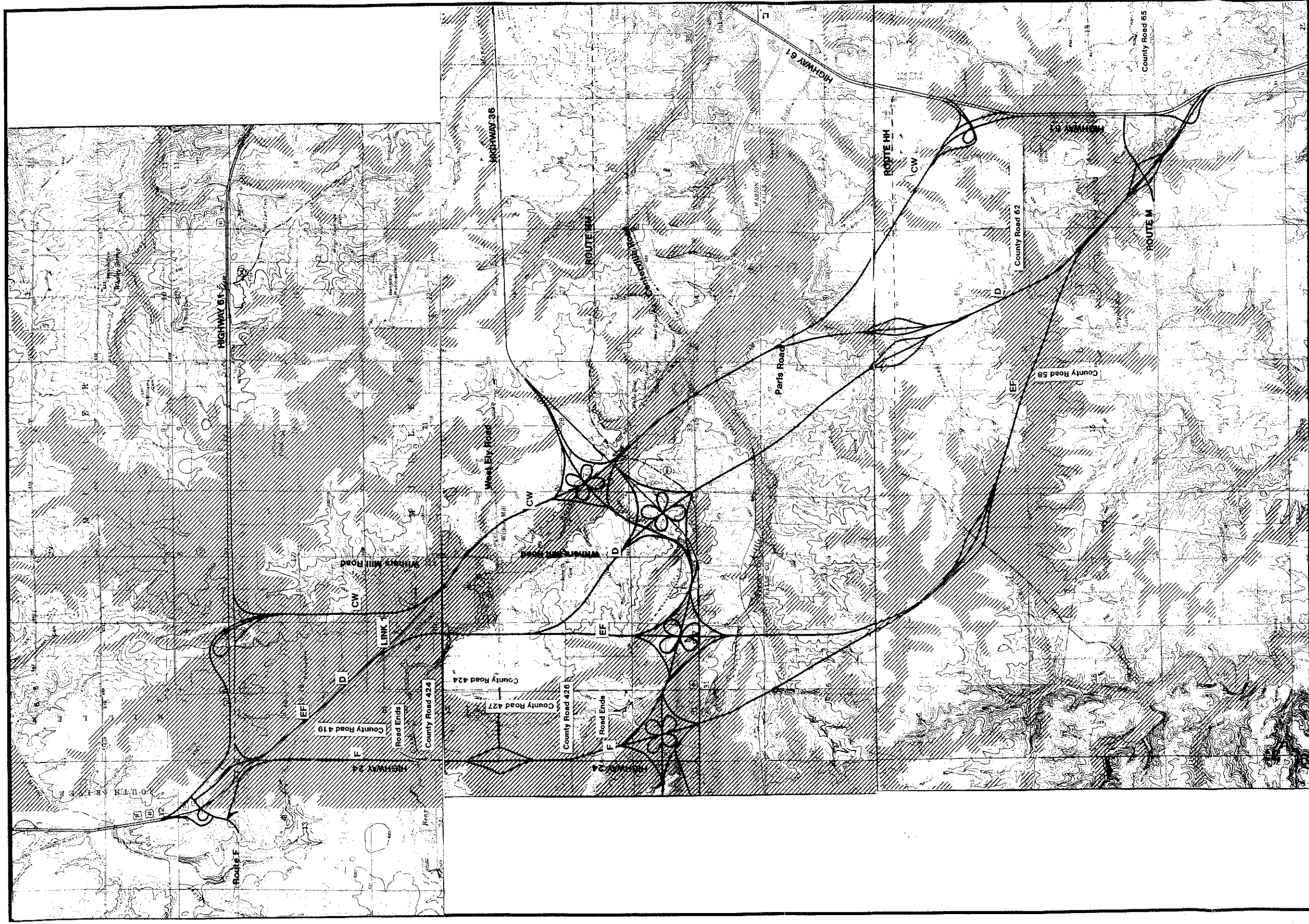
4.2 AGRICULTURAL IMPACTS

4.2.1 Agricultural Acres Required

The farmland conversion impact rating forms SCS-CPA-106 were submitted to NRCS, and the returned copies are in Appendix H. The rating was done using a conservative right-of-way width of 120 meters (400 feet). The overall ratings are highest for Alternate F, less high for Alternate EF, and less high yet for Alternate D, as would be expected. The overall rating for Alternate CW is surprisingly high, considering the relatively low amount of Prime Farmland and Statewide Important soils affected.

4.2.1.1 Alternative CW

The build alternatives are shown in Exhibit 4-2 with respect to prime farmland. In Alternative CW, cropland or pasture occupies approximately 53 percent of the approximately 199 hectare (492 acre) study area. Not all of this cropland or pasture is underlain by prime farmland soils. Approximately 46 percent of the study area is underlain by soils of statewide importance. Approximately 28 percent of the study area is occupied by prime farmland soils. Approximately 28 percent of the study area occupied by prime farmland soils is currently used for producing crops or pasture. This land would be taken out of production with the construction of the new highway along this corridor.



REFERENCE: Drawing taken from U.S.G.S. Quadrangles -
 Rensselaer, MO dated 1958, Quincy SW, MO-IL dated 1971,
 Palmyra, MO dated 1975 and Hannibal West, MO dated 1971.

PRIME FARMLAND Exhibit 4-2

Following is a summary of the prime farmland soils found in the study area:

- Belknap silt loam
- Chariton silt loam
- Fatima silt loam
- Menfro silt loam, 2 to 5 percent slopes
- Moniteau silt loam
- Smileyville silt loam, 2 to 6 percent slopes.

Following is a summary of statewide important soils in the study area:

- Menfro silt loam, 5 to 9 percent slopes
- Menfro silt loam, 9 to 14 percent slopes
- Winfield silt loam, 5 to 9 percent slopes
- Winfield silt loam, 9 to 14 percent slopes.

4.2.1.2 Alternative D

In Alternative D, cropland or pasture occupies approximately 41 percent of the approximately 241 hectare (596 acre) study area. Not all of this cropland or pasture is occupied by prime farmland soils. Approximately 38 percent of the study area is occupied by prime farmland soils. Approximately 51 percent of the study area is occupied by statewide important soils. Approximately 18 percent of the study area occupied by prime farmland soils is currently used for producing crops or pasture. This land would be taken out of production with the construction of the new highway along this corridor.

Following is a summary of the prime farmland soils found in the study area:

- Belknap silt loam
- Cedargap silt loam
- Marion silt loam, 2 to 5 percent slopes
- Putnam silt loam
- Smileyville silt loam, 2 to 6 percent slopes.

Following is a summary of statewide important soils in the study area:

- Menfro silt loam, 5 to 9 percent slopes
- Menfro silt loam, 9 to 14 percent slopes
- Winfield silt loam, 5 to 9 percent slopes
- Winfield silt loam, 9 to 14 percent slopes.

4.2.1.3 Alternative EF

In Alternative EF, cropland or pasture occupies approximately 51 percent of the approximately 270 hectare (668 acre) study area. Not all of this cropland or pasture is occupied by prime farmland soils. Approximately 59 percent of the study area is occupied by prime farmland soils. Approximately 36 percent of the study area is occupied by statewide important soils. Approximately 31 percent of the study area occupied by prime farmland soils is currently used for producing crops or pasture. This land would be taken out of production with the construction of the new highway along this corridor.

Following is a summary of the prime farmland soils found in the study area:

- Belknap silt loam
- Cedargap silt loam
- Marion silt loam, 2 to 5 percent slopes
- Mexico silty clay loam, 2 to 5 percent slopes, eroded
- Putnam silt loam
- Smileyville silt loam, 2 to 6 percent slopes
- Weller silt loam, 2 to 5 percent slopes.

Following is a summary of statewide important soils in the study area:

- Armstrong loam, 9 to 14 percent slopes
- Menfro silt loam, 5 to 9 percent slopes
- Menfro silt loam, 9 to 14 percent slopes
- Winfield silt loam, 5 to 9 percent slopes
- Winfield silt loam, 9 to 14 percent slopes.

4.2.1.4 Alternative F

In Alternative F, cropland or pasture occupies approximately 75 percent of the approximately 257 hectare (635 acre) study area. Not all of this cropland or pasture is occupied by prime farmland soils. Approximately 75 percent of study area is occupied by prime farmland soils. Approximately 21 percent of the study area is occupied by statewide important soils. Approximately 66 percent of the study area occupied by prime farmland soils is currently used for producing crops or pasture. This land would be taken out of production with the construction of the new highway along this corridor.

Following is a summary of the prime farmland soils found in the study area:

- Belknap silt loam
- Cedargap silt loam
- Edina silt loam
- Menfro silt loam, 2 to 5 percent slopes
- Mexico silty clay loam, 2 to 5 percent slopes, eroded
- Putnam silt loam
- Smileyville silt loam, 2 to 6 percent slopes
- Weller silt loam, 2 to 5 percent slopes.

Following is a summary of statewide important soils in the study area:

- Armstrong loam, 9 to 14 percent slopes
- Leonard silt loam, 5 to 9 percent slopes
- Menfro silt loam, 5 to 9 percent slopes
- Menfro silt loam, 9 to 14 percent slopes
- Winfield silt loam, 5 to 9 percent slopes
- Winfield silt loam, 9 to 14 percent slopes.

4.2.1.5 Link 1

In Link 1, cropland or pasture occupies approximately 83 percent of the approximately 7.5 hectare (18 acre) study area. Approximately 100 percent of the study area is occupied by

prime farmland soils. Approximately 83 percent of the study area occupied by prime farmland soils is currently used for producing crops or pasture. This land would be taken out of production with the construction of the new highway along this corridor.

Following is a summary of the prime farmland soils found in the study area:

- Moniteau silt loam.
- Smileyville silt loam, 2 to 6 percent slopes.

4.2.1.6 Link 2

In Link 2, cropland or pasture occupies approximately 15 percent of the approximately 30 hectare (69 acre) study area. Not all of this cropland or pasture is occupied by prime farmland soils. Approximately 10 percent of the study area is occupied by prime farmland soils. Approximately 46 percent of the study area is occupied by statewide important soils. Approximately four percent of the study area occupied by prime farmland soils is currently used for producing crops or pasture. This land would be taken out of production with the construction of the new highway along this corridor.

Following is a summary of the prime farmland soils found in the study area:

- Belknap silt loam.

Following is a summary of the statewide important soils in the study area:

- Winfield silt loam, 5 to 9 percent slopes
- Winfield silt loam, 9 to 14 percent slopes.

Approximate farmland requirements for each alternative are summarized in Table 4-1. Some secondary loss of prime and statewide important farmland will occur for all the alternatives if development occurs at interchanges. The northern terminus of all alternatives are located in areas of prime and statewide important farmland. Development at the proposed Route HH interchange for Alternatives EF and F, and at the proposed interchange at Marion Route 424/426 on Alternative F would also result in additional losses of prime and statewide

important farmland.

The no build alternative would not affect farmland.

4.2.2 Severed and Otherwise Affected Farm Operations

For the purposes of this study, a farm operation is defined as one or more parcels of land, not necessarily contiguous, that are farmed as a single operation. A severed farm operation is one that will be bisected by right-of-way requirements. An otherwise affected farm operation is defined as a farm from which right-of-way is taken although the farm operation is not bisected.

Severing and otherwise affecting farm operations was avoided as much as practical by such techniques as locating routes adjacent to existing routes, as with Alternative F along Route 24; and by locating routes adjacent to linear features that form property boundaries such as the railroad right-of-way and section lines.

As shown in Table 4-2, Alternative CW will create the largest number of severed farms, 15, compared to Alternatives EF and F which will create the least number, 11 farms each.

4.2.2.1 Severance Management Zones

Severance management zones are those areas of the farm remaining after being diagonally affected by the proposed right-of-way. These zones represent problem areas for the farmer. Skewed rows are created which make equipment use and turning difficult. The problem is more serious with sharper skews and is particularly pronounced in areas of fairly level farmland where crops are normally tilled in rectangular fields with no landscape obstructions such as woods or creeks.

As shown in Table 4-2, Alternative EF will create the greatest severance management area, 800 hectares (1,977 acres). Alternative D will create the least severance management area, 644 hectares (1,592 acres).

<p>Table 4-2</p> <p>Impacts on Farm Operations</p>					
	Alternative CW	Alternative D	Alternative EF	Alternative F	
Number of severed farms	15	13	11	11	
Severance management area, hectares (acres)	673 (1,663)	644 (1,592)	800 (1,977)	771 (1,906)	
Farm displacements					
Residences	2	5	2	2	
Large barns	2	5	4	5	
Grain silos	0	3	3	3	
Vehicle storage structures	1	6	2	2	
Other buildings (e.g., sheds)	0	13	10	10	

4.2.2.2 Farm Displacements

Farm displacements occur when the proposed right-of-way causes the demolition or removal of farm buildings due to highway construction. Displacements were divided into two categories: farm residences and other buildings. Other farm buildings include barns, silos, sheds, or other structures associated with farm operations.

As shown in Table 4-2, Alternative D displaces the most farm residences, 5. Twenty-seven farm buildings will be displaced by Alternative D, which displaces the most, and three farm buildings will be displaced by Alternative CW, which displaces the least number.

4.2.2.3 Summary of Farm Impacts

Alternative F has the largest impact on prime farmland, and Alternative CW, the least. The alternatives are similar to one another in their impact on farm operations.

4.2.2.4 Mitigative Measures

The Missouri Highway and Transportation Department (MHTD) has various methods at its disposal to mitigate the negative impacts of highway construction for local farmers. MHTD may purchase small parcels of land remaining after being severed by highway construction to reduce the total number of severed farms. This method is particularly applicable when the severed parcels are landlocked. These parcels may be purchased by MHTD for borrow or other uses. In other cases, current landowners of severed parcels may sell the parcels to adjacent landowners, further reducing the number of severed parcels.

To reduce the number of adverse travel miles generated by highway construction and to provide access to large landlocked parcels, farm underpasses will be constructed at locations where feasible. This is particularly true when large severed parcels remain on both sides of the highway. At some locations, special access roads may be provided to reach landlocked parcels.

In some locations it may be feasible to move farmhouses and other farm buildings from the

affected portion of the farm to another part of the farm not affected by highway construction. MHTD would assist with these relocations.

4.3 SOCIAL IMPACTS

4.3.1 Neighborhoods and Community Cohesion

4.3.1.1 Segmenting Neighborhoods

None of the build alternatives would result in the segmentation of neighborhoods. The area of the alternatives is rural and neighborhoods consist of several houses close together along a single public roadway. For Alternatives CW, D, and EF, all public roadways along the alternatives will have either grade separated crossings or interchanges, so none of these neighborhoods will be split. For Alternative F, there will be changes in the existing roadways north of the existing Routes 36/24 intersection, but there are no neighborhoods in that area.

Because there will not be changes in the existing public roadways for Alternatives CW, D and EF, residents will also not be separated from community facilities. The changes in Marion Routes 424 and 426 may result in some slight increases in driving times for a few residents.

For the same reasons, any effects on pedestrian and bicycle use will be minimal.

The no build alternative will not result in the segmentation of any neighborhoods, separation of residents from community facilities, nor effects on pedestrian and bicycle use.

4.3.1.2 Low Income, Minority and Other Special Groups

Executive Order 12898 (February 11, 1994) entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires each Federal agency to identify and address disproportionately high and adverse effects of its actions in low income and minority populations.

Based on visual observation, there are no low income or minority neighborhoods in the study area.

The no build alternative will not affect low income or minority neighborhoods.

There are no concentrations of elderly or handicapped persons within the right of way of any of the build alternatives. There are also no concentrations of racial or ethnic groups.

4.3.1.3 Changes in Property Values

It can be expected that property values will increase for areas adjacent to Route 61 interchanges, except for the interchange at Route 36, which will not have access. These areas are candidates for commercial and industrial development.

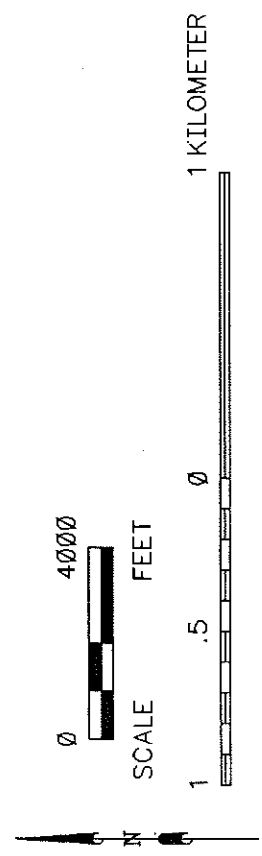
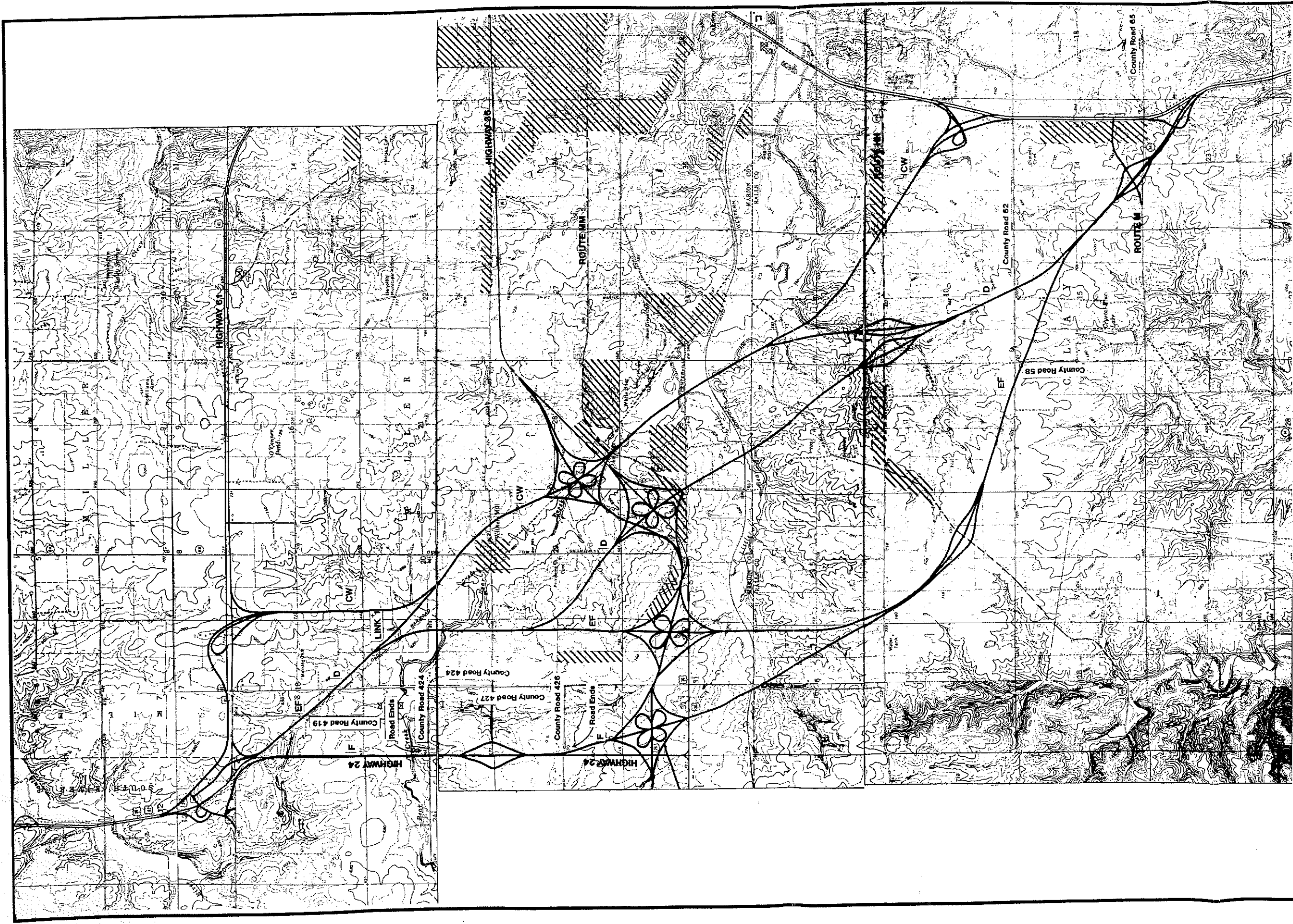
The value of residential property lying directly adjacent to the highway may be lowered due to increased noise levels and visual intrusion. Because of their proximity to areas of residential development, Alternatives CW and D would have the largest impact on residential properties, with Alternative EF having less effect and Alternative F negligible effect.

With the no build alternative, property values may be adversely affected due to increasing noise from increasing truck traffic.

4.3.1.4 Proximity Effects on Residential Areas

Some residential areas will experience visual intrusion and increased noise levels with some of the build alternatives. With Alternative CW, residential areas at Withers Mill and along Route MM will be affected. Alternative D will affect residential areas along Route MM. Alternative EF will affect residential areas along Marion Route 426. Alternative F will have negligible effect. Exhibit 4-3 shows the alternatives with respect to current residential development.

With the no build alternative, noise levels along the existing route will increase with increasing traffic, particularly truck traffic.



AREAS OF RESIDENTIAL DEVELOPMENT

Exhibit 4-3

REFERENCE: Drawing taken from U.S.G.S. Quadrangles - Rensselaer, MO dated 1958, Quincy SW, MO-IL dated 1971, Palmyra, MO dated 1975 and Hannibal West, MO dated 1971.

4.3.2 Displacements and Relocations

4.3.2.1 Number of Households Displaced

Because of the rural nature of the area, the number of residential displacements is small for any of the build alternatives. The build alternative requiring the most residential displacements is Alternative D with 16. Most of these occur at the interchange with Route 36 and the southern interchange with existing Route 61. Alternatives CW and EF would each result in four residential displacements, and Alternative F in two.

The great majority of the residential displacements are of white, middle income households.

The no build alternative would not require any residential displacements.

4.3.2.2 Available Housing

Since the area had been contracting in terms of population, there was predictably a housing surplus at the time of the 1990 census. While population trends have probably not changed appreciably, other factors have contributed to a current housing shortage in the Hannibal area. Based on conversations with real estate professionals, it appears that the main causes of the current shortage are relocations due to the 1993 flood on the Mississippi River, the current relocation of residences for the Route 36 project, and the low interest rates of the past few years. According to the City of Hannibal, about 78 residences have been bought out by the federal government due to the 1993 flood, with a total of about 100 scheduled for buyout. The Environmental Assessment prepared for the Route 36 project between the Route 24 junction and the river (1993) indicated that there would be approximately 50 residential relocations, mainly in the Harrison Hill area of Hannibal. These buyouts are currently underway. Based on conversations with real estate professionals, there is currently a shortage both of rental housing and of homes for sale, up to the \$90,000 range. Even though housing may be short, average home prices are well below the national average. Reportedly, the average home price in Hannibal is currently around \$45,000.

There are currently some apartment rental units and single family residences under construction in the Hannibal area. It is impossible to determine what the housing situation

will be in a few years when the relocations for the Route 61 project will occur. However, it is reasonable to expect that the current needs due to the 1993 flood and the Route 36 relocations will be met. It is not unlikely that conditions will be more similar to what they were in 1990, since the current temporary shortage will be over.

In 1990, there was surplus housing available in the area. (Twelve percent vacancy for Ralls County and ten percent vacancy for Marion County.) Information on vacant housing units is summarized in Table 4-3. From the data it appears that most vacant housing units available were single-family homes that were available either for rent or for sale. In Ralls County, over 30 percent of the vacant housing was less than 10 years old. Most available units had two or more bedrooms.

4.3.2.3 Businesses Affected by Proximity

There are few businesses in the areas of the build alternatives, and no business displacements will occur.

For Alternative F, some businesses will be affected due to the access changes on existing Route 24 from the Route 61 junction to the Route 36 junction. With Alternative F, Route 24 and 61 will be coincident at this location, and since Route 61 will be built to freeway standards, these businesses will no longer have direct access to the highway. An outer road will be constructed, and these businesses will have access to Routes 24/61 at the reconstructed West Ely Road interchange, which will be about 2.3 km (1.4 miles) south. A west outer road will be constructed, from the north Routes 61/24 interchange at the northern terminus of Alternative F to the new interchange for Marion Routes 424 and 426. This outer road will provide access for the livestock market and veterinarian clinic on the west side of Route 24 about 1,000 meters (3,000 feet) south of the existing Routes 24/61 junction. The impact on those businesses will be negligible in terms of increased travel distance: instead of accessing Route 24 directly, the businesses will use the parallel outer road and can travel either north or south to interchanges which will provide access.

There is an MFA supply facility on the east side of existing Route 24, about 600 meters (2,000 feet) south of the livestock market. Access for the MFA facility will be affected. No outer road is proposed; instead access will be provided to Marion Route, about 400

Table 4-3

Vacant Housing Units for Marion and Ralls Counties, 1990¹

Vacant Housing Units	Percent of Vacant Housing Units	
	Marion County	Ralls County
With complete plumbing facilities	93.6	81.7
Without complete plumbing facilities	6.4	18.3
Condominiums: for rent	33.3	5.9
for sale only	66.7	35.3
for seasonal, recreational, or occasional use	0	7.4
all other vacants	0	51.5
Units other than condominiums: for rent	26.4	15.3
for sale only	10.0	8.9
for seasonal, recreational, or occasional use	8.0	12.3
all other vacants	55.6	63.6

¹ Source: USDC, Bureau of Census.

meters (1,300 feet) east of the facility. From there, traffic from the facility will travel about 1,500 meters (5,000 feet) due north to existing Route 61, east of the Alternative F interchange. Travel distance for traffic from the facility that is north or east bound (or traffic to the facility coming from the north or east) will increase by only about 400 meters (1,300 feet) , but about 1,500 meters (5,000 feet) of the travel will be over secondary county roadways. Traffic that is southbound from the facility (or northbound to the facility) will have an additional 4.6 km (2.7 miles) of travel. Access to the truck stop and recreational vehicle sale and service facility at the existing Route 24/36 interchange will be either from the Route 61/24 interchange between Routes 424 and 426, or from Route 24/36 west of the existing intersection. Route 24/36 west of the intersection is planned to be upgraded to four lanes. When that construction is complete the nearest exit on Route 24/36 west that can be used to reach the truck stop area will be at Route H, almost 1 mile west of the existing Route 24/36 intersection.

No businesses will be displaced by the no build alternative. However, over time increased traffic congestion may negatively impact the accessibility of businesses along the existing roadway.

The acquisition and relocation program will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and relocation resources are available to all residential relocated without discrimination.

The MHTD offers a Relocation Assistance Program to any person, family, business owner, farm operator, and nonprofit organization displaced by a state highway project. The relocation program provides advisory services and payments to help offset expenses incurred by those who are displaced. A relocation agent would contact all affected parties to explain the relocation program services, and help with any questions or problems. There are two types of relocation payments available:

- Replacement housing payments, and
- Moving expense payments.

Replacement housing payments would be made to qualified homeowners and are designed to cover the costs of purchasing an equivalent replacement home. The replacement payment

would be determined through a study of demographics and housing needs. Relocation services would be provided until all persons are satisfactorily relocated. Moving expense payments typically cover the costs associated with relocation of household goods. A copy of the MHTD relocation assistance program brochure, which outlines all qualifications and procedures, is available at the MHTD Right-of-Way Division Office in Jefferson City, or the MHTD District 3 Right-of-Way Office in Hannibal.

4.3.3 Community Facilities and Services

4.3.3.1 Schools

As shown in Exhibit 4-4 all of the alternatives cross portions of the Hannibal M-60 and the Palmyra R-1 School Districts, and Alternative EF and F also cross a very small portion of the Ralls County R-2 School District. There are no schools, private or public, located anywhere near any of the alternatives. The only build alternative that would have any impact on schools is Alternative F, which would result in minimal changes in the bus routes for the Palmyra R-1 School District. These changes would result from the changes in roadway location and usage for Route 24 between the 61 junction and the 36 junction, and changes in Marion Routes 424 and 426 in the vicinity of the relocated Route 61. The bus service for the Palmyra R-1 District indicated that the changes would have negligible impact. School busing for the Mississippi Valley State School for the severely handicapped is limited to U.S. highways and state routes near Hannibal; the build alternatives will have no impact.

For the no build alternative, as traffic increases, noise levels will increase at the Hannibal School complex and the Hannibal-LaGrange College on the existing Route 61.

4.3.3.2 Churches

Exhibit 4-4 shows the relationship of the alternatives to churches.

One of the ramps on the Route 61/36 interchange of Alternative D will pass within about 90 meters (300 feet) of the Cornerstone Baptist Church on Route MM, which will result in visual intrusion, noise impacts, and some loss of church property. No other church buildings or church property will be directly impacted by any of the build alternatives.

4.3.3.3 Parks and Recreation Areas

No parks or recreation areas will be affected by any of the build alternatives, or by the no build alternative.

4.3.3.4 Fire and Police Protection

With Alternatives CW, D and EF, there will be no change in access and travel patterns for emergency fire and police vehicles, except that the relocated Route 61 will provide an alternative route and improved access in some instances. For Alternative F, the changes in Route 24 between the 61 and 36 junction and the minor changes in Marion Routes 424 and 426 will result in some changes in travel patterns and slightly increased response time to residences and businesses located on the existing Route 24 between the 61 and 36 junctions, since they will have access from outer roads rather than directly from the highway.

The no build alternative will ultimately result in an increased response time for emergencies responded to by the Hannibal Municipal Police and Fire Departments because of increased congestion on existing Route 61.

4.3.3.5 Hospitals

The only impacts of the build alternatives on the one hospital in the area, the Hannibal Regional Hospital, will be improved access. North-south access will be improved for all the build alternatives, with the improvement being the greatest for Alternative CW and the least for Alternative F. All build alternatives will result in improved emergency vehicle access. Emergency vehicle service is provided by Marion County Ambulance, located on existing Route 61 near the north side of the City of Hannibal. Decreased congestion on the existing Route 61 in Hannibal will result in shorter response time for the emergency vehicles.

The no build alternative will have the effect of increasing response time for emergency vehicles, due to increased congestion on Route 61 and the lack of improved access to the hospital.

4.4 ECONOMIC IMPACT

4.4.1 Regional and Local Economy

The project is most likely to have an overall positive effect on the regional and local economy, due to improved access to the area and increased traffic passing through. Development due to the highway will likely increase tax revenues for both Marion and Ralls Counties, since some of the proposed interchanges are in Marion County and some are in Ralls County. The southern terminus for all build alternatives is in Ralls County, as is the Route HH interchanged proposed for Alternatives D, EF, and F. The northern terminus for all alternatives is in Marion County, as is the proposed interchange on Alternative F for Marion Routes 424 and 426. Coincidentally, the proposed interchanges located in Ralls County are all also in the Hannibal M-60 School District, and the proposed interchanges located in Marion County are all in the Palmyra R-1 School District. If development occurs at the interchanges located in Marion County at the expense of existing businesses on Route 61, the Palmyra School District will benefit and the Hannibal M-60 School District will lose revenue.

4.4.2 Impacts on Existing Route 61 Businesses

For all the build alternatives, the most important negative impact is likely to be on existing highway-related businesses on that portion of Route 61 that will be bypassed by the relocated route. If development along the new route occurs at the expense of these existing businesses, it will also result in lost revenue for the City of Hannibal, since none of the proposed interchanges are in the City of Hannibal. Hannibal has a sales tax of 6.725 percent, and a 3 percent hotel tax.

There are approximately 116 businesses along the section of Route 61 which will be bypassed by the relocated route. These are listed in Table 4-4 according to name, type, and approximate size. Locations are shown in Exhibit 4-5. Previous studies have found that motels, service stations, and some restaurants are usually adversely impacted by highway relocations, but that other businesses have experienced increases in sales due to greater accessibility.

**Table 4-4
Businesses on Existing Route 61**

No.	Name	Description	Approximate Size
1	Farm Credit Services	Bank	Small
2	Tom Boland Ford	Auto dealer	Large
3	KMart	Misc. shopping	Large - going out of business
4	Moore Paints	Paint store	Medium
5	Abbott Academy of Cosmetology	Cosmetology School	Medium
6	Hunan	Restaurant	Medium - sit down
7			
8	Country Kitchen	Restaurant	Medium - sit down
9	F&M Bank	Bank	Medium
10	Culligan	Water rentals	Medium
11	Hannibal Chiropractor	Chiropractic	Medium
12	Data Solution	Computer store ?	Medium
13	Ron's Tire	Tire	Medium
14	Miracle Bible Show Me Shoes Big River Sports Subway Payless Shoes JC Penney	Book store Shoe store Sports store Restaurant Shoe store Clothes store	Small Small Small Small Small Large
15	Walmart	Misc. shopping	Large

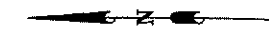
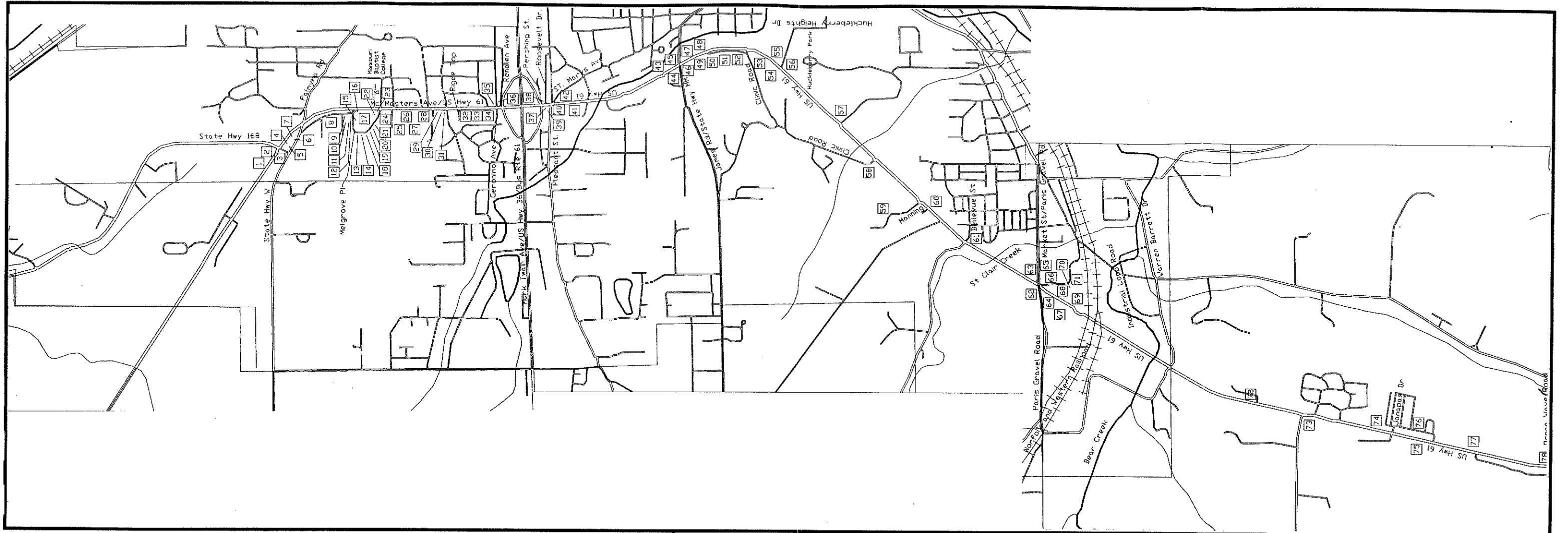
Table 4-4 Businesses on Existing Route 61			
No.	Name	Description	Approximate Size
16	Hardees	Restaurant	Small
17	Ponderosa	Restaurant	Medium - sit down
18	Quick Stop	Lube & oil	Medium
19	Nutri System	Weight loss	Small
20	Radio Shack	Electronics	Small
21	Kirllins Hallmark Dollar General Stores Maurices Little Caesars Big Lots Fashion Bug	Shopping Shopping Clothes store Restaurant Misc. shopping Clothes store	Small Medium Small Small Large Medium
22	Roosevelt Bank	Bank	Medium
23	Commerce Bank	Bank	Medium
24	Kroger	Grocery	Large
25	Aldi	Grocery	Small
26	Taco Bell	Restaurant	Small
27	Jacks	Misc. shopping	Large
28	McDonalds	Restaurant	Small
29	Long John Silvers	Restaurant	Small
30	TCBY	Restaurant	Small

Table 4-4 Businesses on Existing Route 61			
No.	Name	Description	Approximate Size
31	Dimensional Hair Designs	Hair salon/home	Medium
32	Martin's Tru Value	Hardware store	Medium
33	Misc. Realtors	Office building	Large/Medium
34	Golden Corral	Restaurant	Medium/Large - sit down
35	Conoco	Gas station	12 nozzles
36	Amoco	Gas station	18 nozzles
37	Howard Johnsons	Motel	Medium
38	Tom N Huck	Motel	Medium
39	Donna's Stoplight Cafe	Restaurant	Medium - sit down
40	Walgreens	Shopping	Medium
41	Auto Zone Dr. Michael Murphy H&R Block Pizza Hut (Delivery & C.O.) Yen Ching IEC Best Buy Pharmacy Best Buy Home Care Farm & Home Supplies Food for Less Great River Video Dimitries Pizzeria Sherwin Williams	Auto parts store Chiropractor Income tax office Restaurant Restaurant Eyecare center Pharmacy Nursing home equipment Misc. shopping Grocery Video rental Restaurant Home remodeling	Medium Small Small Small Small Small Small Small Small Large Large Small Small Small

Table 4-4 Businesses on Existing Route 61			
No.	Name	Description	Approximate Size
42	Clark	Gas station	18 nozzles
43	KFC	Restaurant	Small
44	Hardees	Restaurant	Small
45	Cassano's	Restaurant	Medium - sit down
46	Phillips 66	Gas Station	32 nozzles
47	Shell	Gas station	24 nozzles
48	Ott's Auto Supply	Auto parts	Medium
49	Dairy Queen	Restaurant	Small
50	Wendy's	Restaurant	Small
51	Hannibal Monument	Cemetery monuments	Small
52	Mid America Dairymen	?	Small
53	Edward G. Jones Co.	New York Stock Exchange	Small
54	Carriage House	Restaurant	Medium - sit down
55	Logue's	Restaurant	Medium - sit down
56	Super 8	Motel	Medium
57	Missouri National Guard Armory	?	Medium/Large
58	Poage Used Cars	Used car dealer	Large
59	MHTD	District Headquarters	Large

Table 4-4 Businesses on Existing Route 61			
No.	Name	Description	Approximate Size
60	Tourist Information Center	Information	Small
61	Scott Ganer	Detail/Auto dealer	Medium - Probably self owned
62	Dean Poage Pontiac	Auto dealer	Large
63	Days Inn	Motel - 2 buildings	Medium/Large
64	Texaco	Gas station	10 nozzles
65	Phillips 66	Gas station	24 nozzles
66	Holiday Inn	Hotel	Large
67	Pet	Manufacturing facility	Large
68	Agco Allis	Farm equipment sales	Medium
69	Buckhorn	Rubber products group	Large - part of industrial complex
70	Watlow	Not actually on 61 but large part of industrial complex next to Buckhorn	
71	Dura	?	Large warehouse
72	Grandview Nursery	Nursery, lawn equipment	Medium, probably has lots of land
73	Comp. Health Systems, Inc.	?	Part of owners home?
74	Grandview Funeral Home	Funeral home	Medium
75	Wright Furniture	Furniture store currently being built	Large warehouse
76	Heetco, Inc.	Propane tank farm	Small/Medium
77	Hair Club 61	Hair salon	In owners home

Table 4-4 Businesses on Existing Route 61			
No.	Name	Description	Approximate Size
78	No name	Junkyard - private	Medium
	G&M Gunsmithing	Gunsmith shop	Medium warehouse
	Mississippi Valley Center	Residential care - office?	Medium - part of home?
	Salt River Trading Co.	Bait shop?	Looks like a house, not a business
	Bar-B-Q Cabin		Appears to be used for storage
	Meat processing	Looks out of business - no traveled road to building	
	Geo. Spegal Auto Sales	Auto dealer - 10 vehicles, 10 trailers, self owned	
	Mississippi Valley Gun Club	Building with rifle range	Small building, lots of land approximately 0.8 hectares (2 acres)
	C&S Construction	Plumbing, electrical, etc.	Large building
	Harris Stables	Horse boarding	Large with lots of land
	Diamond Car Wash	Car wash	Small
	Pestige Realty	Realty office	Small
	Meco Engineering	Engineering firm	Medium
	Hannibal Ambulatory Care Center	Office building	Medium



0 2000
SCALE FEET

1 .5 0 1 KILOMETER

EXISTING ROUTE
61 BUSINESSES
Exhibit 4-5

Of the businesses listed in Table 4-4, five are motels, seven are service stations, and 23 are restaurants. These businesses employ an estimated 350 to 400 people. A survey of owners or managers of these businesses was conducted in person and by telephone, to help evaluate the expected impact of the Route 61 relocation. All the motels and service stations and all but three of the restaurants were surveyed. Information on length of time in business and gross revenues and/or size of business was requested. Each person was asked to estimate the percent of business that comes from through highway traffic that would not otherwise be stopping. The results are summarized by category to protect privacy.

The motels have been in business from 8 to 46 years. One motel, the Holiday Inn is relatively large (283 rooms) and the other four range in size from about 50 to 65 rooms. Estimates of dependency on through traffic ranged from a high of 95 percent to a low of 30 percent.

The seven service stations have been in business from 11 to over 40 years. Most of them estimated that about 50 percent of their business is from through traffic. (One estimated 25 percent and one estimated 60 percent). Their sizes were similar except that one was somewhat larger than the others in terms of revenue.

There were wide ranges in lengths of time the restaurants have been in business, from 3 weeks to 40 years. There were also wide ranges in estimated percentages of business derived from through traffic, from five percent to 95 percent.

Based on the information gathered, a worst-case estimate of impact on tax revenue for the City of Hannibal was made. This worst-case estimate was based on the following assumptions:

- The existing businesses will eventually lose all their through traffic business to new businesses that will be established along the relocated route. Estimates of dependency on through traffic provided by the businesses were used.
- All of the new businesses that will be established along the relocated Route 61 will be outside the city limits of Hannibal.

- Rough estimates of revenue were made when this information was not provided. The estimates were based on number of rooms, room rates, and occupancy rates for motels; size of service stations; and for restaurants, type and seating capacity.

The above worst-case analysis results in an estimated amount revenue loss of \$200,000 for the City of Hannibal. This is about 7 percent of the City's total overall tax revenue. Because business owners did not indicate that the particular alternative selected would make a difference in the impact on their business, no adjustments were made for the different alternatives. Employment is likely to increase somewhat; while jobs may be lost as existing businesses, new and similar employment would be available with businesses along the relocated route.

4.5 AIR QUALITY IMPACTS

4.5.1 Mesoscale Concerns

This project is in an area where the State Implementation Plan (SIP) does not contain any transportation control measures. Therefore, the conformity procedures of 23 CFR Part 770, 40 CFR Part 51 (subpart T), and 40 CFR Part 93 (subpart A) do not apply.

4.5.2 Microscale Concerns

In cases where projected traffic counts are high, a microscale analysis for carbon monoxide is conducted to determine whether the 1-hour or 8-hour National Ambient Air Quality Standard (NAAQS) for carbon monoxide will be exceeded. When carbon monoxide impacts can be judged to be well below the NAAQS, a microscale analysis is not necessary. Guidance provided in the FWHHA Federal Aid Urban Program Manual, which is incorporated as part of MHTD's design documents (1989) indicates that a microscale air quality analysis should be conducted when present or predicted average daily traffic volume on the project exceeds 54,000 vehicles in the year of project construction or 72,700 vehicles in the 20th year following project construction. Projected counts for this project are 9,300 in the year of construction, and 18,550 in the 20th year following construction. Therefore, a microscale air quality analysis is not necessary, because carbon monoxide levels can be assumed to be well below the NAAQS.

4.6 NOISE IMPACTS

4.6.1 Noise Analysis

Potential traffic generated highway noise impacts were identified for the four build alternatives. Primary factors in this determination were the location of sensitive receptors in relation to the build alternatives and the prediction of existing and future traffic noise levels at these receptors. The analysis was conducted in accordance with the FHWA Highway Traffic Noise Prediction Model. This section summarizes the results of the analysis.

4.6.2 Noise Sensitive Areas

A number of receptors were identified for which noise levels could conceivably exceed the FHWA standards. No lands on which serenity and quiet are of extraordinary importance were identified along any of the alternative routes. A number of receptors, primarily residences, were identified for which the noise abatement criteria is 65 decibels (dBA) for the total hourly equivalent sound level (L_{eq}). All potential receptors within 229 meters (750 feet) of the centerline of each alternative were identified for further analysis. All of the receptors have been classified as "soft sites" and 65 dBA is reached at a distance of about 107 meters (350 feet).

Criteria established by MHTD (Design Manual revision date September 27, 1994) and approved by FHWA for noise walls were used in evaluating these receptors. These criteria are as follows:

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

Single noise receptors were omitted from evaluation based on the first of these criteria. Receptors which would require the noise wall to cross a roadway were also not evaluated because these noise walls would be cost prohibitive.

Within 229 meters of the highway centerline there are a total of 149 potential receptors. These are listed in Table 4-5. Locations on Exhibit 4-6 are shown by the property number on Table 4-5. There are 134 residences - 21 of which can potentially be removed, 3 of which are businesses and residences combined, and one of which is abandoned. There are also 11 businesses, one church, one trailer park to the east of existing Highway 61, and one street of residences also to the east of existing Highway 61.

The total number of receptors identified by Alternative is as follows:

- Alternative CW - 71
- Alternative D - 80
- Alternative EF - 58
- Alternative F - 54.

While a number of the receptors exceeded the NAC established by the MHTD, only a few of these may require abatement. Explanations for elimination from consideration for abatement are shown in Table 4-5. Those which may require abatement are summarized by Alternative, below.

- Alternative CW: 2 residences (Receptors #69 & 70)
- Alternative D: 5 residences, one church, one business (Receptors #2, 3, 85, 86, 87, 88, 90, 91, 92, 93, & 94)
- Alternative EF: 2 residences (Receptors #2 & 3)
- Alternative F: 2 residences (Receptors #2 & 3)

Along Alternatives D, EF, and F, just south of the interchange with Highway M, abatement may be required for two of the residences. For Alternative D one noise wall may be necessary for the remaining seven residences, one church and one business (Puppy Parlor). These receptors are located just to the southwest of the interchange with Highway 36.

Table 4-5
Noise Sensitive Receptors Within 229 Meters (750 Feet) of Centerline

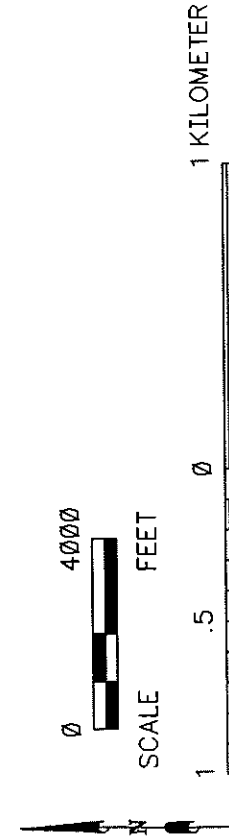
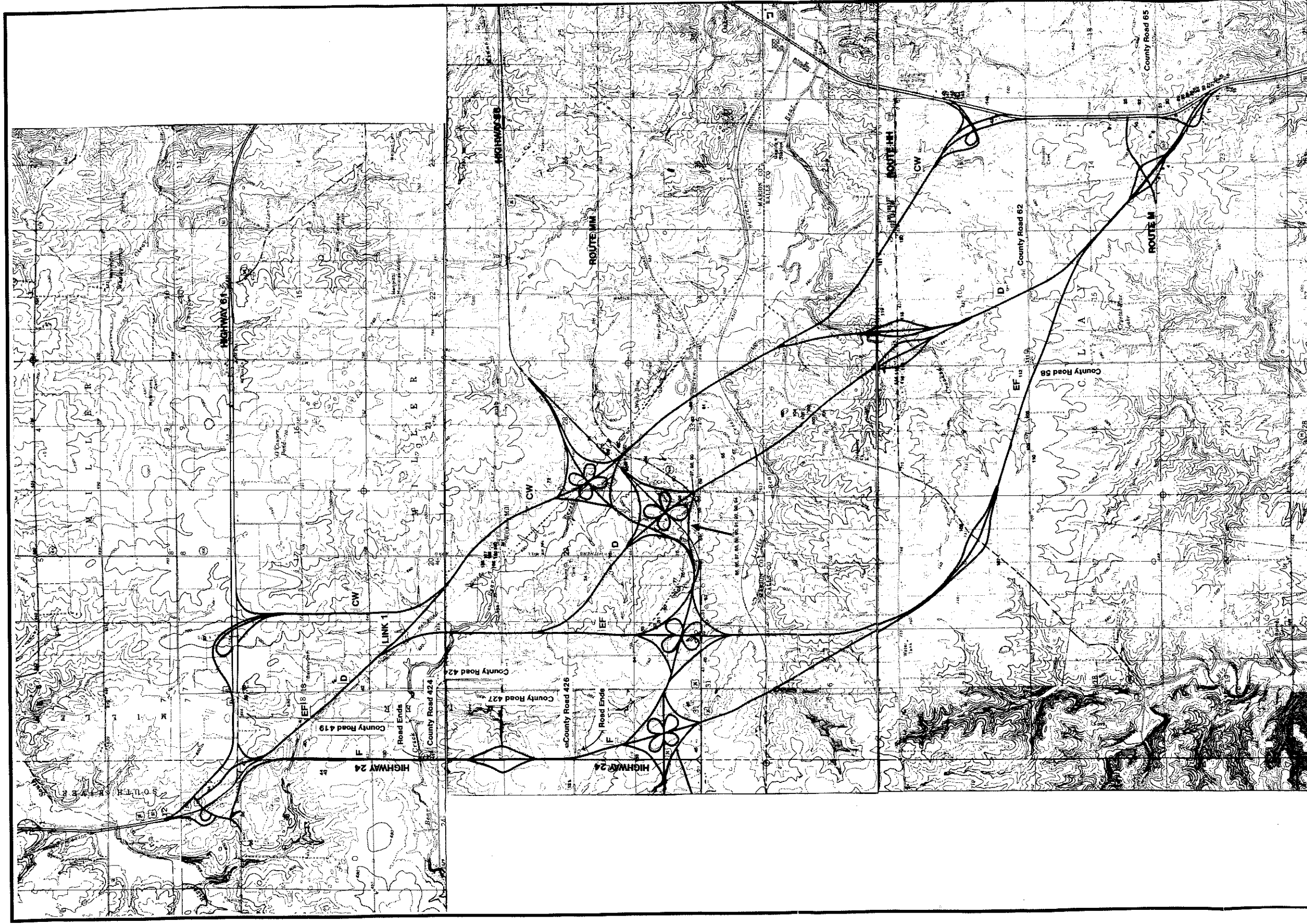
Property Number	Eliminated from Further Study	Reason for Elimination	Leq (dBA) Estimated	NAC
1	X	<65 dBA	64	65
2			67	65
3			69	65
4	X	<65 dBA	63	65
5	X	=65 dBA	65	65
6	X	<65 dBA	61	65
7	X	Res. appears to be abandoned - remove	>71	65
8	X	Res. to be removed	>71	65
9	X	<65 dBA	62	65
10	X	=65 dBA	65	65
11	X	Gun Club <72 dBA	67	72
12	X	Single	>71	65
13	X	Commercial property <72 dBA	60	72
14	X	Commercial property <72 dBA	60	72
15	X	Commercial property <72 dBA	60	72
16	X	To the east of existing 61 - same or reduced amt. of traffic	>71	65
17	X	To the east of existing 61 - same or reduced amt. of traffic	>71	65
18	X	To the east of existing 61 - same or reduced amt. of traffic	71	65
19	X	To the east of existing 61 - same or reduced amt. of traffic	>71	65
20	X	To the east of existing 61 - closed for business (meat processing)	>71	72
21	X	To the east of existing 61 - same or reduced amt. of traffic	>71	65
22	X	Trailer below grade of hwy. to the east of existing 61	<65	65
23	X	To the east of existing 61 - same or reduced amt. of traffic	69	65
24	X	To the east of existing 61 - same or reduced amt. of traffic	69	65
25	X	Commercial - To the east of existing 61 - same or reduced amt. of traffic	71	72
26	X	To the east of existing 61 - same or reduced amt. of traffic	69	65
27	X	To the east of existing 61 - same or reduced amt. of traffic	71	65
28	X	To the east of existing 61 - same or reduced amt. of traffic	69	65
29	X	To the east of existing 61 - same or reduced amt. of traffic	65	65
30	X	To the east of existing 61 - same or reduced amt. of traffic	67	65
31	X	To the east of existing 61 - same or reduced amt. of traffic	66	65
32	X	To the east of existing 61 - same or reduced amt. of traffic	64	65
33	X	Piping Co. to the east of existing 61 - same or reduced amt. of traffic	66	72
34	X	Abandoned res. to be removed	>75	65
35	X	Commercial property <72 dBA	66	72
36	X	<65 dBA	63	65
37	X	Commercial/Residence - =65 dBA	65	65
38	X	Commercial/Residence - Single	66	65
39	X	<65 dBA	64	65
40	X	<65 dBA	61	65
41	X	May be removed for Alt. D, & EF	>71	65
42	X	Single	69	65
43	X	Commercial property <72 dBA	64	72
44	X	Commercial property <72 dBA	63	72
45	X	=65 dBA	65	65
46	X	<65 dBA	60	65
47	X	<65 dBA	60	65
48	X	<65 dBA	64	65
49	X	Remove	71	65
50	X	Remove	66	65
51	X	<65 dBA	62	65
52	X	<65 dBA	63	65
53	X	<65 dBA	63	65
54	X	<65 dBA	63	65
55	X	Commercial property <72 dBA	63	72
56	X	Commercial property <72 dBA	70	72
57	X	<65 dBA	62	65
58	X	<65 dBA	62	65

Table 4-5
Noise Sensitive Receptors Within 229 Meters (750 Feet) of Centerline

Property Number	Eliminated from Further Study	Reason for Elimination	Leq (dBA) Estimated	NAC
59	X	< 65 dBA	64	65
60	X	< 65 dBA	64	65
61	X	< 65 dBA	61	65
62	X	< 65 dBA	62	65
63	X	Abandoned Res. = 65 dBA	65	65
64	X	< 65 dBA	61	65
65	X	= 65 dBA	65	65
66	X	< 65 dBA	63	65
67	X	= 65 dBA	65	65
68	X	Could use with 69 & 70 only would have to cross Rte MM	69	65
69			68	65
70			67	65
71	X	< 65 dBA	60	65
72	X	< 65 dBA	62	65
73	X	= 65 dBA	65	65
74	X	< 65 dBA	63	65
75	X	Single	72	65
76	X	Commercial/Residence = 65 dBA	65	65
77	X	< 65 dBA	62	65
78	X	< 65 dBA	63	65
79	X	< 65 dBA	63	65
80	X	= 65 dBA	65	65
81	X	= 65 dBA	65	65
82	X	Single	66	65
83	X	Single	67	65
84	X	< 65 dBA	60	65
85			67	65
86			67	65
87			67	65
88			71	65
89	X	Remove < 30m from interchange	> 71	65
90		Back church bldg. remove? Church itself will need a barrier	69	65
91			68	65
92			67	65
93		Commercial	> 71	72
94			70	65
95	X	Remove	> 71	65
96	X	Remove	> 71	65
97	X	Remove also as a part of the triangle bet. MM and Centerville Rd. - Single	69	65
98	X	Remove	> 71	65
99	X	Remove	> 71	65
100	X	Res. remove - dist = 45m from Alt EF	71	65
101	X	= 65 dBA	65	65
102	X	Could use with 103 only Paris Rd. would have to be crossed	68	65
103	X	Could use with 102 only Paris Rd. would have to be crossed	69	65
104	X	= 65 dBA	65	65
105	X	< 65 dBA	60	65
106	X	< 65 dBA	61	65
107	X	< 65 dBA	60	65
108	X	Single	69	65
109	X	< 65 dBA	62	65
110	X	< 65 dBA	60	65
111	X	= 65 dBA	65	65
112	X	< 65 dBA	60	65
113	X	< 65 dBA	61	65
114	X	Single	66	65
115	X	Res to remove (< 30m)	> 71	65
116	X	Res. abandoned - to be removed	> 71	65

Table 4-5
Noise Sensitive Receptors Within 229 Meters (750 Feet) of Centerline

Property Number	Eliminated from		Leq (dBA)	NAC
	Further Study	Reason for Elimination	Estimated	
117	X	Res to be removed w/ both Alt D, & Alt EF interchanges	> 71	65
118	X	Single residence to remove	> 71	65
119	X	< 65 dBA	60	65
120	X	= 65 dBA	65	65
121	X	Remove	> 71	65
122	X	Remove	> 71	65
123	X	< 65 dBA	64	65
124	X	< 65 dBA	63	65
125	X	< 65 dBA	63	65
126	X	< 65 dBA	60	65
127	X	< 65 dBA	60	65
128	X	Single	> 71	65
129	X	Single	> 71	65
130	X	Single - Commercial	> 71	72
131	X	Single	67	65
132	X	Single	67	65
133	X	Single	67	65
134	X	< 65 dBA	62	65
135	X	= 65 dBA	65	65
136	X	< 65 dBA	61	65
137	X	< 65 dBA	63	65
138	X	< 65 dBA	61	65
139	X	< 65 dBA	60	65
140	X	< 65 dBA	61	65
141	X	< 65 dBA	60	65
142	X	Remove	> 71	65
143	X	Trailer park to the east of existing 61 - same or reduced amt. of traffic	70	65
144	X	Commercial to the east of existing 61 - same or reduced amt. of traffic	69	72
145	X	To the east of existing 61 - same or reduced amt. of traffic	69	65
146	X	To the east of existing 61 - same or reduced amt. of traffic	69	65
147	X	To the east of existing 61 - same or reduced amt. of traffic	69	65
148	X	Many residences to the east of existing 61 - same or reduced amt. of traffic	70	65
149	X	Single	69	65



REFERENCE: Drawing taken from U.S.G.S. Quadrangles -
 Rensselaer, MO dated 1958, Quincy SW, MO-IL dated 1971,
 Palmyra, MO dated 1975 and Hannibal West, MO dated 1971.

NOISE-SENSITIVE RECEPTORS Exhibit 4-6

4.6.3 Traffic-Generated Noise Impacts

Future design-hour traffic noise levels were predicted for the receptors using the FHWA Highway Traffic Noise Prediction Model. Factors that influence the predicted noise levels include design-hour traffic volumes, average traffic speeds, traffic composition, terrain, and the location of the receptor relative to existing highways and the Highway 61 build alternatives.

All future design hour traffic noise levels were calculated in terms of L_{eq} . L_{eq} is a descriptor of the noise level defined as the total hourly equivalent sound level.

Design-year (2020) traffic volumes were used in predicting the Year 2020 traffic generated noise levels for the receptors. Year 2020 noise levels were predicted for the four build alternatives and the calculated noise levels are summarized in Table 4-5.

4.6.4 Noise Abatement Considerations

Noise barriers, either earthen berms, walls, or a combination wall/berm, are generally the most efficient method of providing noise abatement. The use of vegetation screens is relatively ineffective in reducing noise. Earthen berms are usually more efficient in providing abatement than walls of equal height, and are generally more aesthetically pleasing. However, berms usually require more right-of-way and more maintenance than do walls. Noise walls can be constructed of various materials including wood, brick, concrete, and steel. The visual intrusion of noise walls can be minimized by landscaping. For any noise barrier to be effective, it must be continuous. Any gaps or openings in a barrier severely decrease its effectiveness.

4.6.5 Potential Noise Abatement Measures

Noise abatement measures were evaluated for each of the sites adversely affected by traffic noise. Factors considered in the evaluation included the level of noise reduction provided, the number of structures affected, and the cost effectiveness of providing noise abatement. For the three locations which were to be further investigated (those receptors shaded in Table 4-5), feasible locations for noise walls were determined based on site conditions. After the

locations of the potential noise abatement walls were established, a cost estimate was made for each. The results are following.

For the potential location along Alternatives D, EF, and F (Receptors 2 & 3), the maximum length for the wall would be 152 meters (500 feet), located along the interchange in between the driveway for Receptor 2 and the county road immediately east of Receptor 3. This location for the wall was selected since the wall cannot block access to any properties nor can it cross any existing roads due to prohibitive costs. The wall would cost approximately \$125,000 or \$62,500 per residence. Since this is above the \$30,000 cost per benefited receptor criteria set by the MHTD, it is believed that a noise wall at this location is not economically feasible.

For the potential location along Alternative CW (Receptors 69 & 70), a wall was located approximately 60 meters (197 feet) from the centerline of the highway. The wall was estimated to be 100 meters (328 feet) long by 4 meters (13 feet) high, so that the cost per receptor would be under \$30,000 per receptor or \$60,000 total. This wall was determined to be ineffective (i.e., it did not provide a noise reduction of at least 5 dBA). In order to get more noise reduction, a longer or higher wall would have to be constructed and this is not economically feasible.

For the potential location along Alternative D (Receptors 85, 86, 87, 88, 90, 91, 92, 93, & 94), a wall was located right along the interchange with Highway 36. The length of this wall to be located between existing Highway 36 and Route MM, is 488 meters (1600 feet). The total cost for the wall would be approximately \$400,000 or \$44,450 per benefitted receptor. Since this is above the \$30,000 cost per benefitted receptor criteria set by the MHTD, it is believed that a noise wall at this location is not economically feasible.

It is important to note that these costs are only estimates and that grade information was not available at the time of the estimation. Therefore these costs are subject to change.

4.7 WATER QUALITY IMPACTS

4.7.1 Surface Water Impacts

The following FHWA guidance documents were used in evaluating impacts of the build alternatives on receiving waters:

- Management Practices for Mitigation of Highway Stormwater Runoff Pollution (4 volumes, September 1985)
- Effects of Highway Runoff on Receiving Waters (5 volumes, June 1985).

Highway runoff may contain solids, heavy metals, nutrients, oil and grease, bacteria, pesticides, herbicides, and other pollutants. The source of the pollutants is both from highway operation and maintenance.

The FHWA guidance documents recommend a screening procedure to eliminate from detailed investigation highway runoff situations that are not likely to have adverse impacts on receiving waters. According to the guidelines, which are based on extensive field data, when public water supplies are not involved, (and they are not in this case) highway runoff is not likely to have adverse effects on receiving waters when:

1. The highway has less than 30,000 ADT, or
2. Highway runoff is conveyed by overland flow or grassed channels an average distance of 60 meters (200 feet) prior to discharge to receiving waters, or
3. The ratio of the cumulative impervious roadway surface/total watershed area is less than 0.01. This assumes that the dilution ratio is approximately equal to the area ratio and that a dilution of 100:1 is sufficient to protect aquatic life.

For all alternatives, all of the above criteria are met (even though only one is necessary). The design year ADT is 18,550 for the relocated Route 61. Roadside ditches will be grassed. The overall ratio of paved area to total watershed area is less than 0.01.

Based on the screening criteria, then, it can be concluded that the effects of highway runoff on receiving waters are negligible for all alternatives.

4.7.2 Ground Water Impacts

There are a few private residential wells, but all public water supplies in the area are from reservoirs, or directly from the Mississippi River, or indirectly from the river through wells in the Mississippi River floodplain. There are a number of springs in the area, most of which are very small, less than a few gallons per minute when observed during field visits. There are a few springs in the area which are used for residential water supply. None of these are in the vicinity of any of the routes. There is one fairly large spring very close to the Routes 36/61 interchange of Alternative CW, as shown in Exhibit 4-5. This spring, which is used for water supply to livestock, is higher in elevation than most of the interchange, and is recharged from an even higher elevation, possibly the karst area to the northeast of the spring. It is unlikely that construction or usage of Alternative CW would impact this spring.

All the build alternatives avoid the karst portions of the study area. Therefore, ground water contamination via sinkholes is not expected to occur. There are two sinkholes southwest of the existing Routes 61/24 interchange which currently receive some runoff from the interchange and will continue to do so under all alternatives.

Impacts to ground water resources during construction and operation are expected to be minimal. Mitigation measures during construction will include the sealing of wells found during road construction to prevent ground water pollution from construction and from future road maintenance.

4.7.2.1 Principal or Sole Source Aquifer

Section 1424(e) of the Safe Drinking Water Act requires that proposed actions which may affect designated "principal or sole-source aquifers" be coordinated with the U.S. Environmental Protection Agency. There are no designated principal or sole-source aquifers within or near the study area. Therefore these requirements of the Safe Drinking Water Act do not apply to this project.

4.7.2.2 Special or Sensitive Areas

The State of Missouri has designated certain areas of the state as special or sensitive areas, where the ground water is especially sensitive to impacts or is of unusually high quality (10 CSR 23-3.100). None of the alternatives are in or near a special or sensitive area.

4.8 WETLAND IMPACTS

4.8.1 Areas of Impact

George Butler Associates, Inc., prepared a wetlands report entitled "Comparative Assessment of Potential Wetland Impacts for Alternative Highway Corridors" (Appendix A of the Draft EIS, dated August 23, 1995) in which 300 meter (1,000 ft) wide alternative corridors were compared for potential impacts to jurisdictional wetlands and other waters of the U.S. A conservative approach was taken for the assessment, in that all U.S. Fish & Wildlife Service (USFWS) National Wetlands Inventory (NWI) wetlands; Natural Resource Conservation Service (NRCS) hydric soils and wetlands; and drainages included on official county highway maps were combined in an assessment of maximum potential impacts to potential COE jurisdictional wetlands per proposed alternative corridor. The comparative assessment report concluded that Alternative F, the westernmost 300 meter (1,000 ft) wide alternative corridor, had the least amount of potential impacts to both jurisdictional wetlands and to other waters of the U.S. (such as streams, rivers, tributaries, and impoundments).

The proposed alternative corridors were then refined to 90 meter (300 ft) corridors with interchanges. Potential waters of the U.S. were assessed to determine an estimate of the type, number, and area of potential wetlands and the linear distance or area of other waters of the U.S. within each corridor segment. Table 4-6 of this Submittal summarizes estimated potential impacts to jurisdictional wetlands and other waters of the U.S. in each of 20 corridor segments and interchanges based on preliminary information. Potential relocations of the previously approved U.S. Highway 36 were also assessed. Methods for this assessment are described in Appendix A.

In addition to those methods, farm ponds have been included as potentially jurisdictional waters of the U.S. in this 90 meter (300 ft) corridor assessment, and drainageways with

<p>Table 4-6 Preliminary Identification of Wetlands and Other Waters of the U.S.^{1,2}</p>									
Alternative Corridor ³	NWI Wetland Designation ⁴	Description	NRCS Hydric Soil ⁵	NRCS Wetland Designation ⁶	Waters of U.S. [Drainage Areas > 3.8 km ² (1.5 mi. ²)] ⁷	Water of U.S. on Official County Map ⁸	Potential COE Jurisdictional ⁹		
							Wetlands	Farm Ponds	Other Waters of the U.S.
F2 (North Interchange)	PEMC	potential wetland	--	--	--	--	0.2 ha (0.5 ac)	--	--
	PEMFh	farm pond	--	--	--	--	--	0.2 ha (0.5 ac)	--
	PEM1A	potential wetland	--	--	--	--	0.2 ha (0.5 ac)	--	--
	PUBGh	2 farm ponds	--	--	--	--	--	0.3 ha (0.6 ac)	--
	R2UBG	Bear Creek	--	--	1	--	--	--	90 m (300 ft)
F2 (Corridor)	R4SBC	Little Bear Creek	--	--	--	1	--	--	152 m (500 ft)
	--	unnamed tributary	--	--	--	1	--	--	120 m (400 ft)
	--	unnamed tributary	--	--	--	1	--	--	90 m (300 ft)
	PUBGh	2 farm ponds	--	--	--	--	--	0.4 ha (1.0 ac)	--
F2 (36 Interchange)	PUBGx	excavated pond	--	--	--	--	--	--	0.2 ha (0.5 ac)

Table 4-6

Preliminary Identification of Wetlands and Other Waters of the U.S.^{1,2}

Alternative Corridor ³	NWI Wetland Designation ⁴	Description	NRCS Hydric Soil ⁵	NRCS Wetland Designation ⁶	Waters of U.S. [Drainage Areas > 3.8 km ² (1.5 mi. ²) ⁷	Water of U.S. on Official County Map ⁸	Potential COE Jurisdictional ⁹		
							Wetlands	Farm Ponds	Other Waters of the U.S.
Relocated 36-F	--	--	--	--	--	--	--	--	--
F1 (Corridor)	PEMF	pond	--	emergent wetland	--	--	0.2 ha (0.5 ac)	--	--
	PUBFh	farm pond	--	--	--	--	--	0.2 ha (0.5 ac)	--
	PUBGh	2 farm ponds	--	--	--	--	--	0.4 ha (1.0 ac)	--
	PUBOx	excavated pond	--	--	--	--	--	--	0.4 ha (1.0 ac)
	--	unnamed tributary	--	--	--	1	--	--	600 m (2,000 ft)
F1 (South Interchange)	PUBFh	farm pond	--	--	--	--	--	0.2 ha (0.5 ac)	--
	PUBGh	2 farm ponds	--	--	--	--	--	0.4 ha (1.0 ac)	--
	PUBGh	farm pond	--	--	--	--	0.4 ha (1.0 ac)	0.4 ha (1.0 ac)	--
EF1 (Corridor)	R4SBC	Little Bear Creek	--	--	1	1	90 m (300 ft)	--	90 m (300 ft)
	--	unnamed tributary	--	--	--	1	--	--	105 m (350 ft)
EF1 (Interchange)	PUBGh	3 farm ponds	--	--	--	--	--	0.8 ha (2.0 ac)	--

<div>Table 4-6</div> <div>Preliminary Identification of Wetlands and Other Waters of the U.S.^{1,2}</div>									
Alternative Corridor ³	NWI Wetland Designation ⁴	Description	NRCS Hydric Soil ⁵	NRCS Wetland Designation ⁶	Waters of U.S. [Drainage Areas > 3.8 km ² (1.5 mi. ²)] ⁷	Water of U.S. on Official County Map ⁸	Potential COE Jurisdictional ⁹		
							Wetlands	Farm Ponds	Other Waters of the U.S.
D1	-	-	-	-	-	1	-	-	-
	PUBGh	5 farm ponds	-	-	-	-	-	1.2 ha (3.0 ac)	-
D2 (Corridor)	PUBFh	farm pond	-	-	-	-	-	0.2 ha (0.5 ac)	-
	R2UBG	Little Bear Creek	-	-	1	1	-	-	90 m (300 ft)
	R4SBC	Crooked Creek	-	-	1	1	-	-	200 m (650 ft)
D2 (Interchange)	PUBF	2 ponds	-	-	-	-	-	-	0.2 ha (0.5 ac)
	PUBGh	6 farm ponds	-	-	-	-	-	1.2 ha (3.0 ac)	-
D3	PFO1A	unimproved tributary	-	-	-	1	-	-	180 m (600 ft)
	-	potential wetland	hydric soil (2.5 ha; 6.3 ac)	wet pasture in hydric soil (1.2 ha; 3.0 ac)	-	-	2.5 ha (6.3 ac)	-	-
	R2UBG	Bear Creek	-	-	-	-	-	-	730 m (2,400 ft)

Table 4-6
Preliminary Identification of Wetlands and Other Waters of the U.S.^{1,2}

Alternative Corridor ³	NWI Wetland Designation ⁴	Description	NRCS Hydric Soil ⁵	NRCS Wetland Designation ⁶	Waters of U.S. [Drainage Areas > 3.8 km ² (1.5 mi. ²)] ⁷	Water of U.S. on Official County Map ⁸	Potential COE Jurisdictional ⁹		
							Wetlands	Farm Ponds	Other Waters of the U.S.
D4	PFO1A	unnamed tributary	-	-	-	-	-	-	150 m (500 ft)
	-	unnamed tributary	-	-	-	1	-	-	90 m (300 ft)
	-	unnamed tributary	-	-	-	1	-	-	120 m (400 ft)
CW3 (Including North Interchange)	PUBGh	farm pond	-	-	-	-	-	0.4 ha (1.0 ac)	-
	PFO1A ¹⁰	potential wetland at unnamed tributary	hydric soil	wooded wetland	-	-	0.6 ha (1.6 ac)	-	-
CW2 (Corridor)	PFG1A ¹¹	potential wetland at unnamed tributary	hydric soil	wooded wetland	1	1	1.6 ha (4 ac)	-	150 m (500 ft)
	PFO1A	potential wetland at Bear Creek	-	-	-	-	1.0 ha (2.5 ac)	-	-
	PFO1A	potential wetland at Bear Creek	-	-	-	-	2.2 ha (5.5 ac)	-	-
CW2 (Corridor)	PFO1A	unnamed tributary	-	-	-	1	-	-	90 m (300 ft)
	PUBGh	2 farm ponds	-	-	-	-	-	0.8 ha (2.0)	-
	R2UBG	Bear Creek	-	-	1	-	-	-	580 m (1,900 ft)

Table 4-6
Preliminary Identification of Wetlands and Other Waters of the U.S.^{1,2}

Alternative Corridor ³	NWI Wetland Designation ⁴	Description	NRCS Hydric Soil ⁵	NRCS Wetland Designation ⁶	Waters of U.S. [Drainage Areas > 3.8 km ² (1.5 mi. ²)] ⁷	Water of U.S. on Official County Map ⁸	Potential COE Jurisdictional ⁹		
							Wetlands	Farm Ponds	Other Waters of the U.S.
CW2 (Corridor) [Cor'l.]	R2UBG	Confluence, Bear & Little Bear Creeks	-	-	2	-	-	-	250 m (825 ft)
	R4SBC	unnamed tributary	-	-	1	-	-	-	900 m (1,000 ft)
	-	unnamed tributary	-	-	-	1	-	-	90 m (300 ft)
CW2 (HWY 36 Interchange)	PFO1A	2 potential wetlands at Bear Creek	-	-	-	-	1.8 ha (4.5 ac)	-	-
	PUBG	pond	-	-	-	-	-	-	0.2 ha (0.5 ac)
	R2UBG	Bear Creek	-	-	1	-	-	-	1,000 m (3,400 ft)
	-	unnamed tributary	-	-	-	1	-	-	640 m (2,100 ft)
Relocated 36-CW	R4SBC	unnamed tributary	-	-	-	1	-	-	275 m (900 ft)

Table 4-6
Preliminary Identification of Wetlands and Other Waters of the U.S.^{1,2}

Alternative Corridor ³	NWI Wetland Designation ⁴	Description	NRCS Hydric Soil ⁵	NRCS Wetland Designation ⁶	Waters of U.S. [Drainage Areas > 3.8 km ² (1.5 mi. ²)] ⁷	Water of U.S. on Official County Map ⁸	Potential COE Jurisdictional ⁹		
							Wetlands	Farm Ponds	Other Waters of the U.S.
CW1 (Including Interchange)	PUBCh	3 farm ponds	-	-	-	-	-	0.4 ha (1.0 ac)	-
	PUBF	pond	-	-	-	-	-	-	0.2 ha (0.5 ac)
	R2UBG	Crooked Creek	-	-	1	1	-	-	90 m (300 ft)
	R4SBC	unnamed tributary	-	-	-	1	-	-	90 m (300 ft)
CW1 (Including Interchange) [Con't.]	R4SBC	unnamed tributary	-	-	-	1	-	-	90 m (300 ft)
L1 (Link 1)	PFO1A	potential wetlands at unnamed tributary	-	-	-	1	0.4 ha (1.0 ac)	-	90 m (300 ft)
	PFO1A	potential wetland at unnamed tributary	hydric soil	wooded wetland	-	-	1.6 ha (4.0 ac)	-	-

Table 4-6
Preliminary Identification of Wetlands and Other Waters of the U.S.^{1,2}

Alternative Corridor ³	NWI Wetland Designation ⁴	Description	NRCS Hydric Soil ⁵	NRCS Wetland Designation ⁶	Waters of U.S. [Drainage Areas > 3.8 km ² (1.5 mi. ²)] ⁷	Water of U.S. on Official County Map ⁸	Potential COE Jurisdictional ⁹		
							Wetlands	Farm Ponds	Other Waters of the U.S.
L2 (Link 2)	FUBOh	2 farm ponds	-	-	-	-	-	0.6 ha (1.5 ac)	-
	R2UBG	Crooked Creek	-	-	1	1	-	-	210 m (700 ft)
	R4SBC	Crooked Creek	-	-	1	1	-	-	300 m (1,000 ft)

¹ Sources: USFWS National Wetland Inventory Maps, Natural Resource Conservation Service Soil Survey of Marion and Ralls Counties NRCS/ASCS farm program wetland maps, and Missouri Highway and Transportation Department Marion and Ralls County Highway Maps.

² Refer to Table 4 of Appendix A for explanation and interpretation of National Wetland Inventory terms.

³ See Exhibit 2-6 for location of proposed alternative 90 meter (300 ft) corridors.

⁴ See Appendix A, Attachment 3, National Wetland Inventory Maps for proposed alternative 30090 m (300 ft) corridor segments.

⁵ Hydric soils from Natural Resource Conservation Service's *Hydric Soils List of Marion County and Hydric Soils List of Ralls County*. See Appendix A, Attachment 2 for location of proposed 90 meter (300 ft) corridor alternative segments on aerial photographs taken from NRCS Soil Survey of Marion and Ralls Counties.

⁶ Emergent wetlands and open-water wetlands are potential sinkholes.

⁷ As per MHTD Design Manual

⁸ See Appendix A, Figure 1 for location of 90 m (300 ft) corridors on MHTD General Highway Maps for Marion and Ralls Counties.

⁹ Estimates based upon worst-case-scenario that all NWI wetlands, including all farm ponds, are jurisdictional. Wetland areas are planimetric estimates from NWI/USGS maps. Areas which are 0.2 ha. (0.5 ac.) and smaller are all shown as 0.2 ha. (0.5 ac.). Numbers have been rounded. Refer to Appendix A for 90 meter (300 foot) corridor segment wetland estimates based upon onsite Jurisdictional Wetland Delineation.

¹⁰ Associated tributary included in adjacent DW2 corridor estimates.

¹¹ Tributary includes small portion in adjacent CW3 corridor.

drainage areas ≥ 3.8 square kilometer (≥ 1.5 square miles) have been identified. Farm ponds might be considered as jurisdictional waters of the U.S., depending upon their current use, location, and the presence or absence of associated wetlands. A comparison of estimated impacts among four 90 meter (300 ft) alternative corridors is provided in Table 4-7 of this Submittal (Corridors F, EF, D, and CW). Additional corridors may be assessed for wetland impacts by summing the wetlands impacts for each segment of the corridor.

Appendix A of this Final EIS provides information based upon the onsite Jurisdictional Wetland Delineation of alternative 90 meter (300 foot) corridors by George Butler Associates during July and September, 1995. This more detailed report replaces the preliminary Comparative Assessment report submitted in the Draft EIS. Information in the Jurisdictional Wetland Delineation report regarding the types and amounts of wetlands within alternative corridors supersedes the preliminary information provided in this subsection.

This table presents the preliminary estimated total number and area of potentially jurisdictional wetlands; total number of crossings of waters of the U.S. (such as rivers, streams, and intermittent drainages, and impoundments); and total number and area of potentially jurisdictional farm ponds per 90 meter (300 ft) corridor for each of four proposed alternative corridors. These preliminary calculations represent the worst-case assumption that all waters of the U.S. within the 90 meter (300 ft) corridor will be impacted by the

proposed project. Other waters of the U.S. are tallied as number of crossings, to reflect the manner in which regulated impacts are evaluated for Section 404 permitting. This comparison of alternative narrow corridors concurs with the 300 meter (1,000 ft) wide corridors analysis. Alternative F (the westernmost narrow corridor) will potentially impact the smallest area of waters of the U.S., and will require the least number of crossings of waters of the U.S. (1 crossing). The type of permit available for this project will partially determine the method of mitigation appropriate for impacts to wetlands. More detailed information based upon the Onsite Jurisdictional Wetland Delineation is provided in Appendix A of this Final EIS.

Table 4-7
Summary of Preliminary Wetlands and Waters of the U.S.¹

Alternative Corridor	Alternative Corridor Segments	Potential Farm Ponds ²		Potential Wetlands		Potential Other Waters of the U.S. ³		Total Area/Crossings
		number	area	number	area	number	area or length	
F	F2 North Interchange/F2 Corridor /F2 HWY 36 Interchange/Relocated 36-F/F1 Corridor/F1 South Interchange	11	2.0 ha (5.0 ac)	2	0.4 ha (1.0 ac)	3 ponds 1 drainage	0.8 ha (2.0 ac) 90 m (300 ft)	3.2 ha (8.0 ac) and 1 crossing
EF	F2 North Interchange/D4/D3/EF1 Corridor/EF1 HWY 36 Interchange/F1 Corridor /F1 South Interchange	10	2.4 ha (6.0 ac)	2	2.7 ha (6.8 ac)	2 ponds 8 drainages	0.6 ha (1.5 ac) 2,065 m (6,850 ft)	5.7 ha (14.0 ac) and 8 crossings
D	F2 North Interchange/D4/D3/D2 Corridor/D2 HWY 36 Interchange/D1/F1 South Interchange	17	3.2 ha (8.0 ac)	2	2.7 ha (6.8 ac)	2 ponds 7 drainages	0.2 ha (0.5 ac) 1,560 m (5,150 ft)	6.1 ha (15.3 ac) and 7 crossings
CW	CW3/CW2 Corridor/CW2 HWY 36 Interchange/Relocated 36-CW/CW1	6	1.6 ha (4.0 ac)	6	7.2 ha (18.0 ac)	2 ponds 13 drainages	0.4 ha (1.0 ac) 4,990 m (12,125 ft)	9.2 ha (23 ac) and 13 crossings
L1	—	—	—	2	2.0 ha (5.0 ac)	— 1 drainage	— 90 m (300 ft)	2.0 ha (5.0 ac) and 1 crossing
L2	—	2	0.6 ha (1.5 ac)	—	—	2 drainages	510 m (1700 ft)	0.6 ha (1.5 ac) and 2 crossings

¹ This tally of area and crossings represents preliminary estimates based upon information, and is presented as a "worst-case" estimate. Refer to Appendix A for 90 meter (300 foot) corridor segment wetland estimates based upon Onsite Jurisdictional Wetland Delineation. The July 1995 onsite wetland delineation may determine that some of many of these areas are not Crops jurisdictional waters of the U.S. Actual right-of-way location may avoid some wetlands within the chosen corridor.

² Farm ponds might be jurisdictional waters, depending upon current use and COE interpretation.

³ Potential waters of the U.S. includes all drainages and impoundments (excluding farm ponds) listed in Table 4-8.

4.8.2 Impacts on Wetlands Values

During the July, 1995 on-site jurisdictional wetland delineation of the proposed 90 meter (300 ft) alternative corridors, wetland functions will be quantified using best professional judgment of the wetlands specialist. Results will be documented and included in the final wetland delineation report (Appendix A of this Final EIS).

4.8.3 Potential Secondary Impacts

Secondary wetland impacts include construction related temporary impacts, and long-term secondary impacts which may continue for the life of the project. The primary temporary secondary wetland impact consists of a potential temporary increase in water turbidity downstream of project construction due to runoff. Turbidity will be minimized through use of runoff controls such as strategic placement of silt fences or weed-free hay bales; best management practices for spill control from construction equipment; and maintenance of buffer areas where possible. Long term secondary impacts to wetlands include runoff from highway surfaces. Runoff may potentially carry petroleum residues, salt, and other materials into adjacent waters throughout the life of the project.

4.8.4 Mitigative Measures and Monitoring Plan

The mitigation policy set forth in Executive Order 11990, "Protection of Wetlands" provides a sequence of mitigation options which must begin with the avoidance of adverse impacts to wetlands, followed by minimization of unavoidable impacts. Only after these two options have been fully implemented may creation/enhancement/restoration be used as the final method by which a project may mitigate the loss of wetlands.

This ongoing process is currently being implemented with the assessment of alternative 90 meter (300 ft) wide corridors, to determine which of these alternatives will cause the least amount of impacts to wetlands functions and values (Section 4.8.1 of this Submittal). Depending upon the amount of unavoidable wetlands impacts and the type of permit required by the COE for dredge and fill activities in waters of the U.S., additional mitigation may not be required. If additional mitigation is necessary in the form of creation/enhancement/restoration, a Mitigation and Monitoring Plan will be prepared as part of the Section 404

permit application.

Executive Order 11990 requires federal agencies to "avoid adverse impacts associated with the destruction or modification of wetlands.. wherever there is a practicable alternative." Based upon both the preliminary comparative wetland assessment and the final jurisdictional wetland delineation of proposed alternative corridors, Alternative F contains the least amount of wetlands and the fewest number of crossings of water of the U.S. Therefore, Alternative F is the most practicable alternative with the least possible adverse impacts associated with the destruction or modifications of wetlands.

4.9 WATER BODY MODIFICATION AND WILDLIFE IMPACTS

There will be minimal modifications to stream channels and none to other water bodies. Modifications will be done only as required for crossings. No relocations, impoundments, or channel deepening is anticipated. None of the streams impacted by the alternatives are used for recreation or water supply. Impacts to fish and aquatic wildlife are judged to be negligible based on FHWA criteria (see Section 4.7.1.).

Wildlife often travels along wooded stream channels, hence highway impacts to wildlife often occur at or near stream crossings that interrupt normal travel patterns. Bridge crossings that allow for free travel represent less impact than structures that do not allow for travel. Alternative F will have the least impacts on wildlife travel patterns because it lies almost entirely along the tops of ridges and has only one stream crossing (a bridge). Alternative CW will have the largest impact on streams.

4.10 FLOODPLAIN IMPACTS

4.10.1 Regulations

In 1968, the U.S. Congress passed the National Flood Insurance Act, which created the National Flood Insurance Program (NFIP). The NFIP was designed to reduce future flood losses through local floodplain management and to provide protection for property owners against potential losses through flood insurance.

As part of the agreement for making flood insurance available in a community, the NFIP requires the participating community to adopt floodplain management ordinances containing certain minimum requirements intended to reduce future flood losses. The community is also responsible for submitting data to the Federal Emergency Management Agency (FEMA) reflecting revised flood hazard information so that NFIP maps can be revised as appropriate. This will allow risk premium rates and floodplain management requirements to be based on current data.

Marion and Ralls Counties both participate in the NFIP and have a Floodplain Ordinance in effect. Development or expansion in the floodplain needs to comply with their respective ordinances. Under the ordinance, the County Engineer is the enforcement/management officer for the floodplain in Marion County, while the County Superintendent is the authorized official in Ralls County. Both Counties have a Floodplain Development Permit application, which must also be completed. This project is compatible with floodplain management in these counties.

Floodplains are those with a designated 100-year floodplain that are mapped on National Flood Insurance Rate Maps or Flood Hazard Boundary Maps by the Federal Emergency Management Agency (FEMA). No regulatory floodways have been designated on the FHBM. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood can be carried without increases in the flood heights of more than one foot. Encroachment shall mean an action within the limits of the base floodplain. The base floodplain is the area subject to flooding by the base flood, which is a flood having a 1-percent chance of being exceeded in any given year. Encroachment of the alignment on these designated floodplains requires a formal response under Executive Order 11988: Flood Plain Management. This Executive Order 11988 regarding floodplain management requires that federal agencies evaluate any agency activities on proposed floodplains. The agency should provide leadership in reducing the risk of flood loss; minimizing impact of floods on human safety, health, and welfare; and restoring and preserving the natural and beneficial values of floodplains. The agency is required to (1) evaluate potential impacts of the proposed action on floodplains, (2) consider flood hazards and floodplain management in design, (3) modify designs to the extent practicable to minimize potential harm to or within the floodplain, and (4) prepare and circulate a notice containing an explanation of why the proposed action is to be located in

a floodplain.

The Highway 61 route alternatives shall also follow the requirements for Location and Hydraulic Design of Encroachment on Floodplains as described in 23 CFR 650, Subpart A.

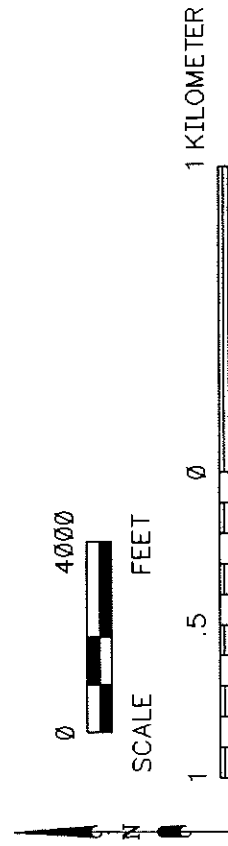
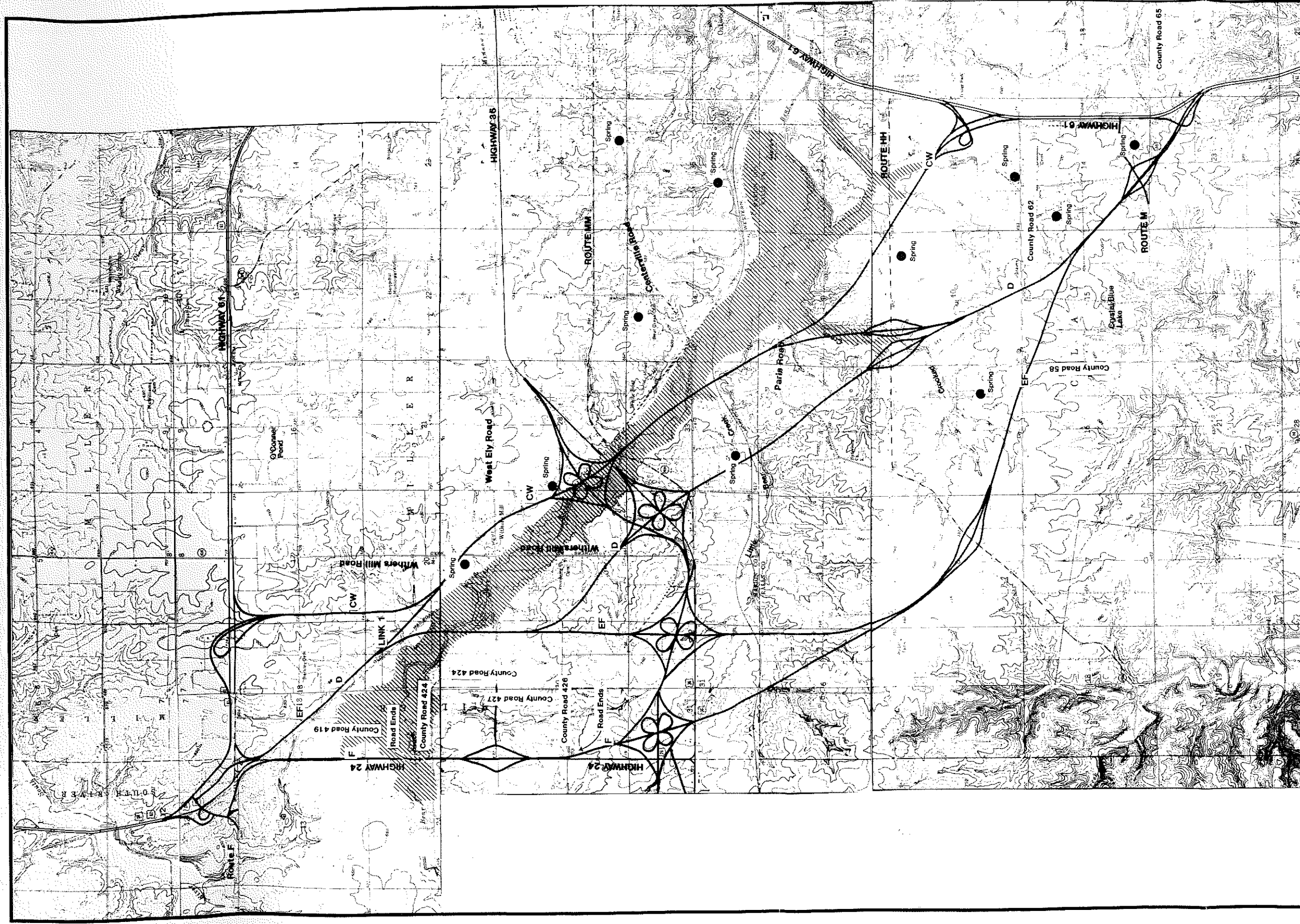
4.10.2 Location and Areas Impacted

The Highway 61 route alternatives include a total of twelve possible floodplain encroachments. These involve encroachments on floodplains of Bear Creek, Little Bear Creek, and Crooked Creek and are illustrated in Exhibit 4-7. Flood Hazard Boundary Maps (FHBM) published by the U.S. Department of Housing and Urban Development for the Federal Insurance Administration in 1977 & 1980 for Marion and Ralls counties were used to determine the floodplain areas along the alternative routes. There are three potential floodplains that the alternatives for Highway 61 span that are identified as Zone A Flood Hazard Areas on the FHBM. The zone designation used by the Flood Insurance Administration explains that a Zone A is an area of 100-year flood, where base flood elevations and flood hazard factors are not determined.

The Zone A streams and tributaries along the routes include the Bear Creek, Little Bear Creek, and Crooked Creek. An earthfill dam (Bear Creek Reservoir) with gated outlets is situated on Bear Creek just outside the southwest corporate limits of Hannibal, Missouri to the north of Route HH. This was completed in 1961 by the COE for the purpose of retaining the 100-year flood along Bear Creek. Bear Creek and its tributaries are the principal sources of flooding within this area, which is caused chiefly by short, intense thunderstorms producing heavy runoff. Flooding along these streams is aggravated by the presence of numerous highway and railroad bridges, which create a potential for debris blockage and floodwater backup.

4.10.3 Impacts on Floodplains

The placement of the relocated Highway 61 within floodplains is unavoidable. The Bear Creek floodplain extends far to the west outside the study area; going around it would not be practical. The least impacting location possible within the study area is the Alternative F alignment, which follows the ridge tops and crosses Bear Creek at nearly a right angle, in



SPRINGS AND FLOODPLAINS Exhibit 4-7

REFERENCE: Drawing taken from U.S.G.S. Quadrangles -
Rensselaer, MO dated 1958, Quincy SW, MO-IL dated 1971,
Palmyra, MO dated 1975 and Hannibal West, MO dated 1971.

**Table 4-8
Floodplain Crossings**

Route	ID#	Stream Name	Location of Crossing Section/Township/ Range	Length of Floodplain Crossing
F	F-1	Bear Creek	S19&24/T57N/R6W Marion Co.	366 m (1,200 ft.)
Link #2	Link #2-1	Crooked Creek	S10/T56N/R5W Ralls Co.	152 m (500 ft.) (SW On Ramp)
Link #2	Link #2-2	Crooked Creek	S3/T56N/R5W Ralls Co.	122 m (400 ft.) (NW Off Ramp)
Link #2	Link #2-3	Crooked Creek	S3/T56N/R5W Ralls Co.	366 m (1,200 ft.)

disturbed while constructing embankment and/or bridge in the floodplain. No significant encroachment since the creek crossings shall be designed without floodway encroachments or with offsetting hydraulic improvement with surcharges less than one foot.

- Stream Crossing CW-4 crosses the Bear Creek Zone A floodplain along the proposed route, from approximately 610 m (2,000 feet) northwest of Highway 36 to the Centerville Road, the route runs longitudinal to and transverses approximately 1829 m (6,000 feet) of the floodplain. (Sect. 28 & 33, T57N, R5W)-Marion County. There will be fill added to the floodplain for road embankments. Preliminary wetland identification indicates a small amount of potentially jurisdictional shrubbery and herbaceous wetlands within or adjacent to this area. There will be grading and regrading within the floodplain during compaction of highway road surface. The drainageway will be disturbed while constructing embankment and/or bridge in the floodplain. There will be a longitudinal encroachment of floodplain where the highway runs parallel to the floodplains opposed to transversing. No significant encroachment since the creek crossings shall be designed without floodway encroachments or with offsetting hydraulic improvement with surcharges less than one foot.
- There will also be a stream crossing on the portion of Highway 36 that would be relocated for Alternative CW (referred to as "relocated 36-CW). Stream Crossingrelocated 36-CW crosses the Bear Creek Zone A floodplain from approximately 366 m (1,200 feet) northwest of existing Highway 36, the route traverses approximately 518 m (1,700 feet) of the floodplain. (Sect. 28 & 29, T57N, R5W)-Marion County.

There appears to be some influence on the Bear Creek, Little Bear Creek, and Crooked Creek Zone A floodplains from the Bear Creek reservoir to the north of Route HH near Paris Road.

- Alternative D

- Stream Crossing D-1 transverses 24 m (80 feet) of Crooked Creek Zone A floodplain, south of Route HH (proposed southeast ramp to Route HH intersection). (Sect. 10,

T56N, R5W)-Ralls County. There will be fill added to the floodplain for road embankments. Preliminary wetland identification indicates several isolated wetlands, including potentially jurisdictional farm ponds, in this area. There will be grading and regrading within the floodplain during compaction of highway road surface. The drainageway will be disturbed while constructing embankment and/or bridge in the floodplain. No significant encroachment since the creek crossings shall be designed without floodway encroachments or with offsetting hydraulic improvement with surcharges less than one foot.

- Stream Crossing D-2 transverses approximately 46 m (150 feet) and 91 m (300 feet) of Crooked Creek Zone A floodplain, north of Route HH (proposed northeast ramp to Route HH intersection). (Sect. 3, T56N, R5W)-Ralls County. There will be fill added to the floodplain for road embankments. Preliminary wetland identification indicates several isolated wetlands, including potentially jurisdictional farm ponds, in this area. There will be grading and regrading within the floodplain during compaction of highway road surface. The drainageway will be disturbed while constructing embankment and/or bridge in the floodplain. No significant encroachment since the creek crossings shall be designed without floodway encroachments or with offsetting hydraulic improvement with surcharges less than one foot.
- Stream Crossing D-3 transverses approximately 701 m (2,300 feet) of Bear Creek Zone A floodplain north of West Ely Road. (Sect. 19 & 20, T57N, R5W)-Marion County. There will be fill added to the floodplain for road embankments. Preliminary wetland identification indicates that no jurisdictional wetlands are likely to occur at this site. There will be grading and regrading within the floodplain during compaction of highway road surface. The drainageway will be disturbed while encroachment since the creek crossings shall be designed without floodway encroachments or with offsetting hydraulic improvement with surcharges less than one foot.

- Alternative EF

- Stream Crossing EF-1 transverses approximately 701 m (2,300 feet) of Bear Creek

Zone A floodplain north of West Ely Road. (Sect. 19 & 20, T57N, R5W)-Marion County. There will be fill added to the floodplain for road embankments. Preliminary wetland identification indicates that no jurisdictional wetlands are likely to occur at this site. There will be grading and regrading within the floodplain during compaction of highway road surface. The drainageway will be disturbed while constructing embankment and/or bridge in the floodplain. No significant encroachment since the creek crossings shall be designed without floodway encroachments or with offsetting hydraulic improvement with surcharges less than one foot.

- Alternative F
 - Stream Crossing F-1 transverses approximately 366 m (1,200 feet) of the Bear Creek Zone A floodplain approximately 2 km (1 1/4 miles) south of the existing U.S. Highway 61 and Route F intersection. (Sect. 19 & 24, T57N, R6W)-Marion County. There will be fill added to the floodplain for road embankments. Preliminary wetland identification indicates several isolated wetlands, including potentially jurisdictional farm ponds, in this area. There will be grading and regrading within the floodplain during compaction of highway road surface. The drainageway will be disturbed while constructing embankment and/or bridge in the floodplain. No significant encroachment since the creek crossings shall be designed without floodway encroachments or with offsetting hydraulic improvement with surcharges less than one foot.
- Link #1 transverses no Zone A floodplains.
- Link #2
 - Stream Crossing Link #2-1 transverses approximately 152 m (500 feet) of Crooked Creek Zone A floodplain, south of Route HH (proposed southwest ramp to Route HH intersection). (Sect. 10, T56N, R5W)-Ralls County. There will be fill added to the floodplain for road embankments. There will be grading and regrading within the floodplain during compaction of highway road surface. The drainageway will be disturbed while constructing embankment and/or bridge in the floodplain. No

significant encroachment since the creek crossings shall be designed without floodway encroachments or with offsetting hydraulic improvement with surcharges less than one foot.

- Stream Crossing Link #2-2 transverses approximately 122 m (400 feet) of Crooked Creek Zone A floodplain, north of Route HH (proposed northwest ramp to Route HH intersection). (Sect. 3, T56N, R5W)-Ralls County. There will be fill added to the floodplain for road embankments. Preliminary wetland identification indicates several isolated wetlands, including potentially jurisdictional farm ponds, in this area. There will be grading and regrading within the floodplain during compaction of highway road surface. The drainageway will be disturbed while constructing embankment and/or bridge in the floodplain. No significant encroachment since the creek crossings shall be designed without floodway encroachments or with offsetting hydraulic improvement with surcharges less than one foot.
- Stream Crossing Link #2-3 transverses approximately 366 m (1,200 feet) of the Crooked Creek Zone A floodplain, 366 m (1,200 feet) north of Route HH. (Sect. 3, T56N, R5W)-Ralls County. There will be fill added to the floodplain for road embankments. Preliminary wetland identification indicates several isolated wetlands, including potentially jurisdictional farm ponds, in this area. There will be grading and regrading within the floodplain during compaction of highway road surface. The drainageway will be disturbed while constructing embankment and/or bridge in the floodplain. No significant encroachment since the creek crossings shall be designed without floodway encroachments or with offsetting hydraulic improvement with surcharges less than one foot.
- Relocated U.S. Highway 36-CW.
 - Stream Crossing relocated 36-CW transverses the Bear Creek Zone A floodplain from approximately 366 m (1,200 feet) northwest of the existing U.S. Highway 36, the route transverses approximately 518 m (1,700 feet) of the floodplain. (Sect. 28 & 29, T57N, R5W)-Marion County. There will be fill added to the floodplain for road embankments. Several potentially jurisdictional farm ponds are located in this area. There will be grading and regrading within the floodplain during compaction of

highway road surface. The drainageway will be disturbed while constructing embankment and/or bridge in the floodplain. No significant encroachment since the creek crossings shall be designed without floodway encroachments or with offsetting hydraulic improvement with surcharges less than one foot.

- Relocated U.S. Highway 36-F transverses no Zone A floodplains.

4.10.4 Measures to Minimize Impacts

The level of risk or environmental impact, for the alternate routes which encroach on base floodplains or would support base floodplain development is as follows:

- a. The flooding risks - There shall be no additional backwater (surcharge) on any insurable structures.
- b. The impacts on natural and beneficial floodplain values - There shall be minimal impacts and only at crossing. (No paving of channel should be needed and a scour analysis should be performed). The minimal impacts upon natural and beneficial floodplain values would be as follows:

<u>Impact</u>	<u>Measure to Minimize Impact</u>
• Floodplain filling	• Reduce filling in floodplain by minimizing road embankments for bridge.
• Wetland disturbance	• Minimize wetland impacts by reducing construction disturbances as much as practicable
• Grading	• Minimize grading and regrading to minimize soil compaction

- Drainageway
 - Where possible, preserve the natural drainage when constructing bridges in the floodplain. Otherwise, minimize channel relocations, restrict high velocity flows, and practice good erosion control measures
 - Longitudinal encroachments
 - Try to transverse floodplain at 90 degree angle when possible
- c. The support of probable incompatible floodplain development (i.e., any development that is not consistent with a community's floodplain development plan)- All floodplain development work shall comply with Federal, State, and local governmental regulations. The project could encourage incompatible floodplain development as a secondary impact, but only within NFIP criteria would this development occur and typically only at intersections such as those found in stream crossings CW-4, D-1, D-2, Link #2-1, and Link #2-2. These intersections may encourage homes and businesses to be located near the floodplain.
- d. The encroachments shall be done in accordance to NFIP regulations and 44 CFR Chapter 1, Parts 60, 65, and 72. In addition, a Letter of Map Revision (LOMR) shall be obtained from FEMA for any changes to their mapping including new roads, new hydrologic/hydraulic calculations, or changes to the floodplain/floodway limits and elevations.
- e. The measures to restore and preserve the natural and beneficial floodplain values -The crossings shall minimize encroachments and stabilize scour potential at piers and abutments, while avoiding increases in velocity were possible.

Since there is no detailed study in a Zone A with the existing/effective hydraulic conditions, this analysis must be prepared in order to compare with the proposed conditions with the new alignment. Submissions to FEMA for revisions to effective Flood Insurance Studies (FISs) by individual and community requestors will require performance of hydrologic/hydraulic studies and the signing of application/certification forms. The request will be prepared by

the Missouri Highway and Transportation Department (MHTD) and then submitted to FEMA by the community. These forms will provide FEMA with assurance that all pertinent data relating to the revision is included in the submittal. They will also assure that: (a) the data and methodology are based on current conditions; (b) qualified professionals have assembled data and performed all necessary computations; and (c) all individuals and organizations impacted by proposed changes are aware of the changes and will have an opportunity to comment on them. Request must be submitted to FEMA by the community in accordance with the NFIP regulations published under Title 44 of the Code of Federal Regulations, Chapter 1, Part 65.

Temporary obstructions of floodplains will be minimized by specifying the construction sequence in order to minimize the time, length, and height of obstructions within the floodplain.

4.11 THREATENED OR ENDANGERED SPECIES

The Indiana bat habitat survey conducted for this project is described in detail in Appendix B, and summarized in this section. The habitat survey methodology was developed and modified in cooperation with the volunteer, interagency, multidisciplinary, Indiana bat recovery team.

The wooded areas adjacent to perennial streams in the project area provide generally better roosting habitat than wooded areas away from streams because of the greater availability of water and the higher density of potential roost trees. The most suitable areas occur along Alternative CW, associated with Bear Creek. Areas of Alternative D associated with Bear Creek and Crooked Creek probably provide qualitatively the next best habitat area. Compared to Alternatives CW and D, Alternative EF has little wooded area associated with streams; and Alternative F, which is primarily on the ridge tops, has even less. Alternative F, then, would have the least impact on the better quality potential habitat areas.

Nearly all the wooded areas in the corridor were judged to be suitable or marginally suitable as summer roosting and foraging habitat for the Indiana bat. Considered this way, Alternative CW would have the greatest negative impact with 33 wooded hectares (82 acres) required, followed by Alternative D (21 wooded hectares [53 acres]), then Alternative EF

with 18 wooded hectares (45 acres). Alternative F would have the least impact, with only 12 hectares (29 acres) of wooded land required. USFWS approved restrictions on tree clearing will be used to ensure no jeopardy to potential populations.

During the habitat survey, a bachelor (only males) colony of approximately 90 Indiana bats and 300 Little Brown bats (*Myotis lucifugus*), a non-endangered species, was found in an abandoned room-and-pillar known locally as "Bear Cave." No females were observed in the quarry. None of the build alternatives would impact this quarry.

4.12 HISTORIC AND ARCHAEOLOGICAL PRESERVATION

4.12.1 Archeological Resources

There are two Archaeological Survey of Missouri (ASM) recorded archeology sites located within alternative alignments proposed for this project. Site 23MA164 is a small, low density lithic scatter located in Section 28, T57N, R5W. This site is located within the proposed interchange of US 36 and alternative CW. Should this route be chosen, the site would be impacted. However, based on a limited site visit by the cultural resource investigator, the site does not appear to be potentially significant. Site 23MA164 was reportedly Phase II tested by MHTD for the U.S. Route 36 project. According to MHTD, the results suggest the site is not eligible to the National Register of Historical Places (NRHP). The report for this work is still being written, but reportedly MHTD's recommendation to MDNR will be: No further work is needed; site is not NRHP-eligible.

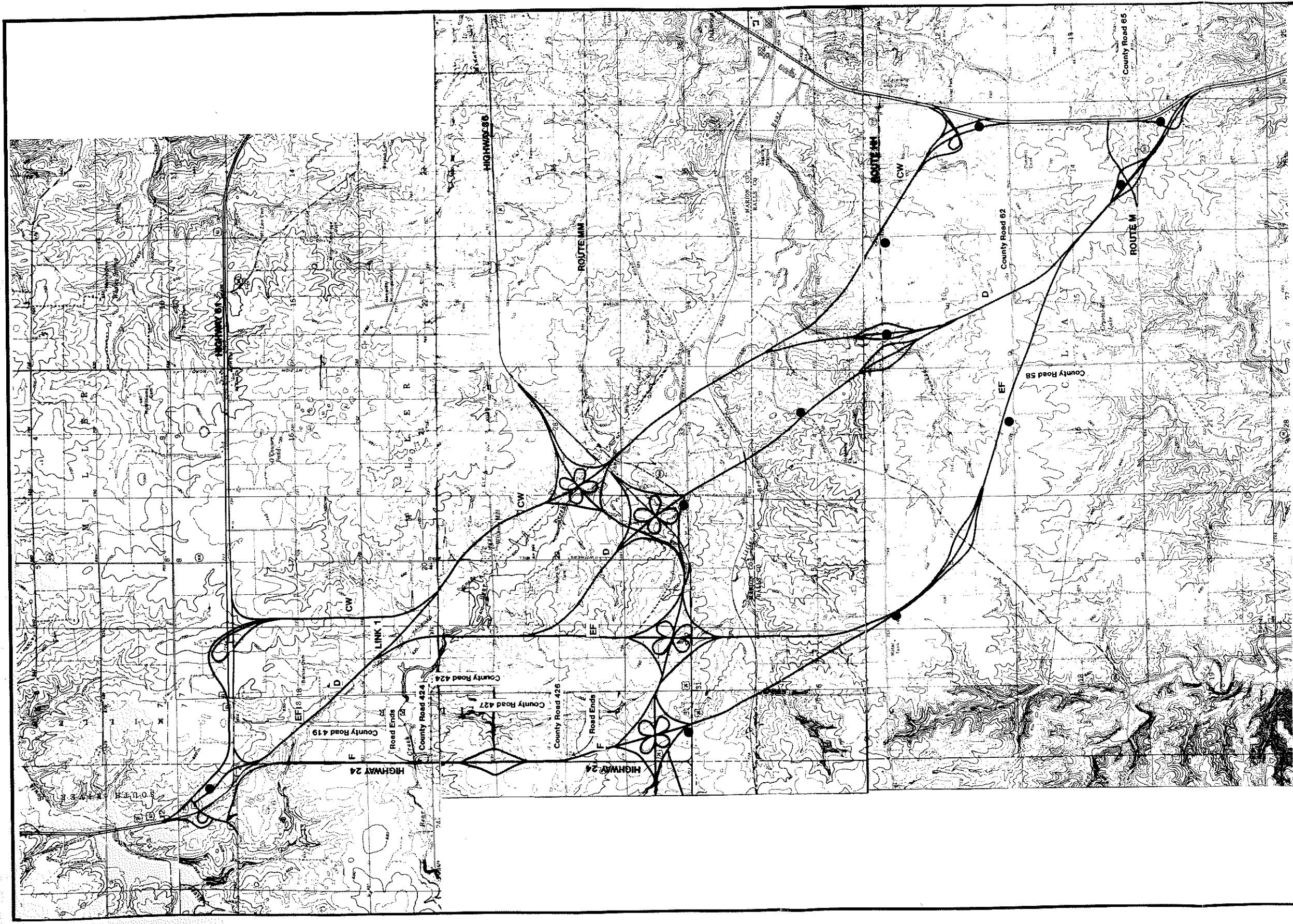
Site 23RA128 is recorded as an "Archaic site - Hannibal Complex type site." This site is located in Section 4, T56N, R5W and lies within the proposed alternative alignment D. Should this alignment be chosen, the site would be impacted. Based on a limited site visit by the cultural resource investigator, the site appears to be potentially significant and warrants further investigation. It is presumed MDNR-HPP would require a Phase II investigation to determine significance relative to NRHP eligibility prior to issuance of the final EIS if Alternative D is selected. A Phase I archaeological survey has been conducted on the preferred alternative. Two light density prehistoric lithic scatters and one mixed component (prehistoric debitage-historic debris) site were discovered. All three sites have been adversely impacted by agricultural terrace construction and/or prior road construction.

The principal investigator has determined the potential for undisturbed buried cultural remains is minimal at the three sites and recommends that project activities be permitted to commence. The Missouri Department of Natural Resources (MDNR) has issued a notice of concurrence that none of the three sites are eligible for inclusion in the National Register of Historic Places (NRHP). The MDNR letter of concurrence is included in Appendix E. The Phase I Report is located in Appendix C.

4.12.2 Architectural Resources

A total of eleven primary structures have been identified within the alternative alignments proposed for this project, which appear to be 50 or more years old. There is only one structure within the study area that is listed in the NRHP. The Landis House is located 760 meters (2,500 feet) southeast of the Highway 61/24 interchange, as shown in Exhibit 4-4. In addition, eleven structures which appear to be 50 or more years old have been identified within the proposed alternative project alignments. It is the recommendation of the cultural resource investigator that all of the identified structures lack significance and do not warrant NRHP listing. MDNR has reviewed the submitted Architectural/Historic Inventory Survey forms and has issued a Cultural Resources Assessment, with the determination that none of the structures are eligible for inclusion in the NRHP. The determination is included in Appendix E. Certain primary structure listed below and/or associated outbuildings would be impacted by construction activities associated with the different alternatives as noted. Locations of these structures are shown in Exhibit 4-8.

- RR3 Box 193, New London, 63459. T56N, R5W, Section 23. Mid-1920s salt box house and associated outbuildings. Located within alternative alignment F-EF-D.
- T56N, R5W, Section 14. New London rural location. 1940s pumphouse and associated outbuildings. Located within alternative alignment F-EF-D.
- RR3 Box 131, New London, 63459. T56N, R5W, Section 9. 1930s farm residence and associated outbuildings. Located within alternative alignment F-EF.
- RR1 Box 205, Hannibal, 63401. T56N, R5W, Section 8. 1940s-1950s barn. Located within alternative alignment F-EF.



STRUCTURES EVALUATED FOR HISTORIC SIGNIFICANCE Exhibit 4-8

REFERENCE: Drawing taken from U.S.G.S. Quadrangles -
Rensselaer, MO dated 1958, Quincy SW, MO-IL dated 1971,
Palmyra, MO dated 1975 and Hannibal West, MO dated 1971.

the upper portion of the drainage. Lengths of floodplain crossings by each of the build alternatives is summarized in Table 4-8. Location of NFIP stream crossings for each alternative are as described below:

- Alternative CW

- Stream Crossing CW-1 crosses approximately 24 m (80 feet) of the Bear Creek Zone A floodplain 610 m (2,000 feet) south of Route HH. (Sect. 11, T56N, R5W)-Ralls County. There will be fill added to the floodplain for road embankments. Preliminary wetland identification indicates that no jurisdictional wetlands are likely to occur at this site. There will be grading and regrading within the floodplain during compaction of highway road surface. The drainageway will be disturbed while constructing embankment and/or bridge in the floodplain. No significant encroachment since the creek crossings shall be designed without floodway encroachments or with offsetting hydraulic improvement with surcharges less than one foot.
- Stream Crossing CW-2 transverses approximately 61 m (200 feet) of the Crooked Creek Zone A floodplain, approximately 488 m (1,600 feet) southeast of Paris Road. (Sect. 11, T56N, R5W)-Ralls County. There will be fill added to the floodplain for road embankments. Preliminary wetland identification indicates that no jurisdictional wetlands are likely occur at this site. There will be grading and regrading within the floodplain during compaction of highway road surface. The drainageway will be disturbed while constructing embankment and/or bridge in the floodplain. No significant encroachment since the creek crossings shall be designed without floodway encroachments or with offsetting hydraulic improvement with surcharges less than one foot.
- Stream Crossing CW-3 The Little Bear Creek floodplain is traversed by approximately 152 m (500 feet) of the route, south of the Centerville Road. (Sect. 33, T57N, R5W)-Marion County. There will be fill added to the floodplain for road embankments. Preliminary wetland identification indicates that no jurisdictional wetlands are likely occur at this site. There will be grading and regrading within the floodplain during compaction of highway road surface. The drainageway will be

**Table 4-8
Floodplain Crossings**

Route	ID#	Stream Name	Location of Crossing Section/Township/ Range	Length of Floodplain Crossing
CW	CW-1	Trib. to Bear Creek	S11/T56N/R5W Ralls Co.	24 m (80 ft.)
CW	CW-2	Crooked Creek	S3/T56N/R5W Ralls Co.	61 m (200 ft.)
CW	CW-3	Little Bear Creek	S33/T57N/R5W Marion Co.	152 m (500 ft.)
CW	CW-4	Bear Creek	S28&33/T57N/R5W Marion Co.	1,829 m (6,000 ft.)
Reloc. 36- CW	36- CW	Bear Creek	S28&29/T57N/R5W Marion Co.	518 m (1,700 ft.)
D	D-1	Crooked Creek	S10/T56N/R5W Ralls Co.	24 m (80 ft.) (SE Off Ramp)
D	D-2	Crooked Creek	S3/T56N/R5W Ralls Co.	91 m (300 ft.) (NE On Ramp)
D & EF	D-3 & EF-1	Bear Creek	S19&20/T57N/R5W Marion Co.	701 m (2,300 ft.)

- RR2 US 36, Palmyra. T57N, R5W, Section 31. Barn, date not recorded. Located within alternative alignment F.
- RR1 Hwy 61, Palmyra. T57N, R6W, Section 12. 1880s house with outbuildings. Located within alternative alignment F-EF-D.
- RR3 Box 165, Hannibal. T56N, R5W, Section 4. 1920s farmhouse with outbuildings. Located within alternative alignment D.
- RR1 Box 222, Hannibal. T57N, R5W, Section 32. 1940s residence with outbuildings. Located within alternative alignment D (Highway 36 interchange).
- RR1 Hannibal. T56N, R5W, Section 11. 1940s residence. Located within alternative alignment CW.
- T56N, R5W, Section 10. Hannibal rural location. 1940s house with outbuilding. Located within alternative alignment CW.
- RR1 Box 282A, Hannibal. T56N, R5W, Section 10. House, date not recorded. Located within the proposed Link 2 connecting alternative alignments CW and D.

In addition to the above structures, the Landis House, an NRHP structure, is located in between Alternatives D/EF and CW (T57N, R5W, Section 18). The construction activities associated with alternative alignment D and EF would impact the current driveway entrance to the historic structure, situated approximately 460 meters (1,500 feet) east of the driveway entrance. Construction activities are not expected to impact the integrity of the historic structure or aesthetically harm the property. Since only the house and three acres surrounding the house are on the NRHP, construction would not impact the site, and would not constitute a 4(f) impact.

4.12.3 Historical Bridges

MHTD has completed a Service Rating for Bridges for both Ralls and Marion Counties. The survey lists the bridges by name and includes information pertaining to type, span, age,

stream crossing, and construction firm. There are no recorded bridges within or adjacent to the proposed preferred or alternative project alignments.

4.12.4 Historical Resources

Based on the assumption that the defunct Hannibal and St. Joseph Railroad alignment warrants recordation as a significant linear resource, it would be impacted primarily by proposed project alternative alignment CW and its interchange with US 36. In addition, project construction associated with alternative alignment F would also impact the railroad alignment.

Other sites that may warrant recordation as historical sites include numerous cemeteries in the project area, although it does not appear that any readily identifiable cemeteries or grave plots are located within or adjacent to any of the proposed project alignments. Should any burials be encountered by project activities, the cultural resource investigator will coordinate with MDNR-HPP as to how to proceed. Such cemeteries may be potentially significant relative to NRHP eligibility criteria.

4.13 HAZARDOUS WASTE SITES

All sites of concern for potential hazardous waste were identified in preliminary investigations and were avoided by the build alternatives. All alternative locations were evaluated as much as possible by access from public roadways. Observations were made of some residences and farms within the alternative alignments. In several cases, solid wastes such as construction debris, used tires and old equipment - probably from farm-related activities, and residential waste such as appliances were observed on some properties. In general, the wastes observed appeared to have originated from the property owner. Missouri law does not forbid a property owner to dispose of his own waste on his own property, unless it represents a public nuisance or health hazard. There were also some small above-ground fuel storage tanks observed, which are very common on farms.

No potential hazardous waste sites were observed within the limits of the new right-of-way identified. Detailed investigations of private properties were not done. If any solid wastes or unexpected hazardous wastes are generated during construction, they will be handled in

accordance with applicable state and federal laws and regulations.

4.14 VISUAL IMPACTS

Views from all alternatives will primarily be of farmland, with gently rolling hills. Some relatively isolated and rural areas will be visually impacted by all the alternatives. Alternatives D/EF will be visible from the Landis House, which is on the National Register of Historic Places. The Landis House sits on top of a gentle rise, about 300 meters (1,000 feet) to the northeast of Alternatives D/EF.

The rural community of Withers Mill, now served by two light-duty county roads, will be visually impacted by Alternative CW, which would pass just to the northeast of the community. The residential area along Marion Route 426 will be visually impacted by Alternative D/EF (Exhibit 4-3). Alternative F will have the least visual impact on the rural residents of the area.

4.15 MATERIALS AND ENERGY REQUIREMENTS

Construction of any of the build alternatives would require the use of a large amount of construction material and petroleum products. Some of the construction materials, such as earthen fill, are theoretically recoverable; however, from a standpoint of economic practicality, all construction materials and petroleum products used during this construction represent an expended resource. Fortunately, construction materials are not considered scarce or depletable resources either at the local or national level. Petroleum products, on the other hand, are a depletable and nonrenewable resource for which there is a national concern. The construction of the proposed highway would represent long-term utilization of petroleum resources in the form of gasoline and diesel fuel. However, high-speed, uninterrupted, vehicular traffic as provided for by the proposed highway would readily reduce low speed, stop-and-go travel on the existing Route 61 through Hannibal. In addition, the proposed highway responds to an identified need for regional transportation service through the corridor and, when compared to an equivalent amount of travel on the existing route, the proposed route would provide a savings in fuel consumption.

Section 1.6 summarizes the analysis that was performed to compare design year fuel

consumption for the build alternative with the no-build alternative. The resulting estimates for daily fuel consumption are as follows:

- Existing conditions: 30,700 liters/day (8,120 gallons/day)
- Design year, no-build alternative: 485,000 liters/day (128,150 gallons/day)
- Design year, with relocation: 67,900 liters/day (17,930 gallons/day).

The breakdown for the design year with relocation is as follows: 32,700 liters/day (8,640 gallons/day) for the relocated route, and 35,000 liters/day (9,290 gallons/day) for the existing Route 61. Fuel consumption for all build alternatives would be similar. The analysis shows that, given the MHTD traffic projections, design year fuel consumption for the no-build alternative is about seven times that of any of the build alternatives.

4.16 CONSTRUCTION IMPACTS

4.16.1 Noise

Construction will generate some noise impacts, primarily to those receptors identified in Exhibit . The area most affected would probably be the residential area and church south of the Alternatives D/Route 36 interchange. Because of the low density of noise-sensitive receptors, construction noise impacts would be least on Alternative F.

Impacts will be reduced because construction activities are planned only for normal weekday work hours.

4.16.2 Air

Construction can create nuisance dust in residential areas and other areas where people gather, such as the Cornerstone Baptist Church. Mitigation consists of implementing standard dust control measures such as spraying water.

4.16.3 Water

Potential construction impacts on surface water resources are increased sedimentation and turbidity, and pollutants such as oil and grease. All contractors will be required to follow the provisions of MHTD's general stormwater permit.

4.16.4 Traffic Congestion and Detours

Since all the alternatives are new construction, interference with traffic will occur only at the north and south termini and at the Route 36 interchange. Detours will not be necessary, except for temporary lane relocations during construction of these interchanges.

4.17 THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The short-term uses of the environment would generally be those associated with construction of the highway. Consequently, short term environmental impacts would include air pollution resulting from emissions and dust from construction equipment and smoke from the open burning of debris. Construction equipment would also temporarily increase noise levels in the area. The removal of ground cover during construction activities would increase erosion, but it will be minimized by implementing erosion control techniques.

The most evident long-term benefit of the construction of the relocated Route 61 would be improved local and regional accessibility and reduced traffic congestion on existing area roads. Increased travel speed will save motorists time and lower vehicle operating costs. In addition, reduced traffic congestion and the removal of a large amount of traffic from non-limited access roadways will reduce the potential for accidents.

Long-term economic benefits resulting from the construction of the relocated Route 61 would include increased tax revenues and employment. The gradual loss of tax revenue to the City of Hannibal from through traffic being routed outside of town will probably be offset overall by increased tax revenues from new or relocated businesses on the relocated route. The improved access resulting from the construction of the relocated Route 61 is expected to

stimulate economic growth by expanding market areas and making the area more attractive to new development. New and expanded businesses will create new employment opportunities.

4.18 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible and irretrievable commitments of resources are impacts resulting from construction of the relocated Route 61 which can neither be mitigated or replaced in the future. Impacts of this nature include the following:

- The commitment of land to the right-of-way ranging from approximately 196 to 282 hectares (484 to 698 acres). Although the land required for the construction of the project could be converted to another use in the future if it is determined that the road is no longer needed, there is presently no reason to believe that any conversion would be desirable or necessary.
- The removal of agricultural land from production or from potential future production. The amount of farmland that will be taken ranges from about 151 to 249 hectares (373 to 618 acres). Prime farmland requirements range from about 74 to 226 hectares (184 to 558 acres).
- Large amounts of natural resources such as fossil fuels, aggregate cement, asphalt, sand, and steel will be required for construction of the highway. These materials are generally not retrievable. However, these materials are not in short supply and their use in this project will not adversely impact their future availability.
- State and federal funds and labor used to build the relocated Route 61 represent an irretrievable monetary commitment. However, the long-term economic and traffic benefits expected to result from the project will outweigh this initial investment.

4.19 UNAVOIDABLE ADVERSE IMPACTS

It will be possible to reduce or prevent some adverse impacts associated with the construction of the relocated Route 61. However, there are certain impacts which cannot be avoided.

Unavoidable adverse impacts resulting from the project include:

- Increased noise levels for some receptors.
- Some visual impacts that will be considered adverse by some residents.
- Loss of agricultural land and disruption to farms.
- Alteration of various wildlife habitats. The highway will also present a barrier to wildlife movement and will probably result in increased road kills.

4.20 SECONDARY AND CUMULATIVE IMPACTS

4.20.1 Definitions

The Council on Environmental Quality (CEQ) regulations for implementing NEPA define cumulative impacts and direct and indirect effects, and require consideration of all of them (40 CFR 1502.16, 1508.7, and 1508.8). Direct effects are defined as those "which are caused by the action and occur at the same time and place" and indirect effects are those "which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable" (40 CFR 1508.8). Indirect effects are also referred to as secondary effects.

A "cumulative impact" is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such action" (40 CFR 1508.7).

4.20.2 Secondary or Indirect Impacts

The EIS does include consideration of secondary or indirect impacts, although they are not specifically identified as such. The following summarizes the discussion of indirect effects in the EIS.

Section 4.1.2 Land Use Changes as a Result of the Project. This section points out the current trend of economic and population contraction in the project area. (Population projections by the University of Missouri Office of Social and Economic Data Analysis show a steady population decline for the Marion/Ralls County area through 2020). Section 4.1.2 discusses the limited potential for new development (the major source of indirect impacts for this highway project), and the most likely areas for it to occur. Because the project is planned as a freeway with no outer roads, any new resulting development is likely to occur at interchanges. Reasonably foreseeable development would probably include service stations, restaurants, and possibly motels, resulting in the loss of several more hectares (acres) of prime farmland. This development is also dependent on other infrastructure being available. There are no floodplains, wetlands, or other identified sensitive areas in the immediate vicinity of the accessible interchanges.

Section 4.4.1 Regional and Local Economy. This section discusses the potential indirect effects of the project on the regional and local economy.

Section 4.4.2 Impacts on Existing Route 61 Businesses. This section discusses the impacts on local service stations, restaurants, and motels on existing Route 61, based on the worst-case scenario of these establishments eventually losing all their business from through traffic to new businesses that would become established on the relocated route, or to other businesses on Route 61 elsewhere. The impact on tax revenue for the City of Hannibal for this worst-case scenario is also discussed.

Section 4.5.2 Microscale Concerns. This section discusses carbon monoxide (air quality) impacts not only for year-of-construction traffic, but also for traffic in the 20th year following construction.

Section 4.7.1 Surface Water Impacts. This section discusses surface water impacts for year-of-construction traffic and for traffic in the 20th year following construction (design year).

Section 4.8.3 Potential Secondary Impacts. This section discusses potential secondary impacts on wetlands.

4.20.3 Cumulative Impacts

A cumulative impact on prime farmland results from the project and past, present and planned development in the area, especially along Route 36. In addition, MHTD is planning improvements on Route 36 within the study area and to the west of the study area. Improvements proposed on the 14.9 km (9.3 mile) section of Route 36 east of Route 24 will require 46 hectares (115 acres) of prime farmland. (The Finding of No Significant Impact for that project was signed on November 24, 1993). About 10 km (6 miles) of these improvements are within the study area for the Route 61 project. Farmland requirements for the proposed Route 61/36 interchange, as well as the associated route changes on Route 36, were taken into account in the evaluation for the current project. Improvements proposed on the 18.5 km (11.5 mile) section of Route 36 west of Route 24 will require approximately 144 hectares (353 acres).

The proposed improvements on Route 36 within the project area may result in some additional impact on water quality due to runoff from increased traffic. Traffic will be highest at the Route 61/36 interchange, with design year average daily traffic (ADT) projections for Route 61 of 18,550 vehicles per day and 5,200 vehicles per day for Route 36. The combined projected traffic for both routes of 23,750 vehicles per day is still well below the FHWA guidance threshold for evaluation of adverse impacts (30,000 ADT). For all alternatives, this interchange is in the Bear Creek drainage, as will be most of the relocated Route 61; Route 36 in the project area is also in the Bear Creek drainage.

The improvements on Route 36 within the study area have no wetland impacts, and therefore do not contribute to cumulative wetland loss. Other development in the area may impact wetlands.

Cumulative impacts can result from increased traffic within the project area due to improvements on the route outside the project area. Upgrading Route 61 from north of Hannibal south to I-70 near St. Louis will likely result in an increase in traffic beyond that which would result solely from improvements in the project area only. Traffic projections for the project account for this incremental increase without specifically identifying it. (The overall improvements are just one factor taken into account in making the traffic projections.) Since the evaluation of environmental impacts is based on these traffic projections, it implicitly includes the cumulative impact caused by the incremental increase

in traffic due to improvements outside the project area.

There can be cumulative impacts on housing availability when two or more events that result in relocation occur during the same time period, such as a major flood and a new highway.

5.0
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COMMENTS AND COORDINATION

The Missouri Highway and Transportation Department (MHTD) provided numerous specific and ongoing opportunities during the preparation of the EIS for interested agencies, local units of government, and the general public to provide comments and input into the development and evaluation of Route 61 relocation alternatives. Specifically, the public involvement program was implemented to accomplish the following objectives:

- Define the scope of the environmental investigations, issues to be addressed, and focus of the technical studies, as they relate to public interests or concerns.
- Inform the public about the proposed project, its objectives, purposes, alternatives, activities, and importance to the community.
- Involve residents, interest groups, state and local government, and relevant public agencies in the planning process.
- Monitor and address the respective viewpoints of residents, interest groups, and public bodies.
- Educate interested community members regarding the Environmental Impact Statement process.
- Create a visual and written record of the project from study phases to completion.

This section provides a summary of the public involvement and agency coordination that occurred during the preparation of the EIS.

The public involvement process was initiated early in the project through agency meetings, a telephone survey and small group meetings which were held within the first 6 to 8 weeks of the

project kick-off. Additionally, a special media briefing was held early in the process. To gather input and provide project information, an "open house" style public meeting was held on June 22, 1994. Newsletters, news releases, and newspaper articles also provided ongoing information to the public as well as solicited comments, concerns, and issues. By establishing a toll-free telephone line, the public had a continuous opportunity to ask questions of and provide input to project team members during the development of the EIS. Comments written on comment sheets were received throughout the process. As such, all of these proactive means were implemented to foster effective two-way communication with interested members of the public.

The following is a chronological listing of the initial public involvement activities:

- Telephone survey: April 22 through May 13, 1994.
- Interagency scoping meeting: May 26, 1994.
- Media briefing: May 26, 1994.
- Group meeting with Ralls County Commissioners and the Mayor of New London: June 6, 1994.
- Group meeting with Hannibal Chamber of Commerce: June 6, 1994.
- Group meeting with Hannibal Regional Hospital Board: June 7, 1994.
- Group meeting with Hannibal City Council: June 7, 1994.
- Group meeting with Monroe City Council, Monroe City Chamber of Commerce, Monroe County Commissioners: June 8, 1994.
- Group meeting with Palmyra City Council and Marion County Commissioners: June 8, 1994.

- "Open House" public information meeting: June 22, 1994.

7.1 AGENCY MEETINGS

The Notice of Intent to prepare a EIS for the proposed project was published in the Federal Register on May 5, 1994. An interagency scoping meeting was held on May 26, 1994. Those agencies which were invited to participate included: the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the U.S. Soil Conservation Service, the Missouri Department of Conservation, the Missouri Department of Natural Resources, and others. Representatives from MHTD and the Federal Highway Administration attended. Concerns which were identified at the scoping meeting included: impacts on floodplains, wetlands, farmlands and cultural resources.

Agencies have been updated through contacts regarding specific issues, thorough project newsletters, and through review of documents prepared as part of the project.

7.2 TELEPHONE SURVEY

As the initial step in the public involvement process, a telephone survey was conducted to identify major issues and concerns and potential impacts. Over 45 key community leaders and representatives of a wide range of community organizations were contacted. The identified issues of concern are summarized below and detailed in a separate report, Telephone Survey Results, which is available upon request.

- Safety was a primary concern, with at least 19 people referencing safety as a major issue. Many people expressed concern about unsafe traffic conditions along Route 61, particularly in the McMasters Avenue/Hannibal Senior High School area.
- Location and economics were major concerns also. While many people believed that relocating Route 61 may provide opportunities for economic development, the issue of "how far west" was the most controversial issue identified in the survey.

- Access to the airport, business park and hospital was important to several people contacted.
- Because of numerous transportation projects underway in the area, several people had questions about how the Route 61 relocation project fits into the developing regional transportation system. Other issues such as how traffic will be handled during construction were also raised.

In addition to identifying issues of concern, respondents also identified potential impacts associated with relocating Route 61. Those impacts were much more focused on human issues than environmental issues. Economic impacts and impacts to farmland and homes were mentioned more frequently than other impacts. Most people stated that they believed the environmental impacts of the project could be minimized or avoided; accessibility to the City of Hannibal was identified as having the largest potential impact on the area.

7.3 SMALL GROUP MEETINGS

From the period of June 6 through June 8, 1994, six meetings were held with key community groups. These groups included: Ralls County Commissioners and the Mayor of New London; the Hannibal Chamber of Commerce; the Hannibal Regional Hospital Board; the Hannibal City Council; and the Palmyra City Council and Marion County Commissioners. The sixth meeting was held with the Monroe City Council, Monroe City Chamber of Commerce, and the Monroe County Commissioners. While the sixth meeting focused on improvements to Route 36, information relative to the relocation of Route 61 was also provided. The number of attendees who signed the registration sheet was 80.

Information was presented to the groups in a consistent format, with MHTD formally introducing the project and team members to all the groups. Following MHTD, the consultant team provided an overview of the project, outlined public involvement activities, and reviewed the EIS/EA process. Presentation materials included display boards, aerial photos, and fact sheets.

Overall, the groups seemed positive about the project. And while many people believe that relocating Route 61 may provide opportunities for economic development, the issue of "how far

west" was once again the most controversial issue identified in the group meetings. Generally, it seemed that the Hannibal Chamber of Commerce preferred that Route 61 be located in the vicinity of the hospital. Monroe City preferred that Route 61 be co-located with Route 24 with the hospital preferring it to be located near the hospital. The City Council of Hannibal had no comments nor questions; they planned to take the information provided under consideration and contact MHTD at a later time.

Closely related to the issues of economics and location, access was of particular importance to the hospital board. For example, the hospital board stated that a 900 percent increase in patients from Lewis county has occurred, partly because the north/south transport was easier last year due to the flood. However, the hospital board expects patient loads to continue to increase from neighboring counties. The Hannibal Chamber of Commerce also highlighted the issues most important to their organization: access to the airport, business park, and hospital.

A general issue labeled "transportation planning" was the subject of many comments and questions. Though many of the comments were not directly related to the Route 61 relocation, the comments demonstrated the interrelationship between MHTD highways and those roadways which are the responsibility of community and counties. For example, many people asked whether MHTD intends to maintain the existing Route 61.

Issues and concerns identified through the group meeting process were once again much more focused on human issues than environmental issues. One question raised repeatedly was the relationship between environmental factors and cost. It was explained that cost is one of the factors considered when evaluating the alternatives. It was pointed out that the Federal Highway Administration will make the final decision.

Several questions about environmental issues were raised, including "What is potential bat habitat?" and "What constitutes a wetland?". Although a few geologic features were identified and someone stated that a chemical/fertilizer storage area may exist on Route M, the groups asked more questions and provided more opinions about where the new route should be located than they identified environmental concerns.

Results of the group meetings are contained in a separate report, which is available upon request.

7.4 PUBLIC MEETING

An "open house" style public meeting provided an informal forum for the public to learn about the Route 61 relocation project and offer comments. The meeting was held from 4:00 pm until 7:00 pm at the Hannibal Holiday Inn on June 22, 1994. The meeting was publicized through paid advertisements in five local papers, news articles, television coverage and flyers placed at local businesses. Details are contained in the report, Open Houses Public Meeting Results, which is available upon request.

Exhibits on display at the meetings included informational boards and aerial photos of the study area. Informational boards summarized topics such as the EIS Process and the importance of public input. Each attendee was greeted at the front door and asked to register his or her name and address. An informational packet containing the following items was given to every attendee:

- Two fact sheets
- A newsletter
- A comment form
- Maps of the study areas
- Copies of the informational boards on display

People were then encouraged to read the display boards, look at the aerial photo displays, and ask questions and discuss the projects with MHTD and the consultant team representatives. Personal attention to the public was important to the success of the meetings; therefore, both MHTD and the consultant team each provided at least four representatives.

Comments from the public were continuously solicited; and comment forms, maps of the study areas, pens, and comment boxes were widely available. These items were located at the four large study area map stations and in the center of the room. A court reporter was also available for taking oral comments.

With over 130 people registered, the public meeting was well attended, particularly in light of the heavy rain which occurred during a portion of the meeting. Based on addresses listed and discussions with attendees, it appears that most were interested citizens from unincorporated areas

of Marion and Ralls counties who were not affiliated with any particular interest group or local government body. This attendance is in contrast to the meetings previously held with groups such as local governments, the hospital board and Chambers of Commerce.

In general, the attendees seemed positive about the project. Written comments received from the public meetings were fairly evenly split between relocating Route 61 in the hospital vicinity and relocating it near Route 24. As was the case with the phone survey and group meetings, the issues of location and economics were addressed most often by written comments received at the public meetings. Once again, upgrading Route 36 was well supported in discussions and received few comments. However, out of the 26 written comments received, 10 had a comment related to location and economics involving Route 61. Specifically, one comment was offered in support of keeping Route 61 close to Hannibal, four comments supported relocating Route 61 to the hospital vicinity, and five comments were in favor of placing Route 61 at the western side of the study area.

The issue of access was an area in which comments received from the public meetings differed from comments received from the group meetings. More rural issues such as farmers having access to their farmland located on both sides of the roadway and farm equipment having access to roadways were raised. Concerns regarding the general issue labeled "transportation planning" were not expressed as often as in the group meetings and phone survey. The concerns raised in the public meetings were primarily focused on what is perceived to be a lengthy time frame for the project.

Potential environmental items were identified on comment forms and were investigated or confirmed by the consultant team. These items included: cultural resources; geologic features; and wildlife and vegetation. Other similar items reported orally to the MHTD Consultant team representatives were also being addressed.

7.5 NEWSLETTERS

Newsletters were published at project milestones and included information such as project and public meeting schedules, routes selected for further analysis, environmental issues investigated, how public concerns were being addressed, and answered to frequently asked questions. The newsletters were mailed to public officials, interested organizations, and attendees at the previously

mentioned meetings. The project team actively sought to expand the mailing list by asking people who called in or who were contacted during field studies if they would like to be added to the mailing list.

7.6 INFORMATION PROVIDED TO THE MEDIA

A media briefing was held on May 26, 1994. Members of the local media, including television, radio, and newspapers attended the briefing. The purpose of the briefing was to establish lines of communication and provide the media with information about the project. Information packets including fact sheets, dates and locations of public meetings, photographs and contact names were provided. The briefing was well received by the media. Representatives of the media also attended the public meetings. A feature article describing environmental activities, including the discovery of the Indiana Bat, was provided to the media.

7.7 TELEPHONE INFORMATION LINE

The public and other interested parties were able to call a toll-free telephone line for direct access to the consultant team's office for information about the project. A log of the telephone calls received was maintained. The majority of the calls were made to express concern about individual homes being located within the corridor alternatives. A few calls identified environmental constraints such as cemeteries, caves and sinkholes.

7.8 INFORMATION REPOSITORIES

Project documents and other information materials were made available for public review at the following locations: Hannibal Public Library, Monroe City Public Library, Palmyra Bicentennial Public Library, Hannibal City Hall, Monroe City Hall, Palmyra City Hall, and New London City Hall.

7.9 LOCATION HEARING

A combined location hearing for the relocation of Route 61 and the upgrading of Route 36 was held from 4:00 to 7:00 p.m., on Tuesday, September 19, 1995, at the Holiday Inn in Hannibal,

Missouri. Approximately 300 people attended the hearing, including representatives from the City of Hannibal, the City of Monroe City, Marion County Planning and Zoning, the Downtown Association, the Hannibal Regional Hospital, the Missouri Department of Conservation, and numerous local businesses and property owners.

The hearing was conducted in the open forum style. Information packets and graphic displays were available to help explain the location alternatives, costs, and potential environmental impacts to people. In addition, several District 3 representatives and the consultant team were available to answer questions.

Areas for written and verbal comments were provided. One oral comment regarding the relocation of Route 61 was received at the hearing. People were advised that comments received through October 30, 1995 are included in the transcript for the hearing.

More than 90 comments were received in support of Alternative F, the preferred alternative. The reasons most cited included: lowest cost alternative, fewer environmental impacts, causes less disturbance to homes and people, and allows Hannibal to grow.

More than 110 comments, including 38 form letters, were received in favor of Alternative CW (the alternative located nearest to Hannibal). The reasons most frequently cited included: more positive economic impact on Hannibal, better health care access, and less impacts on farm land.

Four commenters supported Alternative D, one supported Alternative E, and four were opposed to the project because of the disturbance of rural life. Four commenters opposed Alternative F, but did not state a preferred alternative.

Comments received during the 45-day comment period for the Draft EIS (including those received during the hearing) are addressed in Section 7.10.

7.10 RESPONSES TO COMMENTS ON THE DRAFT EIS

This section consists of two subsections. These include:

Subsection 7.10.1, which contains individual responses to letters from agencies, organizations and individuals. Each letter is included and followed by a response to comments made in that letter.

Subsection 7.10.2, which addresses categories of comments, in cases where a number of comments were the same or very similar. These are comments which were received during the 45-day comment period for the Draft EIS, and include those comments received at the public hearing held for the Draft EIS. These individual letters and comment forms are not included. Comments are summarized and addressed in categories.

7.10.1 Responses to Individual Letter Comments

Individual letters are included in the order received, each followed by the response. Where more than one issue is raised, responses are numbered, and margin notes have been added to the letter to correspond to the numbered response.

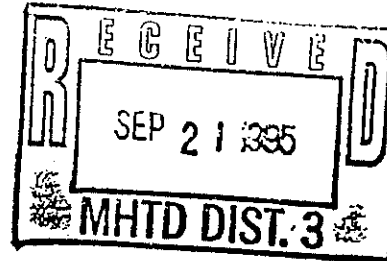


MARK TWAIN'S HANNIBAL

VISITORS & CONVENTION BUREAU

9-15-95

Dick Jones
Missouri Highway & Transportation Depart.
P.O. Box 1067
Hannibal, MO 63401



Dick Jones:

The Hannibal Visitors & Convention Bureau has endorsed alternative route CW for the proposed by-pass of Highway 61. From an economic stand point, it makes much more sense to choose the closest alternative to Hannibal. The further away the alternative route gets, the fewer people will turn off, the fewer restaurants & convenience stores will be visited, the fewer hotels nights will be rented, the fewer tourism attractions will be visited and business drops!

We know that Hannibal will lose a certain percentage of business with a by-pass. However, we strongly feel that we will lose much more business the further away the by-pass is from Hannibal. Please consider our view point.

Sincerely,

Faye Bleigh
Director &
Board Members

RESPONSE TO COMMENTS

Mark Twain's Hannibal Visitors and Convention Bureau - Letter of September 15, 1995

This response addresses the following economic issues raised in the letter:

- Impacts to existing businesses on Route 61 in Hannibal that depend on through traffic (traffic not having a destination in Hannibal), and
- Impacts on tourism.

Impacts to Existing Highway-Related Businesses

The Alternative CW interchange with Route 36 is over 6 km (4 miles) from existing Route 61 in Hannibal, where the service stations, restaurants, and motels are now located. The Alternative F/Route 36 interchange is about 3 km (2 miles) farther west. While it is understandable that the Visitors and Convention Bureau feels that with a closer route, more people will choose to exit the relocated Route 61 and drive into the city, we know of no evidence that supports this conclusion.

As discussed in the draft EIS in Section 4.4.2, *Impacts on Existing Route 61 Businesses*, new traffic-dependent businesses such as service stations, restaurants and motels may become established at accessible interchanges along the relocated route. If so, existing traffic-dependent businesses located on Route 61 in Hannibal are likely to lose business to the new establishments. Through traffic on the relocated Route 61 is not likely to go to Hannibal, whether the distance is 6 or 10 km (4 or 6 miles), for services that are available along the highway.

Impacts on Tourism

Visitors to the historic area and related tourist attractions in Hannibal who arrive from either the north or the south currently use existing Route 61, which is congested in the Hannibal area. All the build alternatives will result in improved access for visitors to the historic area by relieving traffic on existing Route 61. Alternative CW may result in a slightly greater improvement in access over Alternative F, but only for visitors arriving from the north. If Alternative CW was selected, visitors arriving from the south on Route 61 would most likely chose existing Route 61 over the relocated route, because the travel distance on the existing route is 6 km (four miles) shorter. Visitors arriving from the north may chose Alternative CW, even though it is slightly longer, to avoid a traffic signal.

If the historic area was on the existing route, or visible from it, we would expect some visitors to make an unplanned stop. But the historic district is three km (two miles) from existing Route 61, and there is only a small sign which may go unnoticed by anyone just passing through. From the Route 36 interchange, the historic district is 10 km (6 miles) east of Alternative CW, and 13 km (8 miles) east of Alternative F. While there may be a few people who would make an unplanned stop if the distance is 10 km (6 miles), but who would not if the distance is 13 km (8 miles), we would expect this number to be negligible.

In summary, in the absence of evidence to the contrary, it seems reasonable to conclude that there will be little if any difference in impact on tourism among the different build options.



625 A Broadway
Hannibal, MO 63401

Phone 314-221-1033
Fax 314-221-3389

TO:	Missouri Highway and Transportation Commission
FROM:	Northeast Missouri Development Authority
RE:	<i>CW Alternative</i> for Relocation of US Route 61
DATE:	September 19, 1995

The Northeast Missouri Development Authority appreciates this opportunity to express our views to the Missouri Highway and Transportation Commission in support of the **CW** route as the most preferred relocation for US Route 61 around west Hannibal. After substantial deliberation, our Board thought this would be the route which would strike an optimum balance between economic, safety and environmental considerations.

- ①
 - The proposed location of **CW** is approximately 2.8 miles west of a planned north-south connector road west of Hannibal and approximately 2.6 miles east of US Route 24, which creates a midpoint between the connector road and US 24. The **CW** route would create a corridor between these routes which would form a logical transportation grid to receive future growth.
 - Hannibal is now developing west with the building of the Hannibal Regional Hospital on US 36 and the impending construction of a new diecasting plant by Diemakers, Inc. south of US 36 on Route MM. The Hannibal Regional Airport is pursuing plans to expand their services. Because of a scarcity of available commercial and industrial real estate within the City limits of Hannibal, we expect that pent up demand will eventually result in considerable development on Hannibal's western fringe. Due to the close proximity to these ongoing developments, the **CW** route is the natural path that can best accommodate this future growth.
- ②
 - The **CW** location is positioned in the border area between the Palmyra and Hannibal School Districts and would allow both school districts to share in the expanded property tax revenue base that would result from anticipated economic development throughout the transportation corridor.
- ③
 - The **CW** location is situated closest to the Hannibal Regional Hospital and would significantly enhance immediate access to emergency healthcare services.
- ④
 - The **CW** route would be nearest in proximity to the largest concentration of manufacturing in northeast Missouri, which is based in the West Side

Industrial Park south of Hannibal on US 61. Since virtually all of those businesses receive materials and ship their product by way of motor freight, the **CW** route would relieve traffic pressure on US 61 north through Hannibal and improve the ease of access to the Industrial Park by being located about one mile south.

- ⑤
- One of the most important industries in northeast Missouri is agriculture. The **CW** route takes the least amount of highly productive farmland out of operation in comparison with the preferred route F. The remaining differences between **CW** and F in regard to wetlands, woodlands and relocation impact are mostly minor.
- ⑥
- The one point that we would like to leave the Commission with is this: all of the these benefits can be realized for a nominal cost increase of less than 1% in opting for the **CW** route, in lieu of the preferred route F. **CW** provides the Commission with a solution that has an ideal balance of enhanced economic growth and minimized environmental impact.

Thank you for your time and consideration.

Respectfully,

**The Board of Directors
Northeast Missouri Development Authority**

By: David G. Boone
David G. Boone
Chief Executive Officer

RESPONSE TO COMMENTS

Northeast Missouri Development Authority - Letter of September 19, 1995

1. The memo suggests that Alternative CW would provide a corridor for growth and could function as a component of the local transportation network, midway between the planned north-south connector and Route 24. Alternative CW, however, has no accessible interchanges and there are no outer roads planned. As explained in the draft EIS, because both Routes 36 and the relocated Route 61 will be freeways in the study area, access will be fully controlled through the use of an interchange such as a cloverleaf. Fully controlled interchanges do not provide opportunity for development. Because of these features, Alternative CW would not provide new accessible areas for growth, and would not function as a second north-south connector.
2. As discussed above, Alternative CW will provide little opportunity for development. There are no other roads planned, and there are no accessible interchanges.

On Alternative F, the Route HH interchange and about half of the Route M interchange, which both provide opportunity for development, are in the Hannibal school district. The other proposed locally accessible interchange on Alternative F, between Marion County Roads 425 and 424, is in the Palmyra School District. Alternative CW has no locally accessible interchanges.

3. All build alternatives will result in improved access to the hospital, with the improvement being slightly greater for Alternative CW than for Alternative F. Hospital access is important, but it is only one of the considerations in evaluating alternative routes.
4. Any of the build alternatives would benefit industries at West Side Industrial Park by reducing congestion on existing Route 61 and by providing an alternative freeway route north and south. Alternative CW does provide a slightly shorter travel distance from West Side Industrial Park to destinations north of the area on Route 61 and west of the area on Route 36.
5. Prime farmland, an irreplaceable resource, is very important. The differences in impacts between the alternative requiring the most prime farmland (Alternative F) and the alternative requiring the least (Alternative CW) is about 247 acres. This amount represents less than one-tenth of one percent of the prime farmland in Marion and Ralls Counties, and is much less land than will support even one family. Furthermore, much of the prime farmland in the area is not in agricultural production. When all

environmental factors were considered, Alternative F was judged to be the least impacting overall.

6. As pointed out in the memo, the difference in the estimated construction cost between Alternatives CW and F is nominal. But, in addition to the project cost, new construction can also impact the cost of other highway projects. In this case, there is a difference of \$10.6 million between the alternative that has the greatest cost impact on other projects (Alternative CW) and the alternative that has the least cost impact (Alternative F). Specifically:

- The proposed relocated Route 61 will be built to freeway standards for a greater distance for Alternatives D, EF, and F than for Alternative CW. Alternative CW has the disadvantage of retaining an additional 2.7 km (1.7 miles) of existing Route 61 at the southern end of the project. This will eventually need to be upgraded to freeway, at a cost of about \$7.1 million. This 2.7 km (1.7 mile) segment would be added to the cost of upgrading of the rest of Route 61 south of Alternative F, for approximately 8 km (five miles) to New London. All of the alternatives except CW will result in this savings of \$7.1 million.

To offset this disadvantage, it has been suggested that Alternative CW use the same southern terminus as the other alternatives. This could be done by using Link 2 to join the northern part of the original Alternative CW with the southern part of Alternative D. The estimated cost of this option is \$75.3 million, which is more expensive than the combined cost of Alternative CW and the upgrading of the 2.7 km (1.7 mile) segment of existing Route 61.

- As part of another project to upgrade Route 36, a diamond interchange is planned at Routes 36 and 24. Alternative F eliminates the need for this interchange because the cloverleaf interchange between Routes 61 and 36 near the same location, incorporates Route 24. If Alternative CW, D, or EF is chosen, the diamond interchange would still have to be constructed at Routes 36 and 24, at a cost of approximately \$3.5 million. Although the interchange cost doesn't directly impact the cost of the Route 61 alternatives, this additional \$3.5 million cost savings is realized through Alternative F.

Hannibal Regional Hospital

COPY

September 19, 1995

Mr. Dick Jones
District Engineer
Missouri Highway and Transportation Department
P.O. Box 1067
Hannibal, MO 63401

Dear Mr. Jones:

SUBJECT: U.S. ROUTE 61 RELOCATION

Thank you for providing Hannibal Regional Hospital with a complete copy of the "Route 61 Relocation Draft Environmental Impact Statement" (EIS) dated August 23, 1995. We also sincerely appreciate having been provided the opportunity to meet with representatives of the Missouri Highway and Transportation Department and Woodward - Clyde on June 7, 1994 to share our concerns and suggestions with you.

Hannibal Regional Hospital, the only hospital located within the study area, is the primary provider of acute care hospital services within our services area. While our main Hospital campus is located on Highway 36 West, we also operate seven other healthcare service locations including:

- Hannibal Regional Office Center, Hannibal Missouri
- LaGrange Clinic, LaGrange, Missouri
- Canton Clinic, Canton, Missouri
- Monroe City Clinic, Monroe City, Missouri
- Shelbina Clinic, Shelbina, Missouri
- Clarence Clinic, Clarence, Missouri, and
- Center Clinic, Center, Missouri.

We are also a principle provider of Home Health Care Services throughout the Missouri counties of Lewis, Marion, Monroe, Pike, Ralls, and Shelby.

To improve access to healthcare services for all residents within our region, Hannibal Regional

Mr. Dick Jones
September 19, 1995
Page 2

Hospital established the VitaLink Transportation Service in July 1993. This service was initiated to facilitate access to the facilities and services of Hannibal Regional Hospital for older and physically challenged individuals. During the last twelve months, this vital link between health need and health care has provided more than 4,500 patients with more than 142,000 miles of free medical transportation.

Having provided service to residents throughout Northeast Missouri at our hospital, in our clinics, and in their homes on more than 100,000 occasions this year, we have a tremendous investment and interest in highway access and safety.

SAFETY

The draft Environmental Impact Statement reports that "If projected volumes along Route 61 increase to the levels expected . . . , safety related issues in this area will need to be addressed." We strongly support this assessment and agree that the development of a Route 61 relocation corridor west of the present route is essential. Although the EIS does not report complete accident data for the study period and reports personal injury and fatality data for only one intersection, we are exceptionally aware of the highway accident injuries and fatalities which occur on Highway 61 and there associated social and economic costs. The development of a Route 61 relocation alternative is an essential component of a comprehensive public traffic safety effort to reduce the loss of life and injuries caused by current Highway 61 traffic volume.

ACCESS

Hannibal Regional Hospital also has a substantial interest in the selection of the particular corridor alternative and its resultant effect on healthcare service access. Access to healthcare service is a function of a number of related components, i.e., availability, roadways and highways, distance, travel speed, intersection locations, and others. When Hannibal Regional Hospital made the decision to invest millions of local healthcare dollars in our current Hospital location, an important element of our decision was improved highway access from being close to the then proposed new Highway 61. Our location was believed to be quite close to the eventual Highway corridor. As we continue to serve more and more families from throughout Northeast Missouri, access to our Hospital from Highway 61 becomes extremely important.

A recent issue of the Highway 61 Relocation Newsletter discussed the four Route 61 Corridor alternatives and included a margin comment that "All alternatives would improve emergency vehicle access to the Hannibal Regional Hospital." Section 4.3.3.5 Hospitals of the draft EIS states "North-South access will be improved for all the build alternatives, with the improvement being greatest for Alternate CW and the least for Alternate F. All build alternatives will result equally in improved emergency vehicle access." We sincerely question how access can be improved equally while Alternate CW is recognized as providing the greatest improvement. It is

Mr. Dick Jones
September 19, 1995
Page 3

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①

important to note that emergency vehicle access is not determined by evaluating traffic patterns between the Hospital and the emergency vehicle garage location, but by evaluating access from the point of patient origin to the Hospital. Hannibal Regional Hospital regularly cares for patients transported by emergency vehicles and ambulances located in Hannibal, Philadelphia, Monroe City, New London, Bowling Green, Canton and other communities throughout Northeast Missouri. And we also must recognize that emergency vehicle and ambulance transport represents but a minority of the patients transported to Hannibal Regional Hospital for healthcare services.

②

Access is a function of time and distance. We believe that proposed Alternate Corridor CW has a Hospital to Highway 61/36 interchange distance which is at least two miles shorter than Alternate Corridor F. We also believe that the distances from the south Highway 61 interchange and the north Highway 61 interchange to the new Highway 61/36 interchange to be appreciably shorter following Alternate Corridor CW than Alternate Corridor F, as well. There is no question that proposed Alternate Corridor CW is the preferred corridor for both emergency and non-emergent vehicle access to Hannibal Regional Hospital. And its cost is estimated to be almost the same as the least costly alternative.

③

④

Hannibal Regional Hospital respectfully requests, that in the interest of public health and safety, the Missouri Highway and Transportation Department select proposed Alternate Corridor CW for the relocation of U.S. Route 61.

Sincerely,

John C. Grossmeier
President and
Chief Executive Officer

95441

95 miles N-3



RESPONSE TO COMMENTS

Hannibal Regional Hospital (John C. Grossmeier) - Letter dated September 19, 1995

1. Section 4.3.3.5 of the document has been corrected by removing the word "equally" from the sentence, "All build alternatives will result equally in improved emergency vehicle access", resulting in "All build alternatives will result in..."
2. All alternatives improve access to the hospital, with the improvement being greater for Alternative CW than for the recommended Alternative F. Hospital access is important, but it is only one of the considerations in evaluating route alternatives.
3. See response to letter from Northeast Missouri Development Authority dated September 19, 1995, Item No. 6.
4. Safety is one of the considerations that both MHTD and the Federal Highway Administration (FHWA) consider in evaluating the need for a project. Part of MHTD's mission is to provide safe transportation. Safety, however, is evaluated in terms of accident rates and potential hazards.

TRANSPORTATION COMMITTEE

HANNIBAL CHAMBER OF COMMERCE

623 Broadway
P. O. Box 230
Hannibal, MO 63401

RE: Highway 61 Relocation

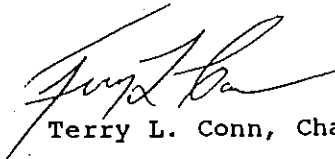
September 19, 1995

The need to relocate Highway 61 around Hannibal is obvious and not to do so should not be considered an alternative. Congested highways and slow-moving traffic is an all too familiar scene for motorists. Good roads provide a safe and efficient means of transporting goods and services while enabling local businesses the opportunity establish economic growth and prosperity.

Upon review of the four basic Route 61 corridor alternatives, this committee finds in favor of utilizing route "CW" as the relocation route for highway 61. Realizing that this new roadway will have a tremendous economic impact on the city and citizens of Hannibal, it is our concern that this relocation would have the most positive effect possible. The present, solid economic foundation along the existing route will certainly be affected and efforts to minimize any negative impact on these businesses should be considered. The following reflect some of the more favorable elements of route "CW":

- ① • Current development along US 36 west of Hannibal would continue in a more timely manner.
- ② • Reasonable access to Hannibal Regional Hospital during emergency and non-emergency situations.
- ③ • Proximity of the interchanges closer to Hannibal's city limits would encourage motorists to visit the community.
- ④ • Both US 36 and US 61 interchanges, and resulting development, would be within Hannibal's School District.

Respectfully,



Terry L. Conn, Chairman



PHONE: (314) 221-1101

FAX: (314) 221-3389

Chamber of Commerce

623 BROADWAY

P.O. BOX 230

HANNIBAL, MISSOURI 63401

NEWS RELEASE

September 14, 1995

FROM: HANNIBAL CHAMBER OF COMMERCE

RE: Highway 61 Relocation

CONTACT: Nancy Stuenkel, 221-1101 or Terry Conn 314-769-2011 Ext. 2140

On Thursday the Chamber Board of Directors passed a resolution in favor of the CW route for the US 61 relocation.

(The CW route turns south off of US 61 just east of the 61/24 intersection south of Palmyra, moves in a southeast direction intersecting US 36 about half way between Hannibal Regional Hospital and the intersection of MM and US 36. It continues southeast and intersects US 61 south of Hannibal south of route HH.)

The resolution emphasizes the following concerns.

The relocation of US 61 will have a huge economic impact on the city of Hannibal. We would like to see that impact be as positive as possible. CW route is positive for at least four reasons.

① 1. It has been established that development along US 36 will be enhanced by the construction of the relocation. Development has already taken place along US 36 as far as Hannibal Regional Hospital. If construction of the new highway is within a mile or two of this development, many driving on the US 61 relocation will choose to drive into the city. If the construction and interchange for US 36 is in an undeveloped area or what would be considered too far from development, the Board feels this will discourage people from turning off the road and coming into Hannibal. Motorists will simply drive on by.

There is also a concern that development along US 36 will be stifled if the relocation is too far away from current and proposed development.

④ 2. The Hannibal School District will benefit if CW is chosen. The interchanges on US 36 and US 61 south, where development will probably occur, both are within the Hannibal School District. All other options put the interchanges outside the Hannibal School District.

③ 3. Providing opportunities for visitors to be in the historic area in just a few minutes is crucial to year round travelers coming into Hannibal to see the sites. The CW route allows for three opportunities of less than 10 minutes to drive to the historic area. All other options involve greater travel time.

② 4. In 1993, Hannibal Regional Hospital opened in its new location and as a result, now serves more and more customers from the region including those counties north and south of Hannibal. The CW route provides a reasonable access to the hospital for emergency and non-emergency reasons.

While the preferred route in terms of the environmental studies would be the one farthest to the west, the Board feels those concerns are not nearly as critical as the economic impact issues related in the four points above.

RESPONSE TO COMMENTS

Transportation Committee, Hannibal Chamber of Commerce - Letter dated September 19, 1995, with attached news release

Note: The news release expands on the items that are bulleted in the letter, but the items in the news release are in a different order. Both the letter and the news release are numbered in the margins to correspond to the responses below.

1. The Alternative CW interchange with Route 36 is over 6 km (4 miles) from existing Route 61 in Hannibal, where service stations, restaurants, and motels are now located. The Alternative F/Route 36 interchange is about 3 km (2 miles) farther west. While it is understandable that the Chamber feels that with a closer route, more drivers will choose to exit the relocated Route 61 and drive into the city, we know of no evidence that supports this conclusion. For both Alternative F and Alternative CW, the proposed Route 36/61 interchange is in an area of undeveloped farmland. No current development will be visible from the interchange with either alternative.

In addition, as explained in the draft Environmental Impact Statement (EIS), because both Route 36 and the relocated Route 61 will be freeways in the study area, they will be connected with a fully controlled interchange such as a cloverleaf. Fully controlled interchanges do not provide opportunity for development, as can be observed at any of the Interstate Highway to Interstate Highway interchanges in Missouri and elsewhere.

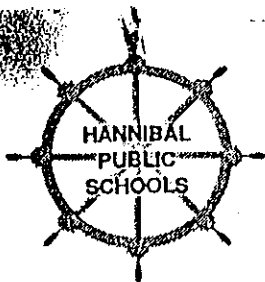
As discussed in the draft EIS in Section 4.4.2, *Impacts on Existing Route 61 Businesses*, new traffic-dependent businesses such as service stations, restaurants and motels may become established at locally accessible interchanges along the relocated route. If so, these traffic-dependent businesses located on existing Route 61 in Hannibal are likely to lose business to the new establishments. Through traffic on the relocated Route 61 (traffic not having a destination in Hannibal) is not likely to go to Hannibal, whether the distance is 6 or 10 km (4 or 6 miles), for services that are available along the highway.

2. All build alternatives will result in improved access to the hospital, with the improvement being slightly greater for Alternative CW than for Alternative F. Hospital access is important, but it is only one consideration in evaluating route alternatives.
3. Visitors to the historic area in Hannibal arriving from either the north or the south currently use existing Route 61, which is congested in the Hannibal area. All the build alternatives will result in improved access for visitors to the historic area by relieving traffic on existing Route 61. Alternative CW may result in a slightly greater

improvement in access over Alternative F, but only for visitors arriving from the north. If Alternative CW was selected, visitors arriving from the south on Route 61 would most likely chose existing Route 61 over the relocated route, because the travel distance on the existing route is 6 km (four miles) shorter. Visitors arriving from the north may chose Alternative CW, even though it is slightly longer, to avoid a traffic signal.

4. As discussed above, because both Routes 36 and the relocated Route 61 will be freeways in the study area, they will be connected with a fully controlled interchange such as a cloverleaf. Fully controlled interchanges do not provide opportunity for development.

On Alternative F, the Route HH interchange and about half the Route M interchange, which both provide opportunity for development, are in the Hannibal school district.

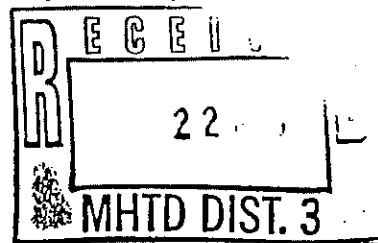


HANNIBAL SCHOOL DISTRICT NO. 60
(ADMINISTRATIVE OFFICES)

4650 McMasters Ave.

HANNIBAL, MISSOURI 63401

Telephone (314) 221-1258



September 21, 1995

Mr. Richard U. Jones, District Engineer
MHTD, Northeast District
Highway 61 South
P. O. Box 1067
Hannibal, MO 63401

Dear Mr. Jones:

Please find enclosed a copy of the resolution that was unanimously passed by the Hannibal Board of Education at the September 20 meeting. We would ask that the resolution become part of the official transcript that will be sent to the Missouri Highway and Transportation Commission as they deliberate and determine the relocation of route 61.

Thank you for your consideration, on behalf of the Hannibal Board of Education.

Very truly yours,

W. Scott Taveau
Superintendent

WST/smw

Enclosure

c: Tom Boland
Nancy Stuenkel
Terry Conn

Hannibal High School
4500 McMasters Ave.
314 - 221 - 2733

Instructional Material Center
4600 McMasters Ave.
314 - 221 - 3054

Eugene Field Elementary School
1405 Pearl
314 - 221 - 1050

Oakwood Elementary School
3716 Market
314 - 221 - 2747

A D Stowell Elementary School
700 Fulton
314 - 221 - 0980

Hannibal Area Vocational School
4550 McMasters Ave.
314 - 221 - 4430

Hannibal Middle School
4700 McMasters Ave.
314 - 221 - 5840

Mark Twain Elementary School
2714 Bird
314 - 221 - 0768

Pettibone Elementary School
600 North
314 - 221 - 0371

Central Elementary School
906 Center
314 - 221 - 0649

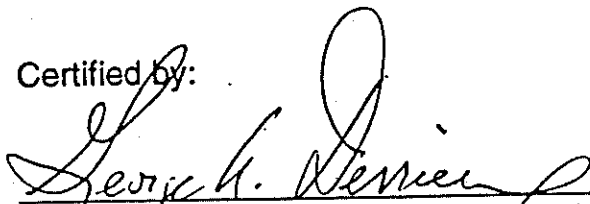
**RESOLUTION
HIGHWAY 61 RELOCATION**

RESOLVED, that the Board of Education, Hannibal School District #60, agrees to the following:

1. To join the resolution passed by the Hannibal Chamber of Commerce Board of Directors in support of the CW route.
2. The Hannibal School District will benefit, if route CW is chosen. The interchanges on US 36 and US 61 south, where development will occur, are within the Hannibal School District boundaries. All other options put interchanges outside the Hannibal School District.

Adopted by the Board of Education on September 20th, 19 95 by a vote of 7-0.

Certified by:


George A. Derrieux, Secretary of Board

Date: September 20, 1995

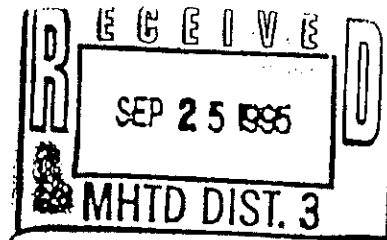
RESPONSE TO COMMENTS

Hannibal School District No. 60 - Letter dated September 21, 1995

Alternative CW may appear to be most advantageous to the Hannibal School District because of the location of the Route 61/36 interchange. However, as discussed in the draft Environmental Impact Statement, because both Routes 36 and the relocated Route 61 will be freeways in the study area, they will be connected with a fully controlled interchange such as a cloverleaf, which does not provide opportunity for development.

On Alternative F, the Route HH interchange and about half the Route M interchange, which both provide opportunity for development, are in the Hannibal school district. Alternative CW has no locally accessible interchanges.

RANDE A. McALLISTER
ATTORNEY AT LAW



300 SOUTH JEFFERSON
P.O. DRAWER 618
MT. PLEASANT, IOWA 52641
(319) 385-9524
FAX (319) 385-8921

September 22, 1995

Dick Jones, District Engineer
Missouri Highway and
Transportation Department
P. O. Box 1067
Hannibal, Missouri 63401

Re: Relocation of Highway 61

Dear Mr. Jones:

Please be advised that I represent Virginia Murphy who is the owner of property located in Section 23 of Township 56 North, Ralls County, Missouri. From the meeting that we attended on September 19th, it would appear that Ms. Murphy's property is going to be severely impacted and probably her home, out-buildings and all of her real estate will be taken. Therefore, Ms. Murphy will have to relocate. Historically, Ms. Murphy's family's land has been taken several times by the Missouri DOT for Highway 61 improvements. Her father, Homer Penington, started out with a 400 acre farm in Sections 23 and 24 of Township 56 North, Ralls County, Missouri. Ms. Murphy's father recently passed away and he lived to the age of 102. The emotional impact upon Ms. Murphy will be very severe as she retired and moved from Iowa to the family farm in Ralls County. Over the past several years, she has made extensive improvements to the home and the property.

I will attempt to outline for you the issues that we want to bring before the Department of Transportation prior to a final decision with respect to alternate F relocation on Highway 61. These areas that DOT needs to review are as follows:

1. The real estate owned by Ms. Murphy will be bisected and it will of course totally sever her farming operation and displace her from her home.

2. It will severely impact the wildlife habitat that she has developed.

Re: Relocation of Highway 61
September 22, 1995
Page 2

3. Ms. Murphy advises me that the property has a large number of Indiana bats that make their home in various trees located on her property. I am sure you are aware that the Indiana bat is an endangered species under the Federal Endangered Species Act. The woodland area right north of Ms. Murphy's home has a large concentration of these endangered species.

4. The prairie dandelion which is also a species on the endangered list also exists on Ms. Murphy's property. Additionally, she has some rare sassafras trees on her farm and several deer living in and around the pond that exists on her property.

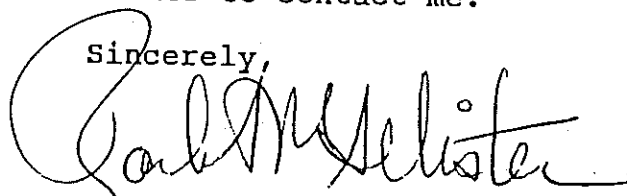
5. There is an existing spring on the north end of Ms. Murphy's property that would be impacted by locating the alternate F for the Highway 61 bypass on her property.

I doubt if the Missouri Department of Transportation Relocation Department could ever find a home that could replace Ms. Murphy's current residence with all of the habitat she has developed for the wildlife. Additionally, when Ms. Murphy is through with her property she intended to pass it on to her children and grandchildren who would continue to enjoy the old family homestead and wildlife habitat.

On behalf of Ms. Murphy, I would certainly urge the DOT to consider the other alternate bypass, specifically, CW and alternate EF. Alternate CW has about the same cost for right-of-way acquisition and construction, and I think it is certainly preferred by the business community of Hannibal. Alternate F extends entirely to far to the west for the City of Hannibal to enjoy any economic benefit.

If you need any additional information concerning Ms. Murphy's property, please do not hesitate to contact me.

Sincerely,



Rande A. McAllister
Attorney for Virginia Murphy

RAM:csf

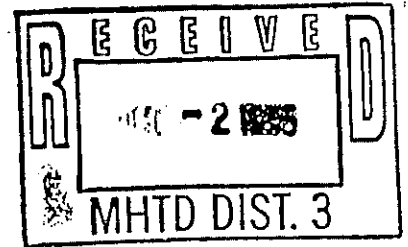
RESPONSE TO COMMENTS

Rande A. McAllister, Attorney at Law - Letter dated September 22, 1995

Note: numbered response items correspond to numbered items in letter.

1. It is true that Mrs. Murphy's farm will be bisected, and she will need to relocate. Unfortunately, all build alternatives require bisected farms and relocations. There are fewer relocations for the preferred alternative than for any other alternative evaluated. As discussed in the draft EIS in Section 4.3.2.3, MHTD offers a Relocation Assistance Program to any person, family, business owner, farm operator, and nonprofit organization displaced by a state highway project.
2. New construction in a rural area with abundant wildlife, such as the Hannibal area, always impacts wildlife habitat. All build alternatives will impact some wildlife habitat.
3. Bat species are very difficult to identify without capturing and examining individuals. It is possible that the bats have been misidentified. None were identified in this area during our field investigation. However, if Mrs. Murphy feels she does have Indiana bats on her property, she can contact the Missouri Department of Conservation at (314) 751-4115.
4. As discussed in the draft Environmental Impact Statement, the prairie dandelion is not on the federal threatened and endangered species list, and, as such, is not protected under the Endangered Species Act. The prairie dandelion is considered a rare species by the Missouri Department of Conservation, but there is no law that protects the plant from removal for construction, such as for a highway project.
5. Springs are frequently encountered during and prior to highway construction. The spring will be addressed during final design or construction.

Hannibal Regional Hospital



September 28, 1995

Mr. Richard Jones
District Engineer
Missouri Highway and Transportation Department
P.O. Box 1067
Hannibal, Missouri 63401

Q. Jones

Dear Mr. Jones:

As a member of the Hannibal City Council, I would like to take the opportunity to thank you and Mr. Huelbert for your attendance at the Meeting of the Committee of the Whole Council on Tuesday, September 26, 1995.

An issue brought up after your presentation concerns the effect of "F" alternative on the ability of the City of Hannibal to issue future general obligation bonds.

After your departure, I had a discussion with an investment banker representing a major brokerage house dealing in Municipal bond issues (he was later on the agenda).

During our discussion he volunteered that the economic effect of moving a by-pass outside of the city limits that distance would be of great concern in the bond market. If in fact, businesses were to follow the by-pass out of Hannibal, tax receipts would no longer be available to the city. As discussed, not only would this be a detrimental effect on new retail business in Hannibal, but also create a need for retail establishments to follow that which they are dependent upon high volume traffic (restaurants, convenience stores, gas stations, etc.) for sales.

Therefore, it's not only the loss of current and future retail sales, but also the detrimental effect such losses would have on the ability of the City to fund new infrastructure through general obligation bonds.

Therefore, once again I appeal that alternative CW be the favored alternative.

Thank you for your consideration.

Sincerely,

A handwritten signature in cursive script, appearing to read "D. B. Miller".

David B. Miller
Senior Vice President - Finance
109595

RESPONSE TO COMMENTS

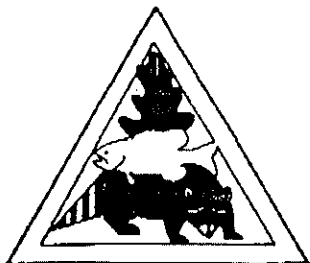
Hannibal Regional Hospital (David B. Miller) - Letter dated September 28, 1995

The letter addresses the potential negative impact on the City of Hannibal of businesses moving from the existing Route 61 within the city limits to a relocated route outside the city limits. This issue is discussed in detail in the draft Environmental Impact Statement, in Section 4.4.2, *Impacts on Existing Route 61 Businesses*, although the specific issue of bonding is not discussed.

On a freeway without outer roads, such as is planned for the relocated Route 61, the only locations where new highway related businesses are likely to be developed are at accessible interchanges. Alternative CW has no accessible interchanges. If Alternative CW was constructed, businesses considering relocation may move out of the area altogether. Alternative F, on the other hand, has three accessible interchanges. Although none of them are currently within the Hannibal city limits, annexation to include the Route M interchange is at least a future possibility for the city.

In our judgment, Alternative CW offers no benefits to the economy of the City of Hannibal.

Further, reduced traffic on existing Route 61 will improve accessibility of existing businesses. This can result in improved sales at non-traffic-dependent businesses.



MISSOURI DEPARTMENT OF CONSERVATION

Headquarters

2901 West Truman Boulevard, P.O. Box 180, Jefferson City, Missouri 65102-0180
Telephone: 314/751-4115 ♦ Missouri Relay Center: 1-800-735-2966 (TDD)

JERRY J. PRESLEY, Director

October 3, 1995

Mr. Dick Jones, District Engineer
Missouri Highway and Transportation Department
P.O. Box 1067
Hannibal, MO 63401

Reference: U.S. Route 61, Draft EIS

Dear Mr. Jones:

Thank you for the opportunity to review and comment on the draft Environmental Impact Statement for the proposed Route 61, Hannibal. The document is well written and accurately describes the anticipated impacts of the different routes that were considered.

Streams that would be impacted by the proposed project include Bear Creek and Little Bear Creek. The aquatic resources of both streams were surveyed in 1990. Eighteen species of fish were collected. Substrate type at all four sampling locations was primarily gravel, with some sand. This level of species diversity and substrate type indicates these are high quality streams.

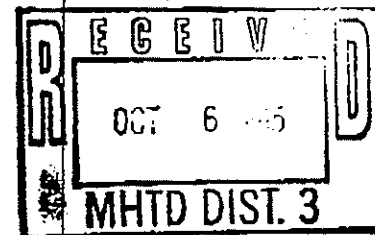
We therefore support the selection of Alternative F. This preferred alternative will have the least impact on potential wetlands and has only one stream crossing.

Further coordination on this project should be directed to Mr. Norm Stucky at the above address.

Sincerely,

Dan F. Dickneite
DAN F. DICKNEITE
PLANNING DIVISION CHIEF

c: Mark Kross (MHTD)



COMMISSION

ANITA B. GORMAN
Kansas City

RANDY HERZOG
St. Joseph

JOHN POWELL
Rolla

RONALD J. STITES
Plattsburg

RESPONSE TO COMMENTS

Missouri Department of Conservation -- Letter dated October 3, 1995

The information in the letter regarding surveys of Bear Creek and Little Bear Creek has been added to the document in Sections 3.7.1.



U.S. Department of Housing and Urban Development

St. Louis Area Office
Third Floor
Robert A. Young Federal Building
1222 Spruce Street
St. Louis, MO 63103-2836



October 6, 1995

Ms. Mary C. Hagerty, P.E.
Senior Project Engineer
Woodward-Clyde Consultants, Inc.
2318 Millpark Drive
Maryland Heights, Missouri 63043

Dear Ms. Hagerty:

Recently you sent a copy of the U.S. Route 61 Draft Environmental Impact Statement for Marion and Ralls Counties to Mr. Kenneth Lange of the St. Louis HUD Office. I am responding for Mr. Lange and our office.

① Although none of the proposed alternatives would necessitate the relocation of large number of residences, we are concerned about a lack of available replacement housing. This draft document does acknowledge that few vacant units are available due to the Great Flood of '93. We were quite involved in flood recovery in '93 and this lack of available housing was quite a problem in both Marion County and the City of Hannibal. Your draft document did not address the condition of the few vacant units available. During a flood recovery meeting in Hannibal, local city and housing officials stated that vacant housing was not suitable for rehabilitation.

The City was going to try to obtain developers to help develop a new single-family subdivision; you may wish to check with them concerning their success. I hope that perhaps this has been communicated between you and the City by now.

② Our office does not have the addresses of single-family units that may have tenants receiving rental assistance, but we ask that you contact the following agencies concerning this issue and whether or not there are concentrations of minority and/or low-income residents. There may be concentrations that a mere visual observation would not detect. Please add the following to your list of interested parties to whom you will send the EIS and from whom you will request comments.

Ms. Shirley Bomar
Executive Director
Housing Authority of the
City of Hannibal


P.O. Box 996
Hannibal, MO 63401-0996
(314) 221-7575

②

Mr. Donald D. Patrick
Executive Director
Lincoln Co. PHA
P.O. Box 470
Bowling Green, MO 63334-0470
(314) 324-2231

I appreciate the opportunity to comment upon this important document. If you have any questions concerning this letter please feel free to call me at (314) 539-6528.

Sincerely,


Sandra J. Freeman
Environmental
Officer

RESPONSES TO COMMENTS

U.S. Department of Housing and Urban Development - Letter dated October 6, 1995

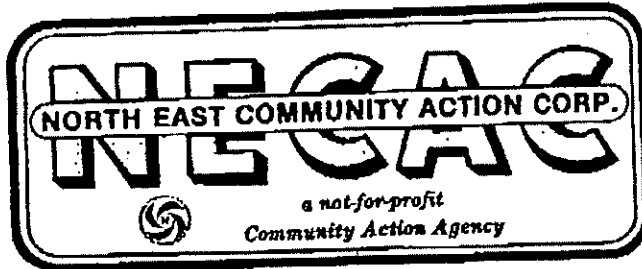
1. The preferred alternative (Alternative F) will result in only two residential relocations, and these will not occur for several years. As discussed in the draft EIS, the housing situation is likely to be quite different then. While the approximately 100 relocations due to the flood and the approximately 50 relocations due to Route 36 improvements had and are still having an impact on the housing market, two relocations will not have an impact.
2. Copies of the draft EIS were distributed to Shirley Bomar of the Housing Authority of the City of Hannibal and to Donald Patrick, Executive Director of the North East Community Action Corporation. Their comment letters are attached. They both confirm the absence of adverse impacts on minority and low income residents.

Post-It Fax Note 7672

To: Mary Hagerty
 Company: Woodward-Clyde Consultants
 Location: Maryland Heights
 Fax #: 314-429-0462
 Comments:

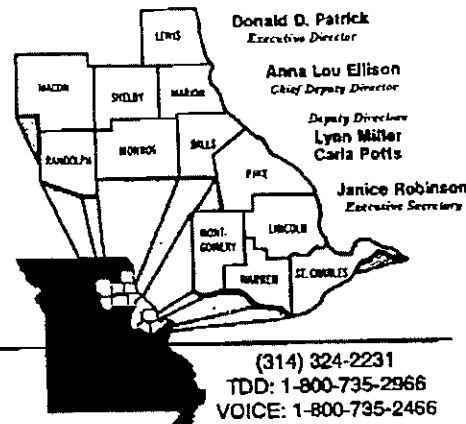
No. of Pages: 1 Today's Date: 10/16/95 Time: 2:20pm
 From: Lynn Miller
 Company: NECAC
 Location: Bowling Green Mo
 Fax #: 314 324 3960
 Original Disposition: ☐ Destroy ☐ Return ☐ Call for pickup
 Dept. Charge: Telephone #: 314 324-2231

Thank you for packet to comment on the developments of Hwy 61.



CENTRAL ADMINISTRATION OFFICE

16 NORTH COURT STREET, P.O. BOX 470
 BOWLING GREEN, MISSOURI 63334-0470



(314) 324-2231
 TDD: 1-800-735-2966
 VOICE: 1-800-735-2456

October 16, 1995

Ms. Mary Hagerty, P. E.
 Senior Project Engineer
 Woodward-Clyde Consultants, Inc.
 2318 Millpark Drive
 Maryland Heights, Missouri 63043

Dear Ms. Hagerty:

This letter is in response to your U.S. Route 61 Draft Environmental Impact Statement for Marion and Ralls Counties. We have reviewed the documents and would concur that the residential displacements would be minimal.

A lack of replacement housing as a result of the Flood of 1993 exists regardless of the plan to develop Route 61. It would be my opinion that the City of Hannibal and Marion and Ralls Counties should continue to pursue replacement housing to fill that need and that the lack of replacement housing is a separate issue from developing Route 61.

The North East Community Action Corporation does not see any adverse affects on the low income populations of the area. The potential for growth and jobs is a positive impact and we would very much endorse this prospect. As a Community Action agency which administers U. S. Department of Housing and Urban Development funds, we will continue to advocate in favor of developments which will increase the opportunities for the low income, handicapped, and elderly. We view the development of Route 61 as increasing job opportunities, increasing transportation services, and providing easier access to services and facilities i.e. the hospital.

Please consider these comments as you continue to examine the proposal. Thank you.

Sincerely,

Lynn Miller
 Deputy Director of Housing,
 North East Community Action Corporation

NECAC IS NOT A GOVERNMENT AGENCY
 An Equal Opportunity / Affirmative Action Employer. Services provided on a nondiscriminatory basis.

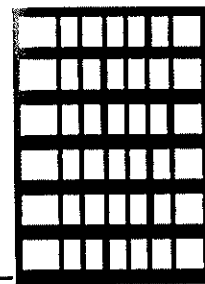
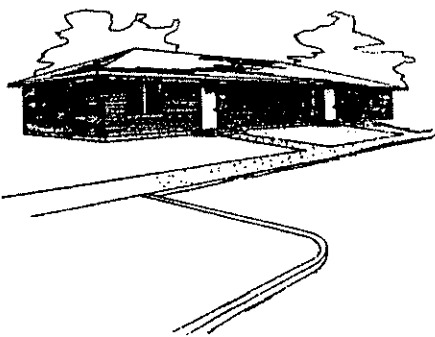
RESPONSES TO COMMENTS

Northeast Community Action Corporation,- Letter dated October 16, 1995

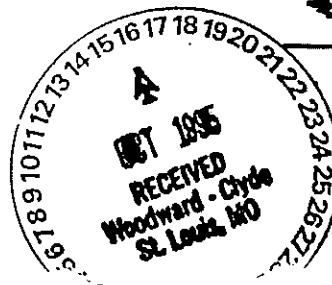
No response required.

The Housing Authority Of
The City Of Hannibal, Missouri

P.O. BOX 996 • (314) 221-7575
HANNIBAL, MISSOURI 63401
TDD/TTY (314) 221-7575
FAX (314) 221-8408



October 12, 1995



Mary Hagerty, P.E.
Senior Project Manager
Woodward-Clyde Consultants
2318 Millpark Drive
Maryland Heights, MO 63043

SUBJECT: Review/Comment - Environmental Impact Statement (EIS) for the
relocation of Route 61 near Hannibal

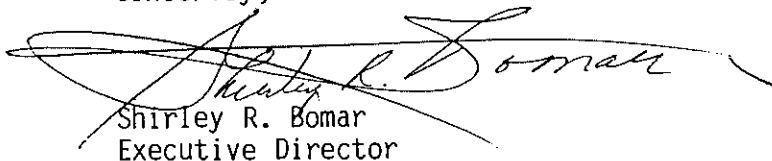
Dear Ms. Hagerty:

Due to the timely deadline for comment on the above subject, I have reviewed to the best of my ability the EIS and have drawn the following conclusions as comment.

- 1) There are no concentration of minority and/or low income residents living in the area proposed for the relocation of Route 61.
- 2) The majority of minority and/or low income Section 8 recipients are located throughout the downtown areas of the city and the authority's public housing developments which house additional minority and/or low income residents are located at least five miles east of the proposed Route 61 relocation.
- 3) The area encompassing the proposed relocation currently consists mainly of undeveloped land, land used for farming, scattered single-family dwellings and a few businesses.

In conclusion we feel that the proposed relocation of Route 61 near Hannibal will have no impact or effect socially or environmentally on the minority and/or low income residents of the Hannibal community.

Sincerely,


Shirley R. Bomar
Executive Director

cc: file



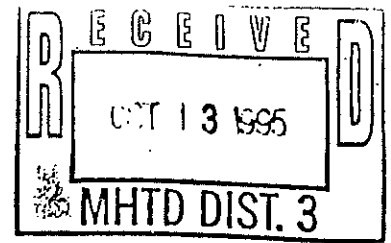
RESPONSES TO COMMENTS

The Housing Authority of the City of Hannibal - Letter dated October 12, 1995

No response required.

*Grand-brother
March 25, 1991*

Hannibal Regional Hospital



COPY

October 10, 1995

Mr. Joe Mickes
Chief Engineer
Missouri Highway and Transportation Department
P. O. Box 270
Jefferson City, MO 65102

Dear Mr. Mickes:

SUBJECT: U. S. ROUTE 61 RELOCATION

We continue to have serious concerns about the selection of a corridor for the relocation and construction of U. S. Route 61 to the west of Hannibal. The corridor selected will have an immediate and permanent effect upon the health and safety of the residents of Northeast Missouri, as well as those who travel through this region of the State.

As we have discussed in previous correspondence with Mr. Dick Jones, District Engineer (copy enclosed), the location for the construction of Hannibal Regional Hospital was chosen, in part, to be highly accessible to the proposed location of the U.S. Route 61 relocation corridor. This site selection was made in consultation with the Missouri Highway and Transportation Department. We subsequently transferred almost four acres of our property to the Department to accommodate the future construction of an east-bound exit ramp for the proposed U.S. Route 36 / Shinn Lane interchange. We began providing acute care and emergent health care services at this location on March 28, 1993. The selection of Corridor F, as recommended in the "U.S. Route 61 Draft Environmental Impact Statement", will greatly diminish this planned improvement in access to critical health care services.

Hannibal Regional Hospital is the primary provider of acute and emergent health care services for Northeast Missouri, including the counties of Lewis, Pike, and Ralls. These counties, and their residents, are located to the north and south of Marion County and their most direct access route to Hannibal Regional Hospital is via U.S. Route 61. In the treatment of severe trauma, cardiac arrest, respiratory insufficiency, and many other medical and surgical emergencies, time to treatment is often the most significant predictor of outcome. We know that in cases of cardiac and respiratory arrest, the human brain can be irreversibly damaged after being without oxygenated blood flow for as little as four minutes, and almost always after six minutes. Brain death is certain after ten minutes.¹ In cases of severe trauma, the "Golden Hour" principle becomes exceptionally important -- the sooner a patient receives aggressive, hospital-based treatment, the more likely the patient will survive.^{2,3} Any delays in the time to treatment can have a catastrophic effect upon an injured patient.

Mr. Joe Mickes
October 10, 1995
Page 2

Time to treatment for people living or working in Palmyra, New London, Frankford, Center, Philadelphia, and many other communities within our region will be permanently altered by the selection of the U.S. Route 61 relocation corridor.

Time to treatment is a function of both speed and distance. Recognizing and assuming that vehicle speed from point-to-point on a limited access expressway is essentially constant and comparable, the distance traveled becomes the most critical element in computing travel time.

Enclosed is a reproduction of a corridor alternative locator map obtained from the Draft Environmental Impact Statement prepared for your Department. Utilizing mileage measurements provided to us by the team of Woodward-Clyde Consultants, Inc. and George Butler Associates, we have computed the approximate travel distances from common points at both the northern and southern limits of the study area to the proposed U.S. Route 36 and Shinn Lane interchange for travel on proposed Corridors F and CW. There is a significant difference in travel distances between the two corridors.

Please refer to the enclosed corridor locator map for the location of the measurement points.

From the northern point A, located at the current junction of U.S. Routes 24 and 61, the travel distance to the proposed U.S. Route 36 / Shinn Lane interchange is:

Corridor F	7.51 miles
------------	------------

Corridor CW	6.26 miles
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Corridor CW is 1.25 miles shorter.

From the southern point D, located at the intersection of proposed Corridor F and the existing location of U.S. Route 61, the travel distance to the proposed U.S. Route 36 / Shinn Lane interchange is:

Corridor F	11.11 miles
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Corridor CW	7.82 miles
-------------	------------

Corridor CW is 3.29 miles shorter.

Mr. Joe Mickes
October 10, 1995
Page 3

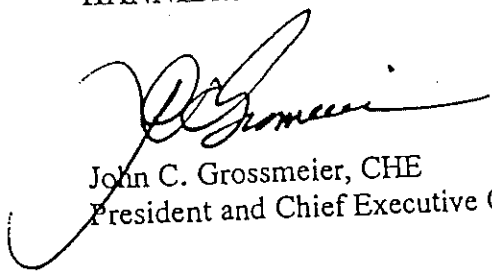
The emergency services of Hannibal Regional Hospital are 1.25 miles closer to residents to the north of the study area and 3.29 miles closer to residents to the south of the study area via Corridor CW than by Corridor F. Using a conservative emergency vehicle travel speed of 60 miles per hour to permit the safe and appropriate transport of a patient, the difference in distance is equivalent to travel time of 1 minute and 15 seconds from the north and 3 minutes and 19 seconds to the south.

These increased travel times may seem minor when considered in isolation. However, 1 minute and 15 seconds consumes 31 percent of the time available to prevent permanent brain damage and 2 percent of the "Golden Hour". Three minutes and 19 seconds unnecessarily consumes fully 75 percent of the time available to prevent irreversible brain damage and more than 5 percent of the "Golden Hour". These are very significant reductions in possible patient survival.

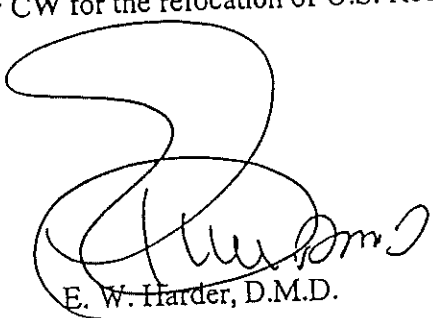
Mr. Mickes, regardless of the method of measurement, whether evaluating mileage or travel time, the effect of selecting proposed Corridor F rather than Corridor CW will be an unnecessary increase in loss of life or permanent disability for the people of Northeast Missouri. This is a situation in which time is life -- human life -- and the minutes and seconds do make a difference, over and over and over again.

On behalf of the Board of Directors of Hannibal Regional Hospital, and in the interest of the health and safety of the people of Northeast Missouri and the many who visit this area, we respectfully recommend and support the selection of Corridor CW for the relocation of U.S. Route 61.

Sincerely,
HANNIBAL REGIONAL HOSPITAL



John C. Grossmeier, CHE
President and Chief Executive Officer



E. W. Harder, D.M.D.
Chairperson

enclosures

c Dick Jones, District Engineer

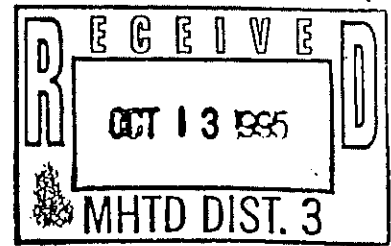
1. Textbook of Basic Life Support for Healthcare Providers; American Heart Association, 1994, pg 4-2.
2. "The OR Suite as a Unique Trauma Resuscitation Bay", AORN Journal, October 1994, Vol. 60, No. 4, pg. 576-584.
3. "Emergency Department: Rapid Identification and Treatment of Patients With Acute Myocardial Infarction", Annals of Emergency Medicine, February 1994, Vol. 23, No. 2, pg. 311-329.

RESPONSE TO COMMENTS

Hannibal Regional Hospital (John C. Grossmeier) - Letter dated October 10, 1995

As discussed in the Environmental Impact Statement and detailed in the letter, the improvement in health care access is greater for Alternative CW than for Alternative F. While health care access is important, many other issues are considered in the evaluation of route alternatives.

Hannibal Regional Hospital



October 12, 1995

Mr. Joe Mickes
Chief Engineer
Missouri Highway and Transportation Department
P.O. Box 270
Jefferson City, MO 65102

Dear Mr. Mickes:

SUBJECT: U.S. ROUTE 61 RELOCATION

I am writing to request support of the selection of Corridor CW for the relocation and construction of U.S. Route 61 to the west of Hannibal. This request is based upon the significant effect Route 61's relocation will have upon Hannibal Regional Hospital's outstanding and future debt issuances.

Hannibal Regional Hospital has been actively involved in discussions associated with the development of the "Route 61 Environmental Impact Statement" and has sincerely appreciated having the opportunity to meet with representatives of the Missouri Highway and Transportation Department as well as the study consultants on this project. As the only acute care hospital located within the study area, we are quite concerned with the eventual highway location. In addition to issues of access, public health, and safety, our concerns do include the relocation effect on our Hospital's financial strength.

Enclosed is a copy of correspondence received today from Mr. Steven C. Davis, Vice President of A. G. Edwards & Sons, Inc. His letter explains that "the closer the bypass is to Hannibal Regional Hospital the more likely the positive effect. The farther away the bypass runs, the more likely a rating agency or other credit analyst (such as an institutional investor) is to discount the value of the Hospital's location. To what degree is difficult to determine, but it will be discounted."

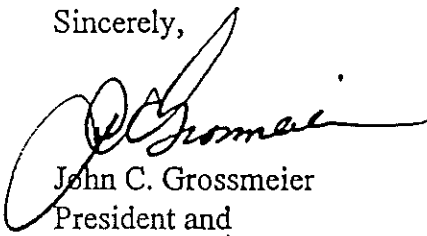
Additionally, Mr. Davis explains that locating U.S. Route 61 further from the City of Hannibal will have a negative effect upon the City's credit rating. As you may know, financial rating agencies place a special emphasis upon their assessment of the overall economic strength of a

Mr. Joe Mickes
October 12, 1995
Page 2

community in which a hospital operates when analyzing the proposed issuance of debt to support that hospital's growth.

Mr. Mickes, Hannibal Regional Hospital respectfully requests and strongly supports the selection of **CORRIDOR CW** for the location of the U. S. Route 61 relocation. Please contact me if you have any questions concerning this correspondence or the enclosure.

Sincerely,

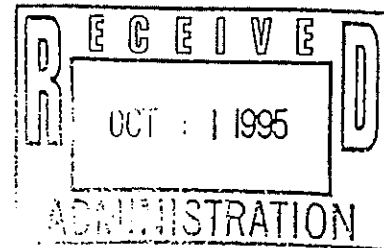
A handwritten signature in black ink, appearing to read "J. Grossmeier", with a large, stylized initial "J" and a long horizontal flourish extending to the right.

John C. Grossmeier
President and
Chief Executive Officer

c: D. Jones, District Engineer
The Honorable Richard Schwartz, Mayor, City of Hannibal

October 10, 1995

Mr. John Grossmeier
Chief Executive Officer
Hannibal Regional Hospital
Highway 36 West
Hannibal, Missouri 63401



Dear John:

You asked us whether the choice of eventual placement for the Route 61 bypass would have any effect on the Hospital's outstanding or future debt issuances. We believe that, generally, the proximity of the bypass could have an effect.

When analyzing the credit strength of any hospital or other health facility, many factors are considered. Historically, location, including proximity to major thoroughfares and highways, has been considered an important piece of the credit puzzle. For example, when analyzing a hospital's credit position, it is important to understand how accessible the facility is to targeted consumers. Anything that improves the accessibility is considered positive and anything that reduces accessibility is at best neutral but most often negative.

Thus, if a facility is close to important roadways, it is perceived as being better able to attract consumers, as providing more rapid entry for emergency vehicles (translating into lower morbidity) and as more attractive for potential physician group practices and other "campus partners" that must choose locations for their businesses. If a facility is so positioned, it has competitive and strategic advantages that strengthen the credit and thus reduce the cost of borrowing.

Clearly, the closer the bypass is to Hannibal Regional the more likely the positive effect. The farther away the bypass runs, the more likely a rating agency or other credit analyst (such as an institutional investor) is to discount the value of Hospital's location. To what degree is difficult to determine, but it will be discounted. Let me give you another example. If the Hospital were located at the junction of 36 and the bypass (or within a mile), it would be reasonable to assume it possessed a prime location for emergency room and trauma activity. If the junction is five or more miles away that assumption is harder to make.


A rating agency will consider the potential for community and business growth at and around the junction. It will look at the possibility that a physician group or for-profit emergency/trauma facility might choose to locate in that area. Given the changes going on in the health care industry, the more distant bypass may even be seen as providing

opportunities to such competitors. This has negative effects on the Hospital's credit strength.

Similarly, because there is this possibility for new growth near the junction of 36 and the bypass, the rating agencies will consider the effects generally on Hannibal. If it is determined that such growth will be at the expense of the city, for example, restaurants and gas stations move out of town, there will be negative effects on the City's credit due to lost tax and business revenue. The rating agencies have stated that more than ever they will be looking at the overall economic strength of the community in which the facility operates when analyzing the facility itself. Thus, any negative for the City (which a bypass farther away would seem to have) creates negative implications for the Hospital.

So, as you can see, the more distant placement of the bypass would have negative effects on the cost of borrowing for the Hospital. I hope this information is useful. Please call me or Kent if you have any other questions.

Sincerely,



Steven C. Davis
Vice President

RESPONSE TO COMMENTS

Hannibal Regional Hospital (John C. Grossmeier) - Letter dated October 12, 1995, with letter from A.G. Edwards attached

The impact of a highway project on the credit strength of a hospital or other institution might be a consideration in a highway location study if the highway project has a negative impact on the hospital. An example of this would be a highway project that changed access to the hospital such that travel time for a significant number of "targeted consumers" was increased.

In this case, however, all alternatives improve access to the hospital, and therefore, negative impact on the credit strength of the hospital does not appear to be an issue.

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Missouri Constitution Governor • David A. Shorr, Director

OFFICE OF THE DIRECTOR

P.O. Box 176 Jefferson City, MO 65102-0176 (314)751-4422

FAX (314)751-7627

October 16, 1995

*Copied Reader
10-30-95
JMK*

Mr. Joe Mickes
 Chief Engineer
 Missouri Highway and
 Transportation Department
 P.O. Box 270
 Jefferson City, MO 65102

Mr. Donald Neumann
 Programs Engineer
 Federal Highway Administration
 Division Office
 P.O. Box 1787
 Jefferson City, MO 65102

RE: Route 61, Marion and Ralls Counties, Missouri
 Draft Environmental Impact Statement

Dear Mr. Mickes and Mr. Neumann:

Staff within the Missouri Department of Natural Resources have reviewed the Draft Environmental Impact Statement (DEIS) that has been prepared for the proposed Route 61 relocation west of Hannibal, Missouri. This department would like to offer the attached comments on the DEIS that has been distributed for public review.

The Department of Natural Resources appreciates the opportunity to review and comment on this DEIS. If you have any questions regarding any of the attached comments, please contact Mr. Tom Lange of my office at 314-751-3195. Thank you.

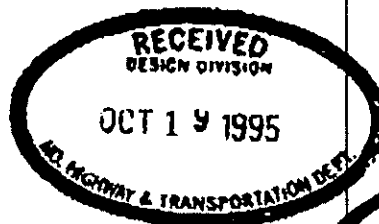
Very truly yours,

DEPARTMENT OF NATURAL RESOURCES

Sherry L. Boldt
 for David A. Shorr
 Director

DAS:tl

Attachment



Missouri Department of Natural Resources
Comments on Draft Environmental Impact Statement
Route 61, Marion and Ralls Counties, Missouri
Job No. J3P0426
Job No. J3P0427

October 16, 1995

Historic and Archaeological Resources

This department's Historic Preservation Program anticipates that there will be no difficulty with the evaluation and mitigation of archaeological sites in the project area of effect.

① In correspondence dated June 5, 1995, this department's Historic Preservation Program requested further information on architectural/historic properties with regard to this proposed highway relocation project. To date the Historic Preservation Program has not received any information; therefore, review of structures that may be eligible for inclusion in the National Register of Historic Places has not been completed. A dialogue regarding consideration of avoidance or appropriate mitigation measures for the buildings which might be effected by the proposed project also has not been initiated.

Comments of the Historic Preservation Program of June 5, 1995 in regards to architectural/historical properties that may be impacted by the proposed project are as follows:

Property 3, the Terry Hubbard place - This appears to be a small agricultural district with few alterations.

Property 7, the Thomas White barn - It is unclear whether this is part of a complex or whether the residential and other outbuildings formerly associated with it have been removed.

Property 8, the Allen Foreman barn - A floor plan will need to be provided in order to help determine the purpose of the barn.

Property 9, the Harold Schwartz property - This property appears to be a small agricultural district with a well intact Italianate farmhouse. Any alterations that occurred appear to be historic. The topographic map indicates two barns on the site. If they are extant, photographs of these barn will be needed. The use of the "tall shed" will need to be determined. It may have been a tankhouse. Also, the ownership history of the house and the place of the owners in local history will be required. Floor plans of the barns and a precise date for the Quonset hut would be helpful to determine its significance.

Upon receipt of the above information, the Historic Preservation Program will be able to complete the evaluation of the properties for inclusion in the National Register of Historic Places, and to

assess effect of the proposed project on significant resources.

② Hazardous Waste Sites

The DEIS appears to be thorough in identifying environmental concern with regard to potential hazardous waste sites. The Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri does not indicate the presence of any sites within the study area for this proposed project; however, this should not imply that a site is without possible environmental concern or impact. It is not indicated in the DEIS whether this department's Registry Log tracking record was used a source of information. The Registry Log lists the Knapheide site in Marion County as being proposed/appealed for the Registry, however this site does not appear to be located in the project area.

③ Water Quality

Wetlands were once a significant component of Missouri's natural heritage, accounting for almost 11 percent of its surface area. As of 1980, 87 percent of Missouri's original 4.8 million acres of wetlands have been eliminated by activities such as land clearing, draining and filling, channelization and damming. Missouri far exceeds the national rate of 53 percent wetland loss.

The preferred alternative (Alternative F) appears to be the alternative that would result in the least impact to water quality and wetlands. Care should be taken to avoid wetland areas as much as possible. Unavoidable impacts should be mitigated at a minimum 1:1 ratio with the same functions and values as those impacted. All wetland mitigation should be covered by a permanent conservation restriction. The conservation restriction covering these areas should reserve them for wetland protection and wildlife purposes exclusively, and should be filed and recorded as a deed restriction on the property in perpetuity.

Best management practices should be utilized during construction to minimize the amount of sedimentation into the water bodies. Any land disturbance activities may require a water pollution control permit. In this regard, please contact the Department of Natural Resources, Northeast Regional Office at (816) 385-2129.

④ Geologic Setting

The description of the geologic setting of the project area provided on page 3-34 of the DEIS is considered to be insufficient. The following are geologic issues that the department believes to be of concern within this area of Missouri, and it is recommended that this be more thoroughly addressed in the Final EIS.

Surface bedrock along all the proposed routes is composed of the Devonian age Callaway, Grassy Creek and Saverton Formations and the Mississippian age Louisiana, Hannibal and Burlington

Formations. The Callaway is a lithographic to fine grained limestone with some sandstone, siltstone and shale. It can vary greatly in thickness but has a maximum thickness of nearly 70 feet. The Grassy Creek and Saverton are dark gray to light gray, fissile, silty shales with a combined thickness ranging from 10 to 75 feet. The Louisiana is a gray, lithographic limestone to yellowish-brown dolomite. Thickness ranges from 15 to 50 feet. The Hannibal is a bluish-gray to yellowish-brown claystone to siltstone. Thickness often approaches 100 feet. The Burlington is a fossiliferous, light-gray to white, medium to coarsely crystalline limestone with considerable chert. Maximum thickness is approximately 200 feet. Some preglacial valleys filled with drift may be encountered.

Surficial materials along the proposed routes include alluvium, loess, till, residuum, terrace material, and often bedrock. Alluvium forming the valley floors along Little Creek and Bear Creek consists of clayey, sandy silt with some sand and gravel. Loess forms a veneer along the ridge tops and the upper part of the valley slopes. Thickness varies but may approach several feet in upland areas and thins rapidly downslope. Glacial till thickness is highly variable but thicknesses greater than 20 to 30 feet are rare. The till is composed of sand, clay and silt with minor amounts of igneous, metamorphic and sedimentary pebbles and cobbles with few boulders. Residuum, in minor amounts, is found in a few localities principally near areas of thin till and Mississippian bedrock. A terrace is present along Bear Creek near Withers Mill and bedrock exposures will be encountered along Crooked Creek, Little Creek, and Bear Creek.

Geologic hazards along the proposed routes are related to properties of the bedrock and surficial materials. Deep cuts in the loess and glacial till may be prone to sliding and slumping. The same condition may exist if there are deep cuts in the Grassy Creek, Saverton, and Hannibal Formations. In addition these same units may create problems with road stability. Road construction in areas underlain by the Burlington Limestone will, almost certainly, encounter karst features. These features may include sinkholes (especially near the northern terminus), an irregular bedrock surface, solution enlarged joints, and caves. Springs are known in the area and others may well be found. All wells acquired during property acquisition or encountered during construction will need to be plugged in accordance with requirements of the Missouri Water Well Drillers Law.

Mineral resources impacted by the proposed construction include limestone and shale. Limestones in the Callaway and Burlington Formations have potential for use as high specification aggregate, agricultural limestone and also cement and lime manufacture. Shales in the Grassy Creek and Saverton Formations and often in the Hannibal Formation have been found suitable for the manufacture of structural clay products and lightweight aggregate in laboratory tests.

RESPONSE TO COMMENTS

Missouri Department of Natural Resources - Letter dated October 16, 1995

1. Historic and Archaeological Resources

Additional information has been provided.

2. Hazardous Waste Sites. The information in the department's Registry Tracking Log is accessed through the environmental data base described.

3. Water Quality.

Wetland mitigation issues will be addressed in the wetland mitigation plan for the project, which will be submitted with the Section 404 permit application..

4. Geologic Setting. The information provided in the comments will be added to Section 3.7.3, *Geologic Setting*.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
725 MINNESOTA AVENUE
KANSAS CITY, KANSAS 66101

October 31, 1995

Mr. Donald Neumann
Federal Highway Administration
P.O. Box 1787
Jefferson City, Missouri 65102

Dear Mr. Neumann:

RE: Draft EIS, Route 61, Marion and Ralls Counties, Missouri

The following comments and rating are provided in accordance with our responsibilities under Section 309 of the Clean Air Act and the National Environmental Act (NEPA). We have rated the subject document LO-2. A rating of LO means that the review has not identified any potential environmental impacts requiring substantive changes to the preferred alternative. A rating of 2 means that the Draft EIS does not contain sufficient information to fully assess environmental impacts that should be avoided in order to fully protect the environment. The following comments are offered for your consideration and inclusion in the final document.

CUMULATIVE, INDIRECT & SECONDARY EFFECTS

1 NEPA clearly points out the need for inclusion of a discussion of cumulative (Section 1508.7) and indirect or secondary effects (Section 1508.8) of the proposed action. Our review didn't reveal any discussion of either subject. This segment of highway 61 is a link in the National Highway System route, as pointed out in the document. Further, the document states that the Missouri Highway and Transportation Department (MHTD) has designated Highway 61 from north of Hannibal to I-70 will be upgraded to "freeway", and that it should be evaluated for upgrade to "freeway" continuing north to the Iowa border. The proposed upgrade falls well within the definition of cumulative impacts as a result of incremental increases in traffic and projects dimension.



RECYCLE

WETLANDS

② It would be helpful to have a wetland inventory map that
③ details where the identified wetland sites are located. Likewise
④ the study area maps in Chapter 3 (3-3 through 3-7) should show the
alternative routes. Also, North arrows on the maps taken from
aerial maps (such as exhibit 2-6. and others).

Please keep us informed of any future project meetings or
public involvement activities. If you have any questions regarding
this project, please call Dewayne Knott at (913) 551-7299.

Sincerely,



Dewayne Knott

Water Resource Protection Branch
Project Manager

cc: Mr. Gary Frazer, U.S. Fish & Wildlife Service
Mr. Michael Brazier, U.S. Army Corps of Engineers
Mr. Steve Vanderhorn, Regulatory Branch
Mr. David Shorr, MDNR
Mr. Mark Kross, Missouri Highway & Transportation Dept.
Mr. Dan Dickneit, Missouri Department of Conservation

TOTAL P.03

TOTAL P.04

RESPONSE TO COMMENTS

United States Environmental Protection Agency, Region VII - Letter dated October 31, 1995

1. Cumulative, Indirect, and Secondary Effects. Subsection 4.20, which addresses cumulative, indirect, and secondary effects, has been added.
2. Wetlands. A wetlands inventory map that details where the identified wetlands are located is included in Appendix A.
3. The maps in Chapter 4, which are identical to the Chapter 3 maps except that they do show the alternatives, may be referenced.
4. North arrows have been included on all aerial-based exhibits.

MIKE S.



United States Department of the Interior



ER-95/650

☒ Asst. Div. Engr.-L & D
☐ Asst. Div. Engr.-Oper
☐ Utilities
☐ Fed. Aid
☐ Recon Engr.
☐ Photo Engr.
☐ C-A-E

OFFICE OF THE SECRETARY
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☐ Value Engr.
☐ Office Mgr.
☐ File

Mr. Donald Neumann
 Programs Engineer
 Federal Highway Administration
 P.O. Box 1787
 Jefferson City, Missouri 65102

Mr. Joe Mickes
 Chief Engineer
 Missouri Highway and Transportation
 Department
 P.O. Box 270
 Jefferson City, Missouri 65102

Dear Messrs. Neumann and Mickes:

The Department of the Interior has reviewed the August 1995 Draft Environmental Impact Statement for the proposed relocation of U.S. Route 61 between the existing Route 61/24 interchange north of Hannibal and the existing Route 61/M interchange south of Hannibal in Marion and Ralls Counties, Missouri. The Department offers the following comments and recommendations for your consideration.

GENERAL COMMENTS

① Based on analyses reported in the Draft EIS, Alternative F has the fewest impacts of any of the build alternatives on important fish and wildlife habitats. It has the fewest impacts on forested wetlands, streams, woodlands, and habitat for the federally and state-listed endangered Indiana bat (*Myotis sodalis*), which occurs in the project area. Alternative F is also the least-cost build alternative. Accordingly, if a build alternative is implemented, we recommend that this alternative be adopted.

SPECIFIC COMMENTS

Affected Environment. Page 3-40

② No data are provided concerning the fishery and water quality of perennial streams that are potentially impacted by the project. The provision of this information, if it exists, would be helpful. Bear Creek is classified as a Class C stream in the Missouri Water Quality Standards with beneficial uses for aquatic life and livestock watering.

Mitigative Measures and Monitoring Plan. Page 4-57

③ We believe that significant impacts to streams and wetlands can be avoided through bridge spans. Channelization of streams at bridge crossings should be avoided, and sediment run-off minimized. Anticipated in-channel work, fills, bank stabilization, and bridge construction methods and designs should be disclosed in the Final EIS to better elucidate likely impacts at stream crossings.

initiate consultation and develop the Biological Opinion.



This page was omitted from the DEIS JEX
7-18-96

Messrs. Donald Neumann and Joe Mickes

2

Regardless of whether or not they are classified as jurisdictional wetlands, mature bottomland timber and riparian corridors have high value for wildlife and stream ecosystems. These habitats should be avoided if possible. Unavoidable impacts should be mitigated through natural succession or planting of borrow or right-of-way areas. Likewise, mature upland forests have high value as habitat for a variety of wildlife species, and also provide for timber production. These areas also should be avoided, if possible. Revegetating the highway right-of-way with native plants, including wildflowers and warm-season grasses, would enhance habitat for resident wildlife and passerine birds.

Threatened or Endangered Species, Page 4-71

The last sentence of the second paragraph, which discusses mitigation measures for Indiana bats, needs to be modified. Whether an action will result in jeopardy to the continued existence of a listed species is determined by the U.S. Fish and Wildlife Service in a Biological Opinion. Formal consultation, which requires the Service to prepare a Biological Opinion, is triggered by the likelihood of adverse effects to a species. The presence of adverse effects does not mean that an action will cause jeopardy to a species, although reasonable and prudent measures to avoid or minimize adverse effects are to be taken even if no jeopardy is found.

Limiting the cutting of roost trees to the specified time frame would prevent direct take of bats, but would not prevent long-term loss of roost habitat. Indiana bats show fairly strong site fidelity for roosting and foraging areas from year to year. Accordingly, the loss of Indiana bat roost trees is an adverse effect that would trigger Section 7 consultation.

ENDANGERED SPECIES ACT COMMENTS

Appendix B of the Draft EIS concludes that all of the build alternatives would impact suitable foraging and roosting habitat for the federally listed endangered Indiana bat. Although the Draft EIS commits to avoiding any direct take of summering bats by not cutting potential roost trees during the summer roost period of April 1 through September 30, suitable habitat will still be removed. Removal of roost trees used by summering Indiana bats may adversely affect Indiana bats. Any adverse effect that cannot be avoided triggers the formal consultation requirements of Section 7 of the Endangered Species Act of 1973, as amended, which are provided in the Service's regulations at 50 CFR 402.14. Formal consultation is initiated by a written request from the Federal Highway Administration to the Service. An exception to formal consultation is informal consultation, whereby the action may be modified to avoid adverse effects.

The Service recommends that the FHWA request informal or formal Section 7 consultation with the Service's Columbia, Missouri Field Office, once the preferred alternative is selected. If formal consultation is necessary, the Service will complete consultation and deliver a Biological Opinion within 135 days, assuming that present scientific and commercial data are adequate to initiate consultation and develop the Biological Opinion.

RESPONSE TO COMMENTS

United States Department of the Interior

1. No response required.
2. Information on the aquatic resources of Bear Creek and Little Bear Creek has been added to Subsection 3.7.1 *Surface Water*.
3. Subsection 4.10.4 *Measures to Minimize Impacts* identifies measures that will be implemented in the design to minimize impacts on floodplains, wetlands, and streams. These include minimizing road embankments, minimizing areas of disturbance in the vicinity of streams and wetlands, preserving natural drainage where feasible, restricting high velocity flows, implementing MHTD's erosion control program, crossing floodplains at 90 degrees, and sequencing construction to minimize temporary obstructions of floodplains. Insufficient information is available at this stage of the project to specify detailed construction methods and designs.
4. No response required.
5. Since the actual roadway design has not yet been done, it is not possible to develop a detailed plan to mitigate project-related effects to wetlands and other fish and wildlife habitats. If additional wetland mitigation is required in the form of creation/enhancement/restoration, a Mitigation and Monitoring Plan will be prepared as part of the Section 404 permit application. There are no plans for entering into formal consultation with the U.S. Fish and Wildlife Service regarding the cutting of potential roost trees for Indiana bats, as long as the cutting is done in accordance with the guidelines for Indiana bat habitat. Based on discussions with the Columbia field office of the U.S. Fish and Wildlife Service, they will not issue a determination of adverse effect because MHTD will be following the guidelines for Indiana bat habitat, as described in the EIS.

7.10.2 Responses to General Comments

7.10.2.1 Economic Impact

A number of commenters indicated a preference for Alternative CW because they believe it would have a more positive impact on the economy of the City of Hannibal. Of the alternatives evaluated in detail, it is closest to the city.

Others felt that Alternative CW would have the most positive impact on the local economy in general, and the least negative impact on tourism.

Comments

Below are excerpts from these comments:

“Any option which places distance between the city and Route 61 severely limits the economic potential. Corridor Alternative CW is the alternative which best satisfies the economic and transportation needs and opportunities of our community.”

“...this route [should] be located as close to the city limits of Hannibal as possible. ...Selection of [Alternative CW] would have the least, adverse, effect on established businesses while accomplishing the intended goal.”

“I believe that Corridor CW will best serve the citizens of Northeast Missouri and enhance the Hannibal economy.”

“[Alternative CW] brings business to Hannibal. A good part of the truck traffic will go to Hannibal businesses and stores....The route closer to Hannibal will benefit local traffic.”

“[Alternative CW] would be the most beneficial to the City of Hannibal and could help offset negative effects on businesses along Highway 61.”

“This could hurt the number of people coming into Hannibal off the highway because of the distance of the alternatives. Alternative F is farther west than Alternative CW.”

“Hannibal’s economy will be hurt if Corridor F is used because it is furthest west of Hannibal.”

“I would like to formally recommend that the relocation of Route 61 follow Alternative CW. This request is primarily due to the severe economic impact any other route would present on the City of Hannibal.”

“[Alternative CW] will keep the chance of revenue within the city limits.”

“We are all aware of the fact that the farther a highway bypasses a city - that the city suffers a lot of traffic. Tourism could suffer.”

“We are in favor of the CW location. We feel the other locations are too far away from Hannibal and the other locations would economically hurt the local economy....We feel the favored location of F would do economic damage to Hannibal.”

“Route CW appears to be in the best interest of Hannibal merchants.”

“The closer you can come to Hannibal and the hospital, the better. For travelers Hannibal will be the only good overnight stop between St. Louis and Keokuk. From experience I know how irritating it is to turn off a major highway to eat or stay overnight and have to drive miles out of the way to get there.”

Response

It seems reasonable to assume that the closer the relocated route is to the City of Hannibal, the less will be the negative impact on existing Route 61 businesses that depend on highway traffic. This simplifying assumption was made during the preliminary evaluation of alternatives (see Section 2.2 and Table 2-1 of the draft EIS). In the detailed analysis of alternatives, however, it was concluded that the difference in impact between the closest Alternative (CW) and the farthest (F) is minor. This is discussed in detail below.

Impacts to Existing Highway-Related Businesses

As discussed in Section 4.4.2, *Impacts on Existing Route 61 Businesses*, previous studies have shown that motels, service stations, and some restaurants are usually adversely impacted

by highway relocations. Other businesses have experienced increases in sales due to greater accessibility.

On Route 61 in Hannibal, there are five motels, seven service stations, and 23 restaurants. The following estimates of dependency on through traffic (traffic with a destination other than Hannibal) were based on interviews with the businesses and are reported in Section 4.4.2 of the draft EIS:

Motels: ranged from 30 to 95 percent of business

Service stations: most, about 50 percent of business

Restaurants: ranged from 5 to 95 percent of business.

All of these businesses are concentrated on a 5 km (three-mile) segment of Route 61, from around Route W on the north to Paris Gravel Road on the south. This 5 km (three-mile) strip is referred to as the "business area" in the discussion below. None of these businesses are visible from any of the alternatives. Logical exit points from the relocated route to the business area for travelers in need of food, gas, or lodging are at the north end of the relocated route (for southbound traffic), at Route 36 (for traffic moving in either direction), and at the south end of the relocated route (for northbound traffic). The nearest distance from these exit points to the business area for Alternatives CW and F are summarized below.

	Alternative CW	Alternative F
North end of relocated route	8.8 km (5.5 miles)	10.2 km (6.4 miles)
Route 61/36 interchange	6.4 km (4 miles)	9.6 km (6 miles)
South end of relocated route	2.4 km (1.5 miles)	5.1 km (3.2 miles)

While studies have been done to assess the impact of relocated routes in general, we know of none that evaluated impact based on distance from existing highway-related businesses. It is probably safe to say, though, that a typical traveler is not likely to drive even 2.4 km (1.5 miles) out of the way for services that are available along the highway. If the service is not available, then the difference between driving, say 6.4 km (four miles) or 9.6 km (six miles) probably does not make much difference either.

In summary, as discussed in the draft EIS, any of the build alternatives are likely to negatively impact existing traffic-dependent businesses on Route 61. There does not appear to be much difference in impact among the alternatives.

Opportunities for New Highway Related Businesses

Alternative CW has no local access interchanges, and no outer roads are planned; there are therefore no opportunities for new development. Alternative F has three local access interchanges: between Marion County Roads 425 and 424, at Route HH, and at Route M. These interchanges provide new economic opportunities for the area, although some of the opportunity may be at the expense of existing Route 61 businesses.

Impacts on Tourism

Visitors to the historic area and related tourist attractions in Hannibal who arrive from either the north or the south currently use existing Route 61, which is congested in the Hannibal area. All the build alternatives will result in improved access for visitors to the historic area by relieving traffic on existing Route 61. Alternative CW may result in a slightly greater improvement in access over Alternative F, but only for visitors arriving from the north. If Alternative CW was selected, visitors arriving from the south on Route 61 would most likely chose existing Route 61 over the relocated route, because the travel distance on the existing route is 6.4 km (four miles) shorter. Visitors arriving from the north may chose Alternative CW, even though it is slightly longer, to avoid a traffic signal.

If the historic area was on the existing route, or visible from it, we would expect some visitors to make an unplanned stop. But the historic district is 3.2 km (two miles) from existing Route 61, and there is only a small sign which may go unnoticed by anyone just passing through. From the Route 36 interchange, the historic district is 9.6 km (6 miles) east of Alternative CW, and 12.8 km (8 miles) east of Alternative F. While there may be a few people who would make an unplanned stop if the distance is 9.6 km (6 miles), but who would not if the distance is 12.8 km (8 miles), we would expect this number to be negligible.

In summary, in the absence of evidence to the contrary, it seems reasonable to conclude that there will be little, if any, difference in impact on tourism among the different build options.

7.10.2.2 Hospital Access

Some commenters supported Alternative CW because of better access to the Hannibal Regional Hospital

Comments

“Alternative CW is in sightline of Hannibal Regional Hospital and Alternative F is approximately 4 miles from the hospital. This is a small distance but in cases of emergency, this could mean someone’s life.”

“Corridor CW gives quicker access to Hannibal Regional Hospital.”

Response

Several letters addressing this issue in detail were received from Hannibal Regional Hospital. Each of these letters is responded to individually. Please refer to Section 7.101 for these letters and responses.

7.10.2.3 Prime Farmland

Some commenters objected to the preferred alternative because it required the largest amount of prime farmland.

Comments

“Where is our food supply going to come from in years to come if prime farmland is taken out of production? Alternative F has 473 acres of prime farmland and Alternative CW has 226 acres of prime farmland.”

“Corridor F destroys 237 more acres of prime farmland. I know this seems small now but will future generations say, why didn’t they protect our food supply along with the Indiana bat habitat.”

Response

Prime farmland, an irreplaceable resource, is very important. The differences in impact between the alternative requiring the most prime farmland (Alternative F) and the alternative requiring the least (Alternative CW) about 237 acres, as noted by one commenter. This amount represents less than one-tenth of one percent of the prime farmland in Marion and Ralls Counties, and is much less land than will support even one family. Furthermore, much of the prime farmland in the area is not in agricultural production. When all environmental factors were considered, Alternative F was judged to be the least impacting.

7.10.2.4 Access

Several commenters expressed concern about access to their property and to places of business. For example, several people were concerned about access to the MFA supply on Route 24. Access issues will be addressed during design.

8.0
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APPENDIX A

WETLANDS DELINEATION REPORT

**JURISDICTIONAL WETLAND DELINEATIONS OF U.S. HIGHWAY 61
ALTERNATIVE RELOCATION CORRIDORS**

**Missouri Highway and Transportation Department
Proposed U.S. Highway 61 Relocation Project
Marion and Ralls Counties, Missouri**

**Prepared by
George Butler Associates, Inc.
January, 1996**

**Jurisdictional Wetland Delineations
of
U.S. Highway 61 Alternative Relocation Corridors**

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- Attachment 2. NRCS County Soil Survey Aerial Photographs with Proposed Alternative
Corridor Segments
- Attachment 3. National Wetlands Inventory Topographic Maps with Proposed Alternative
Corridor Segments and Location of Jurisdictional Wetlands and Other Waters of
the U.S.
- Attachment 4. Wetland Delineation Data Forms and Data Point Key Map

EXECUTIVE SUMMARY

Missouri Highway and Transportation Department (MHTD) proposes to expand U.S. Highway 61 in Marion and Ralls Counties, Missouri (MHTD District 3). The proposed project consists of a relocation to be located in one of several alternative corridors west of Hannibal, Missouri. MHTD has retained the team of George Butler Associates, Inc. (GBA) and Woodward-Clyde Consultants (WCC) to perform environmental investigations for this project. A jurisdictional wetland delineation using U.S. Army Corps of Engineers (Corps) guidelines was performed by George Butler Associates, Inc. (GBA) in July, 1995. This delineation represents the culmination of a year-long wetland identification and avoidance process which included an initial analysis of alternative 300 meter (1,000 ft) wide corridors for the proposed road relocation and a final delineation of four alternative 90 m (300') corridors. This report provides the results of the 1995 jurisdictional wetland delineation, and a comparison of estimated wetlands impacts among alternative corridor segments. The alternative corridors are located in predominantly upland agricultural areas. Results of the onsite jurisdictional wetland delineation indicate that, of the four alternative corridors included in the Environmental Impact Statement (Alternatives F, CW, EF, and D), Alternative F will impact the least area of jurisdictional wetlands.

1.0 INTRODUCTION

Missouri Highway and Transportation Department (MHTD) proposes to expand U.S. Highway 61 in Marion and Ralls Counties, Missouri (MHTD District 3). The proposed project consists of a relocation to the west of Hannibal, Missouri. Several alternative 300 meter (1,000 ft) wide corridors have been identified. The alternative corridors are located in uplands dominated by agricultural activities. A more defined right-of-way will be located within the preferred corridor. The purpose of this study is to provide the results of a jurisdictional wetland delineation to assess comparative potential impacts to waters of the U.S., including jurisdictional wetlands, among the alternative corridors. Waters of the U.S. consist of wetlands, streams, lakes, and similar areas as they apply to the jurisdictional limits of the authority of the U.S. Army Corps of Engineers (Corps) under the Clean Water Act (CWA). The definition of Waters of the U.S. is provided in Title 33, Part 328.3 of the Code of Federal Regulations. For the purpose of this report, the term jurisdictional wetlands refers to those wetlands which meet the regulatory definition at 33 CFR 328.3, and the term waters of the U.S. means all areas which meet the definition, including jurisdictional wetlands.

Preliminary wetland information was obtained from Natural Resource Conservation Service (NRCS); U.S. Fish & Wildlife Service (USFWS) National Wetland Inventory (NWI) Maps; U.S. Geological Survey topographic maps; and official Marion and Ralls county highway maps. A wetland identification was performed on-site by Carol Kuhn of George Butler Associates, Inc. in September, 1994.

1.1 PROPOSED PROJECT DESCRIPTION

The proposed project consists of the construction of new right-of-way to serve as a relocation west of Hannibal, Missouri. Alternative 300 meter (1,000 ft) wide corridors have been established. A preferred right-of-way will be chosen from the alternatives.

1.2 ALTERNATIVE CORRIDORS

For the purpose of this jurisdictional wetland delineation, the proposed alternative corridors were divided into 14 segments, so that comparative impacts may be assessed among potential corridor segment combinations. Figure 1 illustrates the locations of the 14 segments. Table 1 is a matrix of possible corridor segment combinations from which rights-of-way and final preferred route may be chosen. This report provides the results of wetland delineations within each segment. Proposed corridor impacts may be assessed by adding the cumulative impacts of each segment within a corridor.

Table 1. Potential Combinations of Segments for Construction of Alternative Corridors for MHTD Highway 61 Relocation Project. Prepared by George Butler Associates, Inc., February, 1995.

	CW1	CW2	CW3	D1	D2	D3	D4	EF1	F4 Int.	F1 Cor.	F2 Int.	F2 Cor.	Link 1	Link 2
CW1		X	X	--	X	X	X	--	--	--	X	--	X	--
CW2			X	X	--	--	X	--	X	--	X	--	X	X
CW3				X	X	X	--	X	X	--	--	--	X	X
D1					X	X	X	--	X	--	X	--	X	X
D2						X	X	--	X	--	X	--	--	--
D3							X	X	X	X	X	--	--	--
D4								X	X	X	X	--	X	X
EF1									X	X	X	--	--	--
F4 Int.										X	X	X	X	X
F1 Cor.											X	X	--	--
F2 Int.												X	X	X
F2 Cor.													--	--
Link 1														X
Link 2														

Int.=Interchange; Cor.=Corridor

2.0 PROJECT STUDY AREA

The project study area consists of four 90 m (300') wide alternative corridors (Figure 1). Attachment 1 provides color photocopies of ground photographs taken within the project study area. Attachments 2 and 3 illustrate the location of the proposed alternative corridors on Natural Resource Conservation Service (NRCS) Soil Survey aerial photographs and U.S. Fish & Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps, respectively.

The corridors cross gently to moderately undulating uplands and narrow, shallow, eroded stream channels. The majority of the land is agricultural, with some shrubby or wooded areas. Bear Creek, Little Bear Creek, and Crooked Creek are the only named waterways in the alternative corridors. These waterways and their unnamed tributaries are part of the Bear Creek watershed, which eventually drains into the Mississippi at Hannibal.

3.0 PRELIMINARY WETLAND IDENTIFICATION

The preliminary wetland identification consisted of a review of existing wetland information; consultation with the U.S. Army Corps of Engineers; and an on-site wetland identification during September, 1994. The results of the on-site wetland identification were combined with the existing NRCS, USFWS, and Corps information to further define potential jurisdictional wetlands. The estimated types and amounts of wetlands were then compared among several potential combinations of alternative corridor segments, to determine which route(s) might result in the fewest potential impacts to jurisdictional wetlands and other waters of the U.S. A preliminary wetland identification report (GBA, 1995) was then prepared and submitted as an appendix to the Draft Environmental Impact Statement (FHWA and MHTD, August, 1995).

4.0 WETLAND DELINEATION METHODS

4.1 EXISTING INFORMATION

Preliminary wetland identification methods follow the guidelines presented in the U.S. Army Corps of Engineers 1987 *Wetland Delineation Manual*. An off-site delineation was performed to assess existing information and prepare for on-site work. Natural Resource Conservation Service county soil surveys, county hydric soils lists, and Food Security Act farmed wetlands information were gathered and compared with U.S. Fish & Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps to identify areas of potential jurisdictional wetlands. The Rock Island Corps District claims jurisdiction on only those drainageways which are identified on official county highway maps. Therefore, county highway maps were used to aid in determining the extent of waters of the U.S. The following subsections summarize existing general information regarding soils, hydrology, and vegetation within the project study area.

4.1.1 Soils. Table 2 identifies hydric soils mapped in the proposed corridors, as identified by the NRCS in the Hydric Soils List of Marion County, Missouri (NRCS, 1990a) and the Hydric Soils List of Ralls County, Missouri (1990b). Both county lists reflect local soil conditions, and have eliminated several soils which are listed on the state and national hydric soil lists because they do not meet the hydric soil criteria in these counties. The resulting NRCS hydric soil map units

were identified within the proposed corridors and highlighted on NRCS soil survey maps (Attachment 2). This information was then transferred to USFWS NWI maps (Attachment 3). Hydric soils within the project corridors are limited to scattered small areas of Marion and Moniteau silty loams. Marion silty loam is identified as hydric due to inclusions of Chariton silty loam, which is frequently saturated. Chariton inclusions comprise approximately 10% of the Marion silty loam map unit. Therefore, wetland delineations will have to be performed at Marion silty loam locations to determine if hydric soil conditions are present. For the purpose of this wetlands analysis of alternative corridors, the assumption was made that areas mapped as Marion silty loam are hydric, although it is likely that only a small percentage is hydric. Moniteau silty loams are frequently saturated and therefore are classified as hydric soils. Moniteau soils have few inclusions; most areas mapped as Moniteau probably consist of this hydric soil.

Table 2. Hydric Soils of the Proposed MHTD Highway 61 Corridors. Marion and Ralls Counties, Missouri. 300 meter (1,000 ft) Wide Alternative Corridors. Prepared by GBA from NRCS County Hydric Soils Lists.						
County	Alternative Corridor Segment	Map Unit Symbol	Map Unit Name	Hydric Portion	Hydric Composition	Hydric Criterion
Marion	D3	22B	Marion silty loam	Chariton silty loam, inclusions	10%	2B2
Marion	CW3, Link 1	25	Moniteau silty loam	Moniteau	90%	2B2

4.1.2 Hydrology. Topographic maps and soil surveys indicate that the rivers and streams in the project area are located in narrow valleys or are deep channels cut into upland soils. Few flood plains are associated with these waterways. With the potential exception of areas mapped as Marion silty loam or Moniteau silty loam, no soils in the project corridors possess indicators of wetland hydrology [a water table at less than 0.57 meter (1.4 feet) from the surface during the growing season and a permeability of less than 15.4 centimeters/hour (6.0 inches/hour) in any layer within 51.3 centimeters (20 inches) of the surface] (NRCS, 1990a & b).

4.1.3 Vegetation. The proposed alternative corridors are located in the Eastern Section of the Glaciated Plains Natural Division of Missouri (Nelson, 1987). Forests in this Division are eastern deciduous woodlands dominated by oak and hickory. Potential natural vegetation of the project study areas and adjacent land is prairie/forest mosaic (Nelson, 1987). Schroeder (1982) identifies presettlement prairies within the project study area in uplands between Rensselaer and

South River. Land use trends have eliminated most of the presettlement vegetation from the project study area. Current dominant vegetation in non-agricultural areas consists of typical disturbance tolerant upland woody species such as honey locust (*Gleditsia triacanthos*), juniper (*Juniperus virginiana*), white oak (*Quercus alba*), and Siberian elm (*Ulmus pumila*). Wooded drainages such as South River contain slippery elm (*Ulmus rubra*), green ash (*Fraxinus pennsylvanica*), shingle oak (*Quercus imbricaria*), box elder (*Acer negundo*), and sycamore (*Platanus occidentalis*).

4.2 ON-SITE WETLAND DELINEATION

Preliminary on-site wetland identification of 300 m (1,000') corridors was performed during September, 1994 by a GBA wetlands specialist who has been certified through the Corps' Wetland Delineator Certification Program. An onsite jurisdictional wetland delineation of 90 m (300') corridors was performed during July and September, 1995. The *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) was used as a guideline for performing wetland delineations. Farm ponds are identified as Corps jurisdictional if they have extensive areas of hydrophytic vegetation, if they are located within another Corps jurisdictional area such as a tributary, and/or if they are abandoned. Surface mines are considered jurisdictional if they contain standing water and/or wetland vegetation. Tributaries are considered waters of the U.S. to ordinary high water (OHW) if they are included on official Marion and Ralls County Maps. Each crossing was also inspected to determine if wetlands occur. All areas identified as potentially jurisdictional during the preliminary wetlands assessment were investigated during the onsite jurisdictional wetland delineation.

5.0 JURISDICTIONAL WETLAND DELINEATION RESULTS

Table 3 of this Report is a list of vascular plant species identified during the wetland delineation and the preliminary wetland identification. Table 5 provides information regarding farm ponds within each corridor. Based upon results of the wetland delineation, three farm ponds within the project study area are potentially Corps jurisdictional. Table 6 lists the jurisdictional wetlands and other waters of the U.S. for each alternative corridor segment. This table compares the delineation results with the preliminary information gathered from NWI maps; NRCS Soils Surveys and Hydric Soil Lists; NRCS wetland maps; and official county highway maps. It is presented so that total waters of the U.S. may be tallied for any possible combination of alternative segments which forms a corridor.

Attachment 1 contains color photocopies of ground photography along the proposed corridor segments, with Figure A of the Attachment indicating the photograph locations. Attachment 2 and Attachment 3 illustrate the location of wetland delineation data points and jurisdictional

wetland boundaries on NRCS Soil Survey maps and U.S. Fish & Wildlife Service National Wetland Inventory maps, respectively. Attachment 4 contains jurisdictional wetland delineation data sheets, with Figure 1 depicting the location of data points.

A summary of the preliminary wetlands and other waters of the U.S. per alternative corridor segment is provided in Table 7, and Table 8 summarizes the wetlands and other waters of the U.S. for each of the four alternative corridors. Other waters of the U.S. are tallied as number of crossings, to reflect the manner in which regulated impacts are evaluated for Section 404 permitting.

6.0 COMPARATIVE VALUES OF WETLAND SYSTEMS

The project study area is located at the eastern edge of a relatively high, flat, undissected plateau with scattered small drainages. The eastern portion of the study area consists of upper slopes leading into the bluffs of the Mississippi River valley. This area contains more rolling topography, drainages, and larger major waterways than does the western portion of the study area. While none of the four alternative corridors contain exceptionally high quality wetlands, the easternmost corridors (Alternatives D and CW) will cross more waters of the U.S., and contain the only areas identified as hydric soil map units within the study area. The westernmost corridors (Alternatives F and EF) are nearly completely in upland ridges. Along these uplands, jurisdictional wetlands are limited to farm ponds, and waters of the U.S. are upper reaches of tributaries in uplands. The following summarizes the quality of wetlands and waters of the U.S. for each of the alternative corridors.

6.1 Alternative F.

Wetlands within Alternative F are limited to three potentially jurisdictional farm ponds which total 0.6 ha (1.5 ac). Two are adjacent to existing Highway 61 in the southern interchange. The third is located in cropland. None is considered to be high quality wetlands. The only potentially jurisdictional drainages within the corridor are Bear Creek in the northwest, Little Bear Creek in the southwest, and two unnamed intermittent tributaries to these creeks. These consist of drainageways through upland agricultural land. Narrow bands of wooded riparian vegetation are located along the channels. Overall quality of these waters is low to average.

Table 3. Vascular Plants Identified During the July 1995 Jurisdictional Wetland Delineation and September 1994 Preliminary Wetland Identification. Proposed MHTD Highway 61 Relocation Project, Marion and Ralls Counties, Missouri. Prepared by George Butler Associates, Inc., January, 1996.

Scientific Name ¹	Common Name ²	NLPSOW ³ Indicator Status
TREES		
<i>Acer negundo</i> L.	box elder	FACW-
<i>Acer saccharinum</i> L.	silver maple	FACW
<i>Asclepias syriaca</i> L.	common milkweed	NL
<i>Celtis laevigata</i> Willd.	sugar-berry	FACW
<i>Celtis occidentalis</i> L.	hackberry	FAC-
<i>Cercis canadensis</i> L.	redbud	FACU
<i>Fraxinus pennsylvanica</i> Marsh.	green ash	FACW
<i>Gleditsia triacanthos</i> L.	honey locust	FAC
<i>Juglans nigra</i> L.	black walnut	FACU
<i>Juniperus virginiana</i> L.	red cedar	FACU
<i>Maclura pomifera</i> (Raf.)Schneid.	Osage orange	FACU
<i>Morus alba</i> L.	white mulberry	FAC
<i>Morus rubra</i> L.	red mulberry	FAC-
<i>Platanus occidentalis</i> L.	American sycamore	FACW
<i>Quercus alba</i> L.	white oak	FACU
<i>Quercus imbricaria</i> Michx.	shingle oak	FAC-
<i>Quercus macrocarpa</i> Michx.	bur oak	FAC-
<i>Quercus palustris</i> Muenchh.	pin oak	FACW
<i>Quercus rubra</i> L.	northern red oak	FACU
<i>Salix nigra</i> Marsh.	black willow	OBL
<i>Tilia americana</i> L.	American basswood	FACU
<i>Ulmus americana</i> L.	American elm	FACW-

Table 3. Vascular Plants Identified During the July 1995 Jurisdictional Wetland Delineation and September 1994 Preliminary Wetland Identification. Proposed MHTD Highway 61 Relocation Project, Marion and Ralls Counties, Missouri. Prepared by George Butler Associates, Inc., January, 1996.

Scientific Name ¹	Common Name ²	NLPSOW ³ Indicator Status
<i>Ulmus rubra</i> L.	slippery elm, red elm	FAC
<i>Ulmus sibericus</i>	Siberian elm	NL
SHRUBS		
<i>Amorpha fruticosa</i>	false indigo bush	FACW+
<i>Cephalanthus occidentalis</i> L.	buttonbush	OBL
<i>Cornus drummondii</i> Meyer	rough leaved dogwood	FAC
<i>Rhus glabra</i> L.	smooth sumac	N/L
<i>Ribes missouriense</i> Nutt.	Missouri gooseberry	N/L
<i>Rosa multiflora</i> Thunb.	multiflora rose	FACU
<i>Symphoricarpos orbiculatus</i> Moench.	coral berry (buckbrush)	FACU
HERBACEOUS PLANTS & WOODY VINES		
<i>Agropyron smithii</i> Rydb.	western wheat grass	FACU+
<i>Amaranthus albus</i> L.	white amaranth	FACU
<i>Ambrosia artemisiifolia</i> L.	common ragweed	FACU
<i>Ambrosia trifida</i> L.	giant ragweed	FAC+
<i>Andropogon virginicus</i> L.	broomsedge	FAC-
<i>Apocynum cannabinum</i> L.	dogbane	FAC
<i>Asclepias syriaca</i> var. <i>kansana</i>	common milkweed	NL
<i>Aster pilosus</i> Willd.	white heath aster	FACU+
<i>Bidens polylepis</i> Blake	tickseed sunflower	FACW
<i>Bromus inermis</i>	smooth brome	NL
<i>Campsis radicans</i> (L.) Seem	trumpet vine	FAC
<i>Carduus nutans</i>	musk thistle	N/L

Table 3. Vascular Plants Identified During the July 1995 Jurisdictional Wetland Delineation and September 1994 Preliminary Wetland Identification. Proposed MHTD Highway 61 Relocation Project, Marion and Ralls Counties, Missouri. Prepared by George Butler Associates, Inc., January, 1996.

Scientific Name ¹	Common Name ²	NLPSOW ³ Indicator Status
<i>Cicorium intybus</i> L.	common chicory	NL
<i>Cicuta maculata</i> L.	water hemlock; spotted cowbane	OBL
<i>Cirsium vulgare</i> L.	thistle	FACU-
<i>Clematis virginiana</i> L.	virgin's bower	FAC
<i>Commelina communis</i> L.	day-flower	FAC
<i>Convolvulus sepium</i> L. (<i>Calystegia sepium</i> (L.)R.Br)	hedge bindweed	FAC
<i>Daucus carota</i> L.	Queen Anne's lace	N/L
<i>Echinochloa muricata</i> (Beauv.)Fern.	barnyard grass	OBL
<i>Eleocharis obtusa</i> (Willd.)J.A. Schultes	blunt spikerush	OBL
<i>Elymus virginicus</i> L.	Virginia wild rye	FACW-
<i>Equisetum hyemale</i> L.	winter scouring rush	FACW-
<i>Eupatorium capillifolium</i> (Lam.)Small	thorough-wort	FACU
<i>Eupatorium rugosum</i> Houtt.	white snakeroot	FACU
<i>Eupatorium serotinum</i> Michx.	late flowering thoroughwort	FAC+
<i>Festuca arundinacea</i> Schreb.	tall fescue	FACU+
<i>Festuca elatior</i> L.	meadow fescue	N/L
<i>Geum vernum</i> (Raf.)Torr. & Gray	early water avens	FAC-
<i>Glycine max</i> (L.)Merr.	soybean	NL
<i>Helianthus tuberosus</i> L.	Jerusalem artichoke	FAC
<i>Humulus japonicus</i> Sieb. & Zucc.	Japanese hops	FACU
<i>Impatiens</i> sp.	touch-me-not	FACW

Table 3. Vascular Plants Identified During the July 1995 Jurisdictional Wetland Delineation and September 1994 Preliminary Wetland Identification. Proposed MHTD Highway 61 Relocation Project, Marion and Ralls Counties, Missouri. Prepared by George Butler Associates, Inc., January, 1996.

Scientific Name ¹	Common Name ²	NLPSON ³ Indicator Status
<i>Ipomoea hastata</i> Jacq.	ivy morning glory	FAC
<i>Iva annua</i> L.	annual sumpweed	FAC
<i>Juncus interior</i> Wieg.	inland rush	FAC+
<i>Juncus marginatus</i> Rostk.	grass-leaf rush	FACW
<i>Lactuca canadensis</i> L.	wild lettuce	FACU+
<i>Laportea canadensis</i> (L.)Wedd.	wood nettle	FACW
<i>Leersia oryzoides</i> (L.)Swartz	rice cutgrass	OBL
<i>Leersia virginica</i> Willd.	whitegrass	FACW
<i>Ludwigia palustris</i> (L.)Ell.	water purslane	OBL
<i>Ludwigia peploides</i> (H.B.K.)Raven	floating primrose willow	OBL
<i>Lycopus americanus</i> Muhl. ex W. Barton	American bugleweed	OBL
<i>Monarda fistulosa</i> L.	wild bergamot	FACU
<i>Muhlenbergia schreberi</i> Gmel.	nimble will	FAC
<i>Myrabilis nyctaginea</i> (Michx.)MacM.	wild four-o'clock	NL
<i>Oenothera biennis</i> L.	common evening primrose	FACU
<i>Osmorhiza claytonii</i> (Michx.)Clarke	sweet cicely	FACU-
<i>Oxalis stricta</i> L.	yellow wood sorrel	FACU
<i>Parthenocissus quinquefolia</i> (L.) Planch.	Virginia creeper	FAC-
<i>Pastinaca sativa</i> L.	parsnip	NL
<i>Phalaris arundinacea</i> L.	reed canary grass	FACW+
<i>Phleum pratense</i> L.	timothy	FACU
<i>Physalis longifolia</i> Nutt.	ground cherry	NL

Table 3. Vascular Plants Identified During the July 1995 Jurisdictional Wetland Delineation and September 1994 Preliminary Wetland Identification. Proposed MHTD Highway 61 Relocation Project, Marion and Ralls Counties, Missouri. Prepared by George Butler Associates, Inc., January, 1996.

Scientific Name ¹	Common Name ²	NLPSOW ³ Indicator Status
<i>Phytolacca americana</i> L.	poke berry	FAC-
<i>Poa pratensis</i> L.	Kentucky bluegrass	FAC-
<i>Polygonum hydropiperoides</i> Michx.	swamp smartweed	OBL
<i>Polygonum lapathifolium</i> L.	willow-weed	FACW+
<i>Polygonum punctatum</i> Ell.	water smartweed	OBL
<i>Polygonum scandens</i> L.	false buckwheat	FAC
<i>Polygonum virginianum</i> L.	Virginia knotweed	FAC
<i>Rumex crispus</i> L.	curly dock	Fac+
<i>Sambucus canadensis</i> L.	American elderberry	FACW-
<i>Schrankia uncinata</i> Willd.	sensitive brier	NL
<i>Setaria glauca</i> (L.)Beauv.	yellow foxtail	FAC
<i>Silphium perfoliatum</i> L.	cup plant	FACW-
<i>Smilax tamnoides</i> L. var. <i>hispida</i> Muhl. ex Torr.	bristly greenbrier	FAC
<i>Solanum carolinense</i> L.	horse nettle	FACU-
<i>Solidago nemoralis</i> Ait.	old field goldenrod	NL
<i>Solidago ulmifolia</i> Muhl.	elm-leaf goldenrod	NL
<i>Spartina pectinata</i> Link	prairie cordgrass	FACW+
<i>Toxicodendron radicans</i> (L.) Kuntze	poison ivy	FAC+
<i>Tridens flavus</i> (L.)Hitche.	tall redtop	N/L
<i>Trifolium pratense</i> L.	red clover	FACU+
<i>Trifolium repens</i> L.	white clover	FACU+
<i>Verbascum thapsus</i> L.	mullein	NL

Table 3. Vascular Plants Identified During the July 1995 Jurisdictional Wetland Delineation and September 1994 Preliminary Wetland Identification. Proposed MHTD Highway 61 Relocation Project, Marion and Ralls Counties, Missouri. Prepared by George Butler Associates, Inc., January, 1996.

Scientific Name ¹	Common Name ²	NLPSOW ³ Indicator Status
<i>Verbesina helianthoides</i> Michx.	crown beard	NL
<i>Vernonia baldwini</i> Torr.	ironweed	NL
<i>Viola sororia</i> Willd.	woolly blue violet	FAC-
<i>Vitis cinerea</i> Engelm.	grayback grape	FACW-
<i>Vitis riparia</i> Michx.	riverbank grape	FACW-
<i>Xanthium strumarium</i> L.(SYN: <i>Xanthium pensylvanicum</i> Wallr.)	rough cocklebur	FAC

¹Scientific names from Steyermark, J. *Flora of Missouri*, 1963.

²Common names from *Flora of Missouri*. If none provided by the Flora, then common names from Reed, P., *National List of Plants that Occur in Wetlands, North Central (Region 3)*, USFWS Biological Report 88 (26.3) May, 1988.

³Wetland indicator status taken from *National List of Plants that Occur in Wetlands, North Central (Region 3)*.

OBL obligate wetland species
 FACW+ wetter than FACW
 FACW facultative wetland species
 FACW- drier than FACW
 FAC+ wetter than FAC
 FAC facultative species
 FAC- drier than FAC
 FACU- wetter than FACU
 FACU facultative upland species
 FACU+ drier than FACU
 UPL upland species
 NL not listed
 NI no indicator status yet assigned

6.2 Alternative EF. The majority of Alternative EF is included within Alternative F and the northern (upland) portions of Alternatives CW and D. Within Corridor EF, wetlands are limited to jurisdictional farm ponds of low wetland value. Waters of the U.S. consist of Bear Creek, Little Bear Creek, and one unnamed tributary to Little Bear Creek. Within the corridor, Bear and Little Bear Creeks consist of small drainageways in uplands with somewhat wooded riparian areas. They are moderately valuable as narrow wildlife corridors through agricultural land.

6.3 Alternative D. Wetlands in Alternative D are primarily low quality jurisdictional farm ponds, with one small area of low quality cropped herbaceous wetlands within cropland at the Barkley/Landis farm near Withers Mill. Alternative D crosses waters of the U.S. in uplands at four locations: Bear Creek, Little Bear Creek, Crooked Creek, and one unnamed tributary to Bear Creek. These waters of the U.S. are of relatively high value within the corridor, due to their wooded riparian corridors through wooded uplands and agricultural lands.

6.4 Alternative CW. Wetlands in Alternative CW include 0.6 ha (1.6 ac) of wooded and emergent wetlands associated with an unnamed tributary. These wetlands are located within areas mapped as hydric soils, adjacent to an extensive drainage system surrounded by agricultural land. This area is of comparatively good quality due to its location within a larger wooded wetland system. Alternative CW also contains a large portion of the lower Bear Creek floodplain. This wide, predominantly wooded area is a good quality, relatively unmanipulated drainageway with shrubby, herbaceous, and unvegetated gravel washes within its wide shallow beds. In this region, Bear Creek provides a valuable wildlife corridor through adjacent agricultural and transportation centers. Also within Alternative CW are Little Bear and Crooked Creeks, with similarly valuable wooded riparian corridors.

7.0 DISCUSSION AND CONCLUSION

The proposed Highway 61 Relocation Project consists of four alternative corridors which are located in predominantly upland areas west of the City of Hannibal, Missouri. Topography of the region is generally high, undissected uplands which become more dissected with tributaries and major drainages farther east. Therefore, the westernmost corridor (Alternative F) will impact the fewest wetlands. The easternmost corridors, Alternatives CW and D, contain the largest amount of wetland acreage and crossings of waters of the U.S. While Alternative EF has the fewest number of crossings of waters of the U.S. (3 crossings), it contains more jurisdictional

wetland acres than does Alternative F. Results of the jurisdictional wetland delineation of alternative corridors for the MHTD Highway 61 Relocation Project indicate that Alternative F will impact the smallest area of jurisdictional wetlands, and result in the least amount of impact to wetland functions and values.

Table 4. USFWS National Wetland Inventory Classification Terminology and Interpretation.			
National Wetland Inventory Mapping Unit	Classification	Interpretation	Comparison to Potential Corps Jurisdictional Waters of the U.S. ¹
PEMC	Palustrine emergent, seasonally flooded	farm pond or natural wetland	assume jurisdictional
PEMF	Palustrine emergent, semi-permanently flooded	farm pond or natural wetland	assume jurisdictional
PEMFh	Palustrine emergent, semi-permanently flooded, diked/impounded	farm pond or natural wetland	assume jurisdictional
PEM1A	Palustrine emergent, persistent, temporarily flooded	farm pond or natural wetland	assume jurisdictional
PFO1A	Palustrine forested, broad-leaved deciduous, temporarily flooded	forested wetland	assume jurisdictional
PSS1F	Palustrine, scrub/shrub, broad-leaved deciduous, semi-permanently flooded	shrubby wetland	assume jurisdictional
PUBF	Palustrine, unconsolidated bottom, semi-permanently flooded	farm pond or natural wetland	assume jurisdictional
PUBFh	Palustrine, unconsolidated bottom, semi-permanently flooded, diked/impounded	farm pond	not jurisdictional unless abandoned, or located in a water of the U.S., or having substantial stands of hydrophytic vegetation ²
PUBFx	Palustrine, unconsolidated bottom, semi-permanently flooded, excavated	farm pond, mine, or borrow	assume jurisdictional
PUBG	Palustrine, unconsolidated bottom, intermittently exposed	farm pond or natural wetland	assume jurisdictional
PUBGh	Palustrine, unconsolidated bottom, intermittently exposed, diked/impounded	farm pond	not jurisdictional unless abandoned, or located in a water of the U.S., or having substantial stands of hydrophytic vegetation ²
PUBGx	Palustrine, unconsolidated bottom, intermittently exposed, excavated	farm pond, mine, or borrow	assume jurisdictional
R2UBG	Riverine lower perennial, unconsolidated bottom, intermittently exposed	river or stream bed	assume jurisdictional if also shown of official county highway map ²
R2USA	Riverine lower perennial, unconsolidated shore, temporarily flooded	river or stream shore	assume jurisdictional if also shown of official county highway map ²
R4SBC	Riverine intermittent stream bed, seasonally flooded	intermittent stream bed	assume jurisdictional if also shown of official county highway map ²
¹ Assume jurisdictional until on-site jurisdictional wetland delineation is performed. ² As per US Army Corps of Engineers Rock Island District methodology.			

Table 5. Farm Pond Designations for Clean Water Act Jurisdiction. Proposed MHTD Highway 61 Relocation Project, Marion and Ralls Counties, Missouri. Prepared by George Butler Associates, Inc., August 1995.

Farm Pond Number ¹	Location ²	Visual Observation ³	Current Use ⁴	ASCS Farm Program on Property ⁵	USFWS Wetland Designation ⁶	CWA Jurisdiction ⁸⁷
F1	SE of NE 13	no longer present	AcC	Yes	PEMFh	No
F3	SW of SW 30	crop	AcC	Yes	PUBGh	Yes
F5	SW of NW 31	active ag land	AcP	Yes	PUBGh	No
F6	SE of NW 31	active no veget.	AcP	No	PUBGh	No
F7	NE of SW 31	hay pasture	AcP	Yes	PUBGh	No
F12a	SW of Sw 10	active	Acp	Yes	PUBGh	No
F13	NE of NE 23	recreational pond	Na	No	PUBGh	Yes
F14a	NE of NE 14	inactive	AbP	No	PUBGh	Yes
F15	Se of NE 23	active	AcP	Yes	PUBGh	No
D4-1	SW of NW 18	2 ponds active	AcP	Yes	PUBGh	No
D2-1	SW of NE 32	not observed	Na	Yes	PUBGh	Yes
D2-2	SW of NE 32	not observed	Na	Yes	PUBGh	Yes
D2-4a	SE of NE 32	not observed	AcP	No	PUBGh	Yes
D2-4b	SE of NE 32	pasture	AcP	Yes	PUBF	No
D2-7	NW of SW 33	stock	AcP	Yes	PUBGh	No
D2-9	NW of NE 4	pasture	AcP	Yes	PUBFh	No
D2-10	SW of NE 4	pasture	AcP	Yes	PUBF	No
D2-11	NE of SE 4	pasture	AcP	Yes	PUBGh	No
D2-12	SW of SW 3	ag. land	AcC	Yes	PUBGh	No
D2-13	NW of NW 10	recreational pond	Na	Yes	PUBGh	Yes

Table 5. Farm Pond Designations for Clean Water Act Jurisdiction. Proposed MHTD Highway 61 Relocation Project, Marion and Ralls Counties, Missouri. Prepared by George Butler Associates, Inc., August 1995.

Farm Pond Number ¹	Location ²	Visual Observation ³	Current Use ⁴	ASCS Farm Program on Property ⁵	USFWS Wetland Designation ⁶	CWA Jurisdiction ⁷
D2-14	NW of NW 10	ag	AcP	Yes	No	No
EF-1	SE of SE 30	active	AcP	Yes	PUBGh	No
EF-3	SE of NE 31	active ag.	AcP	Yes	PUBGh	No
EF-4	SW of NW 32	hayed. ±wet veget.	AcC	Yes	PUBGh	Yes
EF-5	SE of 31	active	AcP	Yes	PUBGh	No
CW3-1	SE of SE 7	active	AcP	Yes	PUBGh	No
CW2-2	NW of SW 28	active	AcP	Yes	PUBG	No
CW2-4	NE of SE 33	no obs.	AcP	Yes	PUBGh	No
CW2-4	SW of SW 28	no obs.	AcP	Yes	PUBGh	No
CW1-4	SW of SW 2	no obs.	AcP	Yes	PUBGh	No
CW1-5	SE of SE 3	active	AcP	Yes	PUBGh	No
CW1-7	NE of SE 11	distant vis	AbP	Yes	PUBGh	Yes
CW1-8	SE of SE 11	abandoned pasture	AbP	Yes	PUBGh	Yes
Link 2-1	SE of SW 3	distance vis	AcP	Yes	PUBGh	No
Link 1	---	---	---	---	---	---

¹ Pond identification letter refers to alternative corridor segment.

² Quarter of Quarter Section.

³ Observations made during field surveys, based upon aerial photography, and NRCS/ASCS information.

⁴ Current use categories: AcP = active pasture, AbP = abandoned pasture, AC = active cropland, Na = non-agricultural.

⁵ Based upon ASCS aerial photography identification of Farm Program land.

⁶ NWI wetland classification. Refer to Table 4 for classification terminology.

⁷ Farm pond is Clean Water Act Section 404 water of the U.S. if it is abandoned, and/or is located within another water of the U.S., and/or supports substantial stands of hydrophytic vegetation.

Table 6. Jurisdictional Wetlands and Other Waters of the U.S. in Four Alternative 90 meter (300 ft) Wide Corridors and Associated Segments; Two Link Segments; and Two Potential Highway 36 Relocation Segments.^{1,2} MHTD Proposed US Highway 61 Relocation, Marion and Ralls Counties, Missouri. Prepared by George Butler Associates, Inc. January 1996.

Alternative Corridor ³	NW1 Wetland Designation ⁴	Description	NRCS Hydric Soil ⁵	NRCS Wetland Designation ⁶	Waters of U.S. [Drainage Area > 3.8 km. (1.5 mi. ²)] ⁷	Waters of U.S. on County Map ⁷	Preliminary Corps Jurisdiction ⁸		
							Wetlands	Corps Jurisdictional Farm Ponds	Other Waters of the U.S.
CW1 (Corridor; South Interchange)	R4SBG	1 Crooked Creek	---	---	1	1	---	---	90 m (300')
	PUBGh	Farm Pond CW1-5	---	---	---	---	---	---	---
	PUBGh	Farm Pond CW1-7	---	---	---	---	---	0.4 ha. (1.0 ac.)	---
	PUBGh	Farm Pond CW1-8	---	---	---	---	---	0.4 ha. (1.0 ac.)	---
	PUBGh	Farm Pond CW1-4	---	---	---	---	---	---	---
	R4SBC	unnamed tributary #1	---	---	---	1	---	---	90 m (300')
	R4SBC	unnamed tributary #2	---	---	---	1	---	---	90 m (300')
CW2 (Corridor; Hwy 36 Interchange; Relocated 36 Highway)	PUBG	Farm Pond CW2-2	---	---	---	---	---	---	---
	PUBGh	Farm Pond CW2-4	---	---	---	---	---	---	---
	PUBGh	Farm Pond CW2-5	---	---	---	---	---	---	---
	PUBGh	1 potential surface mine	---	---	---	---	0.4 ha (1.0 ac.)	---	---
	R4SBC	1 unnamed tributary	---	---	---	1	---	---	300 m (900')
	PFOIA	3 unvegetated gravel beds at Bear Creek	---	---	---	---	3.2 ha (8.0 ac)	---	---
	R2USA	3 crossings of Bear Creek	---	---	1	1	---	---	450 m (1350')

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Alternative Corridor ¹	NW1 Wetland Designation ⁴	Description	NRCS Hydric Soil ⁵	NRCS Wetland Designation ⁶	Waters of U.S. [Drainage Area > 3.8 km. (1.5 mi. ²)] ⁷	Waters of U.S. on County Map ⁷	Preliminary Corps Jurisdiction ⁸		
							Wetlands	Corps Jurisdictional Farm Ponds	Other Waters of the U.S.
	--	adjacent to unnamed tributary in CW3	hydric soil	wooded/emergent wetland	---	---	0.6 ha (1.6 ac)	---	---
CW3 (Corridor; North Interchange)	PFOIA	1 unnamed tributary	hydric soil	wooded/emergent wetland	1	1	---	---	90 m (300')
	PUBGh	Farm Pond CW3-1	---	---	---	---	---	---	---
D1	---	---	---	---	---	---	---	---	---
D2	PUBGh	Farm Pond D2-1	---	---	---	---	---	0.2 ha. (0.5 ac.)	---
	PUBGh	Farm Pond D2-2	---	---	---	---	---	0.2 ha. (0.5 ac.)	---
	PUBGh	Farm Pond D2-4a	---	---	---	---	---	0.2 ha. (0.5 ac.)	---
	PUBGh	Farm Pond D2-7	---	---	---	---	---	---	---
	PUBGh	Farm Pond D2-12	---	---	---	---	---	---	---
	PUBGh	Farm Pond D2-13	---	---	---	---	---	0.2 ha. (0.5 ac.)	---
	PUBGh	Farm Pond D2-14	---	---	---	---	---	---	---
	R2UBG	1 Little Bear Creek	---	---	1	1	---	---	90 m (300')
	PUBFh	Farm Pond D2-9	---	---	---	---	---	---	---

Table 6. Jurisdictional Wetlands and Other Waters of the U.S. in Four Alternative 90 meter (300 ft) Wide Corridors and Associated Segments; Two Link Segments; and Two Potential Highway 36 Relocation Segments.^{1,2} MHTD Proposed US Highway 61 Relocation, Marion and Ralls Counties, Missouri. Prepared by George Butler Associates, Inc. January 1996.

Alternative Corridor ³	NWI Wetland Designation ⁴	Description	NRCS Hydric Soil ⁵	NRCS Wetland Designation ⁶	Waters of U.S. (Drainage Area > 3.8 km. (1.5 mi. ²)) ⁷	Waters of U.S. on County Map ⁷	Preliminary Corps Jurisdiction ⁸		
							Wetlands	Corps Jurisdictional Farm Ponds	Other Waters of the U.S.
D3	R4SBC	1 Crooked Creek	---	---	1	1	---	---	200 m (650')
	PUBF	Farm Pond D2-10	---	---	---	---	---	---	---
	PFOIA	1 unnamed tributary	---	---	---	1	---	---	90 m (300')
	R2UBG	1 Bear Creek	---	---	---	1	---	---	180 m (600')
D4	---	---	hydric soil	---	---	---	---	---	---
	PUBCh	Farm Pond D4-1	---	---	---	---	---	---	---
	PFOIA	1 unnamed tributary	---	---	---	---	---	---	---
	---	herbaceous wetland in cropland at Landis/Barkley farm	---	---	---	---	0.4 ha (1.0 ac)	---	---
EF1 (Corridor; Interchange)	PUBCh	Farm Pond EF1-1	---	---	---	---	---	---	---
	PUBCh	Farm Pond EF1-3	---	---	---	---	---	---	---
	PUBCh	Farm Pond EF1-4	---	---	---	---	---	0.2 ha. (0.5 ac.)	---
	PUBCh	Farm Pond EF1-5	---	---	---	---	---	---	---
	PUBFh	1 farm pond	---	---	---	---	---	---	---
	R4SBC	Little Bear Creek	---	---	1	1	---	---	90 m (300')

Table 6. Jurisdictional Wetlands and Other Waters of the U.S. in Four Alternative 90 meter (300 ft) Wide Corridors and Associated Segments; Two Link Segments; and Two Potential Highway 36 Relocation Segments.^{1,2} MHTD Proposed US Highway 61 Relocation, Marion and Ralls Counties, Missouri. Prepared by George Butler Associates, Inc. January 1996.

Alternative Corridor ³	NWI Wetland Designation ⁴	Description	NRCS Hydric Soil ⁵	NRCS Wetland Designation ⁶	Waters of U.S. (Drainage Area > 3.8 km. (1.5 mi.) ⁷)	Waters of U.S. on County Map ⁷	Preliminary Corps Jurisdiction ⁸		
							Wetlands	Corps Jurisdictional Farm Ponds	Other Waters of the U.S.
F1 (Corridor; South Interchange)	PUBGx	1 excavated pond	---	---	---	---	---	---	---
	PUBGh	Farm Pond F12a	---	---	---	---	---	---	---
	PUBGh	Farm Pond F13	--	---	---	---	---	0.2 ha. (0.5 ac.)	---
	PUBGh	Farm Pond F14a	--	---	---	---	---	0.2 ha. (0.5 ac.)	---
	PUBGh	Farm Pond F15	--	---	---	---	---	---	---
F2 (Corridor; HWY 36 Interchange)	PEMFh	Farm Pond F-1 (no longer present)	---	---	---	---	---	---	---
	PUBGh	Farm Pond F-3	---	---	---	---	---	0.2 ha. (0.5 ac.)	---
	PUBGh	Farm Pond F-6a	---	---	---	---	---	---	---
	PUBGh	Farm Pond F-6b	---	---	---	---	---	---	---
	PUBGh	Farm Pond F-7	---	---	---	---	---	---	---
	PUBGx	Farm Pond F-5	---	---	---	---	---	---	---
	R4SBC	1 Little Bear Creek	---	---	---	1	---	---	90m (300')
	R2UBG	1 Bear Creek	---	---	1	1	---	---	90m (300')
	---	unnamed tributary #1	---	---	---	1	---	---	120m (360')
	---	unnamed tributary #2	---	---	---	1	---	---	90 m (300')

Table 6. Jurisdictional Wetlands and Other Waters of the U.S. in Four Alternative 90 meter (300 ft) Wide Corridors and Associated Segments; Two Link Segments; and Two Potential Highway 36 Relocation Segments.^{1,2} MHTD Proposed US Highway 61 Relocation, Marion and Ralls Counties, Missouri. Prepared by George Butler Associates, Inc. January 1996.

Alternative Corridor ³	NW1 Wetland Designation ⁴	Description	NRCS Hydric Soil ⁵	NRCS Wetland Designation ⁶	Waters of U.S. (Drainage Area > 3.8 km. (1.5 mi. ²) ⁷	Waters of U.S. on County Map ⁷	Preliminary Corps Jurisdiction ⁸		
							Wetlands	Corps Jurisdictional Farm Ponds	Other Waters of the U.S.
F3	R4SBC	unnamed tributary	---	---	---	---	---	---	---
	---	unnamed tributary	---	---	---	---	---	---	---
F4 (North Interchange)	PEMC	1 potential sinkhole (no longer present)	---	emergent wetland	---	---	---	---	---
Link 1	PFOIA	1 unnamed tributary	hydric soil	wooded wetland	---	---	---	---	90 m (300')
Link 2	PUBCh	Farm Pond L2-1	---	---	---	---	---	---	---
	R2UBG	1 Crooked Creek	---	---	1	1	---	---	300 m (1000')

¹ Sources: USFWS National Wetland Inventory Maps, Natural Resource Conservation Service Soil Survey of Marion and Ralls Counties, Missouri Highway and Transportation Department Marion and Ralls County Highway Maps, and onsite jurisdictional wetland delineation data.

² Refer to Table 4 for explanation and interpretation of National Wetland Inventory terms.

³ See Figure 1 and Table 1 for location of proposed alternative corridor segments and segment combination matrix.

⁴ See Attachment 3, National Wetland Inventory Maps for proposed alternative corridor segments and segment combinations.

⁵ Hydric soils from Natural Resource Conservation Service's *Hydric Soils List of Marion County* and *Hydric Soils List of Ralls County*. See Attachment 2 for location of proposed corridor alternative segments on aerial photographs taken from NRCS *Soil Survey of Marion and Ralls Counties*.

⁶ Emergent wetlands and open-water wetlands are potential sinkholes.

⁷ See Figure 1 for location of proposed alternative corridor segments on MHTD General Highway Map for Marion County and Ralls County.

⁸ Estimates based upon results of onsite jurisdictional wetland delineation.

Table 7. Summary of Jurisdictional Wetlands and Waters of the U.S. per Proposed Alternative 90 meter (300 ft) Corridor Segment. Proposed MHTD Highway 61 Corridors. Marion and Ralls Counties, Missouri. Prepared by George Butler Associates, Inc., January, 1996.

Alternative Corridor Segment	Jurisdictional Wetlands ¹	Other Waters of the U.S.
CW1	0.8 ha (2.0 ac)	3 (270 m; 900')
CW2	4.2 ha (10.6 ac)	4 (750 m; 2250')
CW3	1.6 ha (4.0 ac)	1 (90 m; 300')
D1	0	0
D2	0.8 ha (2.0 ac)	2 (290 m; 950')
D3	0	2 (270 (950)
D4	0.4 ha (1.0 ac)	0
EF1	0.2 ha (0.5 ac)	1 (90 m; 300')
F1	0.4 ha (1.0 ac.)	0
F2	0.2 ha (0.5 ac)	4 (400 m; 1260')
F3	0	0
F4	0	0
Link 1	0	1 (90 m; 300')
Link 2	0	1300 m (1000')

¹Potentially jurisdictional farm ponds, potential surface mines, and gravel washed are included in this estimate.

²Other waters of the U.S. include linear crossings.

Table 8. Comparative Impacts to Jurisdictional Wetlands and Other Waters of the U.S. per Representative Potential Alternative Corridor Segment Combinations.¹

Alternative Corridor Segment Combinations ²	Potential Wetlands Impacts	Potential Crossings of Waters of the U.S.
Alternative F (F4-F3-F2-F1)	0.6 ha (1.5 ac)	4 crossings (400 m; 1300')
Alternative EF1 (F2 (Int)-D4-D3-EF1-F1)	1.0 ha (2.5 ac)	3 crossings (360 m; 1200')
Alternative D (F2 (Int)-D4-D3-D2-D1-F1 (Int))	1.6 ha. (4.0 ac)	4 crossings (560 m; 1900')
Alternative CW (CW3-CW2-CW1)	6.6 ha.(16.5 ac)	8 crossings (1010 m; 3400')

¹Based upon onsite jurisdictional wetland delineation performed by George Butler Associates, Inc., July and September, 1995.

8.0. REFERENCES

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Attachment 1

Ground Photographs And Photographic Key Map

GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway and
Transportation Department
Camera Make: Canon

GBA Job No.: 7046.03

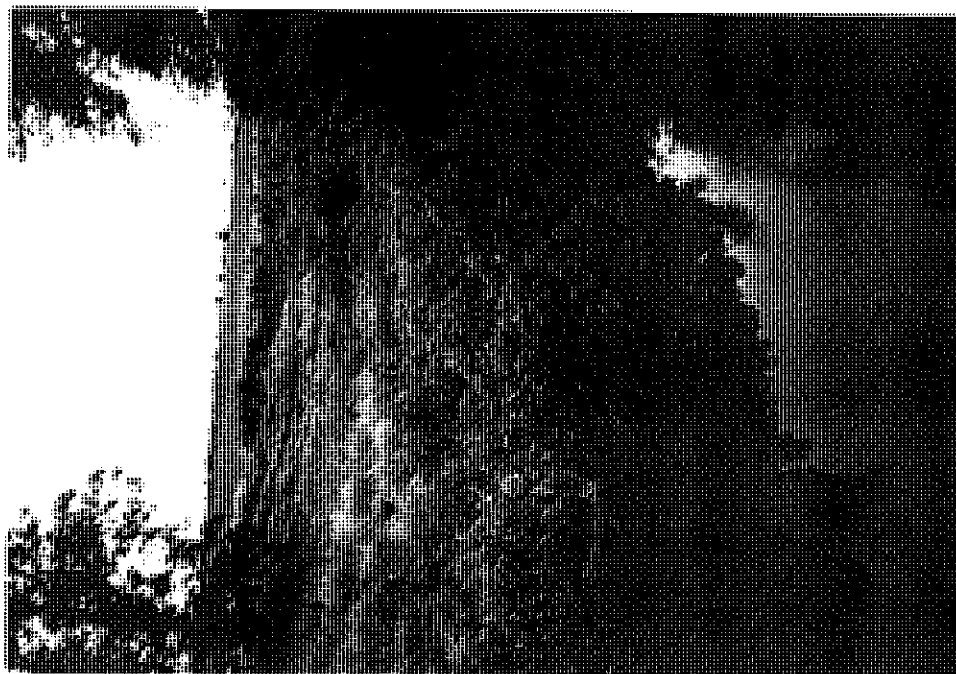
Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 1
Direction: N.W.
Comments: Marion Co.
T57N R6W SW. 1/4 of SE. 1/4
Sec. 12. Segment F2.
Ca. 60 meters (200') S. of Jct.
Marion Co. Rd. F and U.S.
61/24. View of NRCS Sinkhole
Map Unit. Not Jurisdictional.



Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 2
Direction: S.W.
Comments: Marion Co.
T57N R6W SW. 1/4 of SE. 1/4
Sec. 12. Segment F2.
WD 95-1
SW. Corner of US HWY 24
Crossing of Bear Creek
WOUS to OHW.



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway and
Transportation Department
Camera Make: Canon

GBA Job No.: 7046.03

Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 3
Direction: S.E.
Comments: Marion Co.
T57N R6W SW. 1/4 of SE. 1/4
Sec. 12. Segment F2.
WD 95-2
SE. Corner of US HWY 24
Crossing of Bear Creek
WOUS to OHW.



Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 4
Direction: N.W.
Comments: Marion Co.
T57N R6W SW. 1/4 of SE. 1/4
Sec. 12. Segment F2.
WD 95-3
NW. Corner of US HWY 24
Crossing of Bear Creek
WOUS to OHW.



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway and
Transportation Department
Camera Make: Canon

GBA Job No.: 7046.03

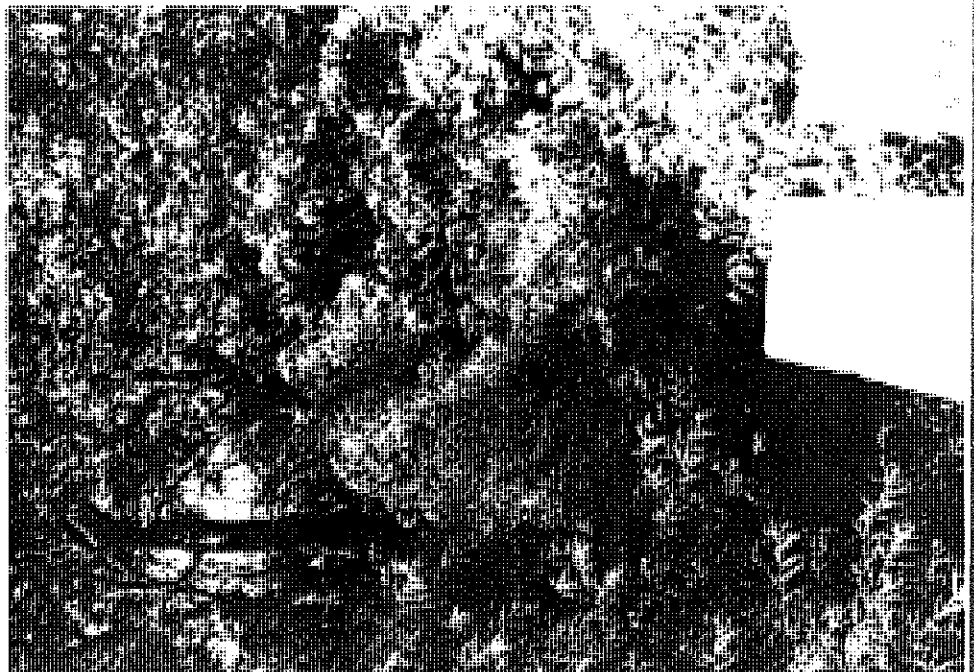
Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 5
Direction: N.E.
Comments: Marion Co.
T57N R6W SW. 1/4 of SE. 1/4
Sec. 12. Segment F2.
WD 95-4
NE. Corner of US HWY 24
Crossing of Bear Creek
WOUS to OHW.



Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 6
Direction: N.
Comments: Marion Co.
T57N R5W SW. 1/4 of SE. 1/4
Sec. 19. Segment D3.
WD 95-5
County Road Crossing of
Unnamed Drainageway.



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway and
Transportation Department
Camera Make:

GBA Job No.: 7046.03

Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 7
Direction: S.
Comments: Marion Co.
T57N R5W SW. 1/4 of SE. 1/4
Sec. 19. Segment D3.
WD 95-6
Unnamed Drainageway in
Pasture, across County Rd.
from WD 95-5.



Photographer: C. Kuhn
Date\Time: 7/18/95
Frame No.: 8
Direction: N.
Comments: Marion Co.
T57N R5W SW. 1/4 of SE. 1/4
Sec. 18. Segment D4.
WD 95-7
Barkley (Landis) Farm.
View of Unplanted Portion of
Soybean Field.



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway and
Transportation Department
Camera Make: Canon

GBA Job No.: 7046.03

Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/18/95
Frame No.: 9
Direction: S.W.
Comments: Marion Co.
T57N R5W SW. 1/4 of SE. 1/4
Sec. 19. Segment D3.
WD 95-8
Soybean Field in Marion Silty Loam
Map Unit. S.W. of Withers Mill Railroad Bed.



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway and
Transportation Department
Camera Make: Canon

GBA Job No.: 7046.03

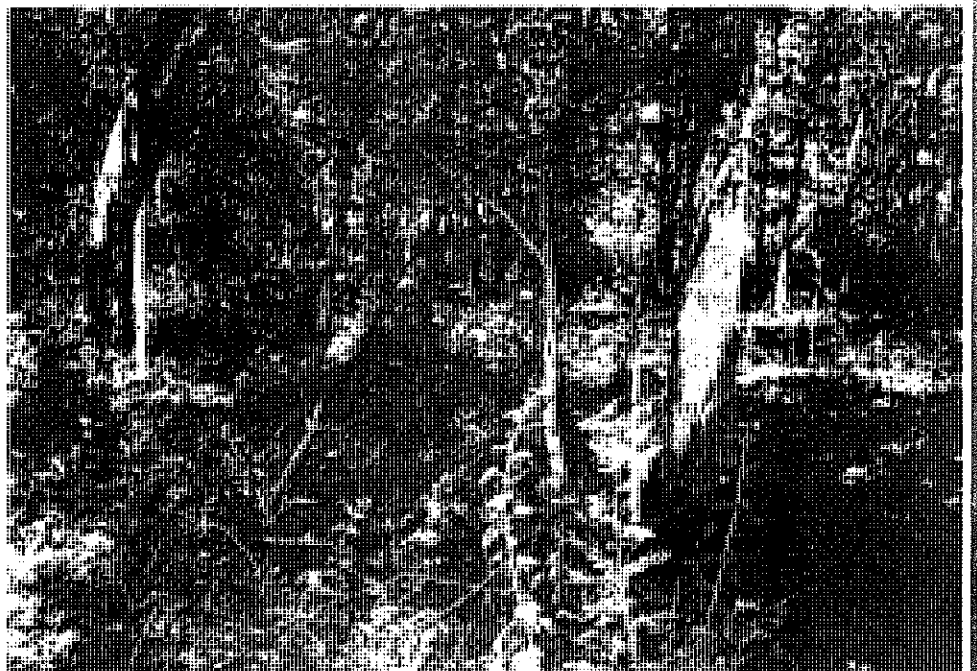
Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/18/95
Frame No.: 10
Direction: S.W.
Comments: Marion Co.
T57N R5W SW. 1/4 of SE. 1/4
Sec. 20. Segment Link - 1
WD 95-9
Soybean Field in Marion
Silty Loam Map Unit.
East of Withers Mill
Railroad bed.



Photographer: C. Kuhn
Date\Time: 7/18/95
Frame No.: 11a
Direction: N.E.
Comments: Marion Co.
T57N R5W SW. 1/4 of SE. 1/4
Sec. 20. Segment Link - 1
WD 95-10
Wooded Tributary in Marion
Silty Loam Map Unit.
NRCS Designated "Wooded
Wetland." No Jurisdictional
Wetland Present.



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

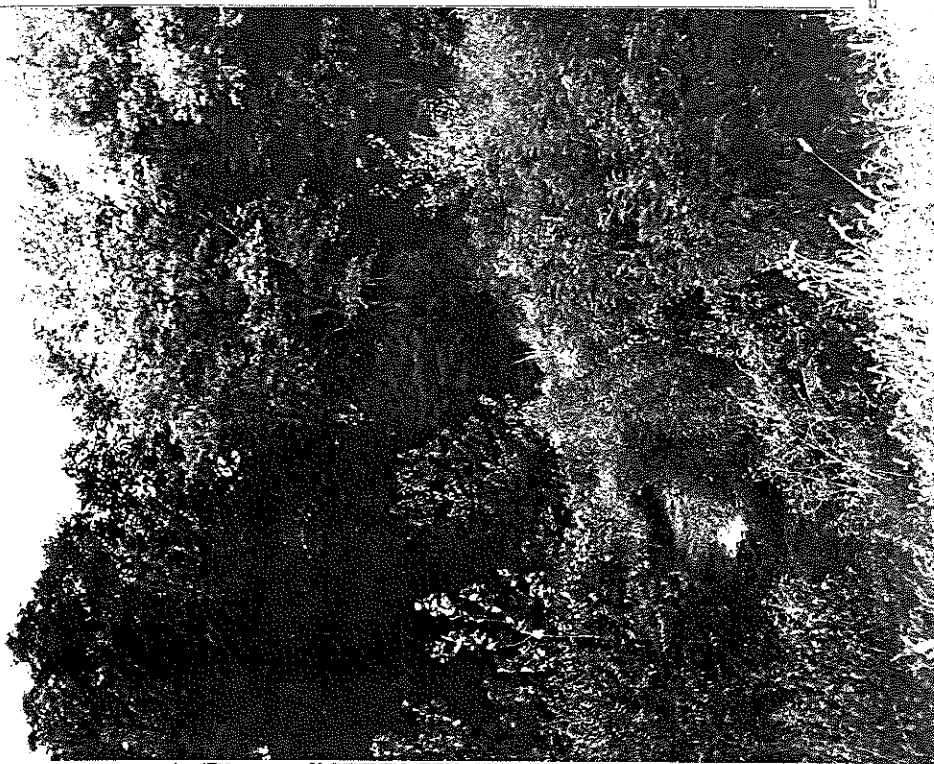
Client: Missouri Highway and
Transportation Department
Camera Make: Canon

GBA Job No.: 7046.03

Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 11b
Direction: West
Comments: Marion Co.
T57N R6W SE. 1/4 of NE. 1/4
Sec. 13.
View to West at jurisdictional
tributary (shown on Marion
County Map). Wooded stream
corridor. Pasture to South
of stream and corn to
WoUS to OHW.



Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 12
Direction: East
Comments: Marion Co.
T57N R5W SW. 1/4 of NW. 1/4
Sec. 18.
View to East at jurisdictional
tributary (shown on Marion
County Map). WoUS to OHW.
Small dry draw. Pasture and
farm buildings.



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway and
Transportation Department
Camera Make: Canon

GBA Job No.: 7046.03

Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 13
Direction: North
Comments: Marion Co.
T57N R5W SE. 1/4 of SE. 1/4
Farm Pond CW3-11
Active Stock Pond
N. of HWY 61,
E. of HWY 24



Photographer: C. Kuhn
Date\Time: 7/18/95
Frame No.: 14
Direction: North
Comments: Marion Co.
T57N R5W SE. 1/4 of SW. 1/4
Sec. 31.
F2 Interchange Location
On HWY 36 just E. of 36 & 24
View N. Farm Pond F6.
Active Stock Pond in Pasture



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway and
Transportation Department
Camera Make: Canon

GBA Job No.: 7046.03

Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 15
Direction: West
Comments: Ralls County
T56N R5W NE. 1/4 of NW. 1/4
Sec. 6.
View to West into jurisdictional
drainage. Currently dry.
West side pasture and cropland
East side wooded.



Photographer: C. Kuhn
Date\Time: 7/18/95
Frame No.: 16
Direction: North
Comments: Marion Co.
T56N R5W SE. 1/4 of SE. 1/4
Sec. 6.
Farm Pond F9
NRCS "Emergent Wetland"
Active Stock Pond in pasture.
Minimal Hydrophytic Vegetation



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway and
Transportation Department
Camera Make: Canon

GBA Job No.: 7046.03

Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/18/95
Frame No.: 17
Direction: S.E.
Comments: Ralls County
T56N R5W NW. 1/4 of SE. 1/4
Sec. 6.
Farm Pond F11 In Haymeadow
Apparently no graing.
Wetland Vegetation Surrounds.
Black willow, Pin Oak, Cottonwood,
Silver Maple, Red Elm.



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway and
Transportation Department
Camera Make: Canon

GBA Job No.: 7046.03

Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 18
Direction: North
Comments: Ralls County
T56N R5W SW. 1/4 of SE. 1/4
Sec. 9.
Farm Pond F12
Complex of several Ponds
Active Stock Ponds in Pasture



Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 19
Direction: North
Comments: Ralls County
T56N R5W NE. 1/4 of SE. 1/4
Sec. 14.
Farm Pond F14A
View W. from existing HWY 61
Right of Way N. of Jct 61
Inactive hayed or mowed



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway and
Transportation Department
Camera Make: Canon

GBA Job No.: 7046.03

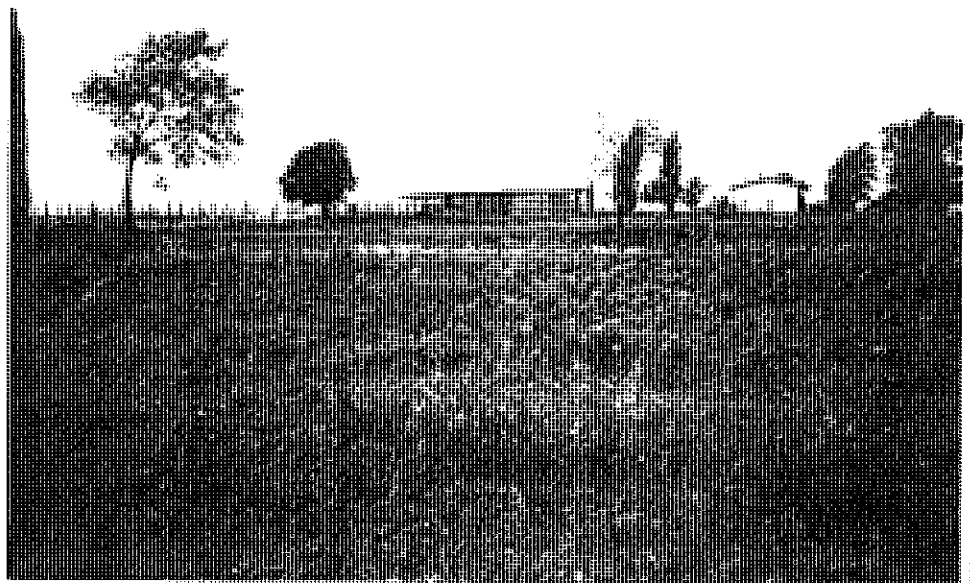
Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 20
Direction: North
Comments: Marion Co.
T57N R5W SE. 1/4 of SE. 1/4
Sec. 30.
View of Farm Pond EF1 in
wooded draw in active pasture.



Photographer: C. Kuhn
Date\Time: 7/18/95
Frame No.: 21
Direction: West
Comments: Marion Co.
T57N R5W NE. 1/4 of NE. 1/4
Sec. 31
View to west from adjacent
pasture Farm Pond EF2



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway and
Transportation Department
Camera Make: Canon

GBA Job No.: 7046.03

Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 22
Direction: West
Comments: Marion Co.
T57N R5W SW. 1/4 of NW. 1/4
Sec. 32.
Some wetland vegetation
(Trees and Herbaceous)
at edge



Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 23
Direction: N.W.
Comments: Marion Co.
T57N R5W SW. 1/4 of NW. 1/4
Sec. 32
Active Stock Pond
Farm Pond EF



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway and
Transportation Department
Camera Make: Canon

GBA Job No.: 7046.03

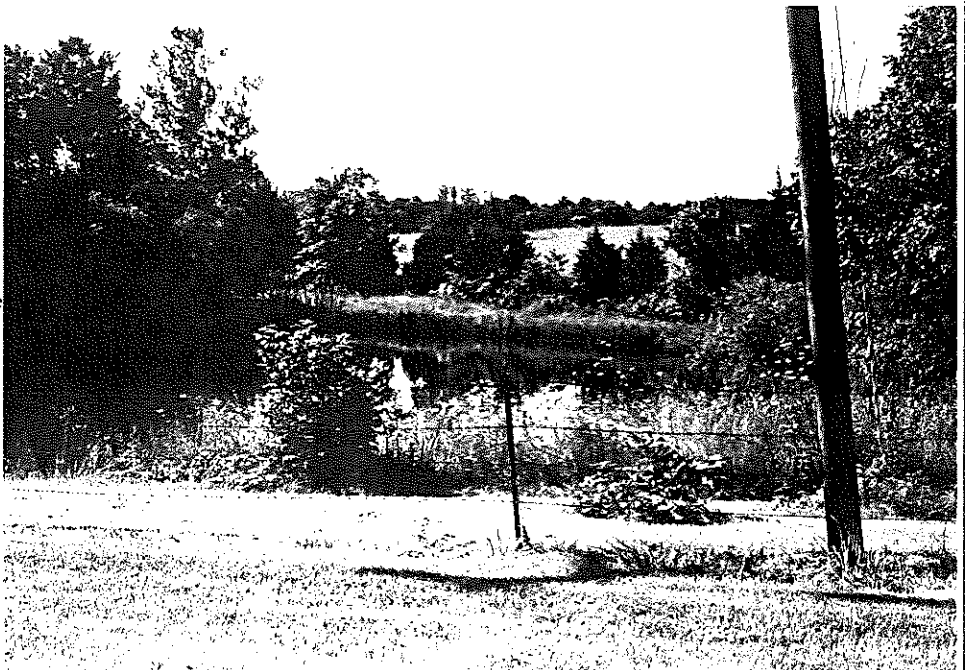
Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 24
Direction: South
Comments: Marion Co.
T57N R5W NW. 1/4 of SW. 1/4
Sec. 33.
Farm Pond D2-7
Active Stock Ponds in
pasture.



Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 25
Direction: South
Comments: Ralls County
T57N R5W NE. 1/4 of NE. 1/4
Sec. 9.
At W. edge of D1/D2 Interchange
with Co. Rd. HH
S. side of HH. Abandoned
Farm Pond recreational pond



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway and
Transportation Department
Camera Make: Canon

GBA Job No.: 7046.03

Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 26
Direction: South
Comments: Ralls County
T57N R5W NW. 1/4 of NW. 1/4
Sec. 10
View S. East of small abandoned
cabin.



Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 27
Direction: South
Comments: Ralls County
T56N R5W SW. 1/4 of SW. 1/4
Sec. 3.
County Road HH View
to South at jurisdictional
drainage WoUS to OHW.



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway and
Transportation Department
Camera Make: Canon

GBA Job No.: 7046.03

Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 28
Direction: South
Comments: Marion Co.
T57N R5W SE. 1/4 of NE. 1/4
Sec. 33.
View to South WoUS to
OHW. County Road crossing
of unnamed tributary
to Bear Creek.



Photographer: C. Kuhn
Date\Time: 7/18/95
Frame No.: 29
Direction: North
Comments: Marion Co.
T57N R5W SE. 1/4 of SW. 1/4
Sec. 28
View North of Hwy. MM. East
bank Bear Creek (flows South)
Channel 25' wide, approx. 4'
deep standing water.
WoUS to OHW.



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway and
Transportation Department
Camera Make: Canon

GBA Job No.: 7046.03

Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 30
Direction: South
Comments: Marion Co.
T57N R5W SE. 1/4 of SW. 1/4
Sec. 28
View to South of Hwy. MM. Bear
Creek (flows South). Channel
approx. 25 wide. Currently
standing water, approx. 4'
deep. WoUS to OHW.
Highway 61.



Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 31
Direction: South
Comments: Marion Co.
T57N R5W SE. 1/4 of SW. 1/4
Sec. 28
View to South of Hwy. MM.
West bank of Bear Creek
(flows South). Channel approx.
25' wide. Currently standing
water approx. 4' deep.
WoUS to OHW
Highway 61 alternate.



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway and
Transportation Department
Camera Make: Canon

GBA Job No.: 7046.03

Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 32
Direction: North
Comments: Marion Co.
T57N R5W SW. 1/4 of SW. 1/4
Sec. 2.
Gravel Base Stream in
Pasture Land



Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 33
Direction: South
Comments: Ralls County
T57N R5W SE. 1/4 of SW. 1/4
Sec. 2
View to South at tributary
on Hwy HH, South side of
road. Standing water in
puddles. Plants growing in
approx. 1/2 of gravel stream
bed. WoUS to OHW.



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

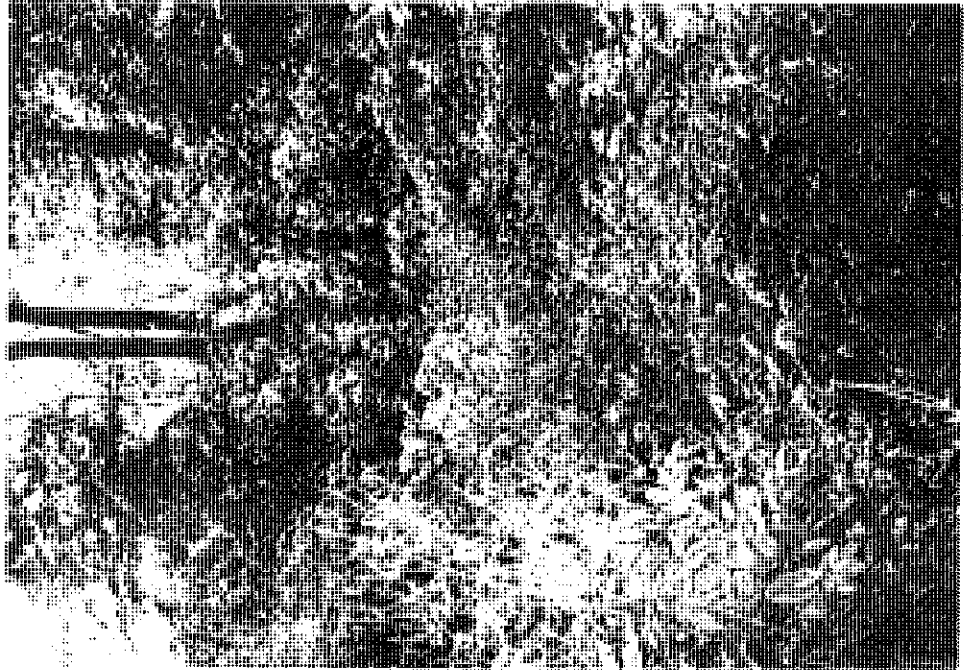
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Transportation Department
Camera Make: Canon

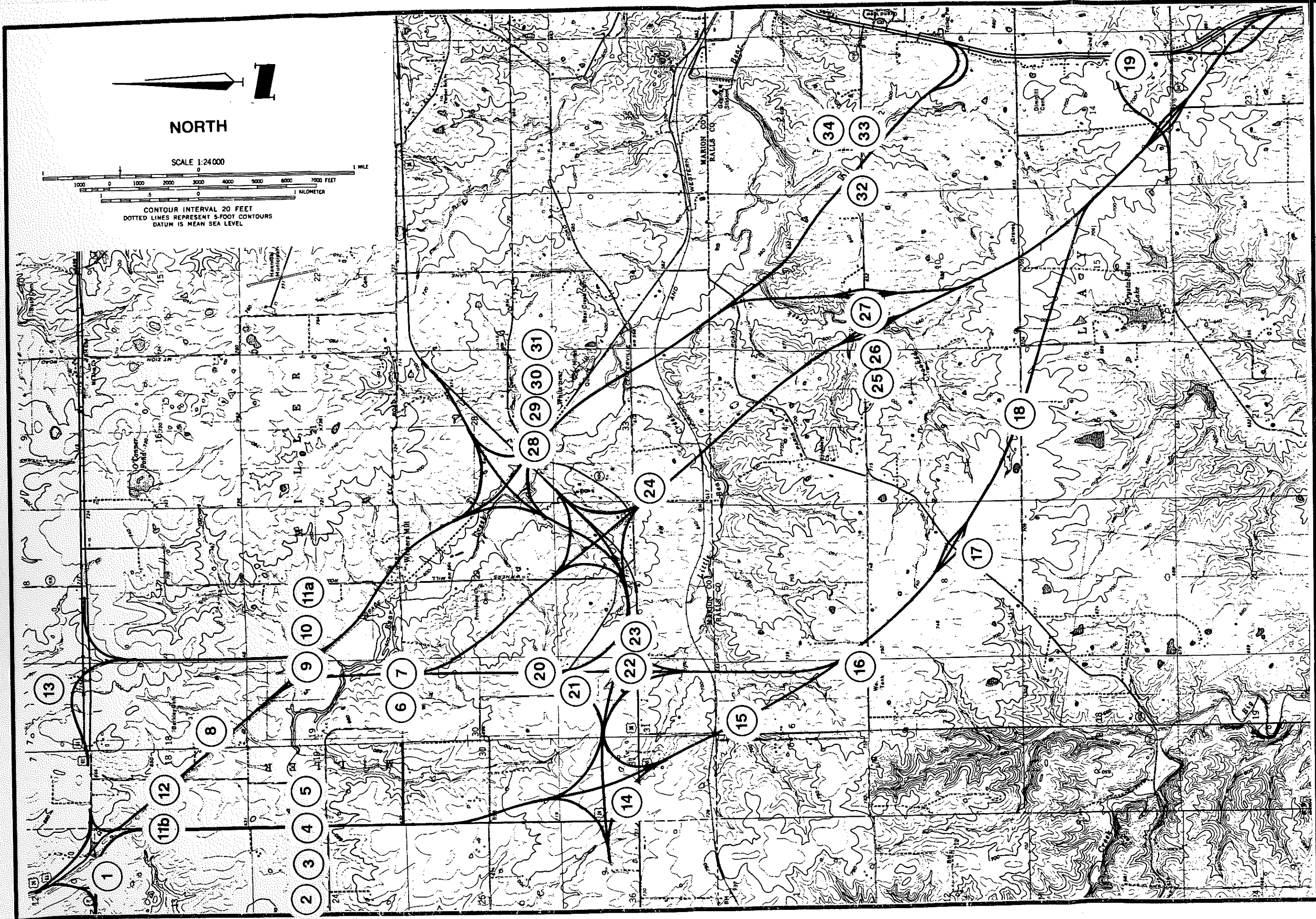
GBA Job No.: 7046.03

Site Name: MHTD Highway 61 Relocation Project

Site Location: Marion and Ralls Counties, Missouri

Photographer: C. Kuhn
Date\Time: 7/17/95
Frame No.: 34
Direction: South
Comments: Marion Co.
View to South Side.





**PROPOSED ALTERNATIVE
90 METER (300') CORRIDORS**
PHOTOGRAPH LOCATION
MHTD HIGHWAY 61 RELOCATION PROJECT
MARION AND RALLS COUNTIES, MISSOURI

DATE: 1/8/96
FIGURE: **A**

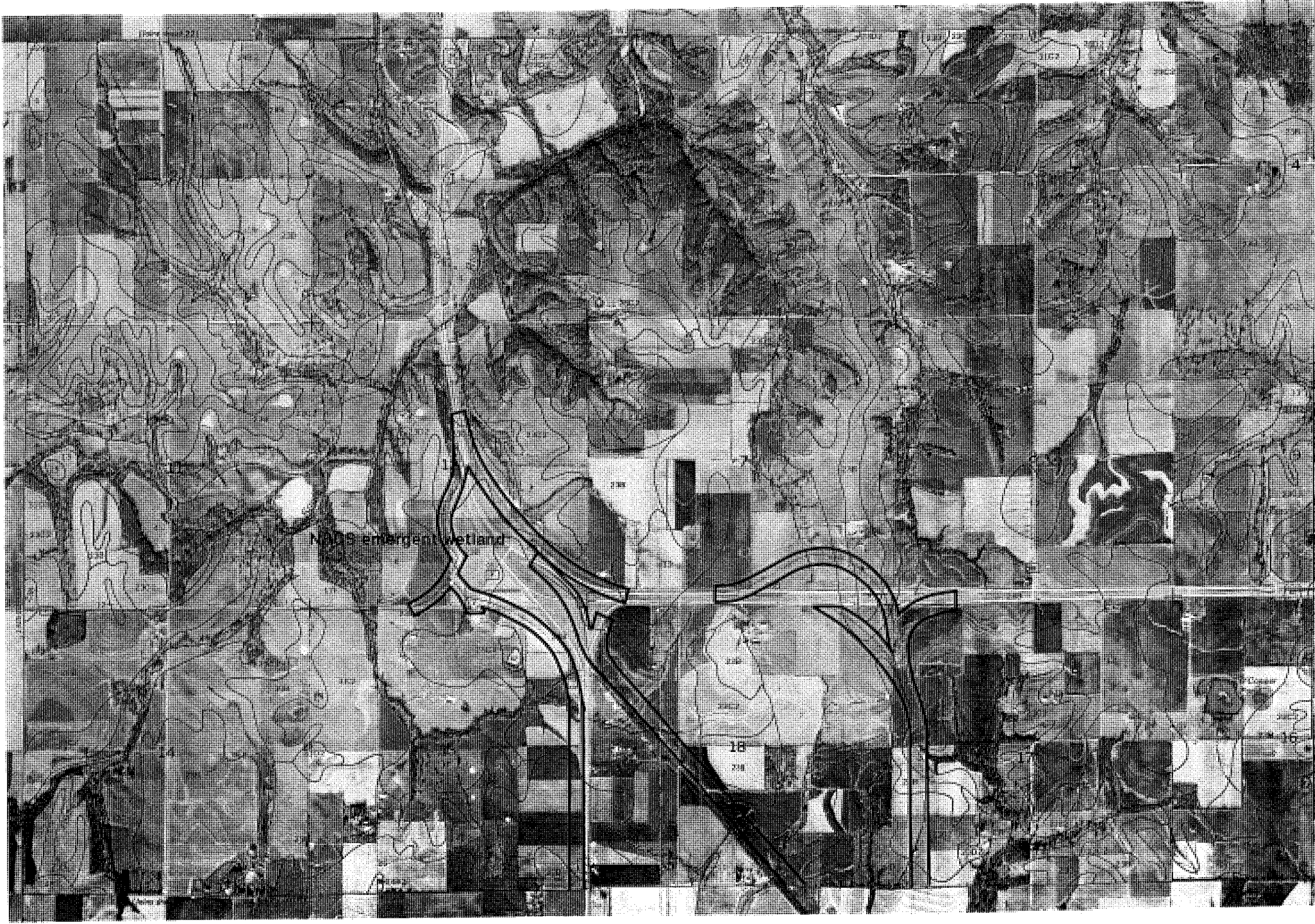
Attachment 2

**Nrcs County Soil Survey Aerial Photographs With Proposed Alternative Corridor
Segments**



1 Mile
5000 Feet

Scale: 1:20000
0 1000 2000 3000 4000 5000

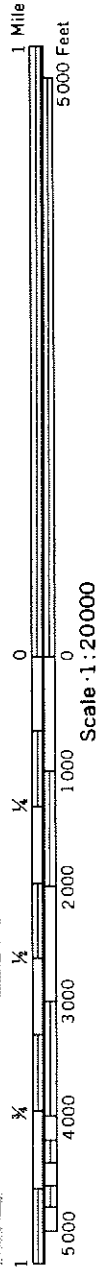


CTBA
GEORGE BUTLER ASSOCIATES, INC.
Engineering • Planning • Surveying • Mapping

**MHTD HIGHWAY 61
RELOCATION PROJECT**
NHC'S SOIL SURVEY MAPS WITH HYDRIC
SOIL AND NHC'S WETLANDS
MARION AND RALLS COUNTIES, MISSOURI

DATE: 1/8/98
FIGURE: 2

SHEET 1 OF 6



35
N

**MHTD HIGHWAY 61
RELOCATION PROJECT**
NRCS SOIL SURVEY MAPS WITH HYDRIC
SOIL AND NRCS WETLANDS
MARION AND RALLS COUNTIES, MISSOURI

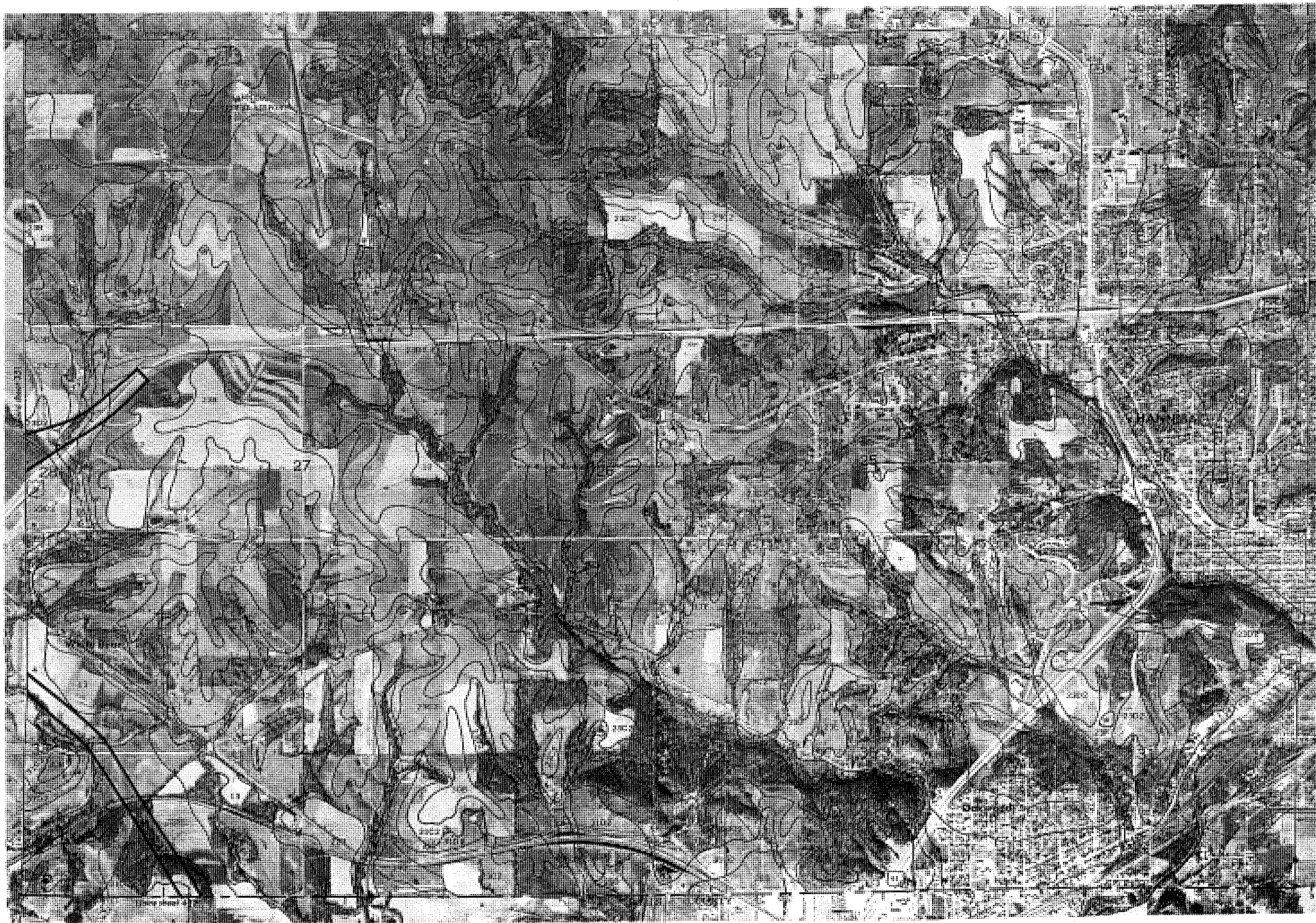
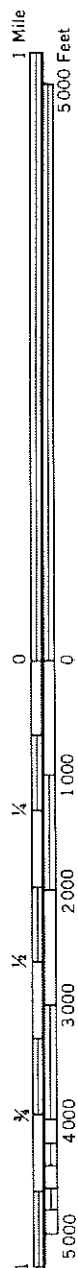
DATE: 1/8/96

FIGURE:

2

SHEET 2 OF 6

GBA
GEORGE BUTLER ASSOCIATES, INC.
Engineers/Architects/Landscape Architects/Planners
7046.03



DATE: 1/6/66

FIGURE:

2

MHTD HIGHWAY 61
RELOCATION PROJECT
NRCS SOIL SURVEY MAPS WITH HYDRIC
SOIL AND NRCS WETLANDS
MARION AND RALLS COUNTIES, MISSOURI

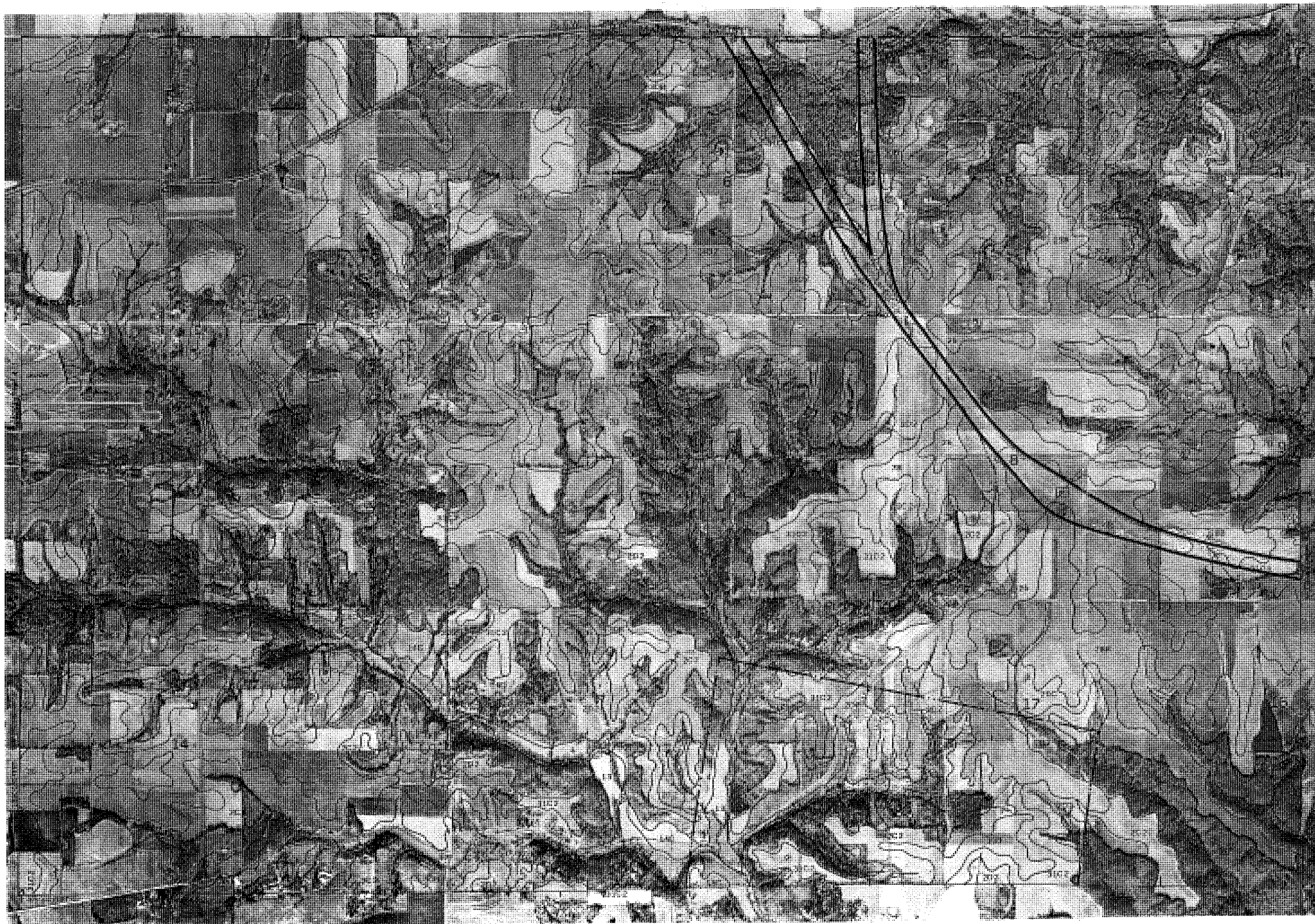
GBA
GEORGE B. ANDERSON, INC.
Engineering, Planning, Construction, Management

SHEET 3 OF 6



1 Mile
5000 Feet

0 1000 2000 3000 4000 5000
Scale: 1:20000



**MHTD HIGHWAY 61
RELOCATION PROJECT**

NRCS SOIL SURVEY MAPS WITH HYDRIC
SOIL AND NRCS WETLANDS

MARION AND RALLS COUNTIES, MISSOURI

DATE: 1/8/00

FIGURE:

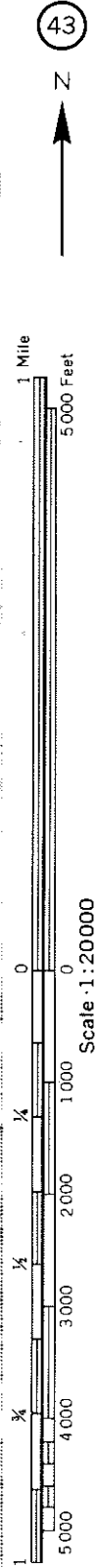
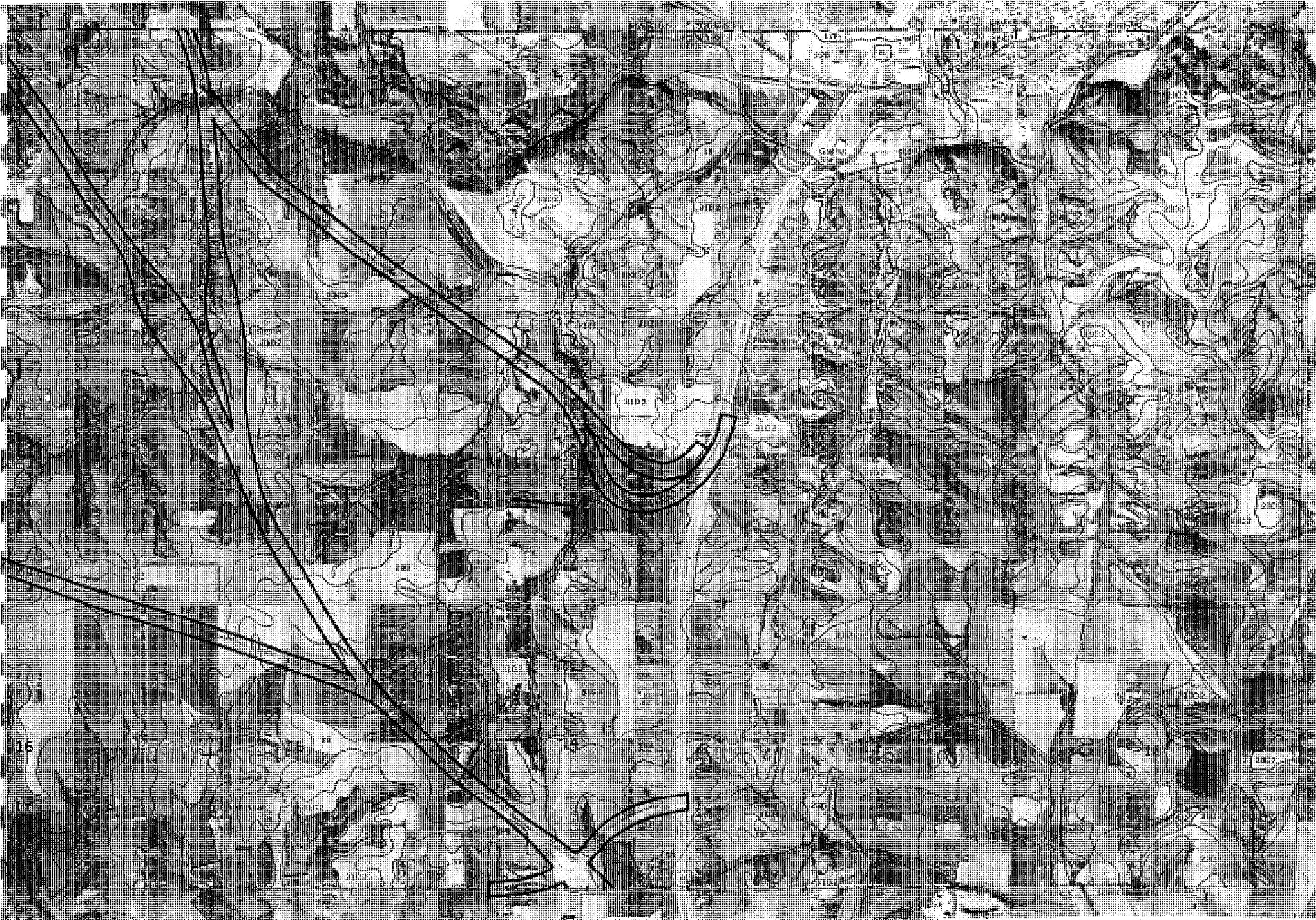
2

SHEET 4 OF 6

GBA

GEORGE BARTON ASSOCIATES, INC.
Engineering, Consulting, Construction Administration

March 2000

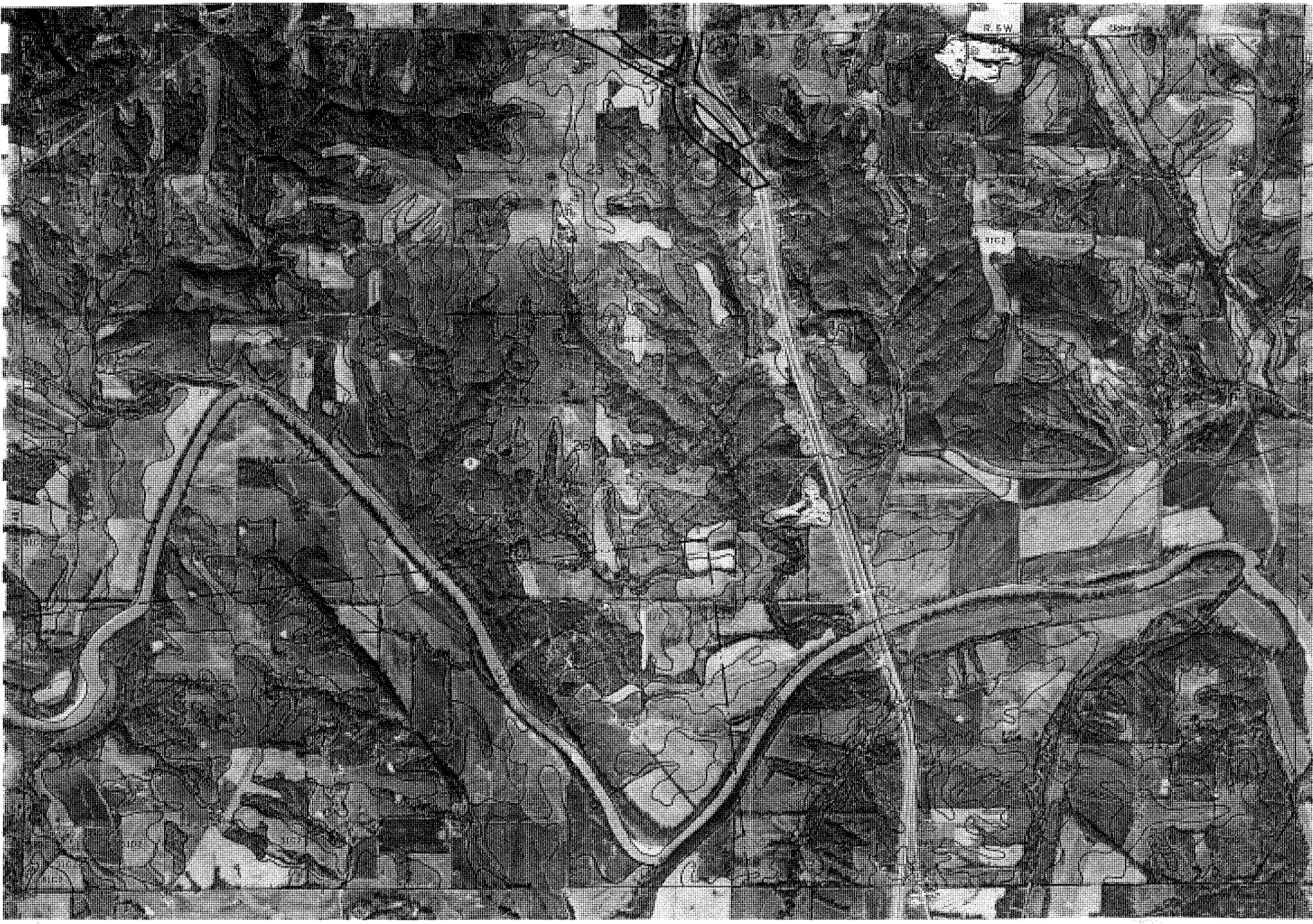
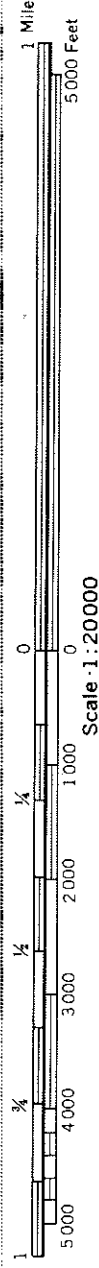


**MHTD HIGHWAY 61
RELOCATION PROJECT**
NRCS SOIL SURVEY MAPS WITH HYDRIC
SOIL AND NRCS WETLANDS
MARION AND RALLS COUNTIES, MISSOURI

DATE: 1/8/96

FIGURE: **2**

GBA
GEORGE BUTLER ASSOCIATES, INC.
Engineers/Architects/Landscape Architects/Planners
7046.03



**MHTD HIGHWAY 61
RELOCATION PROJECT**

**NRCS SOIL SURVEY MAPS WITH HYDRIC
SOIL AND NRCS WETLANDS**

MARION AND RALLS COUNTIES, MISSOURI

DATE: 1/8/96

FIGURE: **2**

GBA
GEORGE BUTLER ASSOCIATES, INC.
Engineers/Architects/Landscape Architects/Planners
7046.03

SHEET 6 OF 6

Attachment 3

**National Wetlands Inventory Topographic Maps
With
Proposed Alternative Corridor Segments**

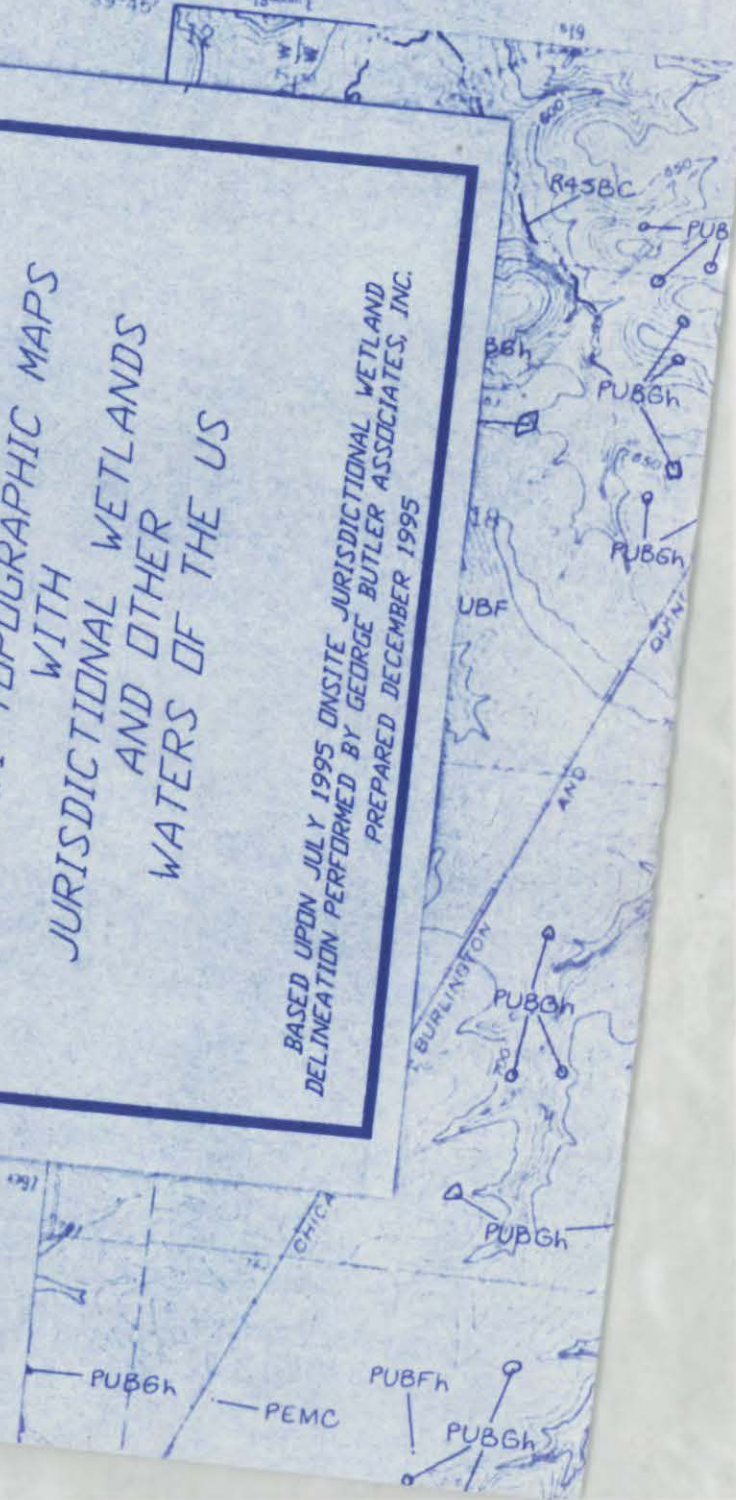


MHTD HIGHWAY 61
RELOCATION PROJECT
USFWS NWI TOPOGRAPHIC MAPS
WITH
JURISDICTIONAL WETLANDS
AND OTHER
WATERS OF THE US

BASED UPON JULY 1995 ON-SITE JURISDICTIONAL WETLAND
DELINEATION PERFORMED BY GEORGE BUTLER ASSOCIATES, INC.
PREPARED DECEMBER 1995

91°37'30" 418000m (

BASED UPON JULY 1995 ONSITE JURISDICTIONAL WETLAND
DELINEATION PERFORMED BY GEORGE BUTLER ASSOCIATES, INC.
PREPARED DECEMBER 1995



Attachment 4

Jurisdictional Wetland Delineation Data Sheets

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)
GBA 6/94

Project/Site: <u>U.S. HWY 61 RELOCATION PROJECT</u> Applicant/Owner: <u>MHTD</u> Investigator: <u>CAROL KUHN/George Butler Assoc.</u>		Date: <u>JULY 95</u> County: <u>Marion/Rails</u> State: <u>MO</u>
Do Normal Circumstances exist on the site? <input checked="" type="radio"/> Yes <input type="radio"/> No Is the site significantly disturbed (Atypical Situation)? <input type="radio"/> Yes <input checked="" type="radio"/> No Is the area a potential Problem Area? <input type="radio"/> Yes <input checked="" type="radio"/> No (If needed, explain on reverse.)		Community ID: _____ Transect ID: _____ Plot ID: <u>95-1</u>

Photos: 2

Site Description: HWY 24 crossing of Bear Creek. SW corner of crossing.

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Sambucus can.</u>	_____	<u>FACW-</u>	9. <u>Acer saccharinum</u>	_____	<u>FACW</u>
2. <u>Pastinaca sativa</u>	_____	<u>NL</u>	10. <u>Phalaris arund.</u>	_____	<u>FACW+</u>
3. <u>Gleditsia triac.</u>	_____	<u>FAC</u>	11. <u>Schrankia magn.</u>	_____	<u>N/L</u>
4. <u>Festuca arund.</u>	_____	<u>FACU+</u>	12. <u>Ipomoea hastata</u>	_____	<u>N/L</u>
5. <u>Toxicodendron rad.</u>	_____	<u>FAC+</u>	13. <u>Bromus inermis</u>	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. <u>other species</u>	_____	_____	15. _____	_____	_____
8. <u>Solidago ulmifolia</u>	_____	<u>N/L</u>	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 40% 2/5

Remarks: WD site in a cleared corridor ca. 100' wide adjacent to existing road bed. Beyond this clearing trees include *Celtis occidentalis*, *Ulmus rubra*, *Acer saccharinum*

SOILS

Map Unit Name (Series and Phase): <u>4</u>			Drainage Class: _____ Field Observations: _____ Confirm Mapped Type? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Taxonomy (Subgroup): _____					
Profile Description:					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
		<u>2.5Y 4/3</u>	—	—	—
Hydric Soil Indicators: <u>None</u>					
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors			<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)		
Remarks:					

yellow, dry, friable silty loam
for > 20" No moisture

→ 20"

6/94

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: <u>NONE</u> Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: <u>No water</u> Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	
Remarks:	

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes <input checked="" type="radio"/> No (Circle)	Is this Sampling Point Within a Wetland? Yes <input checked="" type="radio"/> No (Circle)
Wetland Hydrology Present?	Yes <input checked="" type="radio"/> No	
Hydric Soils Present?	Yes <input checked="" type="radio"/> No	
Remarks:		

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)
GBA 6/94

Project/Site: <u>U.S. HWY 61 RELOCATION PROJECT</u>		Date: <u>JULY 95</u>
Applicant/Owner: <u>MHTD</u>		County: <u>Marion/Ralls</u>
Investigator: <u>CARD K. H. J. / George Butler Assoc.</u>		State: <u>MO</u>
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)	Community ID: _____ Transect ID: _____ Plot ID: <u>95-2</u>	

Photos: 3

Site Description: HWY 24 crossing of Bear Creek SE corner of crossing.

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Solidago ulmifolia</u>		<u>N/L</u>	9. <u>Ulmus rubra</u>		<u>FAC</u>
2. <u>Silphium perfol.</u>		<u>FACW-</u>	10. <u>Pastinaca sativa</u>		<u>N/L</u>
3. <u>Monarda fistulosa</u>		<u>FACU</u>	11. <u>Asclepias syriaca</u>		
4. <u>Phalaris arund.</u>		<u>FACW+</u>	12. _____		
5. <u>Sambucus can.</u>		<u>FACW-</u>	13. _____		
6. _____			14. _____		
7. <u>other species:</u>			15. _____		
8. <u>Festuca arund.</u>		<u>FACU+</u>	16. _____		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 3/5 = 60%

Remarks:

SOILS

Map Unit Name (Series and Phase): <u>4</u>		Drainage Class: _____	
Taxonomy (Subgroup): _____		Field Observations Confirm Mapped Type? Yes No	
Profile Description:	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast
Depth (inches) Horizon	Texture, Concretions, Structure, etc.		
_____ 2.5Y 4/3	_____		
Hydric Soil Indicators:			
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors		<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)	
Remarks:			
yellow, dry, friable silty loam throughout sample (surface to 16")			

GBA
6/94

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: <u>NONE</u> Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: <u>NO water</u>	
Depth of Surface Water: _____ (in.)	
Depth to Free Water in Pit: _____ (in.)	
Depth to Saturated Soil: _____ (in.)	
Remarks:	

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes <u>No</u> (Circle)	(Circle)
Wetland Hydrology Present? Yes <u>No</u>	
Hydric Soils Present? Yes <u>No</u>	Is this Sampling Point Within a Wetland? Yes <u>No</u>
Remarks:	

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)
GBA 6/94

Project/Site: <u>U.S. HWY 61 RELOCATION PROJECT</u> Applicant/Owner: <u>MHTD</u> Investigator: <u>CARD KIM/J. George Butler Assoc.</u>		Date: <u>JULY 95</u> County: <u>Marion/Rails</u> State: <u>MO</u>
Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Atypical Situation)? Yes No Is the area a potential Problem Area? Yes No (If needed, explain on reverse.)		Community ID: _____ Transect ID: _____ Plot ID: <u>95-3</u>

Photos: 4

Site Description: HWY 24 crossing of Bear Creek NW corner of crossing

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Festuca arund.</u>		<u>FACW+</u>	9. <u>Asclepias syri.</u>		
2. <u>Gleditsia triac.</u>		<u>FAC</u>	10. <u>Toxicodendron rad.</u>		<u>FAC+</u>
3. <u>Phalaris arund.</u>		<u>FACW+</u>	11. _____		
4. <u>Sambucus can</u>			12. _____		
5. <u>Pastinaca sativa</u>			13. _____		
6. _____			14. _____		
7. <u>other species</u>			15. _____		
8. <u>Morinda fist.</u>		<u>FACW</u>	16. _____		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC+): _____

Remarks: _____

SOILS

Map Unit Name (Series and Phase): <u>4</u>		Drainage Class: _____ Field Observations Confirm Mapped Type? Yes No																
Taxonomy (Subgroup): _____																		
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Profile Description:</th> <th style="text-align: left;">Matrix Color:</th> <th style="text-align: left;">Mottle Colors</th> <th style="text-align: left;">Mottle</th> <th style="text-align: left;">Texture, Concretions,</th> </tr> <tr> <th style="text-align: left;">Depth (inches) Horizon</th> <th style="text-align: left;">(Munsell Moist)</th> <th style="text-align: left;">(Munsell Moist)</th> <th style="text-align: left;">Abundance/Contrast</th> <th style="text-align: left;">Structure, etc.</th> </tr> </thead> <tbody> <tr> <td style="height: 40px; vertical-align: bottom;">25Y 4/3</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Profile Description:	Matrix Color:	Mottle Colors	Mottle	Texture, Concretions,	Depth (inches) Horizon	(Munsell Moist)	(Munsell Moist)	Abundance/Contrast	Structure, etc.	25Y 4/3				
Profile Description:	Matrix Color:	Mottle Colors	Mottle	Texture, Concretions,														
Depth (inches) Horizon	(Munsell Moist)	(Munsell Moist)	Abundance/Contrast	Structure, etc.														
25Y 4/3																		
Hydric Soil Indicators: <u>NONE</u>																		
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors		<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)																
Remarks: _____																		
friable silty loam surface to 18"																		

6/94

HYDROLOGY

<p>___ Recorded Data (Describe in Remarks):</p> <p>___ Stream, Lake, or Tide Gauge</p> <p><input checked="" type="checkbox"/> Aerial Photographs</p> <p>___ Other</p> <p>___ No Recorded Data Available</p> <hr/> <p>Field Observations: <i>No water</i></p> <p>Depth of Surface Water: _____ (in.)</p> <p>Depth to Free Water in Pit: _____ (in.)</p> <p>Depth to Saturated Soil: _____ (in.)</p>	<p>Wetland Hydrology Indicators: <i>NONE</i></p> <p>Primary Indicators:</p> <p>___ Inundated</p> <p>___ Saturated in Upper 12 Inches</p> <p>___ Water Marks</p> <p>___ Drift Lines</p> <p>___ Sediment Deposits</p> <p>___ Drainage Patterns in Wetlands</p> <p>Secondary Indicators (2 or more required):</p> <p>___ Oxidized Root Channels in Upper 12 Inches</p> <p>___ Water-Stained Leaves</p> <p>___ Local Soil Survey Data</p> <p>___ FAC-Neutral Test</p> <p>___ Other (Explain in Remarks)</p>
<p>Remarks:</p>	

WETLAND DETERMINATION

<p>Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No (Circle)</p> <p>Wetland Hydrology Present? Yes <input checked="" type="radio"/> No</p> <p>Hydric Soils Present? Yes <input checked="" type="radio"/> No</p>	<p>Is this Sampling Point Within a Wetland? Yes <input checked="" type="radio"/> No (Circle)</p>
<p>Remarks:</p>	

Approved by HQUSACE 3/92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)
GBA 6/94

Project/Site: <u>U.S. HWY 61 RELOCATION PROJECT</u>		Date: <u>JULY 95</u>
Applicant/Owner: <u>MHTD</u>		County: <u>Marion/Rails</u>
Investigator: <u>CARD, RUTH/George Butler Assoc.</u>		State: <u>MO</u>
Do Normal Circumstances exist on the site?	Yes No	Community ID: _____
Is the site significantly disturbed (Atypical Situation)?	Yes No	Transect ID: _____
Is the area a potential Problem Area? (If needed, explain on reverse.)	Yes No	Plot ID: <u>95-4</u>

Photos: 5

Site Description: HWY 24 crossing of Bear Creek. NE corner of crossing.

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Gleditsia triac.</u>		<u>FAC</u>	9. <u>Ulmus rubra</u>		<u>FAC</u>
2. <u>Phalaris arun.</u>		<u>FACW+</u>	10. _____		
3. <u>Solidago ulm</u>		<u>N/L</u>	11. _____		
4. <u>Festuca arund.</u>		<u>FACW+</u>	12. _____		
5. <u>Festuca elatior</u>		<u>N/L</u>	13. _____		
6. _____			14. _____		
7. <u>Other species</u>			15. _____		
8. <u>Acer saccharinum</u>		<u>FACW</u>	16. _____		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 2/5 40%

Remarks: cleared to bank; recently mowed.

SOILS

Map Unit Name (Series and Phase): <u>4</u>		Drainage Class: _____	
Taxonomy (Subgroup): _____		Field Observations Confirm Mapped Type? Yes No	
<u>Profile Description:</u>	<u>Matrix Color:</u>	<u>Mottle Colors:</u>	<u>Mottle</u>
Depth (inches) Horizon	(Munsell Moist)	(Munsell Moist)	Abundance/Contrast
	<u>2.5Y 4/3</u>		
Hydric Soil Indicators: <u>NONE</u>			
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input type="checkbox"/> Reducing Conditions <input type="checkbox"/> Gleyed or Low-Chroma Colors		<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)	
Remarks: _____			

friable dry yellow silty loam to 16"

6/94

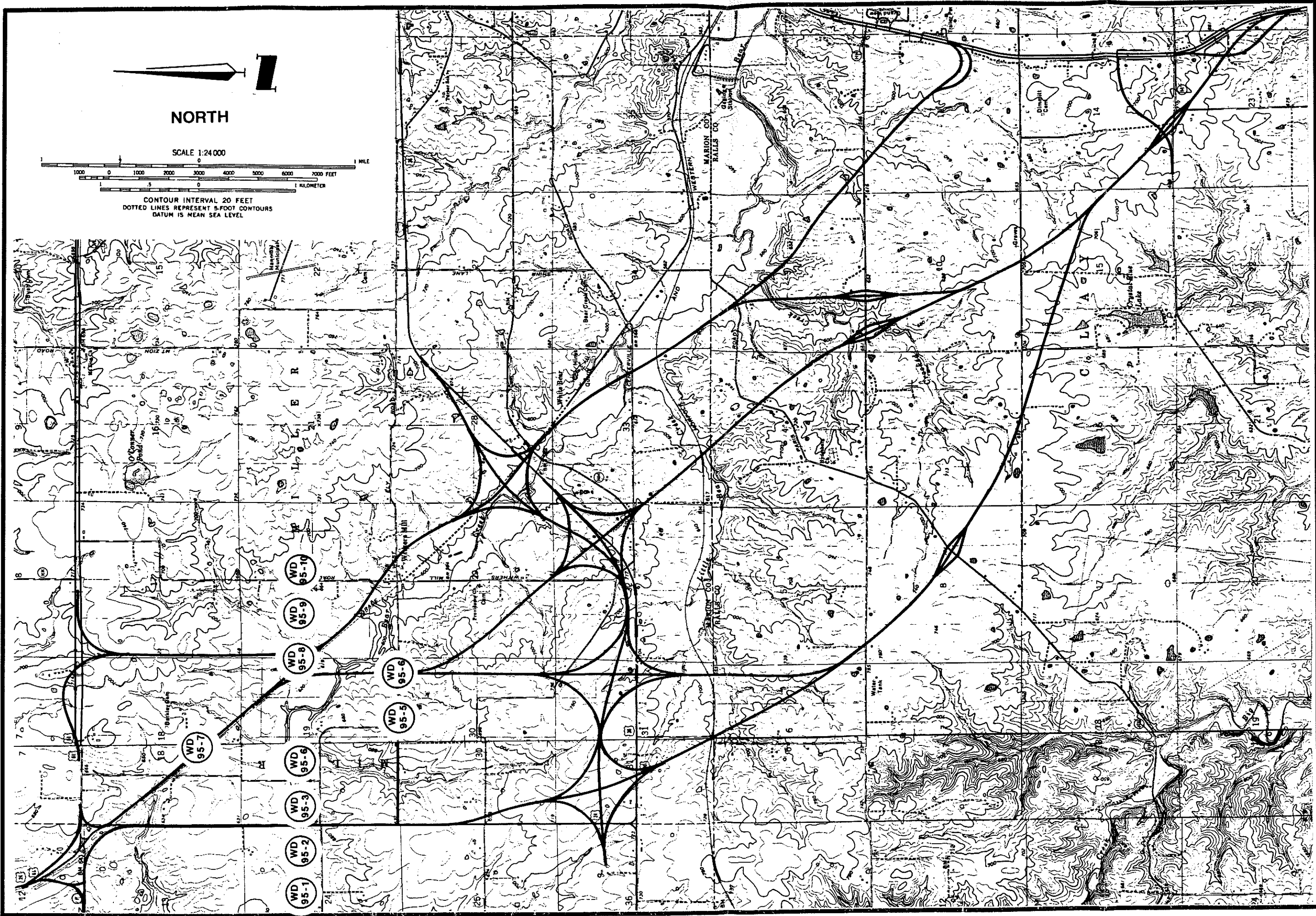
HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: <u>NONE</u> Primary Indicators: <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: <u>No water</u> Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: _____ (in.)	
Remarks:	

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes <input checked="" type="radio"/> No (Circle)	Is this Sampling Point Within a Wetland? Yes <input checked="" type="radio"/> No (Circle)
Wetland Hydrology Present?	Yes <input checked="" type="radio"/> No	
Hydric Soils Present?	Yes <input checked="" type="radio"/> No	
Remarks:		

Approved by HQUSACE 3/92



**PROPOSED ALTERNATIVE
90 METER (300') CORRIDORS**
DATA POINT LOCATIONS
MHTD HIGHWAY 61 RELOCATION PROJECT
MARION AND RALLS COUNTIES, MISSOURI

DATE: 1/8/96

FIGURE: **1**

APPENDIX B

INDIANA BAT SURVEY REPORT

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APPENDIX B

INDIANA BAT SURVEY REPORT

1.0 INTRODUCTION

1.1 *MYOTIS SODALIS* - REVIEW

In 1973 the Indiana Bat, *Myotis sodalis*, was given status as a federally listed endangered species as defined by the Endangered Species Act. An Indiana Bat Recovery Team (actually Indiana Bat/Gray Bat Recovery Team) was subsequently selected to develop a Recovery Plan for the species. The Indiana Bat Recovery Plan, dated 14 October 1983, was prepared by the U.S. Fish and Wildlife Service in cooperation with the Recovery Team and consultants. Because the 1983 Recovery Plan is now somewhat outdated and lacking in information concerning certain aspects of Indiana bat ecology, primarily that relating to summer habitat, the Recovery Plan is currently being revised.

The Indiana bat is found in cave regions of the eastern and mid-western U.S. extending from Vermont to northwestern Florida and westward to Oklahoma and Iowa, and in areas to the north of these cave regions. The Indiana bat is considered endangered throughout its entire range. The current population of Indiana bats is estimated at less than 400,000 individuals. Although the Indiana bat is considered a cave-dwelling species, most caves are unsuitable for Indiana bat habitation. In winter, 85 percent of the known population of Indiana bats hibernates in only nine caves or mines in Missouri, Indiana and Kentucky.

In mid- to late spring, female Indiana bats leave the hibernation cave/mine and disperse to summer maternity roosts. Locations of summer roosting sites remained a mystery until the early 1970's when investigators discovered female Indiana bats roosting beneath the bark of dead trees (Humphrey et al. 1977) and foraging over wooded streams (Cope et al. 1974) in Indiana. Since then, several summer roosting sites have been discovered in Indiana, Illinois, Kentucky, Missouri, Ohio, and Michigan (Gardner et al. 1991, Garner and Gardner 1992, Laval et al. 1977, LaVal and LaVal 1980, Marquart 1994). "Typical" Indiana bat summer habitat is wooded floodplain or upland in proximity to perennial streams. Within these areas, optimal roosts are found beneath exfoliating bark of dead trees, beneath naturally exfoliating bark of living trees, e.g., shagbark hickory, or in tree cavities (Gardner et al.

1991, Garner and Gardner 1992). Garner and Gardner (1992), in an Illinois study, found that Indiana bats occupied roosts in proximity to intermittent streams but usually more than 500 meters from paved roads. They located roosts in both uplands and floodplains with forested habitats containing both closed (80%-100%) canopies and intermediate (30%-80%) canopies. They also located Indiana bat roosts in trees in a wetland, on a heavily grazed ridgetop, and in a partially wooded swine feedlot. In the same study, none of the roosts located were in open (10%-30%) canopy forests, agricultural lands other than pastures, or residential areas. Garner and Gardner (1992) suggested that roost trees are chosen by Indiana bats based on the following factors: 1) the area of loose bark or cavity available, 2) the ability to protect bats from external variables such as heat, rain, etc., and 3) the spatial relationship of the roost tree to roads, streams, alternate roosts, and foraging areas.

The major threats to the continued existence of the Indiana bat are disturbance or destruction of the hibernacula and destruction of the bats' summer roosting and foraging habitat (Garner and Gardner 1992). All known major hibernacula are currently protected with gates and/or management agreements with landowners. Many minor hibernacula have no, or marginal protection, at best. The loss of summer roosting and foraging habitat occurs from land clearing, development, and stream channelization.

In Missouri the Indiana bat is found throughout the state. Twenty-nine caves, mostly in the Ozark region of the state, are known to have served as hibernation caves for at least 100 Indiana bats each at some time in the past (Clawson *et al.* 1992). Laval and Laval (1980) reported on the distribution and status of Indiana bats in Missouri through 1979. At that time, they reported 11 known caves serving as hibernacula for over 1,000 bats each. The eleven hibernation caves accounted for approximately 350,000 bats, or about 67% of the entire known Indiana bat population. By 1980, Laval and Laval (1980) concluded that despite declines at certain hibernacula, the winter population of the Indiana bat in Missouri was relatively stable. Although Laval and Laval's capture data on summer Indiana bats in Missouri was limited, they felt that available summer habitat was not being fully used even though there has been a reduction of available summer habitat throughout most of the Indiana bat's range.

More recent data indicate a steady decline of Indiana bat populations at winter hibernacula throughout the 1980's (Clawson *et al.* 1992). By 1991, Missouri's winter Indiana bat

population had dropped to approximately 190,000 bats, a 46% reduction since 1979. There is still relatively little information on the status of Missouri's summer Indiana bat population. In 1992, the Missouri Department of Conservation assembled a Management Plan for the Indiana bat in Missouri (Clawson *et al.* 1992). The primary objectives of this plan are to 1) stabilize [Missouri] Indiana bat populations by 1997 and restore populations to the 1981 level by 2002, and 2) inform the public about endangered bats, their needs, and management.

1.2 STUDY OBJECTIVES

As part of the EIS for the Route 61 Hannibal relocation, a study was conducted to assess suitability of habitat for Indiana bats in the vicinity of the proposed by-pass corridors. The specific purpose of this study was to rank plots within the study area as to their quality of potential Indiana bat habitat. It was not the purpose of this study to determine if the potential habitat is actually being used by Indiana bats, nor does this report describe possible impacts on Indiana bat populations possibly within the study area.

2.0 FIELD INVESTIGATIONS

2.1 STUDY AREA

The study area for the proposed Route 61 relocation is located in Marion and Ralls Counties, Missouri, generally south and west of the city of Hannibal. The study area, as depicted in Exhibit B-1 is bounded on the north and east by U.S. Highway 61. The western and southern limits of the study area were U.S. Route 24 and State Route M, respectively.

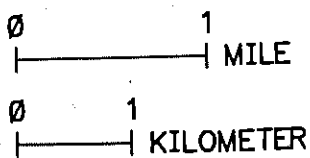
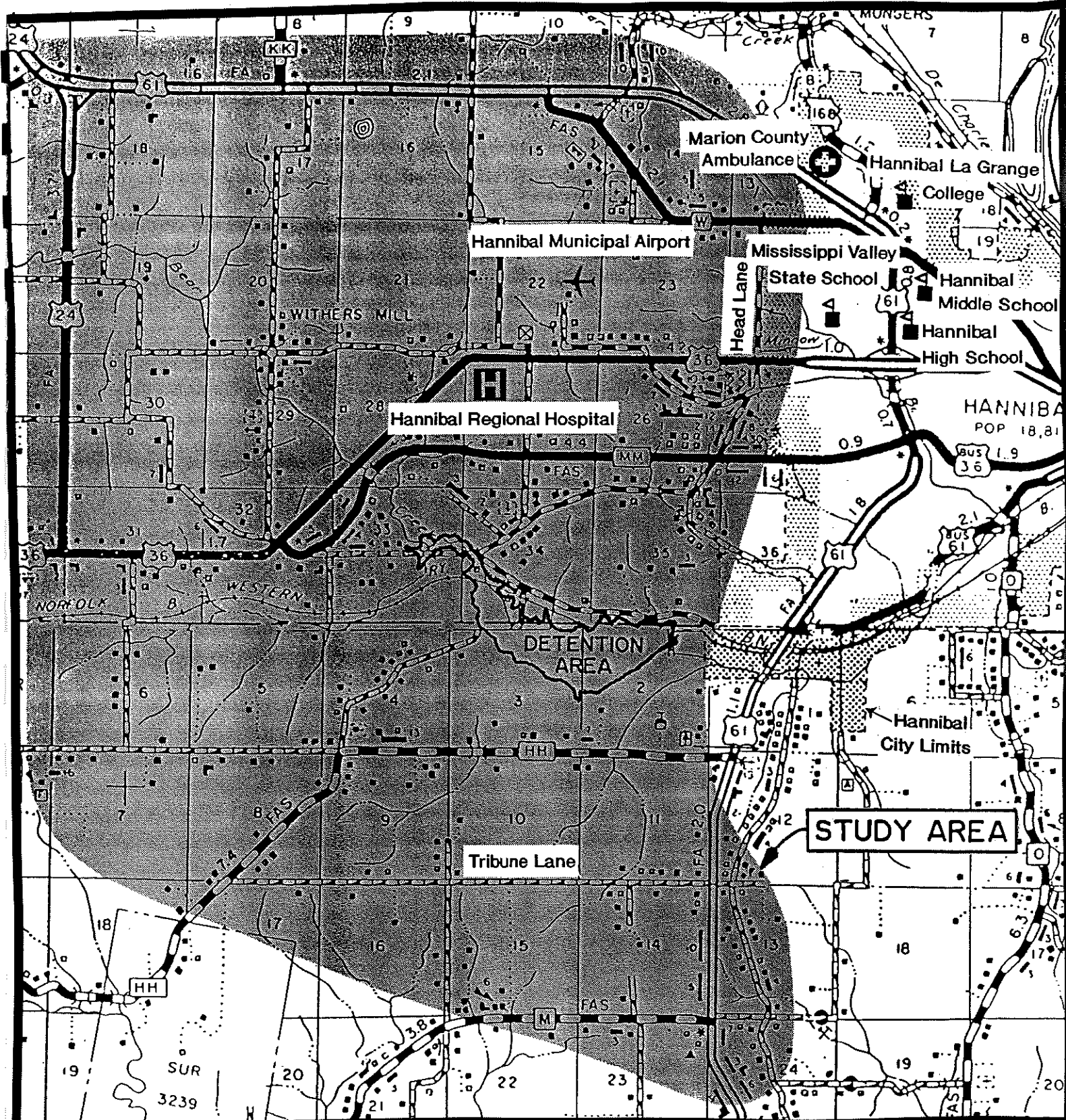
Four relocation routes with inter-connecting links are proposed within the study area (Exhibit B-2, Sheets a, b, and c). The four proposed routes have been designated as CW, D, EF, and F. Note that two or more of the proposed relocation routes share common segments.

2.2 STUDY METHODS

As previously stated, the specific purpose of this study was to rank plots within the study area as to their quality of potential Indiana bat habitat. Previous similar studies have focused on computing an estimate of potential roost tree density and assessing the availability of foraging habitat. Together, these data were used to describe the overall Indiana bat habitat suitability (Garner and Gardner 1992). A similar approach was developed for the current study in consultation with the Missouri Highway and Transportation Department.

2.2.1 Woodland Analysis

The purpose of the woodland analysis was to obtain an estimate of potential roost tree density within forested regions of the study area. Garner and Gardner (1992) previously estimated the mean nightly foraging area for lactating adult female Indiana bats was approximately 344 hectare (850 acre). Following the method of Garner and Gardner (1992), a series of 344 hectares (850 acre) circular plots were drawn on an aerial photo along the centerline of each corridor. Thus, the corridor centerline falling within each circle represented approximately the diameter of the circle ($d = 6900$ ft). Each 344 hectare (840 acre) circular plot was sequentially labelled according to its corridor. Ten woodland (forested) areas were selected throughout the study area and labelled similar to that of the nearest corresponding 344 hectare (840 acre) circular plot. Each woodland area was



PROJECT
STUDY AREA
Exhibit B-1

selectively, *i.e.*, not randomly, chosen based on its size, accessibility through landowner, terrain, and relative elevation, *e.g.*, floodplain or upland. Locations of the selected woodlands are shown in Exhibit B-2.

Within each woodland, potential roost tree density was estimated using the wandering quarter method (Brower and Zar, 1984). To be considered a potential roost tree, a tree had to contain greater than 25% exfoliating bark and be greater than or equal to 22 cm (9 inches) dbh (diameter at breast height) or contain a hollow opening or cavity. On a few occasions, trees less than 22 cm (9 inches) dbh were counted as potential roost trees if they contained a large amount of exfoliating bark or cavities.

2.2.2 Transecting Road Analysis

Other studies have documented Indiana bats using roost trees in non-forested areas (see Section 1.1). In the Route 61 Relocation study area, many trees are found in non-forested areas such as fencerows, roadsides, and pastures. The following method was developed to obtain an estimate of potential roost tree density in these non-forested areas.

A "drive-by" count of potential roost trees was made at the intersection of the proposed corridor and an existing road. The road was thus considered a transect through the corridor. Information recorded during each road count included the length of the transect, the width visually surveyed (*e.g.*, 30.48 m (100 feet) each side of the road) and the number of potential roost trees along with the species, if possible. A total of 16 locations was surveyed by the transecting road method.

3.0 DATA ANALYSIS

3.1 FORAGING HABITAT ASSESSMENT

Within each 344 hectare (840 acre) circular plot, the percent forested area was computed by direct measurement from an aerial photo. Additionally, the presence of permanent water bodies, *e.g.*, streams or ponds, were noted within each circular plot. These data were used to classify the area within each plot according to the following criteria from Garner and Gardner (1992):

<u>Foraging Habitat Classification</u>	<u>Percent Forest</u>	<u>Percent Water</u>
Optimal	> 33	≥ 0.1
Suitable	< 33, ≥ 5	< 0.1, > 0
Unsuitable	< 5	< 0.1

3.2 POTENTIAL ROOST TREE DENSITY

Potential roost tree density, *i.e.*, the number of potential roost trees per hectare within the woodland areas, was calculated with the following equation:

$$PRTD = \frac{1}{d_{avg}^2} \times 10,000$$

where: PRTD = Potential Roost Tree Density,
d_{avg} = the average point-to-plant distance in meters,
and 10,000 = the number of square meters per hectare.

Potential roost tree density for non-forested areas, determined by the transecting road method, was calculated with the following equation:

$$PRTD = \frac{\sum n}{A} \times 10,000$$

where: PRTD = Potential Roost Tree Density,
 $\sum n$ = total number of potential roost trees,
 A = area surveyed (length X width) in square meters,
 and 10,000 = number of square meters per hectare.

Computed densities of potential roost trees for both forested and non-forested areas were compared to the following density suitability ranking as suggested by Garner and Gardner:

Potential Roost Tree Density (Trees/ha) Ranking			
	<u>Optimal</u>	<u>Suitable</u>	<u>Marginally Suitable*</u>
Upland	≥ 64	$< 64, \geq 1$	< 1
Floodplain	≥ 41	$< 41, \geq 1$	< 1

* Would not be favorable for the establishment of maternity colonies within a given area.

3.3 OVERALL HABITAT SUITABILITY

Garner and Gardner (1992) provided the following definition of suitable summer habitat for the Indiana bat; "...any site within the currently delineated summer range of the species that meet the following criteria:

- 1) Deciduous forest cover $\geq 5\%$ and permanent water available within a 1 km (0.6 miles) circle and,
- 2) Suitable roost trees located within 0.4 km (1,312 feet) of [an area meeting criteria 1 above].

For the current study each of the 344 hectare (840 acre) circular plots was compared to these criteria and ranked as either "Suitable" or "Unsuitable" as Indiana bat summer habitat.

4.0 RESULTS

Results of the foraging habitat assessment, potential roost tree density surveys, and overall habitat suitability rankings are presented in the following section. These results are presented separately for each of the four proposed corridors.

4.1 CORRIDOR CW

Six 344 hectare (850 acre) circular plots were located along proposed Corridor CW. Results of the foraging habitat assessment are shown in Table B4-1. All but the northern-most circular plot, CW-1, were considered "Suitable" for Indiana bat foraging habitat based on percent forest and water availability. Plot CW-1 was located at the northern terminus of the proposed Corridor CW with Highway 61 and was characterized mostly by large agricultural fields. The remainder of proposed Corridor CW also contained cropland and pasture but retained sufficient deciduous forested areas to be "Suitable" Indiana bat foraging habitat. Both farm ponds and Bear Creek occur in close proximity to the proposed corridor and as permanent water bodies serve to enhance the available foraging habitat.

Potential roost tree density surveys associated with proposed Corridor CW were performed in Woodlands CW-3, CW-4, CW-5 and Road Transects CW-258, CW-274, CW-277 and CW-HH (Exhibit B-2). A summary of potential roost tree (PRT) density results is given in Table B4-2. Detailed data from these surveys are given in the Attachment.

Woodlands CW-4 and CW-5 were floodplain forested communities located adjacent to Bear Creek and contained estimated PRT densities of 7.2 and 18.2 trees/hectare, respectively. The majority of PRT's in these areas were represented by dead silver maples (*Acer saccharinum*), box elders (*Acer negundo*) or cottonwoods (*Populus deltoides*). The highest estimated PRT density (38.4 trees/hectare) along Corridor CW was in Woodland CW-3. This upland area appeared to be a former clearing with a regrowth of predominantly black locust (*Robinia pseudoacacia*) and mulberry (*Morus rubra*). The occurrence of locust trees, dead and living, with much exfoliating bark, resulted in the high density estimate for this woodland.

**TABLE B4-1
INDIANA BAT FORAGING HABITAT ASSESSMENT
AND SUITABILITY RANKING**

344 hectare CIRCULAR PLOT	% FORESTED AREA	PERMANENT WATER AVAILABLE?	SUITABILITY RANKING
CW-1	4.2	Yes	Unsuitable
CW-2	8.4	Yes	Suitable
CW-3	11.5	Yes	Suitable
CW-4	19.1	Yes	Suitable
CW-5	24.0	Yes	Suitable
CW-6	11.0	Yes	Suitable
D-1	0.6	Yes	Unsuitable
D-2	9.5	Yes	Suitable
D-3	19.7	Yes	Suitable
D-4	20.1	Yes	Suitable
D-5	25.3	Yes	Suitable
D-6	13.4	Yes	Suitable
D-7	18.0	Yes	Suitable
EF-1	0.6	Yes	Unsuitable
EF-2	9.5	Yes	Suitable
EF-3	7.6	Yes	Suitable
EF-4	17.7	Yes	Suitable
EF-5	6.5	Yes	Suitable
EF-6	14.9	Yes	Suitable
EF-7	10.4	Yes	Suitable
EF-8	18.0	Yes	Suitable

**TABLE B4-1
INDIANA BAT FORAGING HABITAT ASSESSMENT
AND SUITABILITY RANKING**

344 hectare CIRCULAR PLOT	% FORESTED AREA	PERMANENT WATER AVAILABLE?	SUITABILITY RANKING
F-1	0.6	Yes	Unsuitable
F-2	9.3	Yes	Suitable
F-3	6.9	Yes	Suitable
F-4	24.2	Yes	Suitable
F-5	6.5	Yes	Suitable
F-6	14.9	Yes	Suitable
F-7	10.4	Yes	Suitable
F-8	18.0	Yes	Suitable

TABLE B4-2
POTENTIAL ROOST TREE DENSITY ESTIMATES
AND SUITABILITY RANKINGS

CORRIDOR	SURVEY TYPE*	LOCATION	PRT DENSITY (trees/ hectare)	SUITABILITY RANKING
CW	Woodland	CW-3	38.4	Suitable
CW	Woodland	CW-4	7.2	Suitable
CW	Woodland	CW-5	18.2	Suitable
CW	Road Transect	CW-258	1.8	Suitable
CW	Road Transect	CW-274	1.1	Suitable
CW	Road Transect	CW-277	0.4	Marginally Suitable
CW	Road Transect	CW-HH	0.9	Marginally Suitable
D	Woodland	D-3 North	13.5	Suitable
D	Woodland	D-3 South	44.4	Suitable
D	Woodland	D-5	7.6	Suitable
D	Woodland	F-8	41.6	Suitable
D	Road Transect	D-259	4.8	Suitable
D	Road Transect	EF-274	0.72	Marginally Suitable
D	Road Transect	D-26	0.4	Marginally Suitable
D	Road Transect	D-277	0	Unsuitable
D	Road Transect	D-276	0.4	Marginally Suitable
D	Road Transect	D-HH	1.6	Suitable
D	Road Transect	D-48	0.3	Marginally Suitable

TABLE B4-2
POTENTIAL ROOST TREE DENSITY ESTIMATES
AND SUITABILITY RANKINGS

CORRIDOR	SURVEY TYPE*	LOCATION	PRT DENSITY (trees/ hectare)	SUITABILITY RANKING
EF	Woodland	F-4	14.6	Suitable
EF	Woodland	F-5	12.4	Suitable
EF	Woodland	F-8	41.6	Suitable
EF	Road Transect	D-259	4.8	Suitable
EF	Road Transect	D-274	0.72	Marginally Suitable
EF	Road Transect	EF-261	0	Unsuitable
EF	Road Transect	F-HH Spur	0.6	Marginally Suitable
EF	Road Transect	F-HH	1.9	Suitable
F	Woodland	F-2	23.3	Suitable
F	Woodland	F-4	14.6	Suitable
F	Woodland	F-5	12.4	Suitable
F	Woodland	F-8	41.6	Suitable
F	Road Transect	F-24	0.25	Marginally Suitable
F	Road Transect	F-HH Spur	0.6	Marginally Suitable
F	Road Transect	F-HH	1.9	Suitable

* Would not be favorable for the establishment of maternity colonies within the area.

Of the non-forested areas of Corridor CW, as represented by the road transects, two (CW-258 and CW-274) were considered "Suitable" while two (CW-277 and CW-HH) were considered "Marginally Suitable". The PRT in these non-forested areas varied from dead roadside trees with exfoliating bark *e.g.*, slippery elm(*Ulmus rubra*) and honey locust (*Gleditsia triacanthos*), to larger pasture trees with cavities or lightning-strike scars, *e.g.*, white oak (*Quercus alba*) and cottonwood.

Combining the foraging habitat and PRT density data yielded a "Suitable" ranking for overall Indiana bat summer habitat for all 344 ha circular plots along Corridor CW except plot CW-1. Qualitatively, potential Indiana bat summer habitat along proposed Corridor CW appears good in the southern and middle regions associated with larger wooded tracts and Bear Creek. The northern segment of the proposed corridor diminishes in potential habitat quality.

White Bear Mine

White Bear Mine, located along the eastern edge of Corridor CW between Route MM and Centerville Road, was visited on August 2, 1994 by Dr. Michael Harvey and Woodward-Clyde personnel. A cluster of bats was located in a natural dome ceiling approximately 61 m (200 ft) inside the mine. Cluster size was estimated at 0.5 m x 0.5 m (1.5 feet x 1.5 feet), or about 400 bats. Identification of the bats was not possible at this time due to inaccessibility. Other bats noted in the mine during this visit were eight Eastern pipestrelles (*Pipistrellus subflavus*) and three Big Brown bats (*Eptesicus fuscus*).

The investigators returned to the mine on August 4, 1994 with James Gardner of the Missouri Highway and Transportation Department. Mr. Gardner concurred with the previous estimate of 400 bats in the cluster. Nine of the bats were plucked from the cluster; seven were identified as Little Brown bats (*Myotis lucifugus*) and two were identified as Indiana bats. This ratio would yield an estimate of approximately 90 Indiana bats for the cluster. All nine of the identified bats were males, thus indicating a bachelor colony.

The owner of the mine stated that a cluster of bats was commonly present during winter months. On December 28, 1994, James Gardner and Richard Clawson visited the mine and counted 22 Indiana bats. Additionally, they noted 300 - 400 Little Brown bats and 46

Eastern pipestrelles. They also noted evidence of past (historical) use by Gray bats, although none were noted during any of the visits to the mine.

4.2 CORRIDOR D

Seven 344 hectare (850 acre) circular plots were located along proposed Corridor D. Results of the foraging habitat assessment are shown in Table 4.1. Like Corridor CW, all but the northern-most circular plot, D-1, were "Suitable" for Indiana bat foraging habitat based on percent forest and water availability. Plot D-1 was located at the intersection of Highway 24 and Highway 61 and contains mostly crop fields with only 0.6% forested area. (Plot D-1 was a common plot with, *i.e.*, same as, Plots EF-1 and F-1). The remainder of the 344 hectare (850 acre) circular plots along proposed Corridor D were characterized by cropland and pasture with forested areas ranging from 9.5% to 25.3%. Permanent water is available from Bear Creek, Crooked Creek, and numerous ponds along much of proposed Corridor D.

Potential roost tree density surveys associated with proposed Corridor D were performed in four woodlands and at seven road transects. A summary of the PRT density results is given in Table 4.2. Detailed data from these surveys are given in Appendix A.

The four woodlands surveyed for PRT density along proposed Corridor D all ranked as "Suitable" and exhibited various stages of successive growth and elevations. Woodlands D-3 South and D-5 were previous clearings currently dominated by an osage-orange (*Maclura pomifera*)/locust regrowth, however, large white oaks and shagbark hickories (*Carya ovata*) were scattered throughout the woodlands. A portion of Woodland D-5 also contained a dominating sub-mature oak/hickory canopy. Despite containing a similar species dominance, the PRT densities for Woodlands D-3 South (44.4 tree/hectare) and D-5 (7.6 trees/hectare) varied considerably. This was due to the large, although not dominant, numbers of large white oaks and shagbark hickories in Woodland D-3 South.

Woodland D-3 North was an open bottomland woodland along Bear Creek with no evidence of flooding. The oak/maple (*Acer* sp.) canopy with open understory and dense grass layer provided a "classic" Indiana bat foraging habitat.

Among the non-forested areas associated with proposed Corridor D, one road transect (D-277) ranked as "Unsuitable", four (EF-274, D-26, D-276, and D-48) ranked as "Marginally Suitable", and two (D-HH and D-259) ranked as "Suitable." As with most other corridors, potential roost trees in the non-forested areas of proposed Corridor D were larger living trees, *e.g.*, oaks and maples in yards, barnyards, or fields, or dead roadside trees with much exfoliating bark, the most common being slippery elm.

Together, the foraging habitat and PRT density data resulted in a "Suitable" ranking for overall Indiana bat summer habitat for all 344 hectare (850 acre) circular plots along Corridor D except plot D-1. Sufficient forested areas with relatively high PRT densities existed along the corridor to offset the "Marginally Suitable/Unsuitable" non-forested areas. As with Corridor CW, potential Indiana bat summer habitat along proposed Corridor D appeared qualitatively good in the southern and middle segments of the corridor. These areas are associated with Bear Creek, Crooked Creek and scattered large, wooded tracts. North of Bear Creek, the corridor passes through less suitable potential Indiana bat summer habitat.

4.3 CORRIDOR EF

Eight 344 hectare (850 acre) circular plots were located along proposed Corridor EF. Results of the foraging habitat assessment are shown in Table 4.1. All plots except EF-1 ranked as "Suitable" Indiana bat foraging habitat based on percent forested area and availability of water. Plot EF-1 was located at the intersection of Highway 24 and Highway 61 and contained mostly crop fields with only 0.6% forested area. (Plot EF-1 was a common plot with, *i.e.*, same as, Plots D-1 and F-1). Among the "Suitable" plots along Corridor EF, percent forested areas ranged from 6.5% to 18% with the remaining area being mostly cleared cropland. Permanent water, while still available from Bear Creek, Crooked Creek, and scattered farm ponds, was less abundant than with Corridors CW and D.

PRT density surveys for proposed Corridor EF were performed in three woodlands and at five road transects. All three woodlands (F-4, F-5 and F-8) were located in the southern half of the corridor and ranked as "Suitable" for PRT density. Woodlands F-4 and F-8 were mature upland hardwood forests with shagbark hickories providing the majority of the potential roost trees. Woodland F-5 exhibited a mature osage-orange/honey locust

dominance. Potential roost trees in this woodland were available from the osage-oranges, honey locusts, and several dead slippery elms.

Large forested areas were less common along proposed Corridor EF north of Bear Creek. The one road transect (non-forested) surveyed north of Bear Creek ranked as "Suitable" for PRT density (Table 4.2). Among the remaining road transect surveys, one (EF-261) was ranked as "Unsuitable", two (EF-274 and F-HH Spur) as "Marginally Suitable", and two (D-259 and F-HH) as "Suitable."

Despite fewer forested areas north of Bear Creek, sufficient forest cover remained to rank all 344 hectare (850 acre) circular plots along proposed Corridor EF as "Suitable" except for plot EF-1. Qualitatively, the best potential Indiana bat summer habitat along proposed Corridor EF was associated with Bear Creek and Crooked Creek in the central portion of the corridor.

4.4 CORRIDOR F

Eight 344 hectare (850 acre) circular plots were located along the length of proposed Corridor F. As with the other three proposed corridors, all the circular plots ranked as "Suitable" for Indiana bat foraging habitat except the northern-most plot, F-1, which was ranked as "Unsuitable" due to lack of forested area (0.6%). Plot F-1 is a common plot with, *i.e.*, same as, Plots D-1 and EF-1 and was located at the intersection of Highway 24 and Highway 61. Of the "Suitable" plots, percent forested areas ranged from 6.5% to 24.2%.

PRT density estimates were made in four woodland areas and at three road transects (non-forested) along proposed Corridor F. All four woodlands ranked as "Suitable" for Indiana bat summer roosting habitat based on PRT density (Table 4.2). Detailed data from these surveys are presented in Appendix A. Woodlands F-4 and F-8 represented mature, upland hardwoods with a shagbark hickory dominance. Shagbark hickories provided the largest number of PRT's in these woodlands but other PRT's included honey locust, chestnut oak, slippery elm and American basswood (*Tilia americana*). Woodland F-5 was typical of many of the previously cleared tracts in the area, with an osage-orange/honey locust dominance. Woodland F-2 was unique among all surveyed forested areas in that it was a wooded pasture

with an estimated 70%-80% canopy. This woodland contained a walnut (*Juglans nigra*)/honey locust/black locust dominance with scattered slippery elms. These trees provided the majority of PRT's within woodland F-2.

Three road transects were surveyed along proposed Corridor F to estimate PRT density of non-forested areas. Two road transects, F-24 and F-HH Spur, were ranked as "Marginally Suitable" while Road Transect F-HH was ranked as "Suitable" based on their respective PRT densities (Table 4.2). PRT's found during these surveys included larger trees with cavities or loose bark such as maple, cottonwood, and oaks and smaller dead trees of various species with peeling bark.

A combination of the foraging habitat and PRT density data gave an overall Indiana bat summer habitat assessment of "Suitable" for all circular plots along proposed Corridor F except F-1 at its northern terminus. Although they ranked as "Suitable", plots F-2 and F-3 could conceivably be down-graded to "Marginally Suitable" or "Unsuitable" due to their proximity with paved Highway 24. Less wooded area was also found in this segment of the proposed corridor. Although the central and southern portion of proposed Corridor F contained larger wooded tracts, permanent water was limited to farm ponds and small lakes in the vicinity of the corridor.

ATTACHMENT

WOODLAND POTENTIAL ROOST TREE DENSITY

SURVEY DETAILS

WOODLAND F-8

LOCATION: S½, SW¼, SE¼ of Sec 14, T56N, R5W

SURVEYED: 9 Aug 94

DESCRIPTION:

The "classic" mature, upland hardwood forest. Shagbark hickory dominance with white oak, slippery elm, and chestnut oak. Shrub and understory varying from thin to medium density. Herb layer varying from thin to thick density and dominated by Virginia Creeper.

Tree No.	Point-to- Plant Distance	Diameter Breast Height	Species
	(m)	(cm)	
1	15	41	Shagbark hickory
2	25	46	Shagbark hickory
3	6	22	Slippery elm
4	30	38	Shagbark hickory
5	15	32	Honey locust
6	9	30	Shagbark hickory
7	19	49	Shagbark hickory
8	14	24	Unidentified
9	11	49	Mockernut hickory ?
10	11	22	Unidentified

Potential Roost Tree Density = 41.6 trees/hectare

WOODLAND F-4

LOCATION: W½, NE¼ of Sec 6, T56N, R5W

SURVEYED: 4 Aug 94

DESCRIPTION:

Hardwood forest, lower slopes resembling bottomland forest (wet-weather stream present) but does not flood. Thick herb, shrub and understory layers. Upland slopes dominated by shagbark hickory.

Tree No.	Point-to- Plant Distance	Diameter Breast Height	Species
	(m)	(cm)	
1	25	57	American basswood
2	21	24	Honey locust
3	28	33	Unidentified
4	2.2	27	Shagbark hickory
5	10	25	Shagbark hickory
6	12	27	Shagbark hickory
7	38	43	Hackberry
8	32	49	Honey locust
9	19	40	Shagbark hickory
10	32	30	Shagbark hickory
11	20	27	Shagbark hickory
12	100	32	Shagbark hickory

13	5.5	30	Shagbark hickory
14	13	94	Chestnut oak sp.
15	22	35	Shagbark hickory
16	22	29	Shagbark hickory
17	43	37	Shagbark hickory

Potential Roost Tree Density = 14.6 trees/hectare

WOODLAND CW-5

LOCATION: NW ¼, NE ¼ of Sec 3, T56N, R5W

SURVEYED: 3 Aug 94

DESCRIPTION:

Floodplain forest bordering Bear Creek. Evidence of flooding to 6 ft above ground. Thin herbaceous and shrub layer. Mature canopy of cottonwood and silver maples with box elder.

Tree No.	Point-to-Plant Distance (m)	Diameter Breast Height (cm)	Species
1	11.2	30	Unidentified
2	27	43	Box elder
3	29	27	Silver maple
4	35	40	Unidentified
5	22	35	Unidentified
6	16	108	Cottonwood
7	6	97	Cottonwood
8	31	27	Mulberry
9	43	86	Silver maple
10	14	32	Box elder

Potential Roost Tree Density = 18.2 trees/hectare

WOODLAND CW-3

LOCATION: SE¼, SE¼ of Sec 20, T57N, R5W

SURVEYED: 6 Aug 94

DESCRIPTION:

Locust/mulberry dominated woodland between agricultural fields. Deeply eroded creek bed follows long axis of woodland. Thick herb layer. Medium-density understory and shrub layer. Mostly full canopy.

Tree No.	Point-to- Plant Distance	Diameter Breast Height	Species
	(m)	(cm)	
1	17	46	Black locust
2	23	25	Mulberry
3	33	35	Honey locust
4	19	48	Shingle oak
5	8	32	Black locust
6	10	38	Black locust
7	13	45	Black locust
8	31	32	Black locust
9	17	33	Black locust
10	2	29	Black locust
11	14	41	Black locust
12	16	35	Black locust
13	5	51	Black locust

14

18

45

Black locust

Potential Roost Tree Density = 38.4 trees/hectare

WOODLAND CW-4

LOCATION: S½, SE¼, SW¼ of Sec 28, T57N, R5W

SURVEYED: 6 Aug 94

DESCRIPTION:

Bottomland forest with some evidence of flooding. Small to medium-size silver maple dominated canopy with full coverage. Box elder, river birch and cottonwood common along stream. Sparse shrub layer. Dense herb layer of predominantly stinging horse nettle.

Tree No.	Point-to- Plant Distance	Diameter Breast Height	Species
	(m)	(cm)	
1	52	22	Box elder
2	56	18	Silver maple
3	38	35	Box elder
4	83	41	Box elder
5	22	37	River birch
6	55	65	Silver maple
7	5	38	Silver maple
8	26	78	Black locust
9	16	27	Mulberry
10	19	32	Cottonwood

Potential Roost Tree Density = 7.2 trees/hectare

WOODLAND D-3 South

LOCATION: N½, NE¼ of Sec 32, T57N, R5W

SURVEYED: 5 Aug 94

DESCRIPTION:

Mature osage-orange dominated woodland with a few scattered, large white oaks and shagbark hickories. Woodland is obviously a previously-cleared area (except oaks and hickories) that has succeeded into the osage-orange forest. Thick understory with medium dense herbaceous layer.

Tree No.	Point-to-Plant Distance (m)	Diameter Breast Height (cm)	Species
1	43	64	Shagbark hickory
2	12.7	62	Shagbark hickory
3	55	24	Unidentified
4	6.7	40	Unidentified
5	24	60	Mulberry
6	32	70	Cottonwood
7	21	33	Shagbark hickory
8	22	67	Swamp white oak? Swamp chestnut oak?
9	6	29	Shagbark hickory
10	10	35	Shagbark hickory
11	2.4	35	Shagbark hickory
12	44	67	White oak

13	22	102	White oak
14	19	115	White oak
15	24	78	White oak

Potential Roost Tree Density = 44.4 trees/hectare

WOODLAND D-3 North

LOCATION: W½ of Sec 29, T57N, R5W

SURVEYED: 5 Aug 94

DESCRIPTION:

Open bottomland hardwood woodland with no evidence of flooding. Oak/maple dominant canopy with 75% to 90% coverage. Dense grass layer with an open understory. "Classic" *Myotis sodalis* foraging habitat.

Tree No.	Point-to-Plant Distance (m)	Diameter Breast Height (cm)	Species
1	26	33	Unidentified
2	20	72	Red oak
3	23	25	Red oak
4	30	57	Dead <i>Quercus</i> sp.
5	9.5	75	Dead <i>Quercus</i> sp.
6	18	30	Dead <i>Quercus</i> sp.
7	23	70	Red oak
8	29	30	Silver maple
9	39	33	Silver maple
10	55	32	Unidentified

Potential Roost Tree Density = 13.5 trees/hectare

WOODLAND F-2

LOCATION: SE¼, SW¼ of Sec 19, T57N, R5W

SURVEYED: 8 Aug 94

DESCRIPTION:

Open, pastured woodland, 70% to 80% canopy cover. Walnut/honey locust/black locust dominance with scattered slippery elms. Cottonwoods along creek edge. Very thin shrub and understory, thick herb and grass layer. Shrubs and thicker understory more common in northern portion of woodland.

Tree No.	Point-to- Plant Distance	Diameter Breast Height	Species
	(m)	(cm)	
1	35	80	Black locust
2	4	45	Black locust
3	25	60	Black locust
4	13	41	Unidentified
5	23	45	Honey locust
6	15	54	Honey locust
7	18	22	Slippery elm
8	26	21	Slippery elm
9	18	76	Honey locust
10	30	73	Cottonwood

Potential Roost Tree Density = 23.3 trees/hectare

WOODLAND F-5

LOCATION: SE¼, NE¼ of Sec 8, T56N, R5W

SURVEYED: 8 Aug 94

DESCRIPTION:

Mature osage-orange/honey locust dominated canopy with several scattered slippery elms. Medium dense understory and thick herb layer. Dry creek in center of woodland along long axis.

Tree No.	Point-to-Plant Distance (m)	Diameter Breast Height (cm)	Species
1	31	25	Slippery elm
2	36	13	Slippery elm
3	34	16	Slippery elm
4	16	32	Slippery elm
5	18	41	Honey locust
6	20	22	Slippery elm
7	21	24	Honey locust
8	18	29	Slippery elm
9	53	64	Osage-orange
10	36	64	Osage-orange

Potential Roost Tree Density = 12.4 trees/hectare

WOODLAND D-5

LOCATION: SE¼, SE¼, of Sec 4, T56N, R5W

SURVEYED: 8 Aug 94

DESCRIPTION:

North facing slope canopy dominated by osage-orange and black locust. Thick shrub layer with many vines and briars. Thin to thick herb layer. South facing slope dominated by a sub-mature oak/hickory canopy with a thinning shrub layer at the higher elevations. Low to medium dense herb layer.

Tree No.	Point-to-Plant Distance	Diameter	Species
	(m)	Breast Height (cm)	
1	14	54	Black locust
2	75	108	Sycamore
3	43	22	Black oak sp.
4	47	29	Black locust
5	36	51	Red oak
6	25	25	Shagbark hickory
7	7	22	Shagbark hickory
8	19	19	Shagbark hickory
9	85	22	Shagbark hickory
10	11	29	Shagbark hickory

Potential Roost Tree Density = 7.6 trees/hectare

APPENDIX C

PHASE I CULTURAL RESOURCES INVESTIGATION REPORT

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ATTACHMENTS

- A. ASM Site Files
- B. Correspondence
 - 1. Questionnaire to Determine Need for Cultural Resource Assessment and Response
 - 2. Cultural Resource Survey Project Summary Sheet
 - 3. Other Correspondence

**PHASE I CULTURAL RESOURCES INVESTIGATION
OF THE
PROPOSED U.S. 61 HIGHWAY RELOCATION CORRIDOR PROJECT**

JOB NOS. J3P0426 AND J3P0427

RALLS AND MARION COUNTIES, MISSOURI

Prepared for:

**Missouri Highway and Transportation Department
P.O. Box 270
Jefferson City, MO 65102**

Prepared by:

**George Butler Associates, Inc.
8207 Melrose Drive
Lenexa, KS 66214**

Principal Investigator and Report Author

Mark W. Kelly

APRIL 15, 1996

CRM LIBRARY DATA

**USGS Quadrangle Maps: HANNIBAL, MO. WEST; RENSSELAER, MO.
Drainage Basins (1): Upper Mississippi; North River
(2): Salt; Salt 1**

ABSTRACT

During the month of December, 1995, a Phase I archeological survey and evaluation study of the Missouri Highway and Transportation Department (MHTD) Job Nos. J3P0426 and J3P0427 U.S. Highway 61 relocation corridor alignment was conducted by George Butler Associates, Inc. (GBA), to facilitate the preparation of an Environmental Impact Statement (EIS). Three unrecorded archeological sites were identified; two (23MA202 and 23RA824) being light density prehistoric lithic scatters and one (23MA203) being a mixed component (historic debris-prehistoric debitage) site.

Because of lack of integrity due primarily to extensive impacts resulting from past road construction activities and below-grade level disturbance (field terracing to enhance row crop production) and related erosional activity, the three sites do not appear to meet NRHP criteria. Therefore, it is recommended that currently proposed project activities be permitted to commence as scheduled with regard to the currently defined limits of these sites. Further, it is recommended that MHTD and Missouri Department of Natural Resources, Historic Preservation Program, (MDNR-HPP) be notified immediately should buried cultural remains be discovered during below-grade excavation activities by project developers for an assessment of the discovered remains' significance per NRHP criteria at that time.

An inventory of historic structures potentially eligible for NRHP listing within or adjacent to the proposed project corridor alignment has been completed and submitted to MHTD separately for review and comment. There are no potentially significant bridges, as surveyed and assessed by MHTD, likely to be impacted by project activities. Based on the results of the Phase I investigation, it is believed that no significant cultural resources will be impacted by MHTD Job Nos. J3P0426 and J3P0427 and this project requires no further cultural resources investigations.

INTRODUCTION

MHTD has proposed the relocation of U.S. Highway 61 in Marion and Ralls Counties, Missouri (MHTD District 3). The stated objective of this project is to help achieve regional transportation goals for an efficient, safe, and easily accessible transportation system. As part of the EIS process, MHTD initially evaluated 17 variations of corridor alternatives. From that evaluation, four alternatives were selected for further study. An alternatives analysis was performed on the four potential corridors and a preferred corridor was selected. MHTD retained the team of George Butler Associates, Inc. (GBA) and Woodward-Clyde Consultants (WCC) to conduct environmental investigations for this project. The cultural resources investigations were conducted in accordance with the procedures delineated in the 1986 Missouri Department of Natural Resource-Historic Preservation Program (MDNR-HPP) publication *Guidelines for Contract Cultural Resource Survey Reports and Professional Qualifications*, prepared by Michael S. Weichman, and the October 1994, MHTD Protocol for Cultural Resources Investigations Associated with Environmental Assessment or Environmental Impact Statement Corridor Studies, prepared by Bob Reeder.

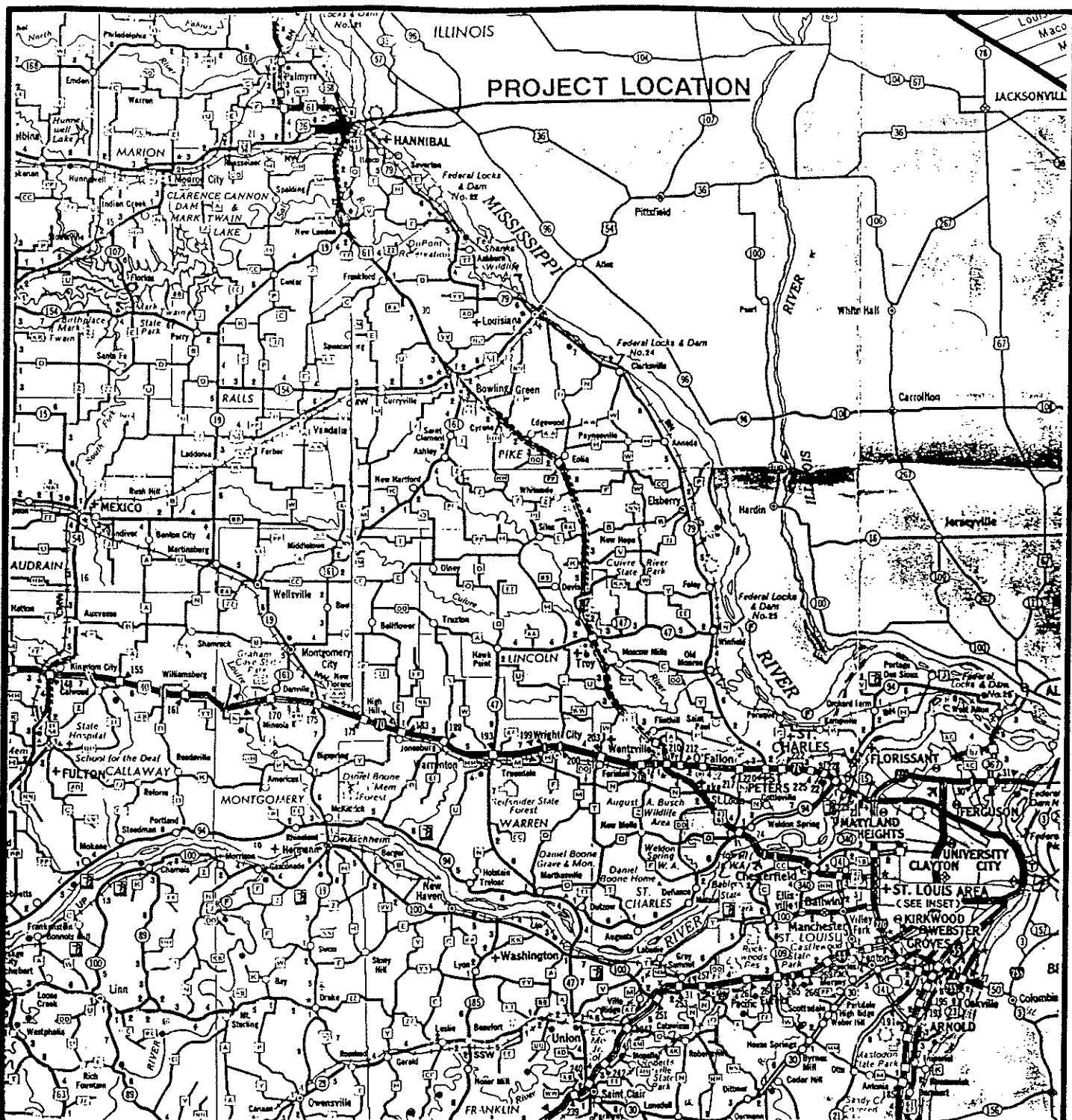
The purposes of the Phase I Investigation were to:

- (1) Locate and identify prehistoric and historic sites or objects within or adjacent to the project boundaries;
- (2) Gather data to be used in evaluating the significance of the discovered sites or objects and to assess their eligibility for nomination to the NRHP in accordance with 36 CFR 60.4; and
- (3) Make recommendations regarding the appropriate mitigation of adverse impacts on the discovered sites within the project boundaries.

The Phase I Investigation was conducted by a GBA team consisting of archeologists, soil scientists, and a geologist. Preliminary file and literature searches were conducted at the Archaeological Survey of Missouri (ASM) in Columbia and at the Missouri Department of Natural Resources, Historic Preservation Program Office (MDNR-HPP) in Jefferson City. Local libraries and residents were also consulted.

PROJECT LOCATION AND DESCRIPTION

The proposed project corridor alignment is located in both Ralls and Marion Counties in northeast Missouri (Figure No. 1). MHTD's selection of the project corridor alignment being investigated is expected to provide a more direct north-south traffic route, located westward of the city of Hannibal. The proposed project corridor alignment is precisely depicted on the topographic map contained herein (Figure No. 2). Legally, the corridor is located in parts of



SOURCE: MISSOURI MAP



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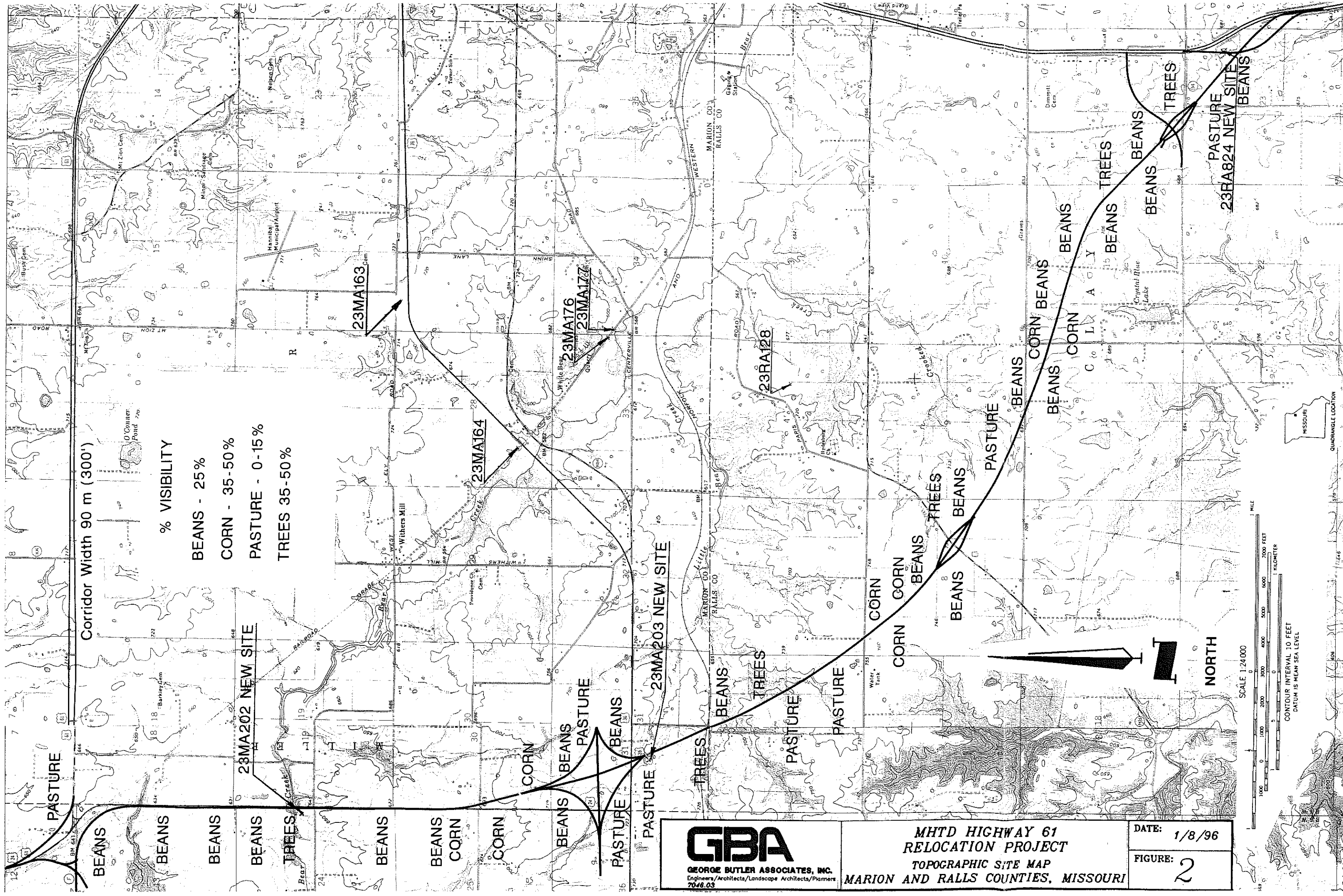
**MHTD HIGHWAY 61
RELOCATION PROJECT
SITE LOCATION**

MARION AND RALLS COUNTIES, MISSOURI

DATE: 1/8/96

FIGURE:

1



Corridor Width 90 m (300')

% VISIBILITY

BEANS - 25%

CORN - 35-50%

PASTURE - 0-15%

TREES 35-50%

23MA202 NEW SITE

23MA163

23MA176

23MA177

23MA164

23RA128

23MA203 NEW SITE

23RA824 NEW SITE

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MHTD HIGHWAY 61
RELOCATION PROJECT

TOPOGRAPHIC SITE MAP

MARION AND RALLS COUNTIES, MISSOURI

DATE: 1/8/96

FIGURE: 2

NORTH

SCALE 1:24,000

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

Sheet Lick Cr

sections 12, 13, 24, 25, and 36 T57N, R6W; sections 7, 18, 19, 30 and 31 T57N, R5W, all in Marion County and shown on the Rensselaer USGS Quadrangle. The corridor is also located in parts of sections 5, 6, 8, 9, 14, 15, 16, 23, and 24 T56N, R5W, all in Ralls County and shown on the Hannibal West USGS Quadrangle. The proposed width of the corridor is 300 feet, excluding the areas depicted for associated interchanges. The total acreage of the project approximates 560 acres.

ENVIRONMENTAL SETTING

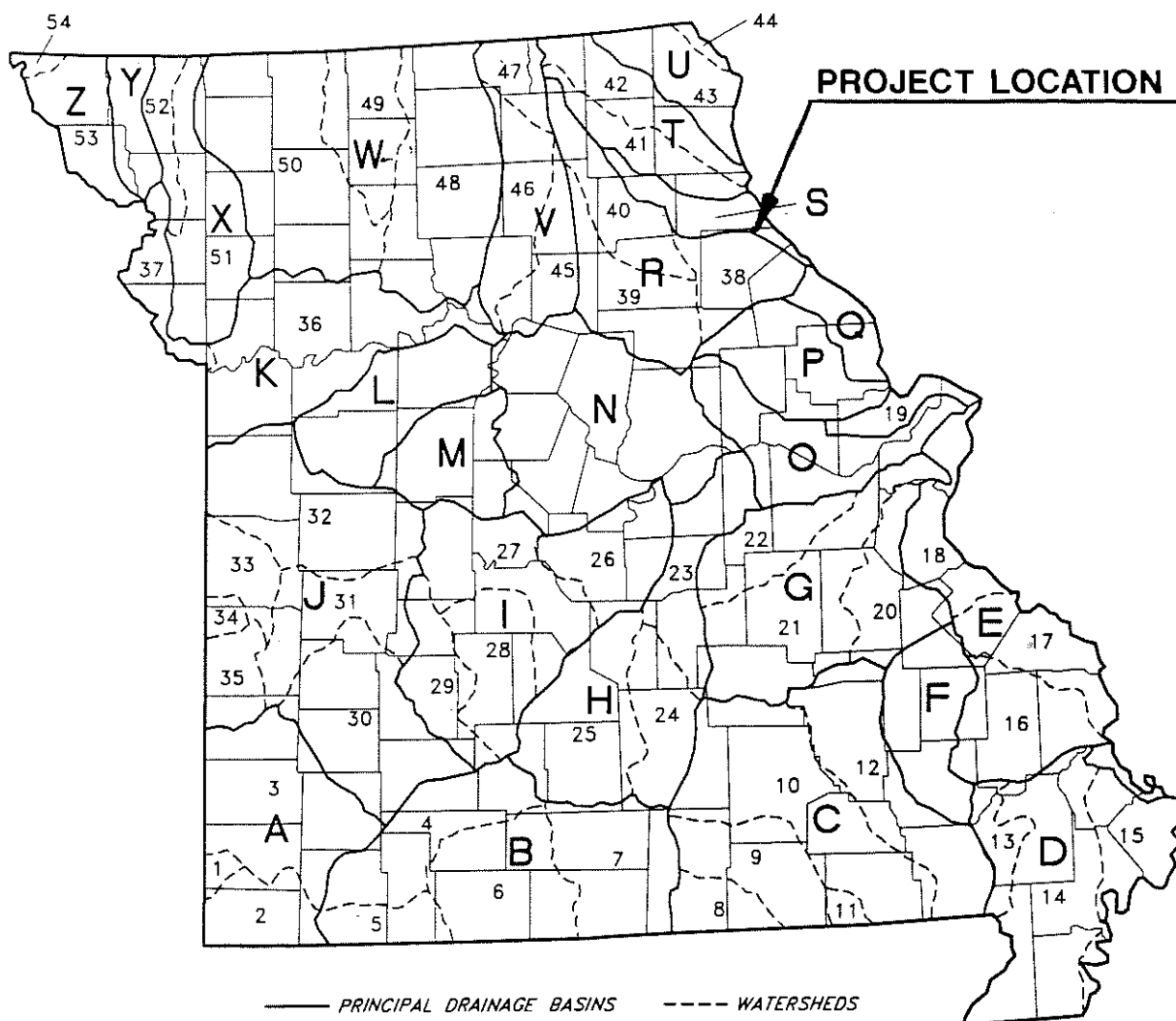
The landscape of northern Missouri is the result of three major geologic factors: the uneven arching or uplifting of the bedrock, the weathering and erosion of the various rocks, and the glacial spreading of a thick mantle of clay, sand, and gravel over the bedrock (Rafferty 1982: 10). The project area is located within the Northeast Prairie physiographic region in an area of low dissected hills with streams having little or no floodplain. Pleistocene glaciation has rendered the area nearly flat although some topographic relief is provided by the drainages as depicted on Figure No. 2.

The project area is located in the northeast part of Ralls County and in part of southern Marion County. The project area is located in the Upper Mississippi River Drainage Basin, North River Watershed and in the Salt River Drainage Basin, Salt 1 Watershed (Figure No. 3).

The project area is located in the Dissected Till Plains, also described geographically as the Mississippi River Border, an area consisting of gently rolling to steep landforms. Relief varies from 200 to 300 feet with steep forested slopes over karst formations (Rafferty 1982:11) (Figure Nos. 4 and 6). The most visible post-Pleistocene landforms in Ralls County resulted from down cutting and erosion by the south-flowing Mississippi River and the generally east-flowing Salt and North rivers, and their tributaries. Those in Marion County resulted from forces of the south-flowing Mississippi River and the generally east-flowing North Fabius, South Fabius, North, and South Rivers, and their tributaries.

Geologically, Ralls and Marion Counties are composed principally of Mississippian limestone and Pennsylvanian shale, sandstone, and limestone deposits. In the eastern part of Ralls County, there are also outcrops of Ordovician, Silurian, and Devonian limestone, sandstone, and shale; in the south-central part of Marion County, there are outcrops of Devonian shale (MDNR 1979) (Figure No. 5).

The general soil associations found in Ralls and Marion Counties are: (1) Putnam-Mexico, (2) Armstrong-Leonard, (3) Goss-Gorin-Lindley, (4) Fatima-Belknap-Landes, (5) Winfield-Menfro-Goss, and (6) Carlow-Belknap-Chequest. The Putnam-Mexico association consists of nearly level and gently sloping, poorly drained and somewhat poorly drained clay pan soils



- | | | |
|--|---|---|
| <p>A. ARKANSAS</p> <p>1. Lost Creek</p> <p>2. Elk</p> <p>3. Spring</p> <p>B. WEST WHITE</p> <p>4. James</p> <p>5. Table Rock</p> <p>6. White</p> <p>7. North Fork</p> <p>C. EAST WHITE</p> <p>8. Spring</p> <p>9. Eleven Point</p> <p>10. Current</p> <p>11. Fourche Creek</p> <p>12. Black</p> <p>D. LOWER ST. FRANCIS/LOWER MISSISSIPPI</p> <p>13. Lower St. Francis</p> <p>14. Little River</p> <p>15. Lower Mississippi</p> <p>E. MIDDLE MISSISSIPPI</p> <p>16. Whitewater/Castor</p> <p>17. Mississippi 1</p> <p>18. Mississippi 2</p> <p>19. Mississippi 3</p> <p>F. UPPER ST. FRANCIS</p> <p>G. MERAMEC</p> <p>20. Big</p> <p>21. Meramec</p> <p>22. Bourbeuse</p> | <p>H. GASCONADE</p> <p>23. Lower Gasconade</p> <p>24. Big Piney</p> <p>25. Upper Gasconade</p> <p>I. OSAGE HIGHLANDS</p> <p>26. Lower Osage</p> <p>27. Lake of the Ozarks</p> <p>28. Niangua</p> <p>29. Pomme de Terre</p> <p>J. OSAGE PRAIRIE</p> <p>30. Sac</p> <p>31. Upper Osage</p> <p>32. South Grand</p> <p>33. Marais des Cygnes</p> <p>34. Little Osage</p> <p>35. Marmation</p> <p>K. WEST MISSOURI</p> <p>36. Missouri 3</p> <p>37. Missouri 4</p> <p>L. BLACKWATER</p> <p>M. LAMINE</p> <p>N. CENTRAL MISSOURI (Missouri 2)</p> <p>O. EAST MISSOURI (Missouri 1)</p> <p>P. CUIVRE</p> <p>Q. UPPER MISSISSIPPI (Mississippi 4)</p> <p>R. SALT</p> <p>38. Salt 1</p> <p>39. Salt 2</p> <p>40. North Fork</p> | <p>S. NORTH RIVER (Mississippi 5)</p> <p>T. FABIVS</p> <p>41. South Fabius</p> <p>42. North Fabius</p> <p>U. WYACONDA-FOX/DES MOINES</p> <p>43. Wyandona-Fox</p> <p>44. Des Moines</p> <p>V. CHARITON</p> <p>45. Middle/East Fork</p> <p>46. Lower Chariton</p> <p>47. Upper Chariton</p> <p>W. GRAND</p> <p>48. Grand 1</p> <p>49. Thompson</p> <p>50. Grand 2</p> <p>X. PLATTE</p> <p>51. Platte</p> <p>52. One Hundred & Two</p> <p>Y. NODAWAY</p> <p>Z. MISSOURI 5/NISHNABOTNA</p> <p>53. Missouri 5</p> <p>54. Nishnabotna</p> |
|--|---|---|

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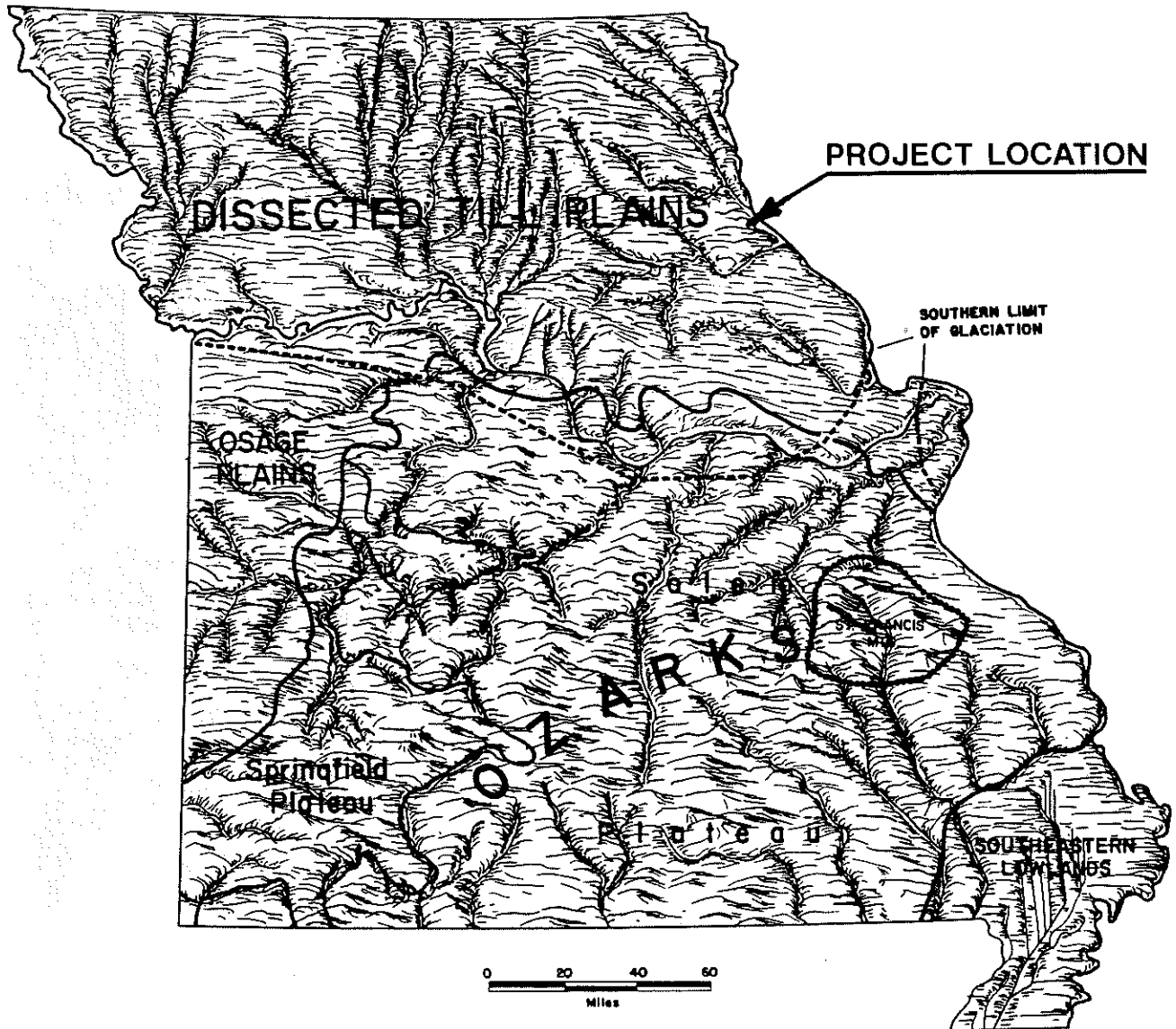
**MHTD HIGHWAY 61
RELOCATION PROJECT
WATERSHED MAP**

MARION AND RALLS COUNTIES, MISSOURI

DATE: 1/8/96

FIGURE:

3



SOURCES: HISTORICAL ATLAS OF MISSOURI


NORTH

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**MHTD HIGHWAY 61
RELOCATION PROJECT
PHYSIOGRAPHIC REGIONS MAP**

MARION AND RALLS COUNTIES, MISSOURI

DATE: 1/8/96

FIGURE:
4



SOURCE: HISTORICAL ATLAS OF MISSOURI

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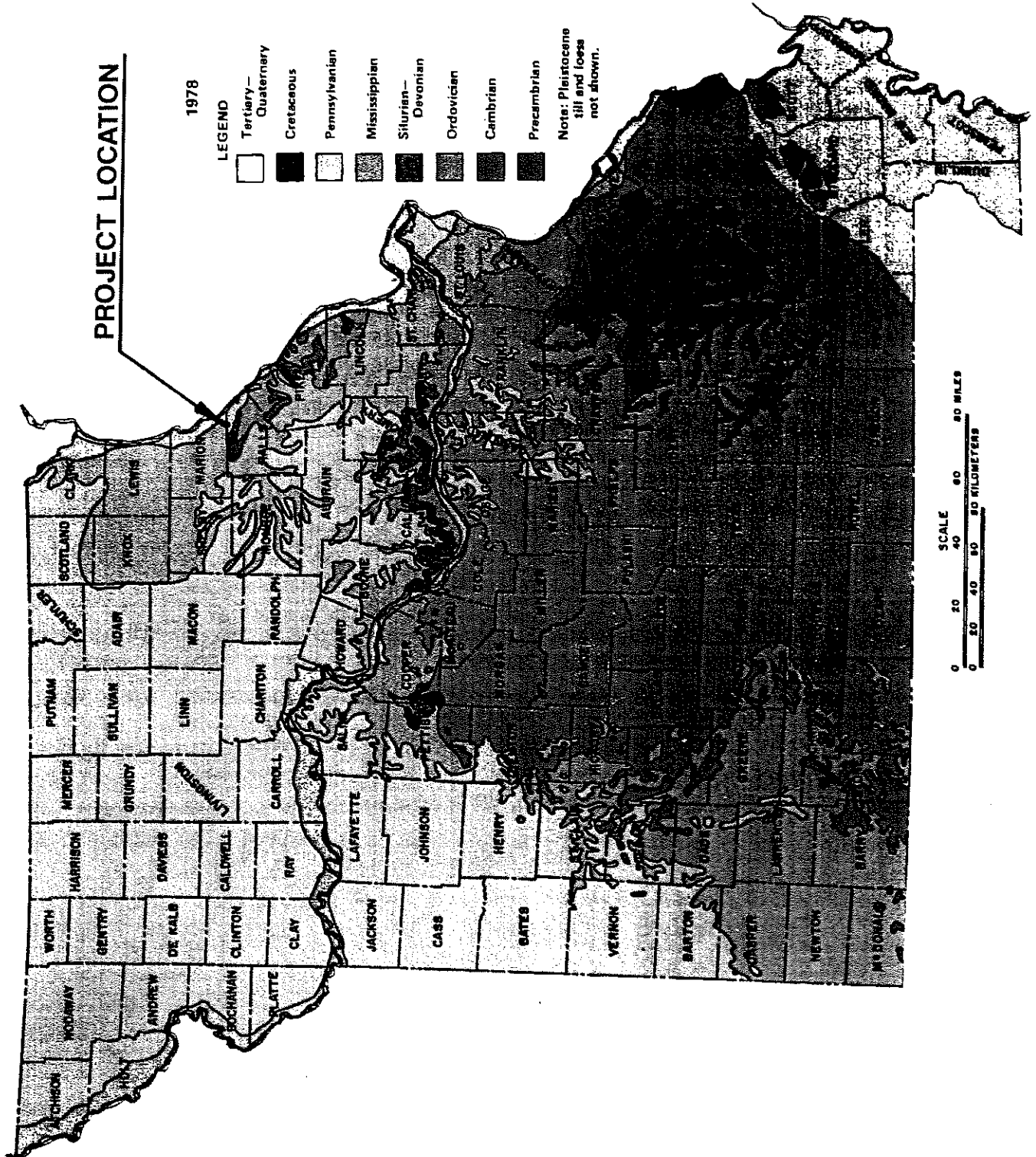
**MHTD HIGHWAY 61
RELOCATION PROJECT
SURFICIAL GEOLOGY**

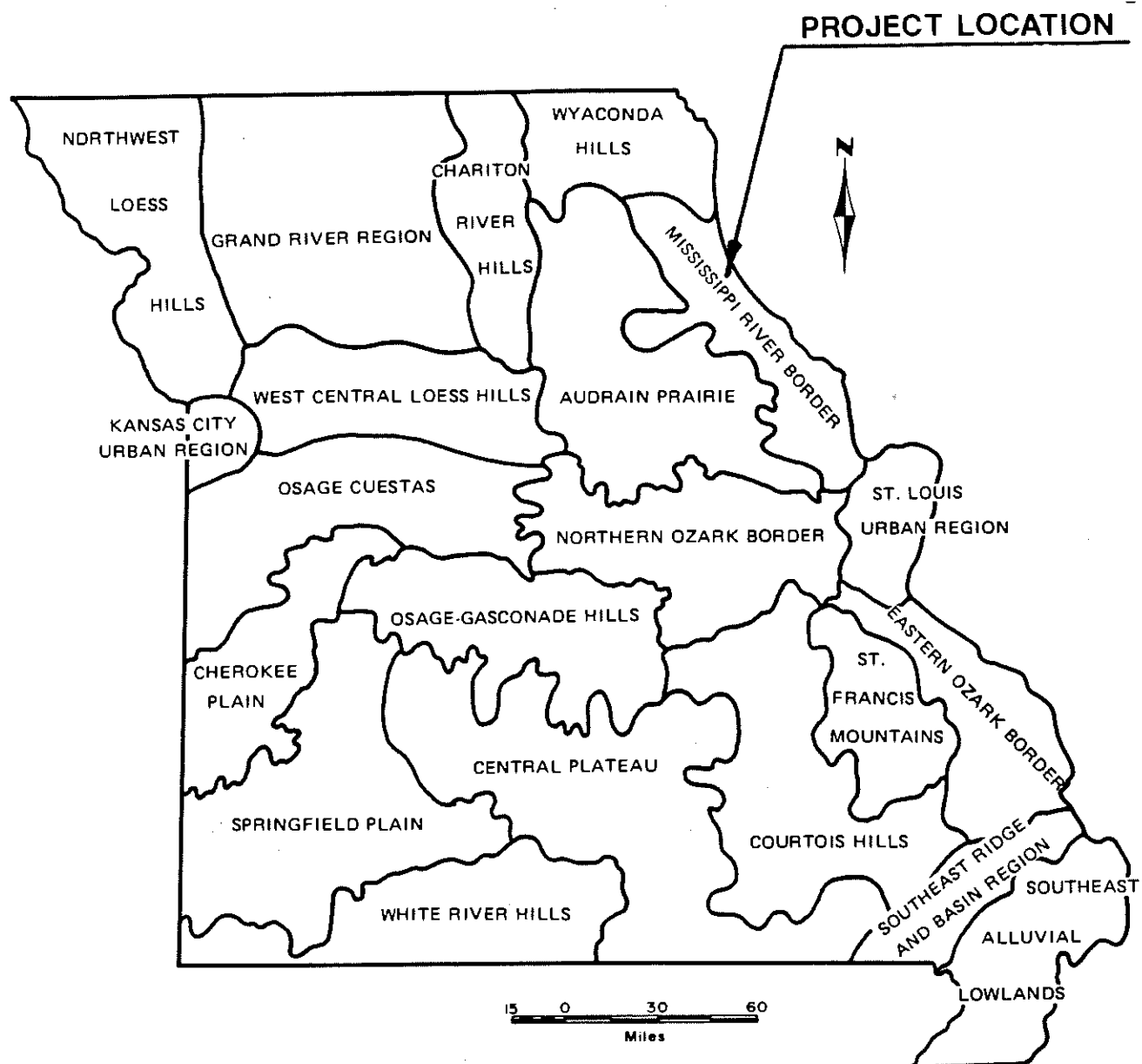
MARION AND RALLS COUNTIES, MISSOURI

DATE: 1/8/96

FIGURE:

5





SOURCES: HISTORICAL ATLAS OF MISSOURI

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**MHTD HIGHWAY 61
RELOCATION PROJECT
GEOGRAPHIC REGIONS OF MISSOURI**

MARION AND RALLS COUNTIES, MISSOURI

DATE: 1/8/96

FIGURE:

6

generally formed in loess. The Armstrong-Leonard association consists of moderately sloping and strongly sloping, moderately well drained and poorly drained soils that formed in glacial till, loess, and pedi-sediments, on uplands. The soils in these associations generally formed under native tall grass vegetation; the exceptions to this general pattern are on lower slopes and along drainages where the soils formed under native forest vegetation. Most soils in these associations are used to grow corn, soybeans, wheat, grain sorghum, and pasture/hay; forest tracts can still be found along drainage ways and on steep side slopes. The Goss-Gorin-Lindley association consists of moderately sloping to steep, well drained to somewhat poorly drained soils that formed in cherty limestone residuum, loess, glacial sediment, and glacial till, on uplands. The Fatima-Belknap-Landes association consists of nearly level, moderately well drained and somewhat poorly drained soils that formed in silty and loamy alluvium, on floodplains. The Carlow-Belknap-Chequest association consists of nearly level, poorly drained and somewhat poorly drained soils that formed in clayey and silty alluvium, on flood plains. The soils in these associations generally formed under native forest vegetation. Soils in these associations are used mainly to grow corn, soybeans, or wheat; in some areas they are used for pasture/hay and there are some areas covered with woodlands. The Winfield-Menfro-Goss association consists of gently sloping to steep, moderately well drained and well drained soils that formed in loess and in residuum of cherty limestone, on uplands. The soils in this association formed under native forest and native tall grass vegetation. Approximately half of the soils of this association are used for corn, soybeans, small grains, or hay; the other half, where cleared, is used as pasture, and the rest consists of steep, uneven areas that are in oak-hickory forest (USDA 1984:5-11) (Figure No. 7).

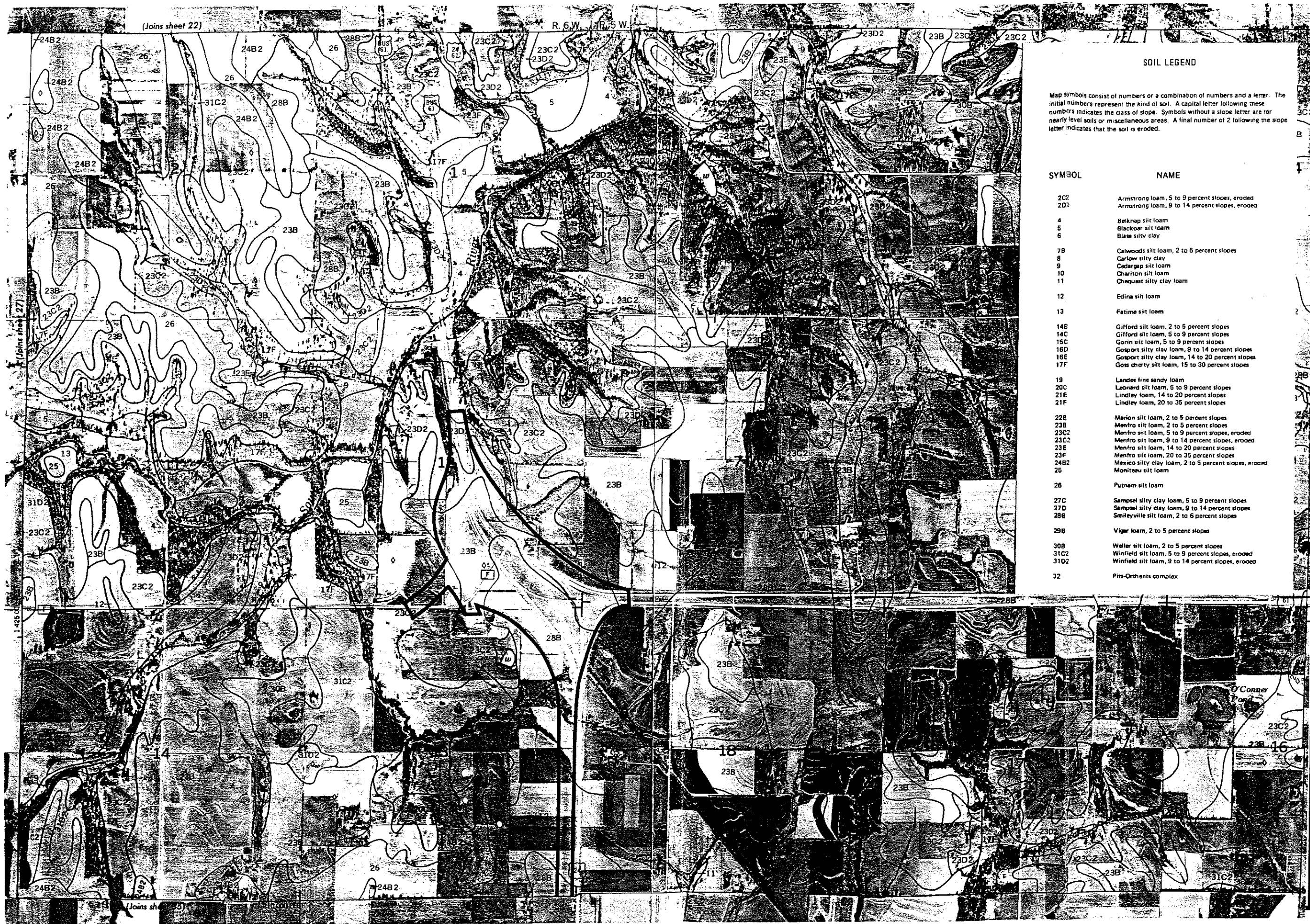
The general climate of Ralls and Marion Counties is temperate and continental; the average yearly temperature is about 53 degrees F. Winters are generally short and moderate with temperatures averaging about 28 degrees F. The average summer temperature is about 74 degrees F.; spring and fall temperatures average about 51 degrees F. January is generally the coldest month, but it usually has several days of above 50 degrees F. temperatures; although summer months are sometimes extremely hot, temperatures seldom rise above 100 degrees F. for more than 4 or 5 consecutive days. The average yearly precipitation is about 38 inches. Precipitation is comparatively light in the winter and about two-thirds of the total average rainfall occurs between April and September. Rainfall increases in frequency and intensity from April through June and then decreases gradually. Most of the summer rain falls in short heavy showers; winter precipitation usually falls as light rain or snow (USDA 1984:1-2).

Ralls and Marion Counties are within the mixed prairie and forest vegetational zone. Early nineteenth century sources indicate that about 25% of Ralls County and about 25% of Marion County was covered by native prairie vegetation at that time, while the remainders of the two counties were covered by native forest vegetation. Three types of native prairies were found in the region in the early nineteenth century: (1) wet prairies which were seasonally ponded marshes found on flat upland ridges where impermeable subsoils prevented drainage, (2) well drained grasslands on rolling uplands and moderately sloping valley sides, and (3) narrow strips of grasslands along the prairie-timber ecotone interface. All three prairie types had

28

1 Mile
5000 Feet

Scale 1:20000

 0 1000 2000 3000 4000 5000
 1/4 1/2 3/4


SOIL LEGEND

Map symbols consist of numbers or a combination of numbers and a letter. The initial numbers represent the kind of soil. A capital letter following these numbers indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas. A final number of 2 following the slope letter indicates that the soil is eroded.

SYMBOL	NAME
2C2	Armstrong loam, 5 to 9 percent slopes, eroded
2D2	Armstrong loam, 9 to 14 percent slopes, eroded
4	Belknap silt loam
5	Blackoak silt loam
6	Blaze silty clay
7B	Calwoods silt loam, 2 to 5 percent slopes
8	Carlson silty clay
9	Cedarap silt loam
10	Chariton silt loam
11	Chiquist silty clay loam
12	Edina silt loam
13	Fatima silt loam
14B	Gifford silt loam, 2 to 5 percent slopes
14C	Gifford silt loam, 5 to 9 percent slopes
15C	Gorin silt loam, 5 to 9 percent slopes
16D	Gosport silty clay loam, 9 to 14 percent slopes
16E	Gosport silty clay loam, 14 to 20 percent slopes
17F	Goss cherty silt loam, 15 to 30 percent slopes
19	Landes fine sandy loam
20C	Leonard silt loam, 5 to 9 percent slopes
21E	Lindley loam, 14 to 20 percent slopes
21F	Lindley loam, 20 to 35 percent slopes
22B	Marion silt loam, 2 to 5 percent slopes
23B	Menfro silt loam, 2 to 5 percent slopes
23C2	Menfro silt loam, 5 to 9 percent slopes, eroded
23C2	Menfro silt loam, 9 to 14 percent slopes, eroded
23E	Menfro silt loam, 14 to 20 percent slopes
23F	Menfro silt loam, 20 to 35 percent slopes
24B2	Mexico silty clay loam, 2 to 5 percent slopes, eroded
25	Moniteau silt loam
26	Putnam silt loam
27C	Sampson silty clay loam, 5 to 9 percent slopes
27D	Sampson silty clay loam, 9 to 14 percent slopes
28B	Smileyville silt loam, 2 to 6 percent slopes
29B	Vigor loam, 2 to 5 percent slopes
30B	Weller silt loam, 2 to 5 percent slopes
31C2	Winfield silt loam, 5 to 9 percent slopes, eroded
31D2	Winfield silt loam, 9 to 14 percent slopes, eroded
32	Pitts-Orrhens complex

DATE: 1/8/96

FIGURE:

7A

MHTD HIGHWAY 61
RELOCATION PROJECT
NRCS SOIL SURVEY MAPS

MARION AND RALLS COUNTIES, MISSOURI

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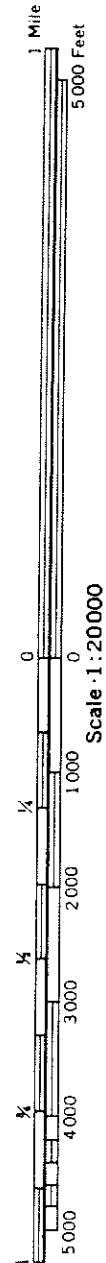
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MARION AND RALLS COUNTIES, MISSOURI

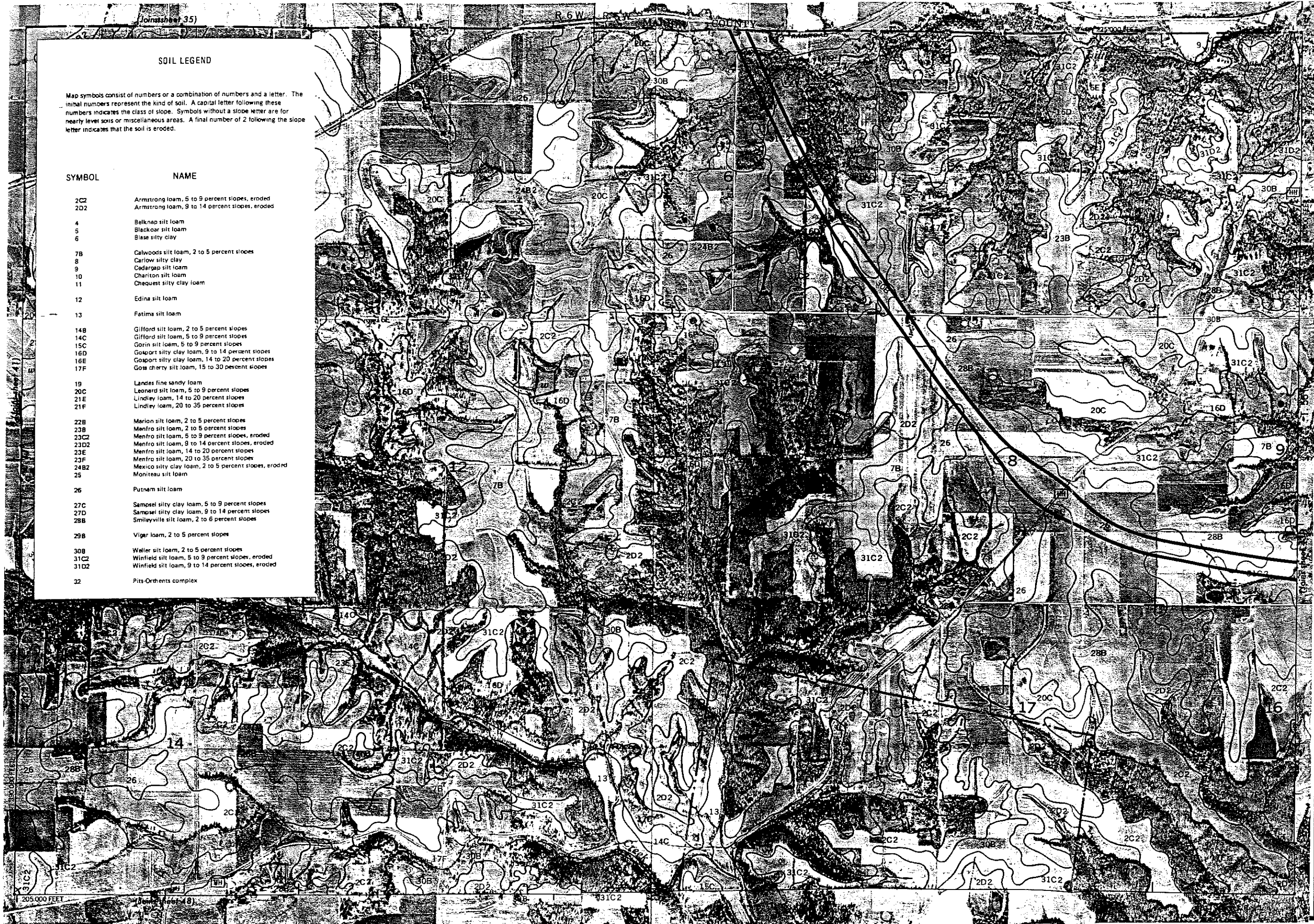
SOIL LEGEND

Map symbols consist of numbers or a combination of numbers and a letter. The initial numbers represent the kind of soil. A capital letter following these numbers indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas. A final number of 2 following the slope letter indicates that the soil is eroded.

SYMBOL	NAME
2C2	Armstrong loam, 5 to 9 percent slopes, eroded
2D2	Armstrong loam, 9 to 14 percent slopes, eroded
4	Balknap silt loam
5	Blackoak silt loam
6	Blase silty clay
7B	Calwoods silt loam, 2 to 5 percent slopes
8	Carlown silty clay
9	Cedargap silt loam
10	Chariton silt loam
11	Chequest silty clay loam
12	Edina silt loam
13	Fatima silt loam
14B	Gifford silt loam, 2 to 5 percent slopes
14C	Gifford silt loam, 5 to 9 percent slopes
15C	Gorin silt loam, 5 to 9 percent slopes
16D	Gosport silty clay loam, 9 to 14 percent slopes
16E	Gosport silty clay loam, 14 to 20 percent slopes
17F	Gosport silty clay loam, 15 to 30 percent slopes
19	Landes fine sandy loam
20C	Leonard silt loam, 5 to 9 percent slopes
21E	Lindley loam, 14 to 20 percent slopes
21F	Lindley loam, 20 to 35 percent slopes
22B	Marion silt loam, 2 to 5 percent slopes
23B	Menfro silt loam, 2 to 5 percent slopes
23C2	Menfro silt loam, 5 to 9 percent slopes, eroded
23D2	Menfro silt loam, 9 to 14 percent slopes, eroded
23E	Menfro silt loam, 14 to 20 percent slopes
23F	Menfro silt loam, 20 to 35 percent slopes
24B2	Mexico silty clay loam, 2 to 5 percent slopes, eroded
25	Moniteau silt loam
26	Putnam silt loam
27C	Sampsel silty clay loam, 5 to 9 percent slopes
27D	Sampsel silty clay loam, 9 to 14 percent slopes
28B	Smileyville silt loam, 2 to 6 percent slopes
29B	Vigar loam, 2 to 5 percent slopes
30B	Waller silt loam, 2 to 5 percent slopes
31C2	Winfield silt loam, 5 to 9 percent slopes, eroded
31D2	Winfield silt loam, 9 to 14 percent slopes, eroded
32	Pitt-Orrhents complex



Scale 1:20,000



DATE: 1/8/96

FIGURE:

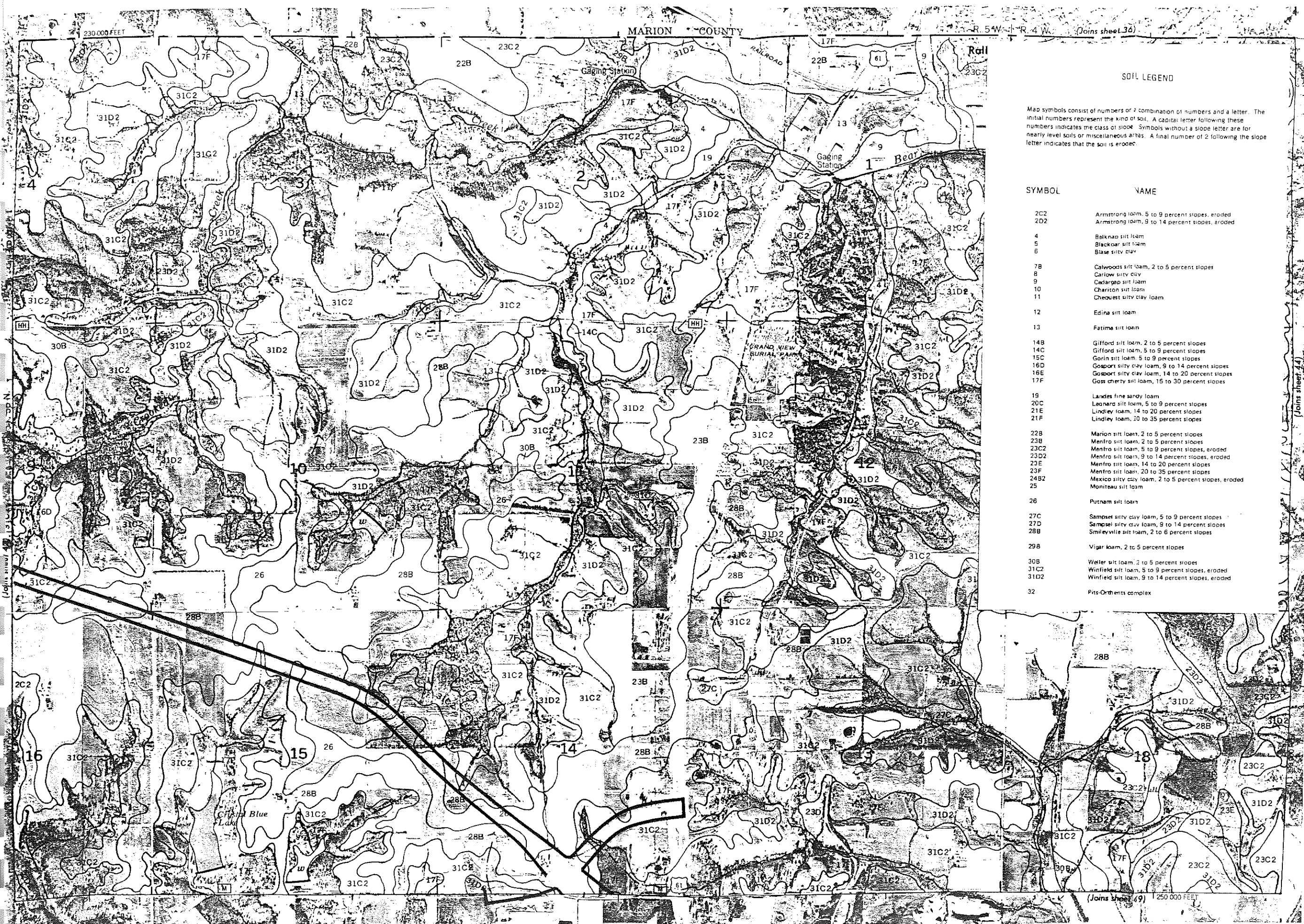
7C

MHTD HIGHWAY 61
RELOCATION PROJECT
NRCS SOIL SURVEY MAPS

MARION AND RALLS COUNTIES, MISSOURI

GBA
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Engineers/Architects/Landscape Architects/Planners

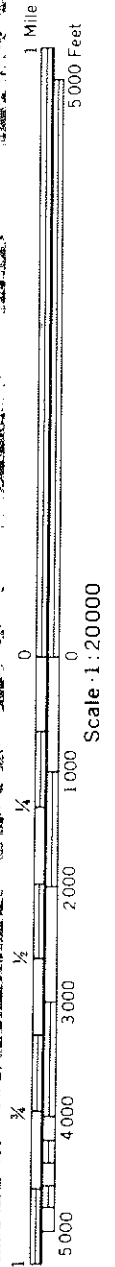
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SOIL LEGEND

Map symbols consist of numbers or a combination of numbers and a letter. The initial numbers represent the kind of soil. A capital letter following these numbers indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas. A final number of 2 following the slope letter indicates that the soil is eroded.

SYMBOL	NAME
2C2	Armstrong loam, 5 to 9 percent slopes, eroded
2D2	Armstrong loam, 9 to 14 percent slopes, eroded
4	Balknao silt loam
5	Blackoak silt loam
6	Blaze silty clay
7B	Calwoods silt loam, 2 to 5 percent slopes
8	Carlow silty clay
9	Cedargap silt loam
10	Chariton silt loam
11	Chequest silty clay loam
12	Edina silt loam
13	Fatima silt loam
14B	Gifford silt loam, 2 to 5 percent slopes
14C	Gifford silt loam, 5 to 9 percent slopes
15C	Gorin silt loam, 5 to 9 percent slopes
16D	Gosport silty clay loam, 9 to 14 percent slopes
16E	Gosport silty clay loam, 14 to 20 percent slopes
17F	Goss cherty silt loam, 15 to 30 percent slopes
19	Landes fine sandy loam
20C	Leonard silt loam, 5 to 9 percent slopes
21E	Lindley loam, 14 to 20 percent slopes
21F	Lindley loam, 20 to 35 percent slopes
22B	Marion silt loam, 2 to 5 percent slopes
23B	Mentro silt loam, 2 to 5 percent slopes
23C2	Mentro silt loam, 5 to 9 percent slopes, eroded
23D2	Mentro silt loam, 9 to 14 percent slopes, eroded
23E	Mentro silt loam, 14 to 20 percent slopes
23F	Mentro silt loam, 20 to 35 percent slopes
24B2	Mexico silty clay loam, 2 to 5 percent slopes, eroded
25	Moniteau silt loam
26	Putnam silt loam
27C	Sampsel silty clay loam, 5 to 9 percent slopes
27D	Sampsel silty clay loam, 9 to 14 percent slopes
28B	Smileyville silt loam, 2 to 6 percent slopes
29B	Vigar loam, 2 to 5 percent slopes
30B	Walter silt loam, 2 to 5 percent slopes
31C2	Winfield silt loam, 5 to 9 percent slopes, eroded
31D2	Winfield silt loam, 9 to 14 percent slopes, eroded
32	Pits-Orrhens complex

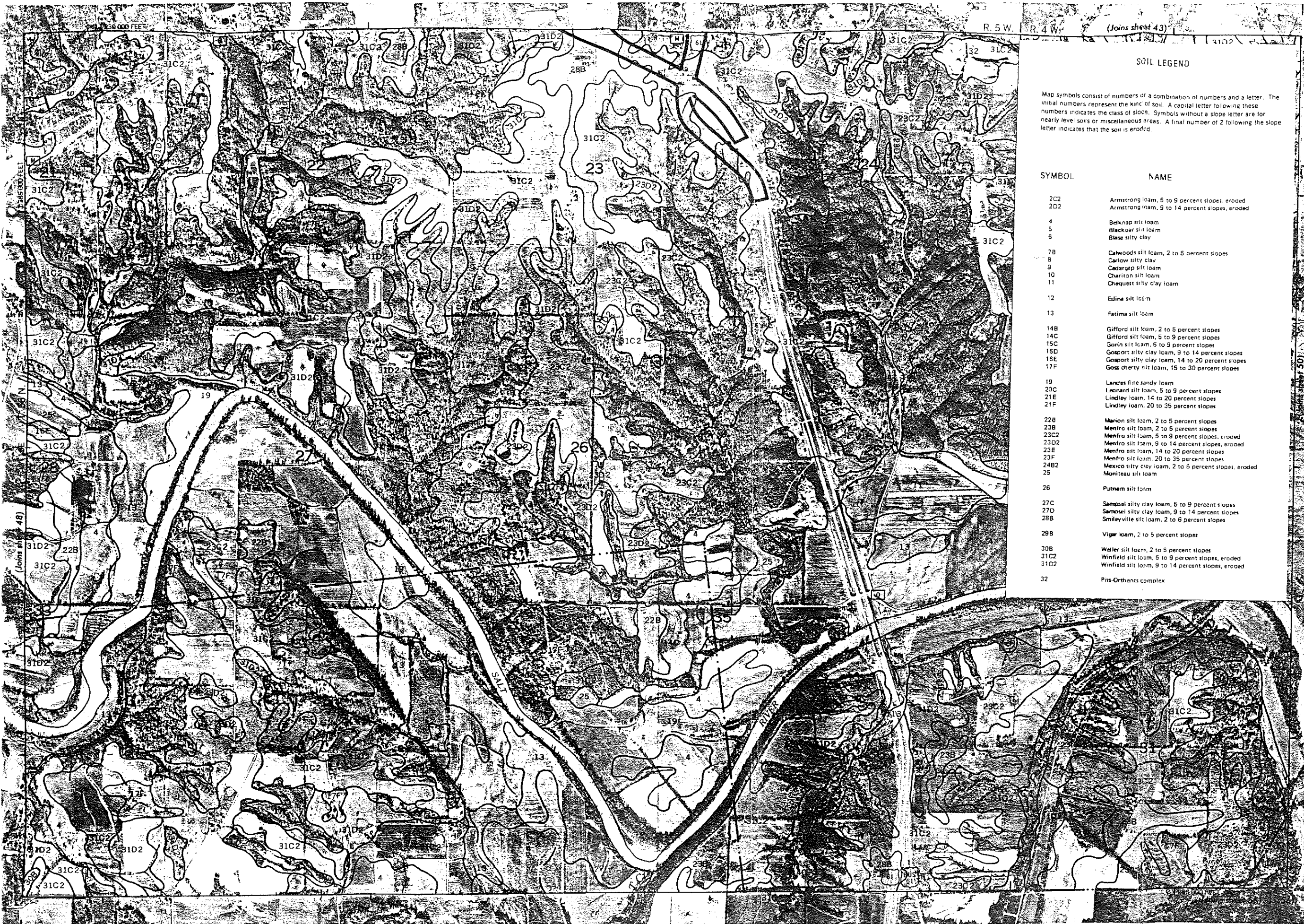


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FIGURE: 7D

MHTD HIGHWAY 61
RELOCATION PROJECT
NRCS SOIL SURVEY MAPS

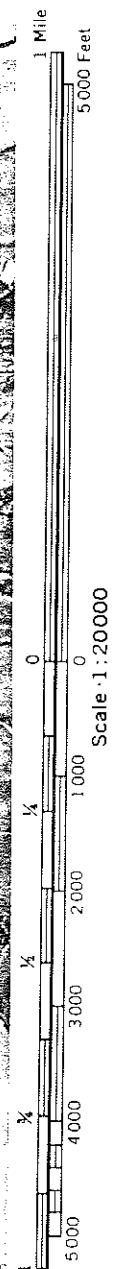
MARION AND RALLS COUNTIES, MISSOURI



SOIL LEGEND

Map symbols consist of numbers or a combination of numbers and a letter. The initial numbers represent the kind of soil. A capital letter following these numbers indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas. A final number of 2 following the slope letter indicates that the soil is eroded.

SYMBOL	NAME
2C2	Armstrong loam, 5 to 9 percent slopes, eroded
2D2	Armstrong loam, 9 to 14 percent slopes, eroded
4	Belknap silt loam
5	Blackoak silt loam
6	Blaze silty clay
7B	Cabwoods silt loam, 2 to 5 percent slopes
8	Carlton silty clay
9	Cedargap silt loam
10	Chariton silt loam
11	Chequest silty clay loam
12	Edina silt loam
13	Fatima silt loam
14B	Gifford silt loam, 2 to 5 percent slopes
14C	Gifford silt loam, 5 to 9 percent slopes
15C	Gorin silt loam, 5 to 9 percent slopes
16D	Gosport silty clay loam, 9 to 14 percent slopes
16E	Gosport silty clay loam, 14 to 20 percent slopes
17F	Goss cherty silt loam, 15 to 30 percent slopes
19	Landes fine sandy loam
20C	Leonard silt loam, 5 to 9 percent slopes
21E	Lindley loam, 14 to 20 percent slopes
21F	Lindley loam, 20 to 35 percent slopes
22B	Marion silt loam, 2 to 5 percent slopes
23B	Menfro silt loam, 2 to 5 percent slopes
23C2	Menfro silt loam, 5 to 9 percent slopes
23D2	Menfro silt loam, 9 to 14 percent slopes, eroded
23E	Menfro silt loam, 14 to 20 percent slopes
23F	Menfro silt loam, 20 to 35 percent slopes
24B2	Mexico silty clay loam, 2 to 5 percent slopes, eroded
25	Moniteau silt loam
26	Putnam silt loam
27C	Sampson silty clay loam, 5 to 9 percent slopes
27D	Sampson silty clay loam, 9 to 14 percent slopes
28B	Smileyville silt loam, 2 to 6 percent slopes
29B	Vigor loam, 2 to 5 percent slopes
30B	Weller silt loam, 2 to 5 percent slopes
31C2	Winfield silt loam, 5 to 9 percent slopes, eroded
31D2	Winfield silt loam, 9 to 14 percent slopes, eroded
32	Prairie-Oriented complex



DATE: 1/8/96

FIGURE: 7E

MHTD HIGHWAY 61
RELOCATION PROJECT
NRCS SOIL SURVEY MAPS

MARION AND RALLS COUNTIES, MISSOURI

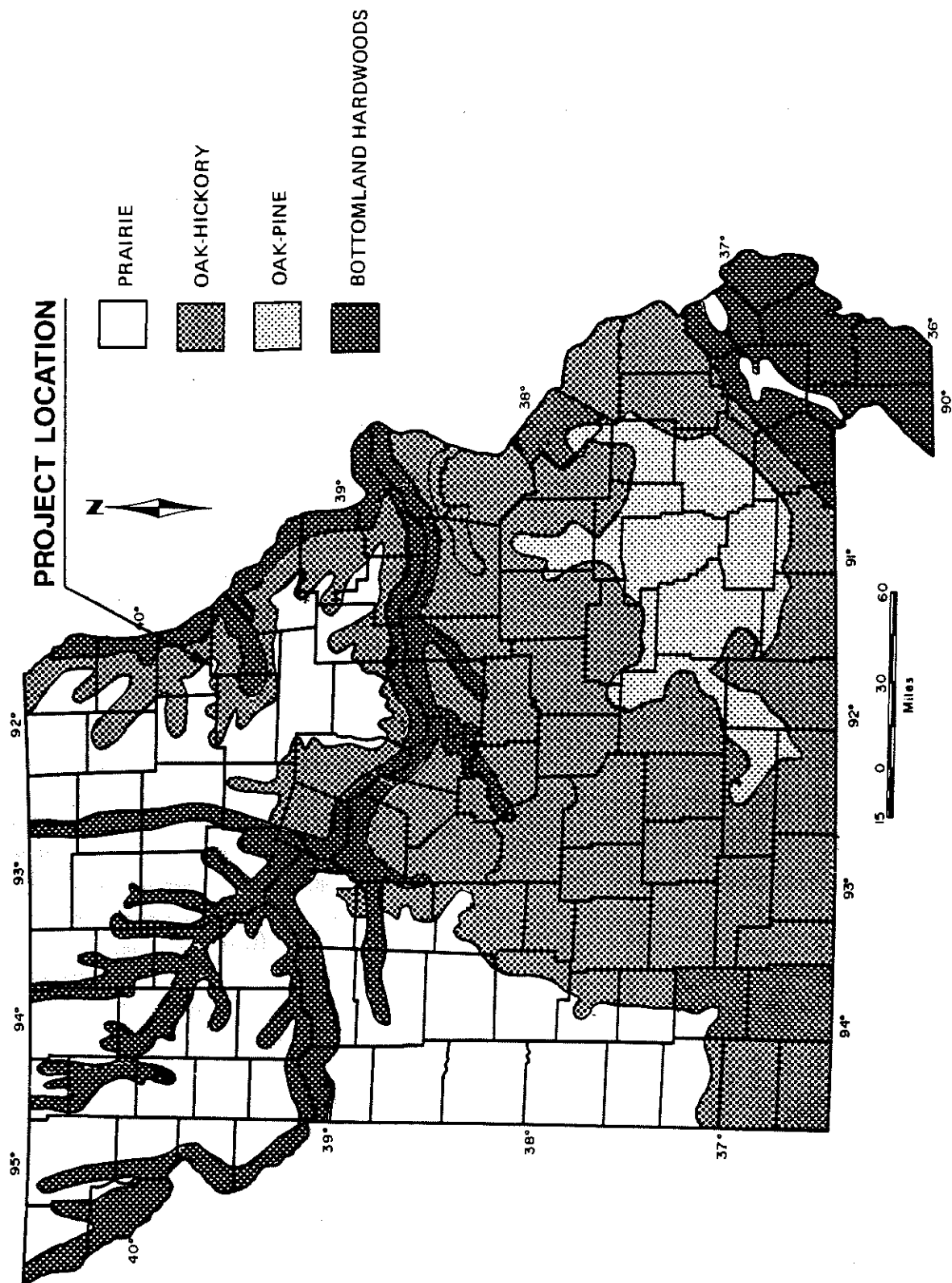
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large bluestem, Indian grass, wild rye, blue joint, switch grass, and slough grass. In addition, the wet prairies contained concentrations of swamp grass, reed grass, rushes, and sedges; the well drained prairies contained side-oats grama, red-top panicum, few-flowered panic grass, roundseed panicum, and wooly panicum; and the understory of forest/grassland strips along the prairie-timber ecotone contained bottle brush, wild oat grass, hairy wild rye, nodding fescue, sylvan blue grass, wood reed grass, white grass, and green muhly. Native forest vegetation of the region at that time was normally confined to areas along waterways, on poorly drained soils and on steep sloping hills/ridges. Forests occupying the steep slopes were generally oak-hickory with associations of maple, elm, black walnut, and red cedar. Forests along waterways or on the poorly drained soils were generally elm-ash-cottonwood with associations of willow, sycamore, sugarberry, river birch, silver maple, and pecan. During the past 150 years most of the prairies were replaced with corn, soybean, grain sorghum, milo, and wheat fields. Agricultural encroachment has also affected the forests of the region. Many formerly forested areas have been cleared and are now being cultivated; extensive cutting of marketable timber, periodic clearing of slopes and bottomlands for cultivation and grazing, and protection from fires has reduced the remaining forests to stands of secondary growth timber (Schroeder 1982:10-11; Rafferty 1982:15) (Figure No. 8). Currently, the majority of the project corridor consists of agricultural and wooded areas, with few stream crossings. Crops being cultivated include primarily soybeans and corn with some fields returned to pasture (Figure No. 2).

PREVIOUS ARCHEOLOGICAL INVESTIGATIONS

Numerous cultural resources investigations have been conducted in the vicinity of the project area, including both Ralls and Marion Counties since 1936, as indicated by the bibliography file located at MDNR-HPP. Regardless, the surveys of record have investigated limited surficial areas of the two counties. The most extensive work in the project area was initially begun in 1959, and continuing through the 1970s, relating to the Clarence Cannon Dam and Reservoir Project by, initially, the University of Missouri, under contract with the National Park Service, and the Missouri Botanical Garden. Other significant investigations were conducted by a team consisting of the University of Nebraska in conjunction with the U.S. Army Corps of Engineers, entitled the *Cannon Reservoir Archaeological Project*, also in the 1970s. The *Cannon Reservoir Human Ecology Project*, a team consisting of the University of Missouri and the U.S. Corps of Engineers, was formed in 1977 to continue the archeological investigations of the reservoir area. Investigations in the project area have been sporadic since that time, involving, typically, limited areas associated with civic projects. (See various documents filed in MDNR-HPP library, including CRM reports, periodicals, and other printed material, authored by Angus, Bremer, Chapman, Donham, Heldman, Henning, Hunt, Klepinger, Klippel, O'Brien, Ruppert, and Teter.)



SOURCES: HISTORICAL ATLAS OF MISSOURI

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**MHTD HIGHWAY 61
RELOCATION PROJECT
GENERAL PLANT COMMUNITIES**

MARION AND RALLS COUNTIES, MISSOURI

DATE: 1/8/96

FIGURE:

8

Prehistoric Background

The project area is located within the general Eastern Woodlands archeological/cultural region of North America and, more specifically, it is within the Northeast Prairie archeological region of Missouri, as described by Chapman. Chapman proposed a general cultural/chronological sequence for this part of Missouri, but subsequent syntheses of data from the region indicate that not all of Chapman's proposed regional periods/phases are present throughout the area. Scattered occurrences of diagnostic materials, nevertheless, suggests the eastern and central physiographic regions of Missouri were occupied early, but evidence of the earliest phases of cultural development in the region are represented only rarely in and around the immediate project area. Thus, a current competent appraisal and synthesis of the results of the numerous investigations conducted within the area is needed to ascertain whether Chapman's proposed chronological sequence is yet viable. Nevertheless, the attached tables purport to indicate the prehistoric cultural sequence of the project area, based on Chapman's dated assessment. See Chapman and Chapman for a relatively current descriptive analysis of each cultural period, as generally designated throughout Missouri, including a discussion of the artifactual record and insights into prehistoric lifeways as gleaned from the collected data. A description of the periods and their approximate durations is provided below.

Pre-Clovis Period (pre-12,000 B.C.)

The earliest defined cultural period is termed the Early Man or Pre-Clovis Period. Sites dating to this time are extremely rare and are usually controversial. They are also widely scattered and small, making them difficult to locate. It is assumed that the earliest human populations lived in small nomadic groups, pursuing megafaunal species such as mastodon, elk, and bison. Like most hunting and gathering groups, however, the subsistence base of these populations was probably diversified. Extensive bone beds of Pleistocene species have been excavated at Kimmswick, Missouri, demonstrating the presence of these species in this part of the state. Chapman stated that if people reached Missouri prior to 12,000 B.C., they would likely have come from the south, perhaps up the Mississippi River valley, or from the southwest through the Gilmore corridor and across the Cherokee Plains (1975:58). It is likely that Pre-Clovis populations utilized a settlement pattern similar to that used by later Paleo-Indian groups. Although no sites of this period have been found in this portion of the state, such sites, if they exist undisturbed, are most likely situated on bluff tops or high terraces overlooking floodplains, thereby facilitating the monitoring of resources in the local environment.

Paleo-Indian Period (12,000-8000 B.C.)

Paleo-Indian Period sites, while better documented, provide little direct evidence concerning subsistence strategies and settlement patterns. Known sites dating to this period include hunting camps, kill sites, quarry sites, and small base camps. It is generally assumed that these populations lived in small nomadic groups, hunting megafaunal species with the aid of

finely made, collaterally flaked and fluted projectile points such as Clovis and Folsom varieties (Chapman 1975:79-93). In Missouri, the discovery of these point types has largely been restricted to surficial sites on hills and terraces near principal rivers, primarily the Missouri and Mississippi, although Chapman stated that many Paleo-Indian sites may be located away from present-day water sources, as water was more plentiful at that time. Sub-surface Paleo-Indian artifacts have been recovered from Rogers Shelter, Shriver, and Kimmswick. At the Kimmswick site, the association of Clovis Fluted points and mastodon and mylodon bones has been verified, providing positive evidence of the association of these people and megafaunal species. (Chapman 1983:25-28).

Dalton Period (8000-7000 B.C.)

The Dalton Period is often characterized as a period of transition from more nomadic subsistence strategies involving big-game hunting covering large areas, to strategies based on intensive hunting of smaller animals and foraging within more restricted territories, characteristic of the later Archaic Period. The Dalton Period coincides with a warming Holocene climate marked by the replacement of the spruce-boreal forest with a mixed deciduous forest-prairie environment. Chapman (1983:30) stated melting of the ice sheets in the Great Lakes region caused periodic and catastrophic floods in the Mississippi River and its tributaries and subsequently, the dust picked up on the river floodplains blanketed the land. The availability of the earlier megafaunal species was limited which necessitated an adjustment by the populations in the lower Missouri-central Mississippi valley to a hunting-foraging economy in which the usage of plants and small animals in their diet was increased. Chapman noted (1983:34) the range of Dalton peoples was limited as the relatively small size of the campsites, distributed on old natural terraces or levees, and the large quantities of refuse indicated a pattern of living on the sites for short periods and returning to them time and time again.

Graham Cave has yielded a limited picture of life in east-central Missouri, during the Dalton Period, indicating that the Dalton settlement-procurement system was not so unstable as previously thought (Chapman 1983:34-37). Finely-made small, eyed bone needles were found in Graham Cave indicating the making of fitted clothing and small flake scrapers are further evidence of skilled hide preparation. Among the other tools found in Graham Cave around the fireplaces were adzes, spokeshaves, and steep-edged scraping and cutting tools denoting extensive woodworking industry. In addition, many cupstones full of red mineral paint and pieces of hematite paintstone that had been ground for powdered pigment were found on the cave floor. The cave also served occasionally as a burial place. The Dalton Period is better known in the Ozark highlands of northeastern Arkansas where a possible Dalton cemetery contained marked graves, caches of Dalton points, adzes, and end scrapers.

The basic Paleo-Indian tool kit was still in use during Dalton times, although tools associated with plant food processing were added to it. The principal artifacts used for defining a Dalton Period occupation are the Dalton Serrated and Dalton Lanceolate point types. The Dalton

Serrated forms characteristic of the Dalton Period have wide distribution. Dalton Serrated is probably a direct descendant of Clovis Fluted, as the basal thinning of the Dalton Serrated approaches fluting. Dalton Serrated points are found with fluted points in the lowest levels of Graham Cave (Chapman 1983:36).

Archaic Periods (7000-1000 B.C.)

Trends that began during the Dalton Period continued to be developed and refined during the Early Archaic Period (7000-5000 B.C.). Chapman noted (1983:41) that because much of the sequence of cultural development in Missouri has been obtained from caves and shelters, "the separation of the Archaic into Early, Middle, and Late periods is somewhat arbitrary." Chapman noted (1983:45) the "Archaic period was one of experimentation, borrowing, and amalgamation of ideas and techniques for obtaining a living and for developing tools as aids in such endeavors."

By the Early Archaic Period the transition to a subsistence pattern based on foraging was well underway; the practice of nomadic wandering was being replaced by a regular hunting-gathering range with specific base camp sites that were returned to at regular intervals (Chapman 1983:38). The drying Holocene climate facilitated the transition to a subsistence strategy based on foraging, exploiting aquatic resources and vegetal foods. This is reflected in the varied artifact assemblage including a number of finely flaked stemmed varieties such as Hidden Valley Stemmed, St. Charles Notched, Hardin Barbed, and Rice Lobed Style points, along with the earlier lanceolate and Dalton style tools. In addition, several different forms of scrapers were produced. The increase in tool forms suggests an increase in function or use in terms of utilization of an extensive number of subsistence-related species. The typical Early Archaic site continued to be the small hunting and/or collecting camp, located in a variety of environmental settings, including upland bluff edges and ridges near small ephemeral streams, the margins of high bottomland terraces, and in rock shelters. Aspects of Early Archaic Period sites have been found in several locations in eastern and central Missouri. In northeast Missouri, the Hannibal Complex includes the Hardin Barbed and St. Charles Notched projectile points. Also, at Graham Cave, the Early Archaic occupation produced a side-notched tool, Graham Cave Notched (Chapman 1983:39).

The Middle Archaic Period (5000-3000 B.C.) corresponds with the Hypsithermal climatic episode, responsible for the extensive grasslands covering most of the interior uplands as well as broader portions of the bottomlands (Fuller and Harl 1993:18). Cultural adaptation to the dry environment, which began in the Early Archaic Period, continued and, although changes in the tool kit (grooved axes and celts and the first apparent use of fabrics and cordage) indicate a greater diversity in subsistence activities, site size does not appear to differ significantly from that of preceding periods, although the exploitation of a diversity of food resources more than likely precipitated an increase in population (Chapman 1983:38-40). The distribution of Middle Archaic sites throughout the state reflects, however, the extremely dry conditions as there appears to be a preference for bottomland settings, primarily shelters. On

the basis of cross-dated artifacts from central and southwest Missouri, it appears that side-notched points are common Middle Archaic artifacts (Fuller and Harl 1993:19).

The Late Archaic Period (3000-1000 B.C.), representing the climax of the warming period, is characterized by a greater diversity and number of sites than during the previous cultural periods, possibly due to a relatively rapid increase in human population levels and climatic conditions similar to the present (Chapman 1975:203-217). Walters (1987:26), paraphrasing Kay, stated the more favorable climatic conditions caused an expansion of the oak-hickory forests and other non-prairie ecological zones, thus creating a more complex resource base than had been available during the Middle Archaic Period. Indeed, the population increase may have encouraged people to utilize more fully the varied resources contained within a distinct territory, resulting in increasing regional differentiation. Supporting this observation, Chapman noted (1983:41) there is never a full complement of the tools or activities of the people represented by the deposits in any single site. Indeed, the relative lack of small dart or projectile points in the Late Archaic tool kit suggests that hunting was not an important activity, though contracting-stemmed Langtry or Gary points are considered diagnostic traits of the period.

Three spatially distinct Late Archaic phases have been defined in Missouri: (1) the James River phase in southwest Missouri, (2) the Nebo Hill phase in central-west Missouri, and (3) the Sedalia phase in central and northeast Missouri (Chapman and Chapman 1983:41-47). Only the latter is pertinent to the culture history of the study region.

The Booth site on the Salt River in the Cannon Reservoir area has been identified as a secondary center of the Sedalia phase. The assemblage included Stone Square-Stemmed knife or projectile point forms, Sedalia Lanceolate forms, drills or drill-like implements, Sedalia Diggers, Clear Fork Gouges, flakes with retouching, rubbed hematite, three-quarter grooved axes, and pitted anvil stones, along with manos and metates, indicating that the Booth site was a base of operations for collecting and processing plant foods. Indeed, gathering rather than hunting appears to be a characteristic of all Sedalia phase sites (Chapman 1983:43-44).

Woodland Periods (1000 B.C.-A.D. 800)

In eastern Missouri, the Early Woodland Period (1000-500 B.C.) is characterized by a continuation of perceived Late Archaic lifestyles, although the development of clay tools and utensils was beginning to gain momentum. The utilization of bottomland resources continued to increase as population density continued to increase. The artifact assemblage remained relatively unchanged, including the continued use of the spear and spear thrower as the primary weapon (Chapman 1983:49). Chapman stated (1983:51) the Early Woodland Period in Missouri is identified by the presence of the Black Sand incised pottery type, first found in Illinois. The low number of Early Woodland Period sites can possibly be explained by the continuation of Late Archaic lifestyles in this region, with only a few groups beginning to use

pottery. Thus, the sites where groups did not use pottery would be similar to those that date to the Late Archaic Period.

The Middle Woodland Period (500 B.C.-A.D. 400) is known primarily by the widespread manufacture of pottery and the apparent practice of trading, as indicated by the emphasis on the production of exotic items, including sculptured stone pipes, finely-detailed clay figurines, and copper ornaments. The growing of corn and locally domesticated plants was also evident, though not as important as hunting and gathering. In the northeastern part of Missouri, along the margin of the Mississippi River, the Hopewell occupation was closely related to that known in Illinois. Groups along the major waterways, including the Mississippi and Missouri Rivers and their major tributaries, are thought to have participated in this exchange system on an opportunistic basis. Exchanged items included exotic goods such as copper ornaments, conch shells, mica materials, and obsidian tools. Functional goods such as decorated pottery and projectile points and raw materials such as galena, copper, mica, obsidian, hematite, and chert were also exchanged. The widespread construction of burial and effigy mounds, implying shared ideas, may have served to integrate populations on a broad local scale. Populations clustered into villages usually situated near perennial streams (Chapman 1983:53-61).

The exchange of exotic goods is believed to have begun to diminish at the beginning of the Late Woodland Period (A.D. 400-800). Although little data are available for interpretation concerning settlement patterns, it appears subsistence practices were similar to their Hopewell predecessors, but without the notable organization. The plainness and lack of variety in the pottery represents a regression from cultural manifestations of the preceding period. Burial mounds continued to be built but they were generally smaller than those of the Middle Woodland Period. These still were situated on the bluff margins above some villages. Burials therein represented a variety of types including extended, flexed, bundled, and cremated interments. The graves also differ from earlier ones as they generally lacked grave goods. During this period the bow and arrow was introduced, probably from the west, and adopted throughout this region. The Late Woodland manifestation in extreme northeast Missouri was designated by Chapman as the Ralls phase (1983:63-69), eventually divided into the Ralls and Salt River phases.

Mississippian Period (A.D. 800-1700)

The Mississippian Period was characterized by changes emanating from the south, including a preference for town dwelling, dependence of agricultural produce, and ability to harvest riverine resources. The earlier Woodland villages and their culture remained, but were noticeably influenced by the ceremonial and political center at Cahokia. This ceremonial center served a series of dependent villages within a radius of thirty to fifty miles. Effects of the center, however, were felt as far away as the Spiro mounds in Oklahoma and as far northwest as the upper Missouri. A secondary center was located in Kansas City (Chapman 1983:71-89).

Perhaps the major change that distinguishes the Mississippian Period from the previous periods is a change in the subsistence strategy. A change towards more intensive agriculture production with corn, beans and squash becoming an increasingly important part of the diet is evident. This period also apparently witnessed the renewing of long range trade networks in which salt and exotic goods comprised important trade items. Utilitarian goods such as pottery vessels and raw materials such as chert were exchanged on a local basis. Pottery discs with a central hole are found for the first time on sites dating to this period; possibly these were spindles. Other pottery objects produced included effigy figurines. Lithic tools in the assemblage included small triangular points with stems, broad-bladed hoes and spades, indicating the intensification of cultivation. Many of these tools are produced from Mill Creek chert found in southern Illinois and traded throughout the Midwest. Villages typically were situated on terraces along prominent waterways near fertile agricultural soils. A variety of small outlying camps occurred around these settlements in different environmental contexts.

For a variety of reasons, the economic, religious, and cultural complexity of the Mississippian civilization began to erode toward the end of the period. Although traits representing this development could still be found to the south in the Gulf Coast region, lifestyles of local populations in Missouri again resembled those of the Woodland periods, a situation reflected in the notes left by explorers from contact times.

Historic Aboriginal Period (A.D. 1400-1800)

The large Mississippian centers began to diminish around A.D. 1300- 400 for a variety of reasons. The trade networks appear to have decreased in scale or ceased altogether. Apparently some groups in the project area reverted to a lifestyle similar to that practiced during the Late Woodland Period; moving into smaller villages and became more localized instead of manifesting a reliance on trade. Some groups continued to rely on agriculture for subsistence while others returned to a hunting-gathering lifestyle. Data pertaining to the prehistory of northeast Missouri between A. D. 1500-1650 is scant, but appears to be a time of transition from the late Mississippi Period to historically identified tribes, particularly the Algonquian-speaking Illinois tribe in the project area.

The final period of Native American occupation of the area encompassing northwest Illinois, southeast Iowa, and northeast Missouri was marked by the appearance of groups which were present during the time of Euro-American contact (Figure No. 9). The larger native tribes included the Osages, Missouris, Otos, Caddos, Quapaws, Iowas, Illinois and Kansas. The Missouris occupied most of the western and interior Ozarks. The Illinois, Caddos, Quapaws, Otos, and Iowas lived along the present borders of Missouri.

Native American settlements were limited in the project area. Although there is evidence of their travel in the area west of Hannibal, major Native American sites tend to appear along larger streams and springs such as Bay De Charles and Clear Creek (Holcombe 1979:882). Two ancient trails utilized by Native Americans are located near the project area. A north-south trail

bisecting Marion County was first recorded in 1684 by a French fur trader named Franquelin. A Dr. James Smith later republished this trail in 1720. The Sac and Fox Indians used this trail to visit trading posts and to conduct raids on the Osages south of the Missouri River. An east-west trail located just south of present day highway 36 in Ralls County was referred to as the Great Trail. This trail was a major conduit between the Mississippi River and the Rocky Mountains. Its location was published on a 1722 De Lisle map (Howard 1980:13).

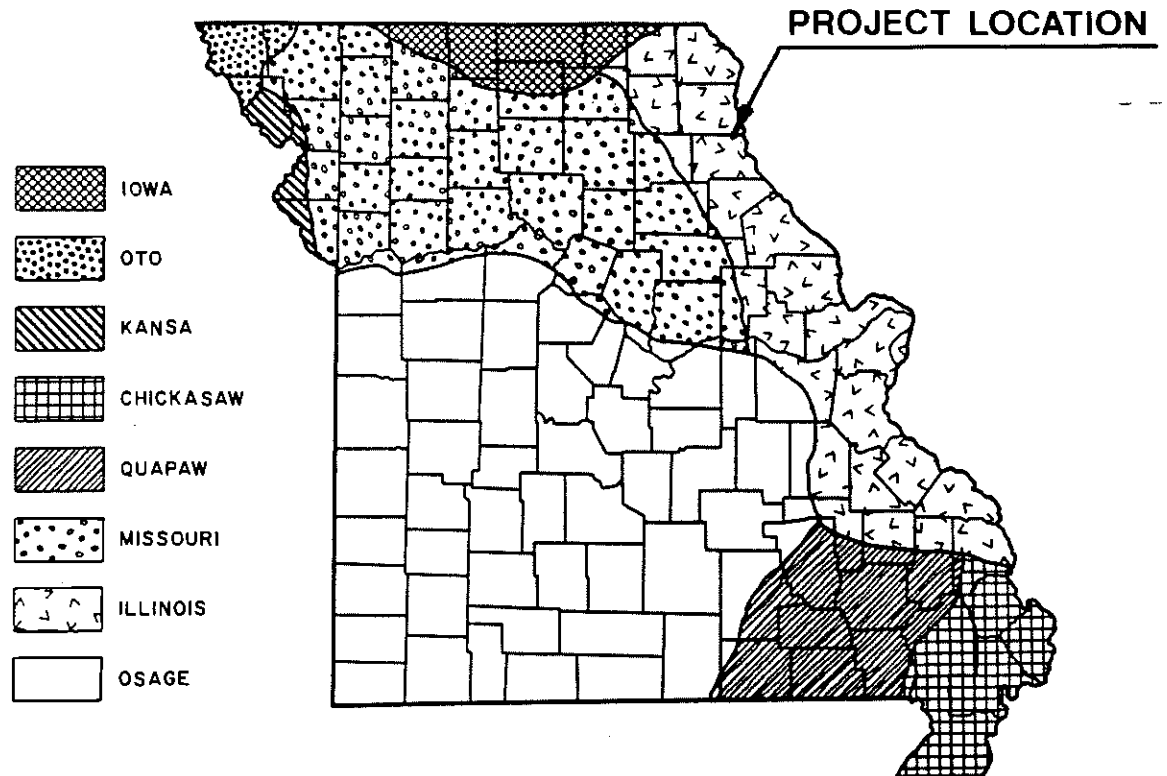
Historic Background

The proposed alternative route for the relocation of Highway 61 is located approximately five miles from the city of Hannibal and was the focus area of the historical literature review. Initial contact in the area with Europeans apparently occurred when the Illinois tribe near the mouth of the Des Moines River encountered Marquette and Joliet on 25 June 1673 (Walters

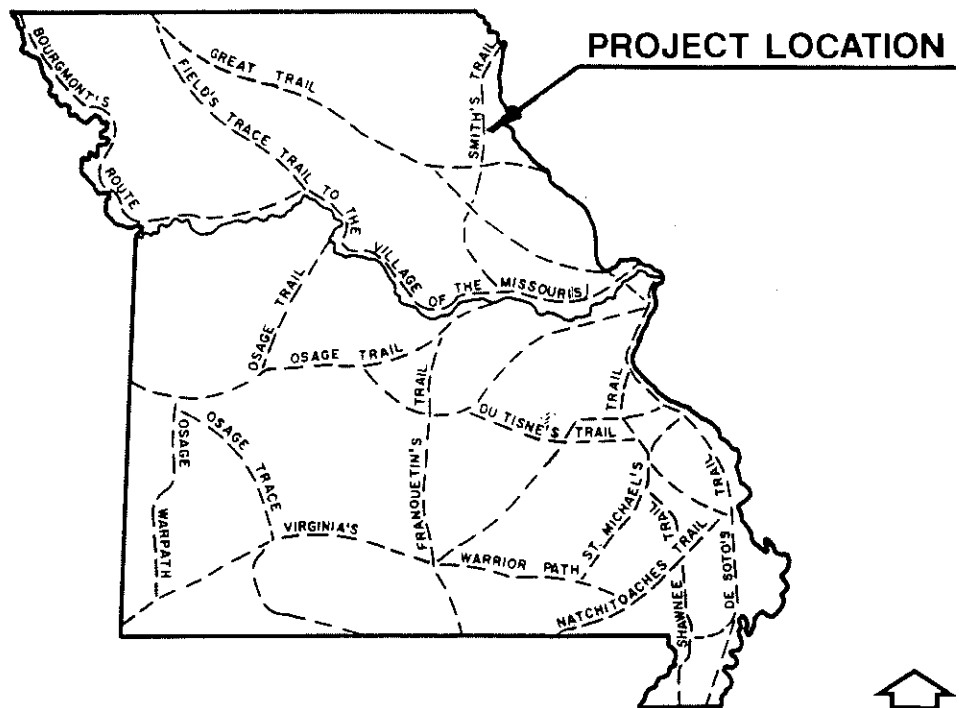
Table 1. North Prairie Region Chronological Sequence.								
Period	Date	Lower Missouri Valley II	Greater St. Louis	Cuivre	Salt	Wyaconda-Fabius	Des Moines	Mississippi Valley North
Historic								
Mississippi								
Woodland								Snyders Point Fragment
Late Archaic		Geiger assemblages of Sedalia complex. Sedalia phase; Gronefeld component, Cuivre ceremonial complex	No data	Cuivre component. Cuivre ceremonial complex, Sedalia phase	Booth assemblage and Hatton Mound ceremonial component of Cuivre complex of Sedalia Phase	No data	No data	No data
Middle Archaic		Graham Cave, middle assemblage; Arnold Research Cave, Forager aggregate	No data	No data	Site 23MN290 Big Sandy Notched from surface of other sites	No data	No data	No data
Early Archaic		Arnold Research Cave, Early Forager assemblage, Dalton site assemblage, Graham Cave	No data	No data	No data	No data	No data	Hannibal "complex" (?)
Dalton		Graham Cave, Hunter-Forager component; Arnold Research Cave, Hunter-Forager component, Sims aggregate, Walter site aggregate	Dalton serrated	No data	No data	No data	No data	Dalton serrated: Site 23RA824 knife or projectile point fragment
Paleo-Indian		Greatest concentration consists of Clovis Fluted, a few Folsom Fluted, Walter site aggregate		Clovis and Folsom Fluted present	Clovis Fluted present	Clovis Fluted present	No data	Several Clovis Fluted
Early Man					No data			
Adapted from MHTD after Chapman								

Table 2. Northeast Prairie Region Chronological Sequence.								
Period	Date	Lower Missouri Valley	Greater St. Louis	Cuivre	Salt	Wyaconda-Fabius	Des Moines	Mississippi Valley North
Middle Mississippi		No data	Sand Prairie phase, Moorehead phase	No data	No data	No data	No data	No data
Early Mississippi		Hunting parties	Moorehead phase, Stirling phase, Fairmount phase	No data	No data	No data	No data	No data
Late Woodland		Boone phase, Moreau subphase	Patrick phase	Ralls phase	Ralls phase	No data	No data	Ralls phase
Terminal Middle Woodland		Fox Creek phase	Creve Coeur assemblage (Terminal)	No data	No data	No data	No data	23MA3 late assemblage Fox Creek phase
Classic Middle Woodland		No data	Creve Coeur assemblage (Hopewell)	No data	No data	No data	No data	Pike phase
Developmental Middle Woodland		No data	Havana phase, Creve Coeur early component	No data	Black Sand Incised sherd	No data	No data	Calhoun phase
Pioneer Middle Woodland		No data	No data	No data	No data	No data	No data	Black Sand complex
Early Woodland		Forager Tradition continues Fiber-tempered pottery in Graham Cave?			Collins site	Forager Tradition continues		Peisker phase
Adapted from MHTD after Chapman								

PRINCIPAL INDIAN TRIBES OF MISSOURI



INDIAN TRAILS IN MISSOURI



SOURCES: HISTORICAL ATLAS OF MISSOURI



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MHTD HIGHWAY 61 RELOCATION PROJECT TRIBAL LOCATIONS

MARION AND RALLS COUNTIES, MISSOURI

DATE: 1/8/96

FIGURE:

9

1987:35). However, possibly due to hostilities with the Osage, Missouri, and other tribes in the late seventeenth century, the Illinois abandoned their villages on the lower Des Moines in about 1705 and joined tribal affiliates further to the east. The area then came under the nominal control of the Ioway tribe, but were themselves displaced by the Sac and Fox in the 1770s. The Sac and Fox retained control of the territory until shortly after 1800 (Walters 1987:35).

After the Louisiana Purchase in 1803, the United States began to negotiate with the aboriginal tribes who claimed the land (within which the project area is located) based on occupancy. The first treaty affecting northeast Missouri between the United States and the aboriginal tribes was made at St. Louis on 3 November 1804, between the representatives of the Sac and Fox and William Henry Harrison, Governor of the Indiana Territory and of the District of Louisiana. The treaty placed the Sac and Fox under "the protection of the United States and no other power." The treaty stood until the War of 1812, when most of the Sac joined the British and fought against the United States. After the War of 1812 it became necessary to draw up another treaty with the Sac. The new treaty signed on 13 September 1815 at St. Louis was essentially a re-affirmation of the 1804 treaty.

Relationships with Native Americans varied according to tribe and nature of encounter. Salt discoveries and subsequent processing activities by early European travelers led to conflicts among area tribes. Early European travelers such as Maturin Bouvet, upon establishing salt manufacturing facilities would experience consistent and considerable destruction of their salt works while away on other business (Williams 1912:447).

Following further settlement of the area, relations between white settlers and Native Americans began to deteriorate as evidenced by the War of 1812. A battle between Ralls County pioneers and Winnebagoes near Saverton resulted in the construction of Fort Mason, named after Lieutenant John Mason (Howard 1980:195). Located near Saverton Salt Works, it was erected to provide additional protection for area settlers. Fort Mason was the army's northern most Missouri fort and the only army fort to be built in the County during any war. It weathered one major clash and was subsequently destroyed by fire (Williams 1912:533; Shoemaker 1943:290). The earliest permanent white settlers in Marion County following Maturin Bouvet are said to be Martin Gash, John Palmer, and their families around 1817 or 1818. Gash located in section 12, township 57, range 6 (South River Township), Palmer settling just south of Gash, and shortly after, Hawkins Smith and his wife Betty Smith arrived to settle nearby. Palmer and Gash formed the nucleus of the first general settlement in the county. Hawkins Smith built the first grist mill (a horse mill) in 1818 or 1819 in section 12, township 57, range 6, a little west of where the railroad bridge crosses the South River, and also the first distillery. The first house of worship (South River Church) (SW $\frac{1}{4}$, SW $\frac{1}{4}$, NE $\frac{1}{4}$ of section 12) erected in 1821 or 1826, and the first brick house, erected in 1823 (NE $\frac{1}{4}$, SW $\frac{1}{4}$ of section 12) were built on Gash property (Holcombe 1979:660-665). A cemetery (about 1 acre) is also located on the church site, dating back to 1829 (Book A, p.14). The South River Church

was eventually rebuilt as a brick structure in 1868 in section 11, T57N, R6W (Holcombe 1979:659-665).

Martin and Mary Gash raised a family of 12 children on their 800 acres of agricultural land. Moses B. Gash was the youngest of the twelve children and eventually went on to be recognized as a major contributor to the economic development of the county. (Anonymous 1982). Martha Gash's (one of Moses Gash's sisters) marriage to Hannibal founder and Palmyra co-founder Moses D. Bates on February 22, 1821 is recognized as the second marriage in the county (Holcombe 1979:660). The Bates settled in Sections 8 and 9 of T57N, R5W, just northeast of the project area (Keck 1994:8).

Within sections 28 and 33, T57N, R5W of Marion County, natural geologic deposits resulting in Burlington limestone have provided the area with an exceptionally white and clear of imperfection source of limestone. This area became known as the Bear Creek Quarry Ground and was utilized for local use until it was purchased in 1877 by the Hannibal Lime Company. The Hannibal Lime Company soon expanded the business into a large scale, multi-quarry industry in the area. The limestone obtained from the quarry was used for buildings (Hannibal Library and City Hall), crushed rock and lime. A single White Bear Lime kiln (the remainder of three originals) remains on White Bear property as a landmark to this industrious process that continued until 1903 (Hagood 1979:53-55).

Northeastern Missouri's abundant salt springs were highly valued by early French explorers (late 1700s) and succeeding land owners. Among the first saltmakers in the area were Maturin Bouvet (Bouvet's Lick) at Spalding, Vicro LaGotre (a fur trader) at Saverton, and Charles Fremont Delauriere and Louis Tartaran La Beaume (Freemore's Lick) in sections 33, 34, and 28, T56N, R5W. Salt production and trade persisted in the area until salt discoveries in the area about Franklin proved to be more profitable due to greater ease of production (Howard 1980:14, 19).

Transportation routes, both railways and roadways, were the key to reducing physical barriers and thus stimulating growth throughout Marion and Ralls Counties. Centerville Road, West Ely Road and Pleasant Street were all east-west routes that provided access to Hannibal and Palmyra's economic and recreational activity (Hagood 1989:11). Centerville Road, built in the 1840s, was an early transportation route to Hannibal for persons living in the Withers Mill area and along Bear Creek. Before the Centerville Road was constructed, no major east-west roads leading to Hannibal existed and travel was across private lands (Hagood 1989:65). West Ely Road was a major post office route. Access to Hannibal was substantially improved in 1884 when West Ely Road was graveled. Improved roadways assisted the growth of Hannibal's economy as stage coaches from St. Louis and St. Charles drove into town by way of West Ely Road and Pleasant Street (Hagood 1989:11).

Two historic railroad routes cross the project area; the Missouri, Kansas and Texas (now known as Norfolk and Western) and the Hannibal and St. Joseph Railroad (now known as the Burlington). The latter was Missouri's first railroad to cross the state. This railroad, especially the run between Hannibal and Palmyra, was a major factor in the area's growth, allowing machinery, passengers, coal, grain, livestock, wartime troops and supplies to be transported quicker, cheaper and safer (Hagood 1989:10-17). In April, 1860, during its second year of operation, the Hannibal and St. Joseph railroad carried the mail posted for the Pony Express' first run to the Pacific coast. Eventually, the railroad became the first railway post office in the world, carrying mail to the Far West by way of St. Joseph (Shoemaker 1943:760). The Chicago, Burlington and Quincy Railroad (commonly called Burlington) purchased the railroad company in 1901. The Hannibal to Palmyra run began in 1956 and was discontinued in 1957 (Hagood 1989:10-17).

Steamboats and water transportation affected the project area primarily as they facilitated the settlement of people and the shipment of products to more distant markets, thereby increasing demand of services and products supporting by the area's agricultural and manufacturing population. The growth of Hannibal and Palmyra in the 1840s as trade, distribution and storage centers (river ports) spawned and supported the outward migration to the west. Settlement along Hannibal and Palmyra's fringe also grew out of cheap land prices, land speculation, and earthquake certificates promising land for those impacted by the New Madrid earthquake. Farming was the dominant economic pursuit for area settlements (Hagood 1989).

The community known as Withers Mill has contributed to the history of the area's past. The first family to locate in the Withers Mill area apparently moved to Missouri in 1830 and settled on 80 acres of land located at the northwest corner of section 31, T57N, R5W. Withers Mill is located at the intersection of the old Hannibal and St. Joseph Railroad and West Ely Road. The village was the first west of Hannibal and included a cemetery (Providence Cemetery in section 29), churches (Providence Church in section 29, Mount Zion Christian Church in section 16, New Banner Baptist Church in section 29), school (Providence School in section 29), general store, blacksmith shop, railroad station (Withers Mill Station) and a viable agricultural way of life (Hagood 1989:21,30,43).

Withers Mill Station and Barkley Station were the area's two main railroad stops along the Hannibal and St. Joseph route. By 1855, runs were being made between Hannibal and Barkley Station, which was located on the southwest corner of the Levi-Barkley farm in sections 18 of Miller Township. As the Civil War progressed, the Barkley site experienced an increase in wartime activities. As Union soldiers entered the area by railroad, attacks by Southern bushwackers became common. A federal fort was constructed at the South River bridge and trestle, a couple of miles away from Barkley property, to guard the railroad. Additionally, federal troops were sent to protect the old New London to Palmyra route, an important early thoroughfare located on the Barkley farm and station. This route was part of the first state road in northeast Missouri leading from St. Charles to the Des Moines River (Hagood 1989:97-99). Withers Mill Station was constructed in 1867 in the aftermath of the war. This station served as

a regular stop or flag stop for the trains, and increased local train travel for such activities as sight seeing and school attendance (Hagood 1989:16-17). Withers Mill residents have also played an important part in Mark Twain history. Mark Twain's daughter, Clara Gabrilowitsch, revealed that Withers Mill's Anna Laura Hawkins was his inspiration for Becky Thatcher in his Tom Sawyer novels (Hagood 1989:68). The Hawkins homesite is located just north of Withers Mill.

Slaves were held as property by many landowners in the area. According to the 1844 Census, most Miller Township residents owned at least one slave, with some owning as many as sixteen (Hagood 1989:10). By 1860, Ralls County had a slave population ranging from 20 to 30 percent of the population, while Marion County had an approximate slave population of 10 to 20 percent of its total. The majority of slaves were employed in agricultural work (Shoemaker 1943:789). In general, slavery was supported throughout the state of Missouri. Abolitionist influences came primary from neighboring states. In fact, as early as 1836, "abolitionist acts" in Marion County, such as receiving literature from the American Colonization Society, resulted in various persons being forced out of the County (Shoemaker 1943:570). The Underground Railroad, associated with the abolitionist movement of the day, was also organized near the area. Slaves attempting to run for freedom would often travel along an established route through Quincy, Illinois, thence further into free-state territory or Canada (Hagood 1989:88).

Federal interest in preventing Missouri from joining the Southern cause drew early strategic involvement from wartime leaders such as Grant and Palmer; although discrepancies exist as to whether or not General Grant ever made his way into Hannibal. Some accounts say that the physical limitations of the terrain as well as the hostile anti-Union environment prevented Grant from entering the territory farther than the site of Quincy, Illinois, a pro-Union town. Union troops and supplies were sent in from Illinois, Iowa and Kansas by railroad which became popular targets for surprise attacks by Southern sympathizers (Williams 1912:456). Union soldiers quickly built a fort at South River Bridge and trestle, a couple of miles from the Barkley Farm in sections 18 and 19 of Marion County, to prevent further railroad attacks (Hagood 1989:99).

Conflict in the area between Federal and Confederate parties arose as recruitment efforts continued. Noteworthy individuals of the southern cause in this area were Colonel Martin E. Green and Colonel John. C. Porter. Both were engaged in numerous encounters with Federal troops, one of which was the memorable Palmyra raid. Porter, in a last attempt to gain control of the town, planned a surprise attack in late 1862. Although capturing several prisoners, he was unsuccessful in his attempt to wrest control of Palmyra away from Union hands (Williams 1912:456).

Today there are numerous small businesses and industries located in the vicinity of the project area; the principal products are agricultural chemicals, heating elements, shoes and boots, optical lenses, fiberglass products, packaged meat spreads, and seat belts. Mineral resources in the county include limestone, coal, shale, and structural clay. One of the largest cement plants in the state is located at Ilasco in Ralls County. Coal was mined in Ralls County until

1962, and following a 20-year hiatus coal mining resumed in 1982. However, as in the past, farming is the most important economic enterprise in the county today. Modern farming in Ralls County is diversified and consists mainly of growing row crops and raising hogs and beef cattle. Large quantities of the corn and soybeans grown in the area are shipped to extra-regional markets by barge on the Mississippi River from a grain terminal in Hannibal (Watson 1984:1-2).

PHASE I SURVEY AND RESULTS

A review of the available cultural resource management reports (numerous pertinent reports evidently are missing or misplaced following the recent move of MDNR-HPP offices), publications and records which have been produced for projects located near or adjacent to the project area being investigated was conducted prior to the initiation of field investigations. These reports are housed in the MDNR-HPP library in Jefferson City and are catalogued by authors well as by county and river drainage. Also, a review of the Missouri Historic Sites Inventory files was conducted to determine which recorded cultural resources are located in the area being investigated. In addition, various historical documents and maps were reviewed. The ASM records in Columbia were also consulted, primarily to review the archeological site forms on file. These forms are filed by county as well as by township, range and section. The ASM records contain 2-4 page summaries of known archeological sites which have been reported to the ASM over the past 50 years. In addition, available USGS topographic maps, government land office records, plat books, and county atlases were consulted as well as available historic aeriels.

More than 820 archeological sites have been recorded for Ralls County at the ASM office, located in Columbia, Missouri. Only one site appears to be located in the vicinity of the proposed project corridor alignment, but is not located within or adjacent to the proposed project boundaries. This site is described briefly as follows:

23RA128 The site file contains very little data pertaining to this site. The recording date is unknown, but it is recorded as an "Archaic site - Hannibal Complex type site." The location is listed as Section 4, T56(N?), R5(W?).

Data files at MDNR-HPP were consulted to determine if any cultural resources other than those noted above had been reported in the project area. No specific references to non-NRHP historic structural/architectural resources in the current project survey could be found in MDNR-HPP's Central Inventory File of Historic Places in Missouri. Five NRHP structures have been recorded in Ralls County, however, none of which are located within or adjacent to the proposed corridor alignment:

1. James B. Brown House (Stonecroft Manor House): located in parts of Section 5, T56N, R4W, at 2400 Carrs Lane, in the Hannibal vicinity, recorded 26 January 1984.

2. John Garth House: located in part of Section 12, T56N, R5W, south of Hannibal on U.S. 61, recorded 11 July 1977.
3. Ralls County Courthouse and Jail-Sheriff's House: located on Courthouse Square, in New London, recorded 14 September 1972.
4. St. Paul Catholic Church: located in parts of Section 31, T55N, R6W, west of Center on State Route EE, recorded 31 May 1979.
5. St. Peter's Catholic Church (Brush Creek Church): located in part of Section 30, T56N, R6W, in the Brush Creek area southwest of Rensselaer on State Route 2, recorded 14 November 1980.

Over 200 archeological sites have been recorded for Marion County at the ASM in Columbia, Missouri. Two of these archeological sites are on the NRHP:

1. Osterhout Mound Park (23MA8): located in the Hannibal vicinity, recorded 11 April 1973;
2. Sharkey Mound Group (23MA13): located in the Hannibal vicinity, recorded 18 December 1973.

There are four additional sites recorded in Marion County that are located in the vicinity of the proposed project corridor alignment. None of the four sites are located within or adjacent to the proposed project boundaries. The following is a brief description of the recorded sites located in the project area in Marion County:

23MA163 This site, recorded 4 December, 1990, as a prehistoric "light density, surface scatter of chert debitage," is located in Section 27, T57N, R5W. The site was not evaluated for NRHP eligibility.

23MA164 This site, recorded 4 December, 1990, as a prehistoric "low density scatter of chert debitage and core fragments covering a 100m by 20m area," is located in Section 28, T57N, R5W. No collection was made of artifacts and the site was not evaluated according to NRHP eligibility criteria.

23MA176 This site, recorded 8 April, 1992, as a "medium to high density, unknown prehistoric lithic material scatter," is located in Section 33, T57N, R5W. The file states that chert items are at a density of 2 items per square meter of exposed surface. A collection was made but no shovel testing was conducted. The site was not evaluated per NRHP eligibility criteria.

23MA177 This site, recorded 8 April, 1992, is a "partially eroded, unmortared, limestone retaining wall," located in Section 34, T57N, R5W. This wall was probably constructed to stabilize the railroad embankment. This site was not evaluated per NRHP eligibility criteria but should not be a factor in the present project corridor selection.

Data files at MDNR-HPP were consulted to determine if any cultural resources other than those noted above had been reported in the project area. Eighteen NRHP structures/districts have been identified in Marion County, as follows:

1. Levi Barkley House (Barkley, Baxter, Landis House): located in Section 18, T57N, R5W, in the Hannibal vicinity, recorded 7 October, 1982.
2. Central Park Historic District: roughly bounded by 4th, 7th, North and Lyon streets in Hannibal, recorded 7 October, 1982.
3. Dryden-Louthan House: located at 402 East Ross Street, in Palmyra, recorded 18 January, 1985.
4. Ebert-Dulany House: located at 1000 Center Street, in Hannibal, recorded 17 February, 1985.
5. Eighth and Center Streets Baptist Church: located at 722 Center Street, in Hannibal, recorded 4 September, 1980.
6. Gardner House: located at 421 Hamilton and Main streets, in Palmyra, recorded 4 March, 1971.
7. Hannibal Lime Company Office: located at 623 Collier Street, in Hannibal, recorded 6 September, 1984.
8. Hendren Farm (Andalusia): located in part of Section 10, T57N, R5W, just off U.S. 61, in the Hannibal vicinity, recorded 22 August, 1984.
9. Mark Twain Boyhood Home: located at 206-208 Hill Street, in Hannibal, recorded 15 October, 1966 (National Landmark Site).
10. Mark Twain Historic District: bounded by Bird, Main, and Hill streets, U.S. 36, and the Mississippi River, in Hannibal, recorded 4 January, 1978.
11. Robert Masterson House: located in part of Section 5, T47N, R5W, in the Hannibal vicinity, recorded 5 April, 1984.

12. Old Federal Building (U.S. Post Office and Courthouse; Naval Reserve Center): located at 600 Broadway Street, in Hannibal, recorded 15 October, 1980.
13. Old Police Station and Jail, Hannibal (City Hall): located at 4th and Church streets, in Hannibal, recorded 17 July, 1979.
14. Rockcliffe Mansion: located at 1000 Bird Street, in Hannibal, recorded 18 September, 1980.
15. Peter J. Sowers House: located at 221 Home Street, in Palmyra, recorded 18 January, 1985.
16. Speigle House: located at 406 South Dickerson, in Palmyra, recorded 14 February, 1985.
17. Walker-Woodward-Schaffer House (Jane Darwell Birthplace): located at 1425 South Main Street, in Palmyra, recorded 16 February, 1984.
18. Ephriam J. Wilson Farm Complex: located in parts of Sections 5 and 6, T57N, R5W, just off Missouri 168, east of Palmyra, recorded 28 December, 1982.

Only one of these NRHP structures/districts is located in the project area, the Levi Barkley House, but will not be adversely impacted by the proposed construction as it is located east of the selected corridor. In addition, no specific references to non-NRHP historic structural/architectural resources in or near the current project area could be found in MDNR-HPP's Central Inventory File of Historic Places in Missouri.

The proposed project corridor alignment was originally investigated during the month of December, 1995. The entire proposed project corridor alignment was subjected to an intensive pedestrian survey, including shovel tests. Figure No. 9 presents the observed land use and ground surface visibility percentage of the entire corridor. All areas possessing less than 50 percent visibility were subjected to shovel tests at intervals and depths calculated to determine the presence of buried cultural remains. Agricultural row crop production is the prevalent land use associated with the upland areas traversed by the proposed U.S. Highway 61 relocation project. Primarily, soybeans and corn are planted in alternating years. Other tracts located on slopes have been deeply terraced to restrict erosion and are in cultivation. Several tracts of land within and adjacent to the proposed project corridor alignment have been stripped of native timber, churned to at least 10 inches, and allowed to produce pasturage for livestock. Other areas traversed by the corridor include riparian areas with tree and shrub cover. In addition, much of the proposed corridor is adjacent to existing highway and county road right-of-ways and, thus, have been severely impacted by the construction necessary to complete those projects.

A total of three new sites were recorded by GBA during December, 1995, applying the methodology described above (Figure No. 2). Artifacts were collected from each of the three discovered sites. Each of the three archeological sites discovered during the investigation was subjected to additional soils testing during the month of March, 1996, to substantiate the observations recorded regarding the disturbed condition of the sites. These sites are described in sequence from north to south along the proposed project corridor alignment:

Site No. ASM # 23MA202

County: Marion

Site Name: Bear Creek A

Cultural Affiliation: Unknown Prehistoric

UTM Location: Zone 15; Northing 4397800 Easting 627640

Legal Description: SE1/4 SE1/4 NE1/4 Section 24, T57N, R6W

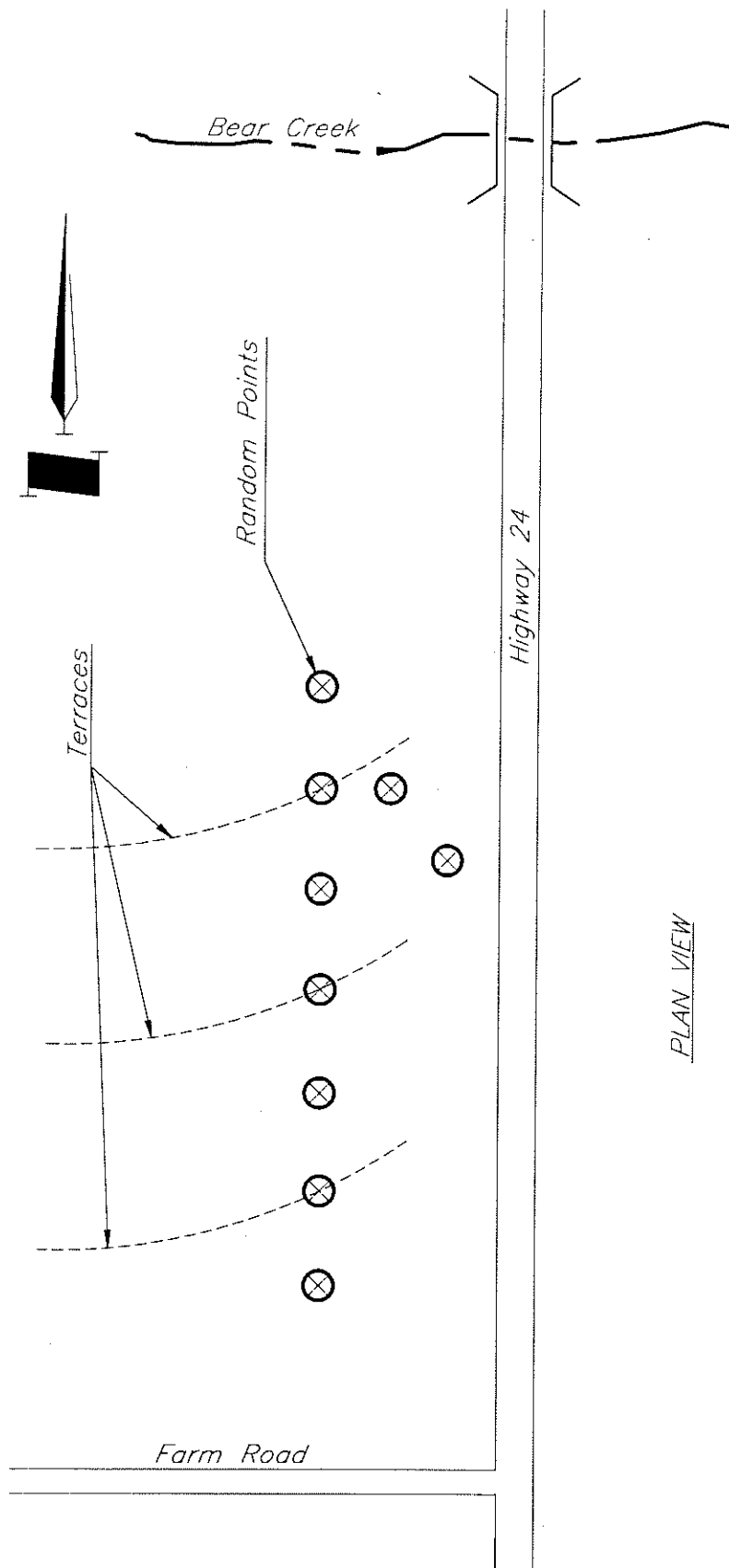
USGS Quadrangle: Rensselaer, MO

Ownership: Unknown

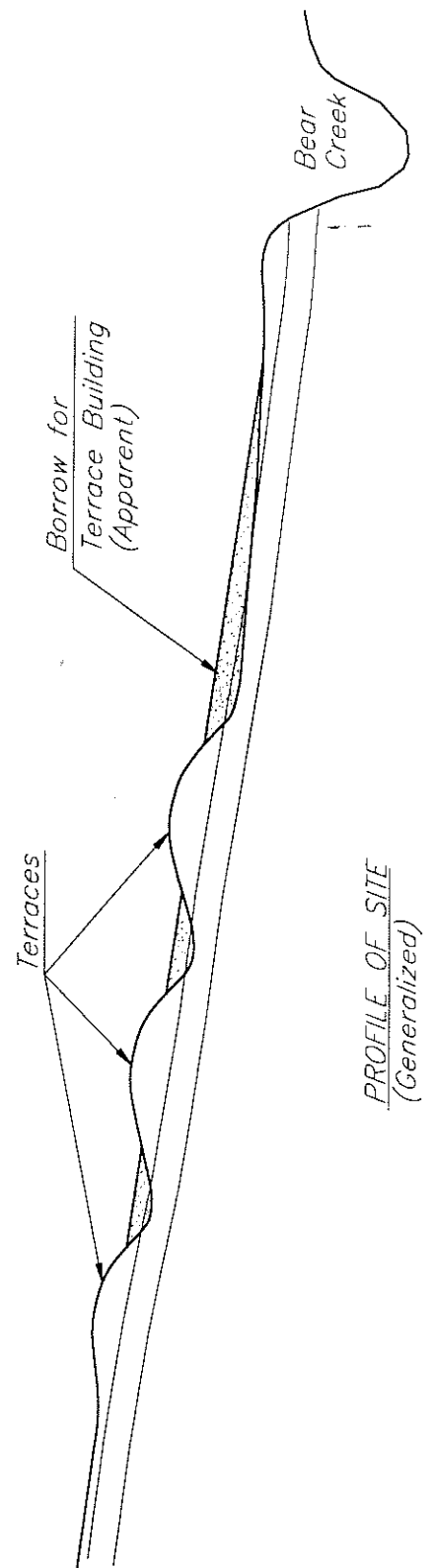
Description: This site is located on a terraced, cultivated slope adjacent to the right bank of Bear Creek west of U.S. Highway 24. The site is defined on the basis of the pedestrian survey of right-of-way corridor. The site is characterized as a medium density lithic debris scatter. Site size is estimated at 180 by 120 m; elevation approximately 630 ft. MSL (610-640 ft.); soil: (1) Belknap silt loam, (2) Leonard silt loam, 5-9 percent slopes, and (3) Smileyville silt loam, 2-6 percent slopes. Due to the absence of surficial soils (except in the terraces themselves) and exposure of underlying clay and rock, a minimum of 20 shovel tests were randomly placed within the site area as determined by surface finds of artifacts. Depth of shovel tests was limited to 10-20 cm. No diagnostic artifacts were discovered and no features could be discerned by screened shovel tests. Prehistoric artifacts collected include 14 chert flakes. The site is in poor condition, being deeply terraced and disturbed agricultural clearing and cultivation practices. Surface visibility was estimated at 25-45 percent at the time of survey. Time spent at the site was two hours. The site may extend upstream outside the confines of the present right-of-way search. No evidence of prehistoric activity was found on the left bank of Bear Creek within the project boundaries. Artifacts are presently in the possession of GBA for cleaning and cataloging.

The site was revisited in March, 1996 by a GBA archeologist and soil scientist. Additional artifacts were collected (as depicted in the accompanying photo logs). The following comments are submitted by GBA soil scientist Mark Felton: The site consists of a sloping field with three to four constructed terraces (see attached diagram). A random group of probings were utilized to analyze this site and were generally located between and on top of the erosion control terraces. The mapped soil unit for much of this site is the Smileyville (28B) silt loam, 2-6% slopes. Initial exploration was performed in the Highway 24/farm field margin to judge correlation with typical profile. This margin met the typical profile very well. We then began to probe the field and found that generally, the spaces between the terraces exhibited truncated or cut-off profiles. The terraces exhibited cumulative or deep surface soils far in excess of the mapped profile. Therefore it quickly became very obvious that the terraces were constructed from local topsoil. In some cases, the regraded took

all of the topsoil, leaving clays and exposed rock at the surface. We therefore firmly believe that this site has been greatly disturbed.



PLAN VIEW



PROFILE OF SITE
(Generalized)

MHTD HWY 61 RELOCATION **SITE - 23MA202**

Site No. ASM # 23MA203

County: Marion

Site Name: Little Bear Creek Site A

Cultural Affiliation: Unknown Prehistoric/Historic

UTM Location: Zone 15; Northing 4394300 Easting 628280

Legal Description: SW1/4 NE1/4 SW1/4 Section 31, T57N, R5W

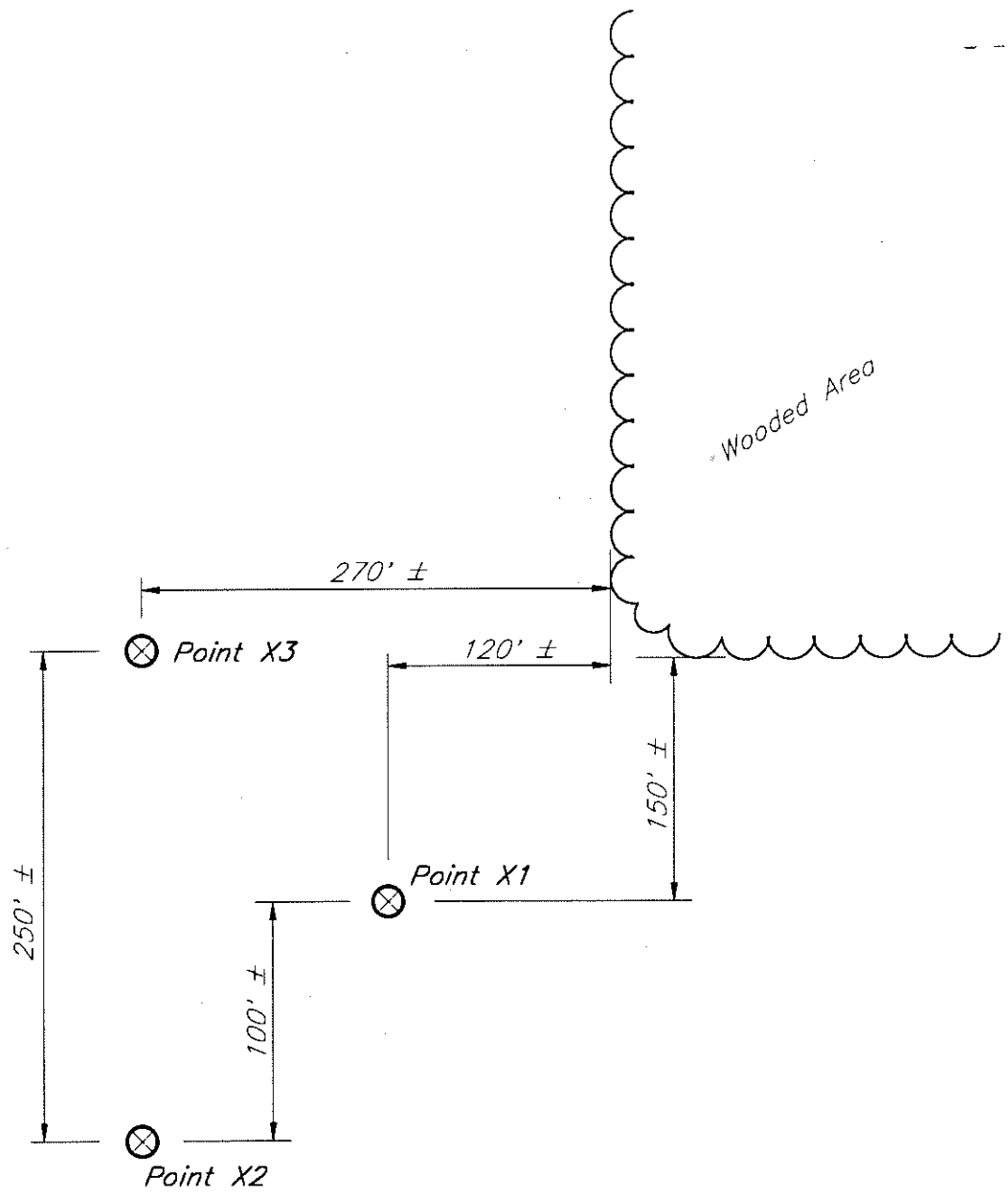
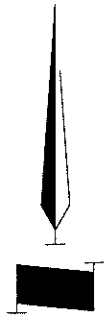
USGS Quadrangle: Rensselaer, MO

Ownership:

Description: This site is located in a cultivated field approximately 300 m west of an intermittent tributary of Little Bear Creek. The site contained chert shatter and flakes of unknown prehistoric affiliation and a scatter of brick, stone, and glass debris from an historic farmstead. According to the 1958 USGS topographic map, two structures were located approximately 200 m east of the site. A series of 30-40 shovel tests, to an average depth of 30 cm, were placed according to arbitrary grid across the site as determined by surface finds in an attempt to find buried features. No diagnostic artifacts were discovered and no features could be discerned associated with either the prehistoric occupation or the farmstead. Site size is estimated at 100 by 100 m; elevation approximately 710 ft. MSL; soil: Mexico silty clay loam, 2 to 5 percent slopes, eroded. The site is in poor condition due to the extensive grade alteration associated with the construction of agricultural terraces. Surface visibility at time of survey was variable; 5 to 30 percent. Time spent at site approximately two hours. Artifacts are presently in the possession of GBA for cleaning and cataloging.

The site was revisited in March, 1996 by a GBA archeologist and soil scientist. Additional artifacts were collected (as depicted in the accompanying photo logs). The following comments are submitted by GBA soil scientist Mark Felton: A series of three data points were located in a random fashion across the site (see attached diagram). The mapped soils for the site are the Mexico (24B2) silty clay loam, 2-5% slopes, eroded and the Putnam (26) silt loam. The site (as mapped) is predominated by the Mexico silty clay loam. The site had a great deal of "trash" incorporated into the soil such as broken bricks and dishware. Point 1-1 confirmed the mapped soil (Mexico unit). However, the Btg2 horizon was exhibited at a much higher point in the profile (approximately 10") and the Btg1 was not evident. Point 1-2 was very similar to Point 1-1 with the Btg2 horizon at approximately 9" in depth. The surface horizon was homogeneous in color and texture and generally corresponded with the mapped Ap horizon. Again, this mapped unit was generally confirmed to be the Mexico soil. Point 1-3 was quite different from the previous points. We believe that this point is located within the Putnam soil unit. The E horizon was exhibited at 10" in depth. All three points exhibited consistent and ongoing agricultural activity. Points 1-1 and 1-2 indicated a great deal of disturbance / mixing has occurred and that some amount of erosion, after and ongoing since plowing, has

created a situation whereby the surface soils have been gradually lost and the remaining surface soils have been mixed thoroughly with the upper profile subsoils. Point 1-3 showed a great deal of surface mixing from plowing but did not exhibit the same overall impacts to such a depth as the previous points. --



MHTD HWY 61 RELOCATION
SITE - 23MA203

Site No. ASM # 23RA824

County: Ralls

Site Name: Virginia Murphy Site

Cultural Affiliation: Unknown Prehistoric

UTM Location: Zone 15; Northing 4388640 Easting 290370

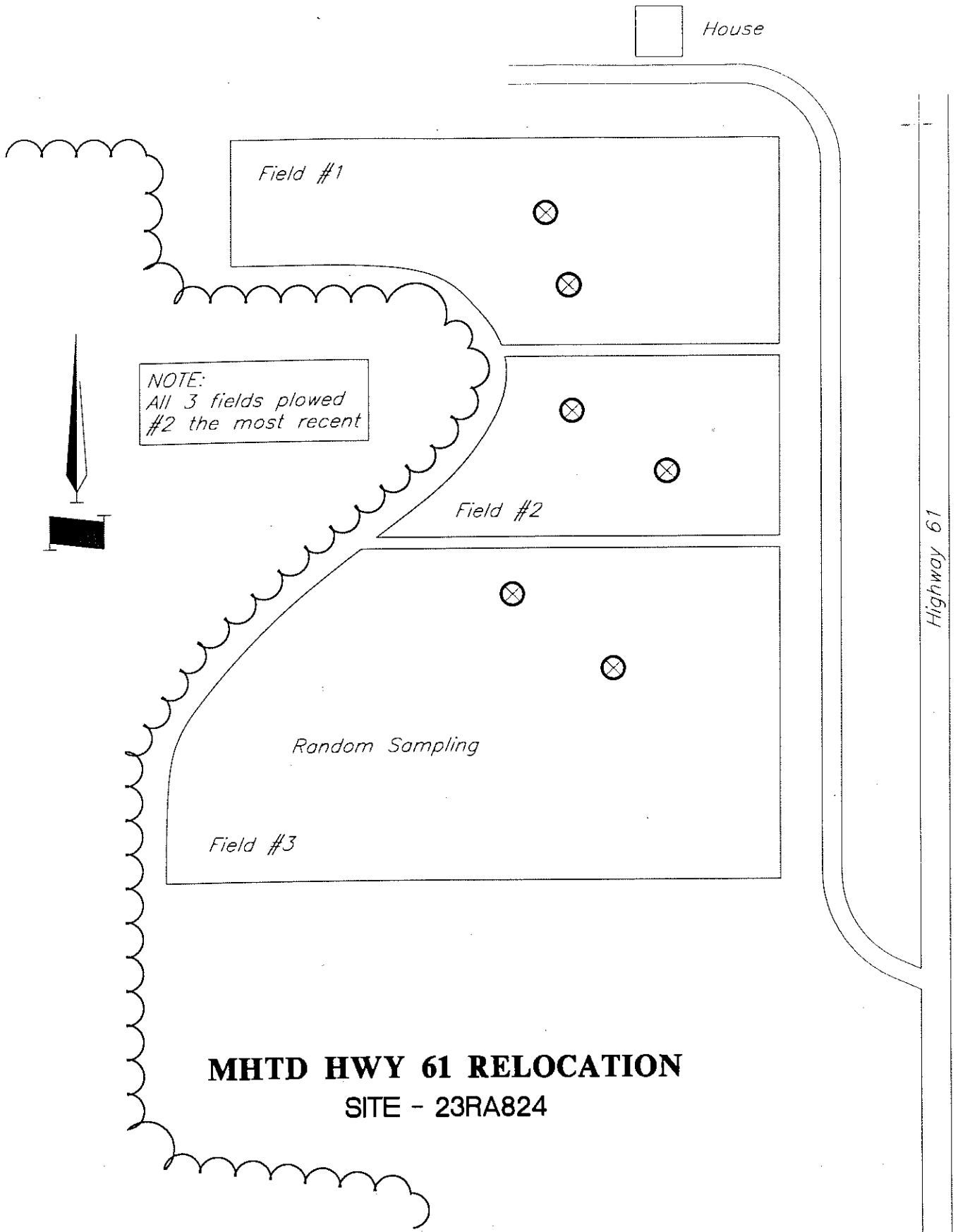
Legal Description: SW1/4 NE1/4 NE1/4 Section 23, T56N, R5W

USGS Quadrangle: Hannibal West, MO

Ownership: Virginia Murphy

Description: The site is located in a cultivated field south of Ms. Murphy's residence, west of U.S. Highway 61, south of State Highway M. Site size is estimated at 30 by 80 m; elevation approximately 700 ft. MSL; soil: Winfield silt loam, 5 to 9 percent slopes, eroded. A series of 25 shovel tests were made at an average depth of 30 cm. No diagnostic artifacts were collected. Surface-collected artifacts include three flakes of undetermined chert source. The site has been adversely impacted by frontage road construction on the east and driveway construction on the north and south. Surface visibility estimated at 25 percent. Time spent at site two hours. Perhaps 1/4 of site has not been impacted. Ms. Murphy stated prehistoric artifacts, including projectile points and blades have been unearthed from the site, but are not now in her possession. Collected artifacts are presently in the possession of GBA for cleaning and cataloging.

The site was revisited in March, 1996 by a GBA archeologist and soil scientist. Additional artifacts were collected, including a Dalton serrated knife or projectile point fragment (as depicted in the accompanying photo logs). The following comments are submitted by GBA soil scientist Mark Felton: This site consists of generally three fields of various uses and sizes. Randomly located probings were located throughout the site (see attached diagram). The mapped soil unit is the Winfield (31C2) silt loam, 5-9% slopes, eroded. The first field generally correlated with the mapped soil unit. However, the upper 9" of the epipedon was strongly disturbed as a plow layer. Very little of the E horizon remained although it was normally present (1-2"). The second field had its A, E, BE and Bt1 horizons thoroughly mixed to a depth of 18". At this point the Bt2 (or a slightly transitional remnant of the Bt1) began. The third field was homogeneous to the standard 9" plow depth. The Bt1 was identified at this depth with the Bt2 present within 3-4". Therefore, the typical profile horizons of A, E, and BE were missing due to mixing. When the Bt1 horizon was present or where the Bt2 horizon was first identifiable, this consistently occurred at a point much higher in the profile than is typical (9" rather than 16"). We believe that some amount of erosion has occurred on this site with the obvious plowing. Additionally, some amount of deep plowing has occurred on site, although this seems to be "sporadic" in extent. Therefore, we believe that the site has undergone significant disturbance in a majority of its area and that some portions reflect extensive disturbance.



Soil Investigation Summary Site Nos. 23MA202, 23MA203, and 23RA824.

The way a soil is mapped, the horizon designations given and the modifiers used to help describe them can give a quick indication of site history and impacts. The use of designations like A horizons over C horizons (parent materials), B horizons with "w" modifiers and the noted eroded phase description quickly lead one to believe that significant natural and/or human disturbances have and perhaps are on-going on these soils. The field work performed often confirmed this for a majority of each of the three sites. However, some portions of these sites are less than definitive for this analysis. We find the following areas as highly disturbed:

- 1) the entire portion of site 23MA202, from up slope of the erosion control terraces to just beyond the toe of slope,
- 2) all portions of site 23MA203 mapped within the Mexico soil unit, and
- 3) the central or second field of site 23RA824.

In addition to the current archeological investigation, a separate historic structure assessment has been prepared and has been revised per MDNR-HPP comments (Laura L. Sparks to Stacy Sone 17 November 1995) and resubmitted to MHTD. Further, MHTD has completed a bridge survey for both Ralls and Marion Counties. The bridges are listed by name and include information pertaining to type, span, age, stream crossing, and construction firm. Only one bridge is located in the vicinity of the proposed corridor alignment, but is not located within the project boundaries; a Pratt pony truss bridge, #289000.3, which MHTD has listed as "Excluded." The "Excluded" category essentially means the bridge is not likely to be considered eligible for NRHP listing.

CONCLUSIONS AND RECOMMENDATIONS

The background records research for the MHTD Job Nos. J3P0426 and J3P0427 revealed no previously reported archeological sites within or adjacent to the project area. A Phase I survey of the project area identified the presence of three archeological sites within the proposed project corridor alignment; 23MA202, 23MA203 and 23RA824, as discussed above. Briefly, the investigation of 23MA202 produced a total of 23 flakes of probable Burlington chert and chert from an unidentified source; 23MA203 produced both historic debitage, consisting of brick, glass, dishware, and metallic artifacts and prehistoric items, consisting of 6 flakes of both Burlington chert and chert from an undetermined source; and 23RA824 produced 8 flakes of primarily Burlington chert and probable Dalton projectile or knife fragment. The three sites do not appear to meet the criteria of eligibility for inclusion on the NRHP, as they are unlikely to yield further significant data pertaining to the local history or prehistory due to site disturbance. Based on the results of the background research, field investigations, and evaluation of the results of these investigations, it is believed that the construction of MHTD Job Nos. J3P0426 and J3P0427 will not impact any significant archeological sites. It is recommended that no further cultural resources work is required by this project and that the project proceed as planned.

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ARCHAEOLOGICAL SURVEY OF MISSOURI

Missouri Archaeological Society—University of Missouri—Columbia

Please Type

1. County Marion 2. ASM Site Number 23MA202
3. Local Name/Number Bear Creek @ Hwy 24
4. ¼ Secs. (1) SE SE NE 5. Sec/Land Grant (1) 24 6. Twp (1) 57N 7. Range (1) 6W
q q q q
8. ¼ Secs. (2) q q q q 9. Sec/Land Grant (2) 10. Twp (2) 11. Range (2)
12. 1-USGS Rensselaer 16. UTM: Zone 15 17. Northing 4397800
13. 2-County Map 18. Easting 627640
14. 3-Other Map 19. NRHP
15. Cultural Affiliation Unknown Prehistoric 20. Size of Site 180m(E-W) x 120m(N-S)
21. 21,600 m²/ha
22. Owner/Address of Property
23. Tenant/Address of Property
24. Information current as of 1/16/95 date.
25. Site Description

See Attached

26. This Information Supplied By

Name Mark W. Kelly
Address George Butler Associates, Inc.
8207 Melrose Dr.
Lenexa, KS 66214

Date 1/16/95

103 SWALLOW HALL

314/882-8364

27. Affiliation of Reporter

 1 UMC
 2 Other Educational Institutions
X 3 MAS Member
 4 Non-educational Institution
 5 Non-MAS, Private Individual

UNIVERSITY OF MISSOURI

COLUMBIA, MO 65211

5M 8/88

28. Condition of Site

Site is in poor condition due to agricultural terracing of remaining portion of site. Probable original spatial limits impacted by U.S. Hwy 24 construction on east and county road on south.

29. Site Nature—General (Check the numbers)

- ☒ 1 - Prehistoric
☐ 2 - Historic
☐ 3 - Protohistoric
☐ 4 - Prehistoric/Protohistoric
☐ 5 - Historic/Protohistoric
☐ 6 - Prehistoric/Protohistoric/Historic
☐ 7 - Historic/Architectural
☐ 8 - Other _____

☐ 9 - Prehistoric/Historic _____

30. Site Nature—Specific

- ☒ 1 - Habitation/Prehistoric (Campsite, village)
☐ 2 - Mounds
☐ 3 - Burial Area
☐ 4 - Petroglyph/Pictograph
☐ 5 - Quarry
☐ 6 - Cave/Shelter
☐ 7 - Cairn
☐ 8 - Trail/Trace/Road
☐ 9 - Other _____

☐ 10 - Residence/Farmstead
☐ 11 - Industrial
☐ 12 - Military
☐ 13 - Residence/Farmstead Outbuilding(s)
☐ 14 - Political/Governmental
☐ 15 - Church
☐ 16 - School

31. Water Source

- ☐ 1 - Spring
☐ 2 - Intermittent Stream
☒ 3 - Perennial Stream
☐ 4 - River
☐ 5 - Confluence of Water Courses
☐ 6 - Natural Lake
☐ 7 - Swamp/Bog
☐ 8 - Other _____

32. Topographical Location

- ☐ 1 - Flood Plain (T-0)
☐ 2 - Stream Terrace (T-1)
☐ 3 - Stream Terrace (T-2)
☒ 4 - Slope
☐ 5 - Bluff
☐ 6 - Hilltop/Ridgetop
☐ 7 - Other _____

33. Material Reported

- ☒ 1 - Prehistoric
☐ 2 - Historical Period
☐ 3 - Both
☐ 4 - ?

Material Location

34. Is there a collection? ☒ Yes ☐ No

35. Repository (1) George Butler Associates, Inc.

36. Repository (2) _____

37. How was the site discovered? Pedestrian

Phase I Survey

38. Contour Elevation 610-640 ft/MSL

Nearest (named OR unnamed) Water

39. Name Bear Creek

40. Distance Adjacent

41. Right or Left Bank of Stream

(looking downstream) R

42. Spring Nearby/Name -

43. Distance -

44. Remote Sensing/Sampling Techniques

shovel tests, surface finds

45. Geomorphology/Land Forms/Soils

upland slope 10%; soils: (1) Belknap Silt Loam (2) Leonard Silt Loam 5-9%

46. Land Status When Reported

- ☒ 1 - Cultivated
- ☐ 2 - Pasturage
- ☐ 3 - Wooded
- ☐ 4 - Flooded
- ☐ 5 - Developed
- ☐ 6 - Other _____

47. Land-Use Comments

appears to be corn-soybean rotation

48. Site Significance/NRHP Eligibility

Not recommended for further testing. Potential for buried cultural remains minimal due to site deflation by extreme terrace construction and roadway construction.

49. Literature Sources (INCLUDE any CRM report[s] pertaining to this site)

A Phase I Cultural Resources Investigation of the Proposed U.S. 61 Highway Relocation Corridor Project, Ralls and Marion Counties, Missouri.

50. Description of Cultural Features

Lithic scatter.

51. Faunal/Floral Remains

None

52. Drawings, photographs, and/or brief description and quantity of artifacts

14 chert flakes of variable source.

53. Sketch Map

Indicate the chief topographical features, such as streams and elevations. Also indicate houses and roads. Indicate the site location by enclosing the site area with dotted line. Note scale of map and portion of section included in sketch map. Include drawings, photographs, etc.

Is this a full section _____, $\frac{1}{4}$ section _____, other _____?
 SE $\frac{1}{4}$ NE $\frac{1}{4}$ Section 24, T57N, R6W

Indicate part of section included in sketch map.

			X

N

S

W

E

Scale _____

Key

54. Attach a copy of the appropriate topographic map with map name, scale, and site location clearly indicated.

Site No. ASM # 23MA202

County: Marion

Site Name: Bear Creek A

Cultural Affiliation: Unknown Prehistoric

UTM Location: Zone 15; Northing 4397800 Easting 627640

Legal Description: SE1/4 SE1/4 NE1/4 Section 24, T57N, R6W

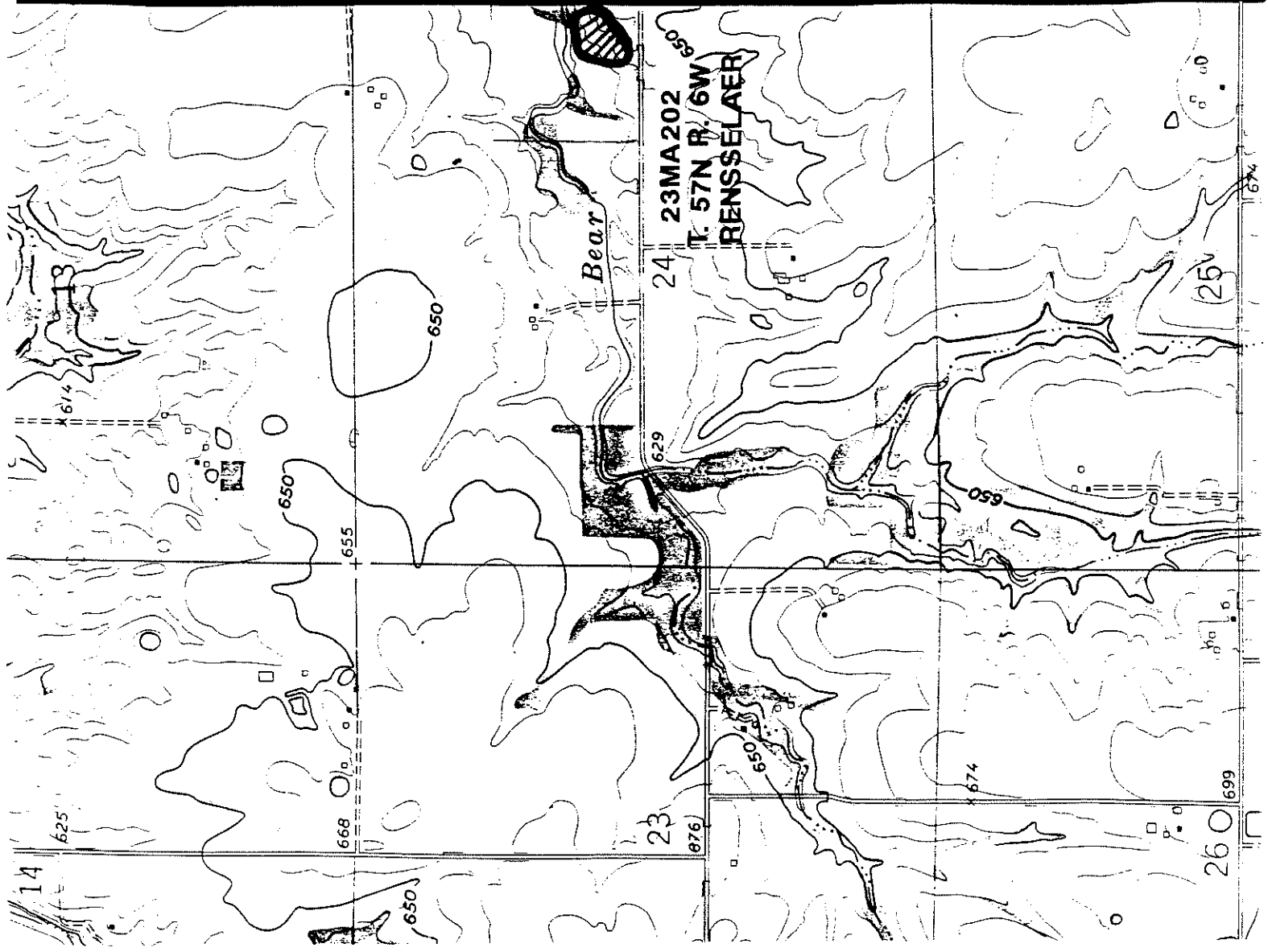
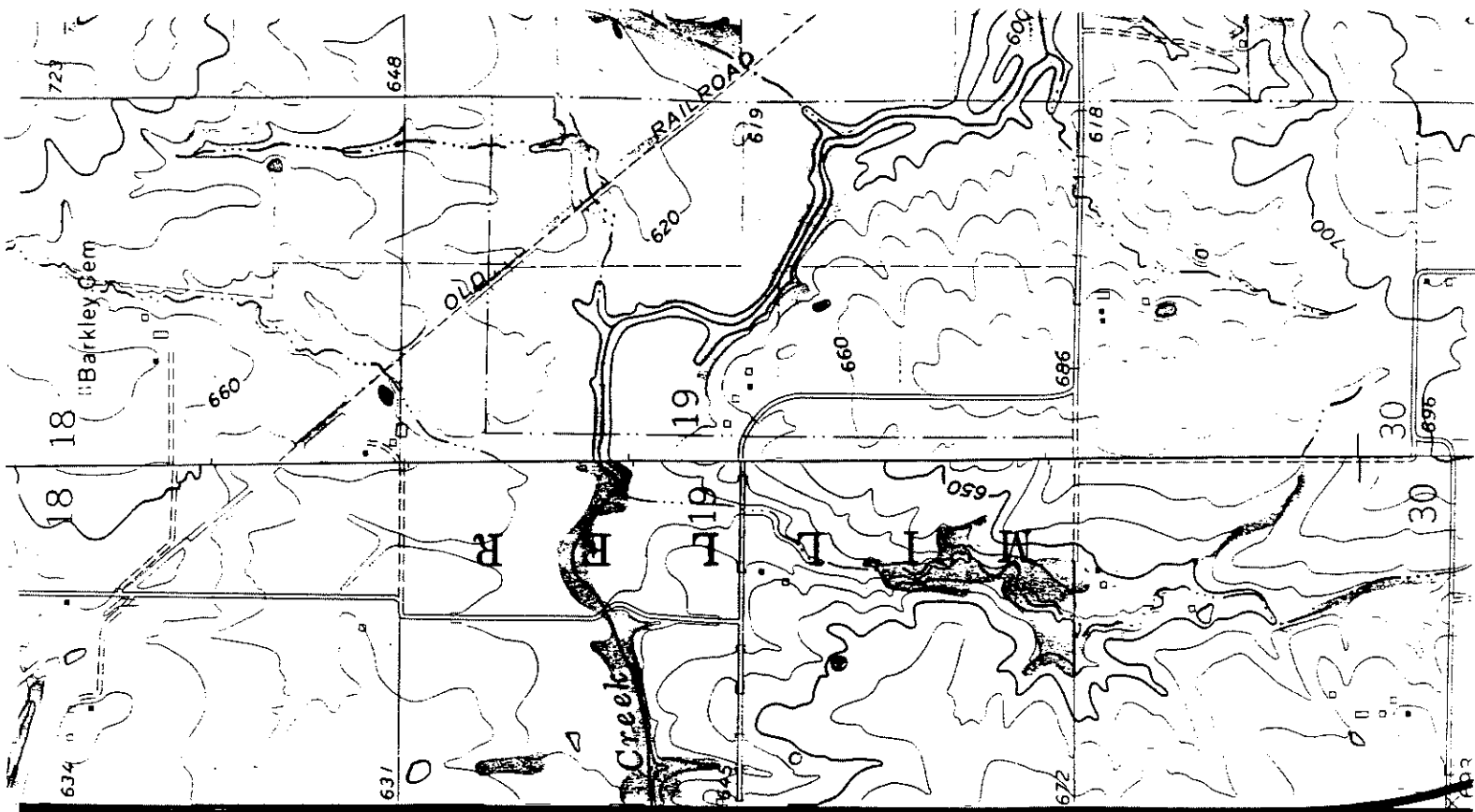
USGS Quadrangle: Rensselaer, MO

Ownership: Unknown

Description: This site is located on a terraced, cultivated slope adjacent to the right bank of Bear Creek west of U.S. Highway 24. The site is defined on the basis of the pedestrian survey of right-of-way corridor. The site is characterized as a medium density lithic debris scatter. Site size is estimated at 180 by 120 m; elevation approximately 630 ft. MSL (610-640 ft.); soil: (1) Belknap silt loam, (2) Leonard silt loam, 5-9 percent slopes, and (3) Smileyville silt loam, 2-6 percent slopes. Due to the absence of surficial soils (except in the terraces themselves) and exposure of underlying clay and rock, a minimum of 20 shovel tests were randomly placed within the site area as determined by surface finds of artifacts. Depth of shovel tests was limited to 10-20 cm. No diagnostic artifacts were discovered and no features could be discerned by screened shovel tests. Prehistoric artifacts collected include 14 chert flakes. The site is in poor condition, being deeply terraced and disturbed agricultural clearing and cultivation practices. Surface visibility was estimated at 25-45 percent at the time of survey. Time spent at the site was two hours. The site may extend upstream outside the confines of the present right-of-way search. No evidence of prehistoric activity was found on the left bank of Bear Creek within the project boundaries. Artifacts are presently in the possession of GBA for cleaning and cataloging.

The site was revisited in March, 1996 by a GBA archeologist and soil scientist. Additional artifacts were collected (as depicted in the accompanying photo logs). The following comments are submitted by GBA soil scientist Mark Felton: The site consists of a sloping field with three to four constructed terraces (see attached diagram). A random group of probings were utilized to analyze this site and were generally located between and on top of the erosion control terraces. The mapped soil unit for much of this site is the Smileyville (28B) silt loam, 2-6% slopes. Initial exploration was performed in the Highway 24/farm field margin to judge correlation with typical profile. This margin met the typical profile very well. We then began to probe the field and found that generally, the spaces between the terraces exhibited truncated or cut-off profiles. The terraces exhibited cumulative or deep surface soils far in excess of the mapped profile. Therefore it quickly became very obvious that the terraces were constructed from local topsoil. In some cases, the regraded took

all of the topsoil, leaving clays and exposed rock at the surface. We therefore firmly believe that this site has been greatly disturbed.



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

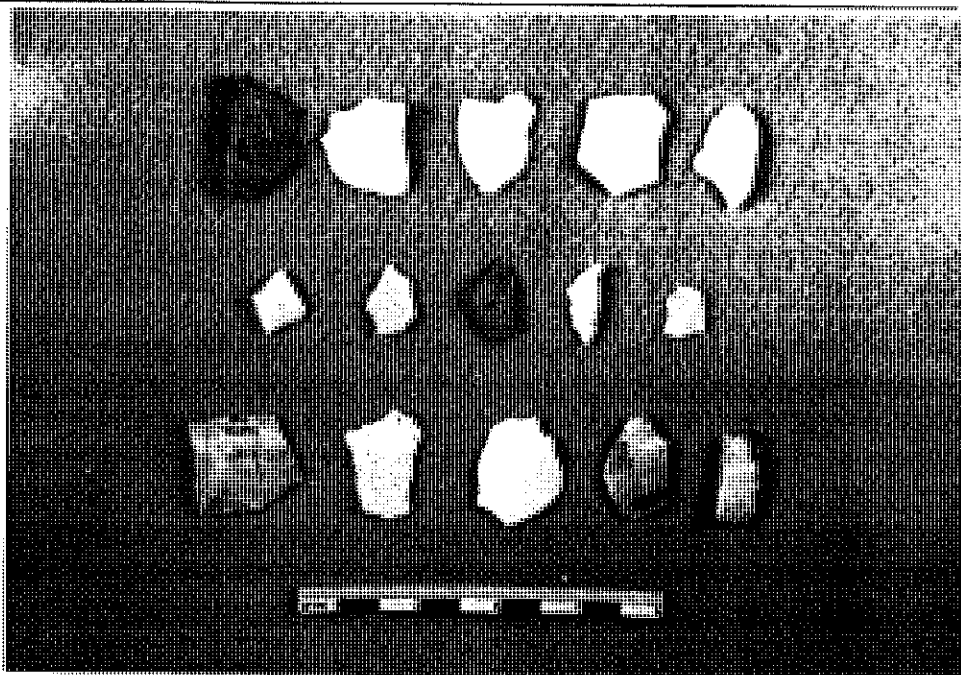
Client: Missouri Highway & Transportation Department GBA Job No.: 7046.03

Camera Make: Olympus 35mm Date

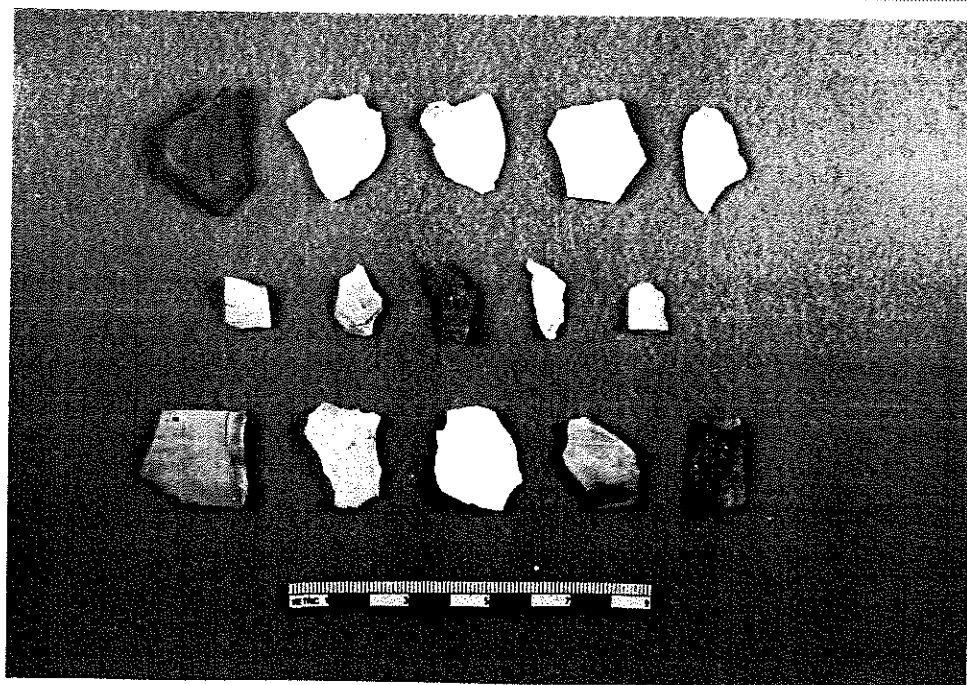
Site Name: Highway 61 Relocation Project

Site Location: 23MA202; T57N, R6W, Section 24

Photographer: M. W. Kelly
Date/Time:
Frame No: 3A
Direction:
Comments: Representative
primary and secondary flakes.
"A" side.



Photographer: M. W. Kelly
Date/Time:
Frame No: 4A
Direction:
Comments: "B" side.



ARCHAEOLOGICAL SURVEY OF MISSOURI

Missouri Archaeological Society—University of Missouri—Columbia

Please Type

1. County Marion 2. ASM Site Number 23MA203
3. Local Name/Number Little Bear Creek
4. ¼ Secs. (1) SW NE SW 5. Sec/Land Grant (1) 31 6. Twp (1) 57N 7. Range (1) 5W
q q q q
8. ¼ Secs. (2) q q q q 9. Sec/Land Grant (2) _____ 10. Twp (2) _____ 11. Range (2) _____
12. 1-USGS Rensselaer 16. UTM: Zone 15 17. Northing 4394300
13. 2-County Map _____ 18. Easting 628280
14. 3-Other Map _____ 19. NRHP _____
15. Cultural Affiliation Unknown Prehistoric / Historic 20. Size of Site 100m x 100m
- _____ 21. 10,000 m²/ha
22. Owner/Address of Property _____
23. Tenant/Address of Property _____
24. Information current as of 1/16/95 date.
25. Site Description

See Attached

26. This Information Supplied By

Name Mark W. Kelly

Address George Butler Associates, Inc.

8207 Melrose Drive

Lenexa, KS 66214

Date 1/16/95

27. Affiliation of Reporter

- ☐ 1 UMC
☐ 2 Other Educational Institutions
☒ 3 MAS Member
☐ 4 Non-educational Institution
☐ 5 Non-MAS, Private Individual

28. Condition of Site

The site has been adversely impacted by the construction of agricultural terraces.

29. Site Nature—General (Check the numbers)

- ☐ 1 - Prehistoric
☐ 2 - Historic
☐ 3 - Protohistoric
☐ 4 - Prehistoric/Protohistoric
☐ 5 - Historic/Protohistoric
☒ 6 - Prehistoric/Protohistoric/Historic
☐ 7 - Historic/Architectural
☐ 8 - Other _____

☐ 9 - Prehistoric/Historic _____

30. Site Nature—Specific

- ☒ 1 - Habitation/Prehistoric (Campsite, village)
☐ 2 - Mounds
☐ 3 - Burial Area
☐ 4 - Petroglyph/Pictograph
☐ 5 - Quarry
☐ 6 - Cave/Shelter
☐ 7 - Cairn
☐ 8 - Trail/Trace/Road
☐ 9 - Other _____

☐ 10 - Residence/Farmstead
☐ 11 - Industrial
☐ 12 - Military
☒ 13 - Residence/Farmstead Outbuilding(s)
☐ 14 - Political/Governmental
☐ 15 - Church
☐ 16 - School

31. Water Source

- ☐ 1 - Spring
☒ 2 - Intermittent Stream
☐ 3 - Perennial Stream
☐ 4 - River
☐ 5 - Confluence of Water Courses
☐ 6 - Natural Lake
☐ 7 - Swamp/Bog
☐ 8 - Other _____

32. Topographical Location

- ☐ 1 - Flood Plain (T-0)
☐ 2 - Stream Terrace (T-1)
☐ 3 - Stream Terrace (T-2)
☒ 4 - Slope
☐ 5 - Bluff
☐ 6 - Hilltop/Ridgetop
☐ 7 - Other _____

33. Material Reported

- ☐ 1 - Prehistoric
☐ 2 - Historical Period
☒ 3 - Both
☐ 4 - ?

Material Location

34. Is there a collection? ☒ Yes ☐ No

35. Repository (1) George Butler Associates, Inc.

36. Repository (2) _____

37. How was the site discovered? Pedestrian

Phase I Survey

38. Contour Elevation 710 ft/MSL

Nearest (named OR unnamed) Water

39. Name Little Bear Creek

40. Distance 300m

41. Right or Left Bank of Stream

(looking downstream) R

42. Spring Nearby/Name none

43. Distance -

44. Remote Sensing/Sampling Techniques

shovel tests, surface finds

45. Geomorphology/Land Forms/Soils

upland slope; soils: Mexico silty clay loam, 2-5%

46. Land Status When Reported

- ☒ 1 - Cultivated
- ☐ 2 - Pasturage
- ☐ 3 - Wooded
- ☐ 4 - Flooded
- ☐ 5 - Developed
- ☐ 6 - Other _____

47. Land-Use Comments

Appears to be corn - soybean rotation

48. Site Significance/NRHP Eligibility

Not recommended for further testing. Potential for buried cultural remains minimal due to construction of agricultural terraces.

49. Literature Sources (INCLUDE any CRM report[s] pertaining to this site)

A Phase I Cultural Resources Investigation of the Proposed U.S. 61 Highway Relocation Corridor Project, Ralls and Marion Counties, Missouri.

50. Description of Cultural Features

Lithic scatter / historic debris

51. Faunal/Floral Remains

None

52. Drawings, photographs, and/or brief description and quantity of artifacts

7 flakes of unknown chert source; brick, stone and glass debris over entire area.

53. Sketch Map

Indicate the chief topographical features, such as streams and elevations. Also indicate houses and roads. Indicate the site location by enclosing the site area with dotted line. Note scale of map and portion of section included in sketch map. Include drawings, photographs, etc.

Is this a full section _____, $\frac{1}{4}$ section _____, other _____?
NE $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 31

Indicate part of section included in sketch map.

	X		

N

S

W

E

Scale _____

Key

54. Attach a copy of the appropriate topographic map with map name, scale, and site location clearly indicated.

Site No. ASM # 23MA203

County: Marion

Site Name: Little Bear Creek Site A

Cultural Affiliation: Unknown Prehistoric/Historic

UTM Location: Zone 15; Northing 4394300 Easting 628280

Legal Description: SW1/4 NE1/4 SW1/4 Section 31, T57N, R5W

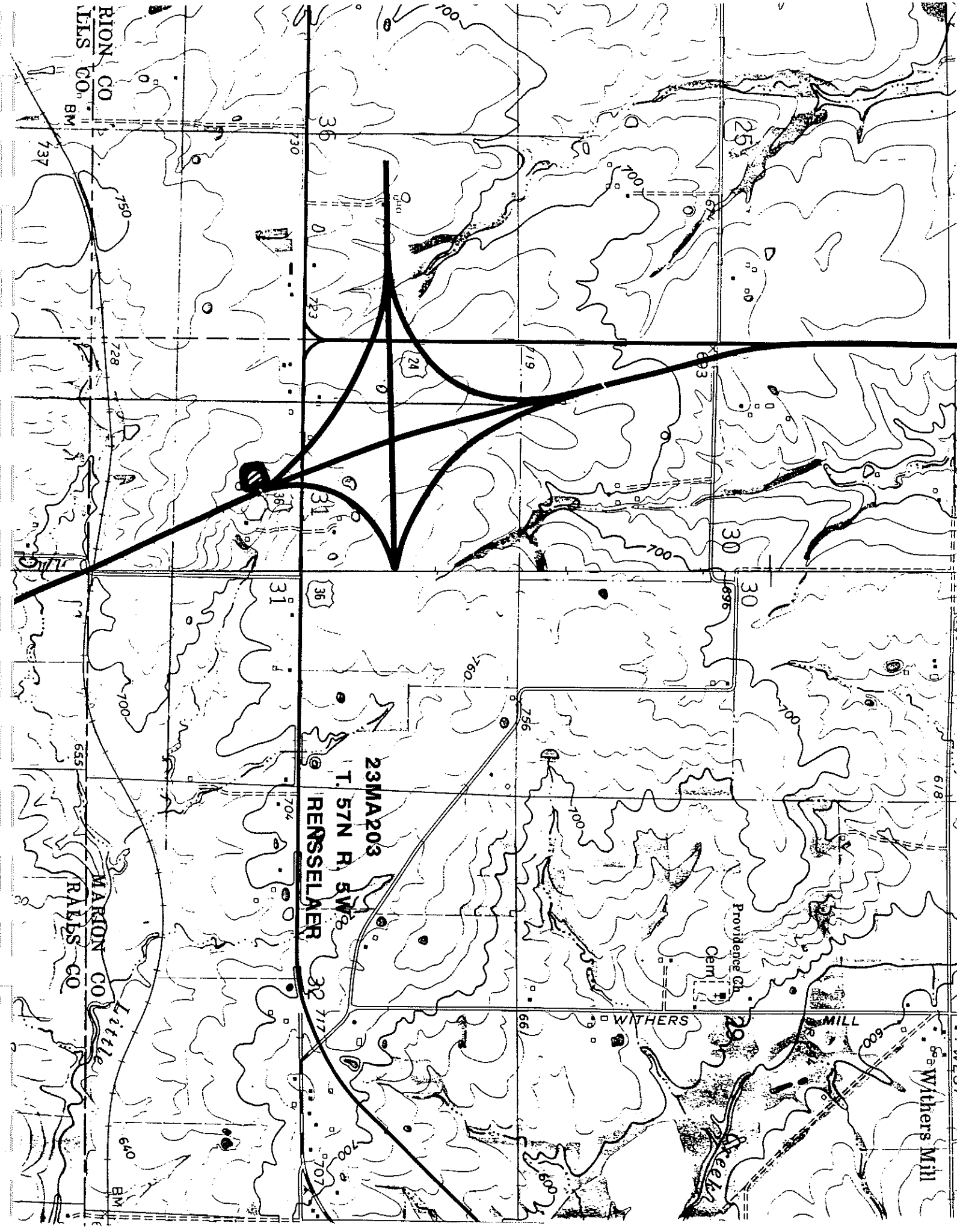
USGS Quadrangle: Rensselaer, MO

Ownership:

Description: This site is located in a cultivated field approximately 300 m west of an intermittent tributary of Little Bear Creek. The site contained chert shatter and flakes of unknown prehistoric affiliation and a scatter of brick, stone, and glass debris from an historic farmstead. According to the 1958 USGS topographic map, two structures were located approximately 200 m east of the site. A series of 30-40 shovel tests, to an average depth of 30 cm, were placed according to arbitrary grid across the site as determined by surface finds in an attempt to find buried features. No diagnostic artifacts were discovered and no features could be discerned associated with either the prehistoric occupation or the farmstead. Site size is estimated at 100 by 100 m; elevation approximately 710 ft. MSL; soil: Mexico silty clay loam, 2 to 5 percent slopes, eroded. The site is in poor condition due to the extensive grade alteration associated with the construction of agricultural terraces. Surface visibility at time of survey was variable; 5 to 30 percent. Time spent at site approximately two hours. Artifacts are presently in the possession of GBA for cleaning and cataloging.

The site was revisited in March, 1996 by a GBA archeologist and soil scientist. Additional artifacts were collected (as depicted in the accompanying photo logs). The following comments are submitted by GBA soil scientist Mark Felton: A series of three data points were located in a random fashion across the site (see attached diagram). The mapped soils for the site are the Mexico (24B2) silty clay loam, 2-5% slopes, eroded and the Putnam (26) silt loam. The site (as mapped) is predominated by the Mexico silty clay loam. The site had a great deal of "trash" incorporated into the soil such as broken bricks and dishware. Point 1-1 confirmed the mapped soil (Mexico unit). However, the Btg2 horizon was exhibited at a much higher point in the profile (approximately 10") and the Btg1 was not evident. Point 1-2 was very similar to Point 1-1 with the Btg2 horizon at approximately 9" in depth. The surface horizon was homogeneous in color and texture and generally corresponded with the mapped Ap horizon. Again, this mapped unit was generally confirmed to be the Mexico soil. Point 1-3 was quite different from the previous points. We believe that this point is located within the Putnam soil unit. The E horizon was exhibited at 10" in depth. All three points exhibited consistent and ongoing agricultural activity. Points 1-1 and 1-2 indicated a great deal of disturbance / mixing has occurred and that some amount of erosion, after and ongoing since plowing, has

created a situation whereby the surface soils have been gradually lost and the remaining surface soils have been mixed thoroughly with the upper profile subsoils. Point 1-3 showed a great deal of surface mixing from plowing but did not exhibit the same overall impacts to such a depth as the previous points.



RION CO
T.L.S. CO. BM

MARION CO
RAILS CO

23MA203
T. 57N R. 5W
RENSSELAER

Providence Ch.
Cem.

WITHERS

MILL

Withers Mill

GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

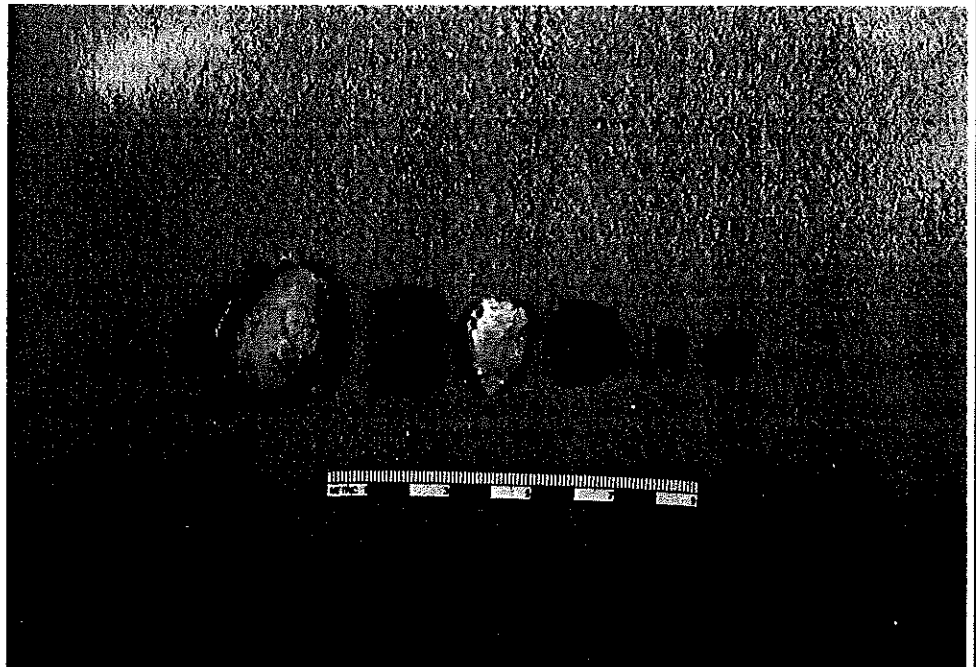
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Camera Make: Olympus 35mm Date

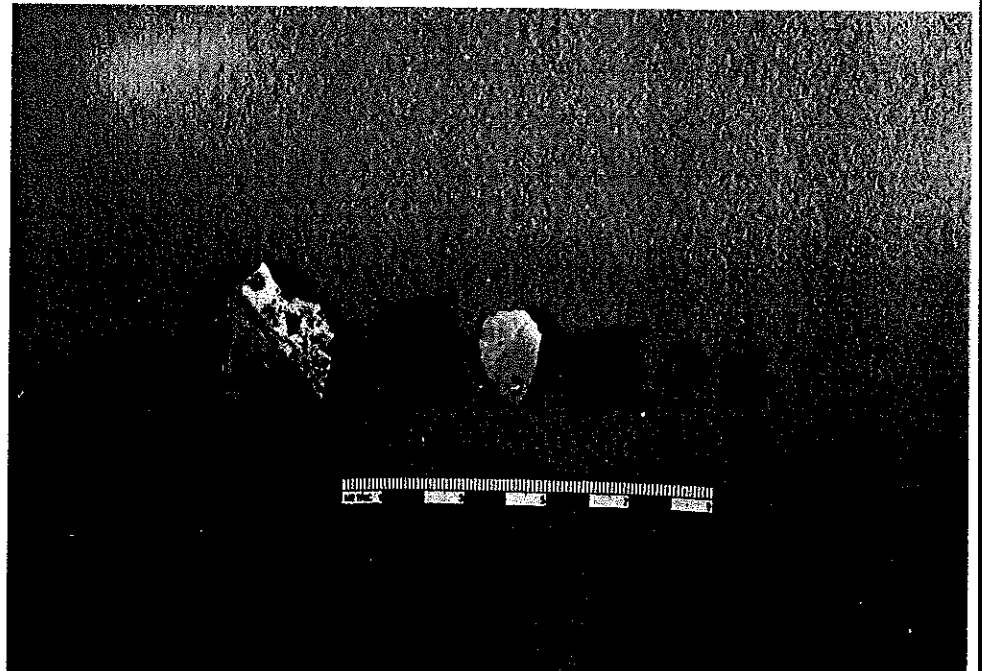
Site Name: Highway 61 Relocation Project

Site Location: 23MA203; T57N, R5W, Section 31

Photographer: M. W. Kelly
Date/Time:
Frame No: 5A
Direction:
Comments: View of
prehistoric flakes:
decortication - tertiary.
"A" side.



Photographer: M. W. Kelly
Date/Time:
Frame No: 6A
Direction:
Comments: "B" side.



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway & Transportation Department GBA Job No.: 7046.03

Camera Make: Olympus 35mm Date

Site Name: Highway 61 Relocation Project

Site Location: 23MA203; T57N, R5W, Section 31

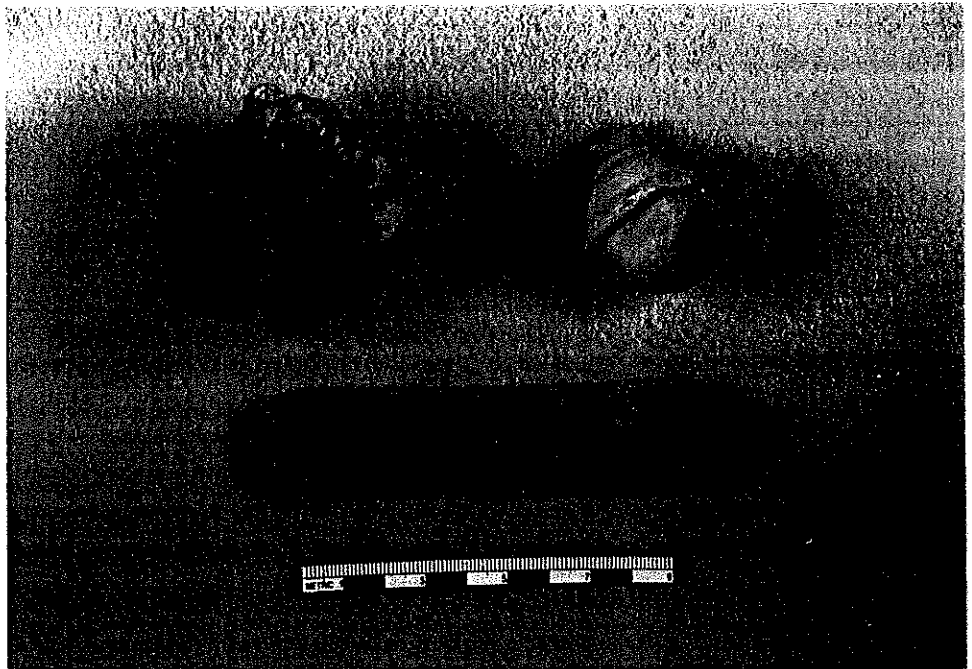
Photographer: M. W. Kelly

Date\Time:

Frame No: 7A

Direction:

Comments: View of
historic metallic artifacts
and brick fragment.



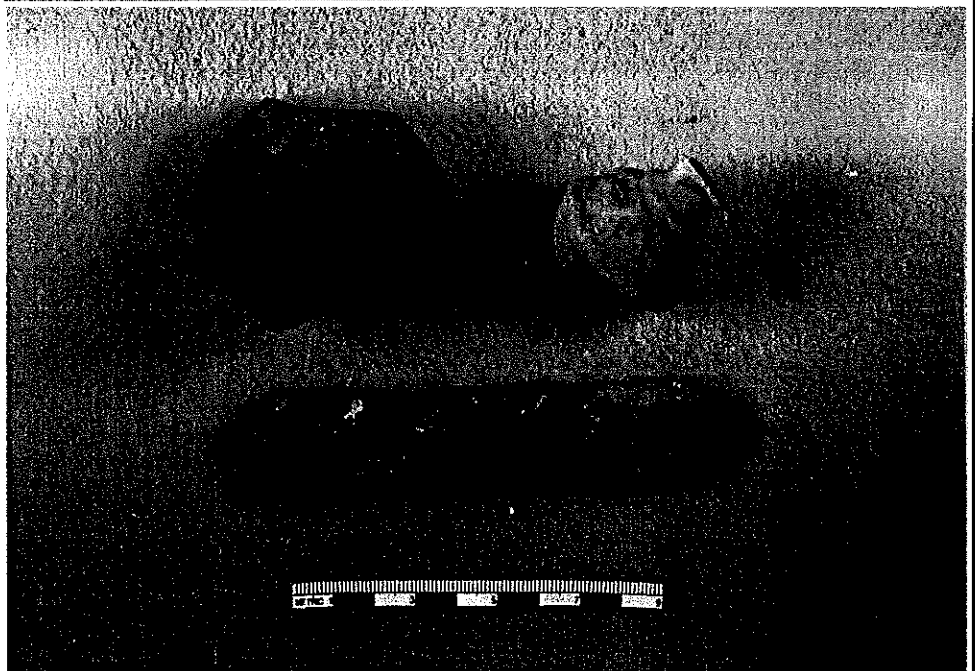
Photographer: M. W. Kelly

Date/Time:

Frame No: 8A

Direction:

Comments: Reverse
of above.



GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

Client: Missouri Highway & Transportation Department GBA Job No.: 7046.03

Camera Make: Olympus 35mm Date

Site Name: Highway 61 Relocation Project

Site Location: 23MA203; T57N, R5W, Section 31

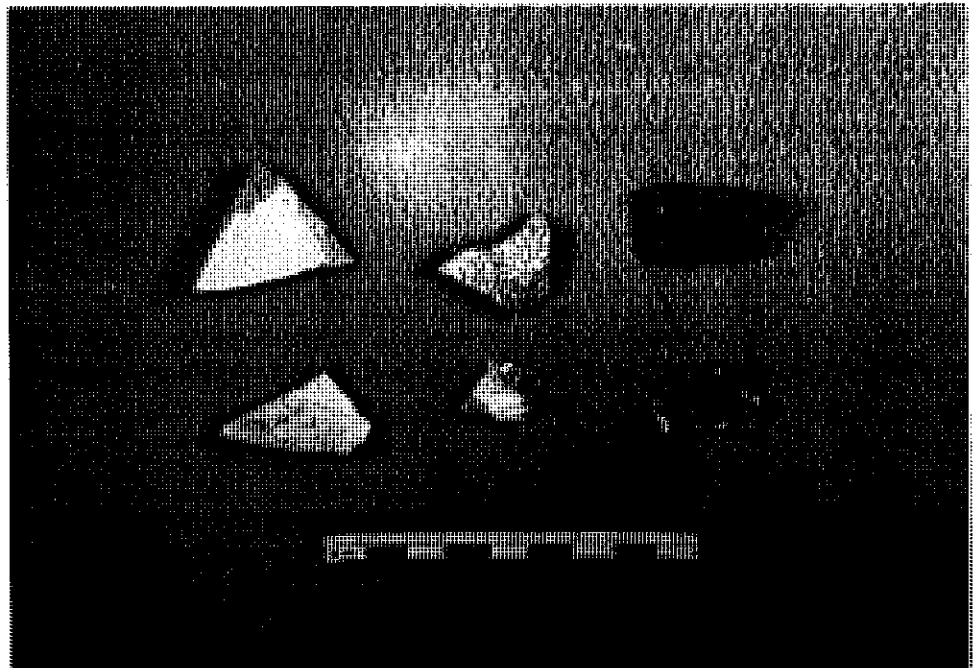
Photographer: M. W. Kelly

Date/Time:

Frame No: 9A

Direction:

Comments: View of
historic dishware fragments
and glass.



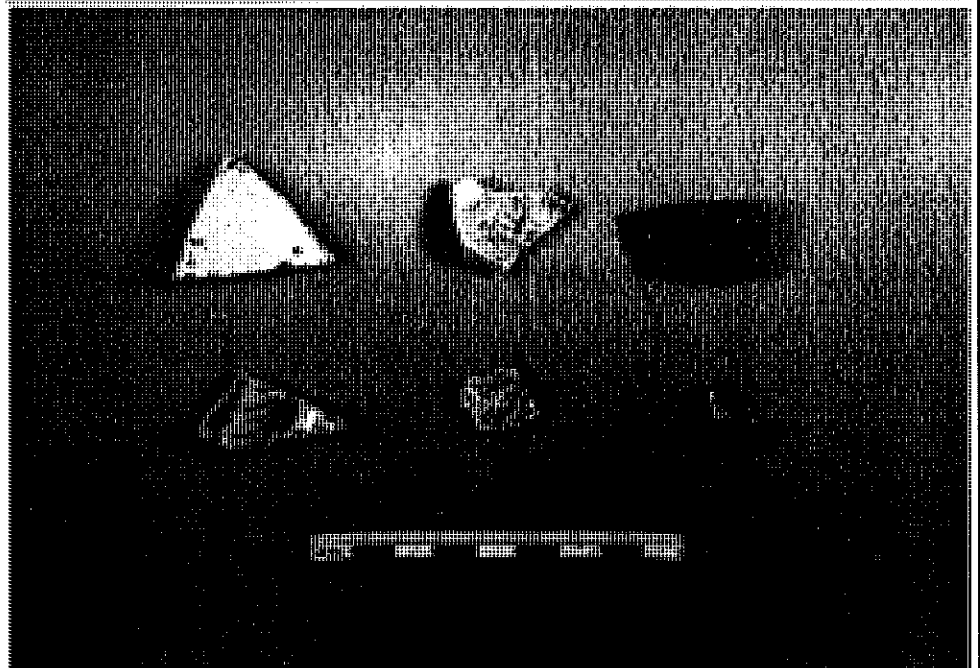
Photographer: M. W. Kelly

Date/Time:

Frame No: 10A

Direction:

Comments: Reverse
of above.



ARCHAEOLOGICAL SURVEY OF MISSOURI

Missouri Archaeological Society—University of Missouri—Columbia

Please Type

1. County Ralls 2. ASM Site Number 23RA824
3. Local Name/Number Virginia Murphy
4. ¼ Secs. (1) SW NE NE 5. Sec/Land Grant (1) 23 6. Twp (1) 56N 7. Range (1) 5W
q q q q
8. ¼ Secs. (2) q q q q 9. Sec/Land Grant (2) 10. Twp (2) 11. Range (2)
12. 1-USGS Hannibal West, MO 16. UTM: Zone 15 17. Northing 4388640
13. 2-County Map 18. Easting 290370
14. 3-Other Map 19. NRHP
15. Cultural Affiliation Unknown Prehistoric 20. Size of Site 30m(N-S) x 80m(E-W)
 21. 2400 m²/ha
22. Owner/Address of Property Virginia Murphy, Rt 3, New London 63459
23. Tenant/Address of Property -
24. Information current as of 1/16/95 date.
25. Site Description

See Attached

26. This Information Supplied By

Name Mark W. Kelly
Address George Butler Associates, Inc.
8207 Melrose Drive
Lenexa, KS 66214
Date 1/16/95

27. Affiliation of Reporter

1 UMC
2 Other Educational Institutions
X 3 MAS Member
4 Non-educational Institution
5 Non-MAS, Private Individual

28. Condition of Site

The remaining portion of the site not adversely impacted by highway/frontage road/driveway construction has been subjected to soybean cultivation. Only three flakes were found in this area, indicating merely a peripheral portion of probable much larger site.

29. Site Nature—General (Check the numbers)

- ☒ 1 - Prehistoric
☐ 2 - Historic
☐ 3 - Protohistoric
☐ 4 - Prehistoric/Protohistoric
☐ 5 - Historic/Protohistoric
☐ 6 - Prehistoric/Protohistoric/Historic
☐ 7 - Historic/Architectural
☐ 8 - Other _____

☐ 9 - Prehistoric/Historic _____

30. Site Nature—Specific

- ☐ 1 - Habitation/Prehistoric (Campsite, village)
☐ 2 - Mounds
☐ 3 - Burial Area
☐ 4 - Petroglyph/Pictograph
☒ 5 - Quarry
☐ 6 - Cave/Shelter
☐ 7 - Cairn
☐ 8 - Trail/Trace/Road
☐ 9 - Other _____

- ☐ 10 - Residence/Farmstead
☐ 11 - Industrial
☐ 12 - Military
☐ 13 - Residence/Farmstead Outbuilding(s)
☐ 14 - Political/Governmental
☐ 15 - Church
☐ 16 - School

31. Water Source

- ☐ 1 - Spring
☒ 2 - Intermittent Stream
☐ 3 - Perennial Stream
☐ 4 - River
☐ 5 - Confluence of Water Courses
☐ 6 - Natural Lake
☐ 7 - Swamp/Bog
☐ 8 - Other _____

32. Topographical Location

- ☐ 1 - Flood Plain (T-0)
☐ 2 - Stream Terrace (T-1)
☐ 3 - Stream Terrace (T-2)
☒ 4 - Slope
☐ 5 - Bluff
☐ 6 - Hilltop/Ridgetop
☐ 7 - Other _____

33. Material Reported

- ☒ 1 - Prehistoric
☐ 2 - Historical Period
☐ 3 - Both
☐ 4 - ?

Material Location

34. Is there a collection? ☒ Yes ☐ No

35. Repository (1) George Butler Associates, Inc.

36. Repository (2) _____

37. How was the site discovered? Pedestrian

Phase I survey

38. Contour Elevation 700 ft/MSL

Nearest (named OR unnamed) Water
Intermittent

39. Name tributaries of Salt River
(1) ESE-300m

40. Distance (2) SSW-420m

41. Right or Left Bank of Stream

(1) - R
(looking downstream) (2) - L

42. Spring Nearby/Name -

43. Distance -

44. Remote Sensing/Sampling Techniques

Shovel tests

45. Geomorphology/Land Forms/Soils

Upland slope; soils: Winfield silt loam, 5-9%, eroded

46. Land Status When Reported

- ☒ 1 - Cultivated
☐ 2 - Pasturage
☐ 3 - Wooded
☐ 4 - Flooded
☐ 5 - Developed
☐ 6 - Other _____

47. Land-Use Comments

soybean cultivation

48. Site Significance/NRHP Eligibility

A light density lithic scatter (3 flakes). A very small portion of the site appears to be undisturbed (except for cultivation). Most of the site has been impacted due to highway and driveway/frontage road construction.

49. Literature Sources (INCLUDE any CRM report[s] pertaining to this site)

A Phase I Cultural Resources Investigation of the Proposed U.S. 61 Highway Relocation Corridor Project, Ralls and Marion Counties, Missouri.

50. Description of Cultural Features

None

51. Faunal/Floral Remains

None

52. Drawings, photographs, and/or brief description and quantity of artifacts

3 flakes of unknown chert source.

53. Sketch Map

Indicate the chief topographical features, such as streams and elevations. Also indicate houses and roads. Indicate the site location by enclosing the site area with dotted line. Note scale of map and portion of section included in sketch map. Include drawings, photographs, etc.

Is this a full section no , $\frac{1}{4}$ section NE , other ?

Indicate part of section included in sketch map.

				N
W				E
				S

Scale _____

Key

54. Attach a copy of the appropriate topographic map with map name, scale, and site location clearly indicated.

Site No. ASM # 23RA824

County: Ralls

Site Name: Virginia Murphy Site

Cultural Affiliation: Unknown Prehistoric

UTM Location: Zone 15; Northing 4388640 Easting 290370

Legal Description: SW1/4 NE1/4 NE1/4 Section 23, T56N, R5W

USGS Quadrangle: Hannibal West, MO

Ownership: Virginia Murphy

Description: The site is located in a cultivated field south of Ms. Murphy's residence, west of U.S. Highway 61, south of State Highway M. Site size is estimated at 30 by 80 m; elevation approximately 700 ft. MSL; soil: Winfield silt loam, 5 to 9 percent slopes, eroded. A series of 25 shovel tests were made at an average depth of 30 cm. No diagnostic artifacts were collected. Surface-collected artifacts include three flakes of undetermined chert source. The site has been adversely impacted by frontage road construction on the east and driveway construction on the north and south. Surface visibility estimated at 25 percent. Time spent at site two hours. Perhaps 1/4 of site has not been impacted. Ms. Murphy stated prehistoric artifacts, including projectile points and blades have been unearthed from the site, but are not now in her possession. Collected artifacts are presently in the possession of GBA for cleaning and cataloging.

The site was revisited in March, 1996 by a GBA archeologist and soil scientist. Additional artifacts were collected, including a Dalton serrated knife or projectile point fragment (as depicted in the accompanying photo logs). The following comments are submitted by GBA soil scientist Mark Felton: This site consists of generally three fields of various uses and sizes. Randomly located probings were located throughout the site (see attached diagram). The mapped soil unit is the Winfield (31C2) silt loam, 5-9% slopes, eroded. The first field generally correlated with the mapped soil unit. However, the upper 9" of the epipedon was strongly disturbed as a plow layer. Very little of the E horizon remained although it was normally present (1-2"). The second field had its A, E, BE and Bt1 horizons thoroughly mixed to a depth of 18". At this point the Bt2 (or a slightly transitional remnant of the Bt1) began. The third field was homogeneous to the standard 9" plow depth. The Bt1 was identified at this depth with the Bt2 present within 3-4". Therefore, the typical profile horizons of A, E, and BE were missing due to mixing. When the Bt1 horizon was present or where the Bt2 horizon was first identifiable, this consistently occurred at a point much higher in the profile than is typical (9" rather than 16"). We believe that some amount of erosion has occurred on this site with the obvious plowing. Additionally, some amount of deep plowing has occurred on site, although this seems to be "sporadic" in extent. Therefore, we believe that the site has undergone significant disturbance in a majority of its area and that some portions reflect extensive disturbance.

GEORGE BUTLER ASSOCIATES, INC.
PHOTOGRAPHIC RECORD

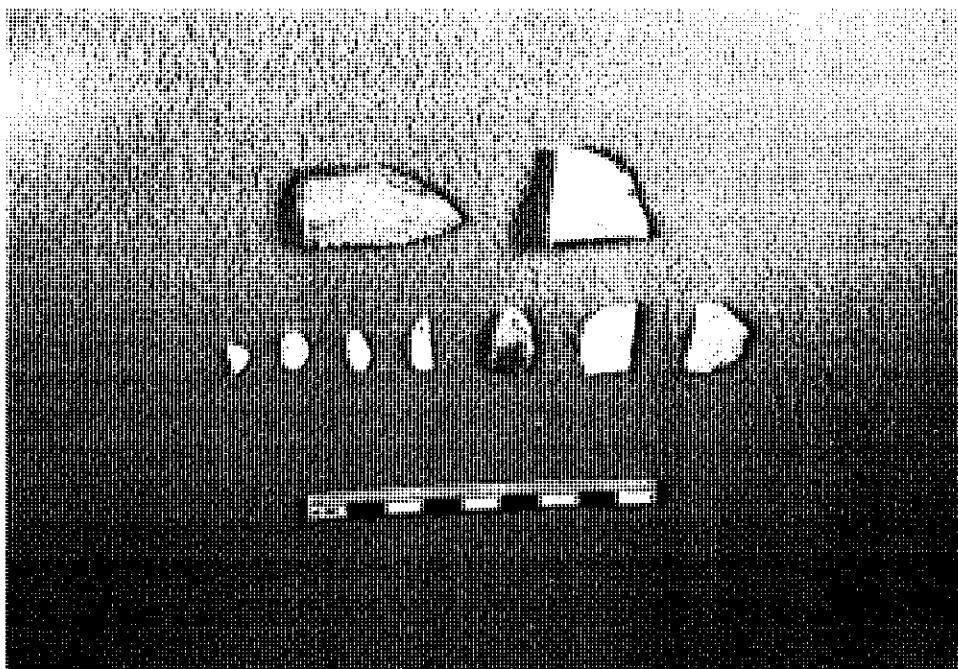
Client: Missouri Highway & Transportation Department GBA Job No.: 7046.03

Camera Make: Olympus 35mm Date

Site Name: Highway 61 Relocation Project

Site Location: 23RA824; T56N, R5W, Section 23

Photographer: M. W. Kelly
Date/Time:
Frame No: 7A
Direction:
Comments: Representative
sample of flakes and Dalton
serrated point or knife
fragment. "A" side.



Photographer: M. W. Kelly
Date/Time:
Frame No: 8A
Direction:
Comments: "B" side.



January 11, 1996

Ms. Judith Deel
Missouri Department of Natural Resources
Division of Historic Preservation
P.O. Box 176
Jefferson City, MO 65102

Re: Questionnaire to Determine Need for Cultural Resource Assessment for the following:

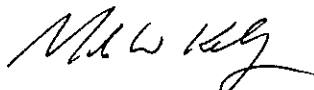
- (1) Relocation of Route 61 - Job Nos. J3P0426 and J3P0427**
- (2) Route 36 Upgrade - Job Nos. J3P0412 and J3P0411**

Dear Ms. Deel,

Please review the accompanying completed Questionnaires to Determine Need for Cultural Resource Assessment for the two jobs identified above. Copies of USGS quadrangles with the limits of the project corridors have been provided. Please note the historical structures inventory and assessment segment has been completed and cleared by personnel of your office for the Route 36 project. The historic inventory of the Route 61 project is currently being completed. If you need further information concerning these projects, please contact me at (913) 492- 0400, ext. 262.

Very truly yours,

George Butler Associates, Inc.



Mark W. Kelly
Cultural Resources



MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF HISTORIC PRESERVATION

QUESTIONNAIRE TO DETERMINE NEED FOR CULTURAL RESOURCE ASSESSMENT

P.O. BOX 176
JEFFERSON CITY,
MISSOURI 65102

Forwarding of this completed form to the Missouri Department of Natural Resources' Historic Preservation Program constitutes a request to review a proposed project/activity to determine if a cultural resource assessment will be required in accordance with the National Historic Preservation Act, 36 CFR Part 800, and other relative federal legislation. THIS ASSESSMENT, INDEPENDENT OF THE A-95 REVIEW PROCESS, IS REQUIRED FOR ALL CONSTRUCTION PROJECTS THAT WILL BE FUNDED, ASSISTED, OR LICENSED BY A FEDERAL AGENCY AND IT MUST BE COMPLETED PRIOR TO INITIATING ANY PROJECT.

I. APPLICANT <u>Mr. Joe Mickes</u>		COUNTY OF PROJECT <u>MAHON / RALLS</u>	
APPLICANT'S ADDRESS <u>Missouri Highway and Transportation Dept.</u>		CITY <u>Jefferson City, MO</u>	ZIP CODE <u>65102</u>
CONTACT PERSON <u>Mr. Mark W. Kelly</u>		TELEPHONE <u>(913) 492-0400</u>	
CONTACT PERSON'S ADDRESS, IF DIFFERENT FROM APPLICANT'S <u>8207 Melrose Drive</u>		CITY <u>Lenexa, KS</u>	ZIP CODE <u>66214</u>
IF APPLICANT IS NOT A FEDERAL AGENCY, TO WHICH FEDERAL AGENCY IS APPLICANT APPLYING <u>Federal Highway Administration</u>			
FEDERAL PROGRAM			
CIRCLE TYPE OF ASSISTANCE SOUGHT GRANT LOAN <u>OTHER</u>			
SIGNATURE OF APPLICANT OR CONTACT PERSON REQUESTING THIS ASSESSMENT <u>Mark W. Kelly</u>			DATE <u>1-9-95</u>

II. 1. Briefly describe this project. A corridor alignment has been selected to relocate U.S. 61 "around" Hannibal, Missouri. The new highway will consist of 400' ROWs and interchanges as shown on the accompanying map.

If more than one project/activity is involved, complete separate assessment for each project/activity.

2. Has the identical project been previously submitted for cultural resource assessment? (If YES, enclose copy of State Historic Preservation Program's comments/response and disregard remaining questions.) ☐ YES ☒ NO

3. Project location

a. Attach a USGS 7.5 min. topographic map (15 min. if 7.5 min. not available) and project map indicating the precise location of the project and total acreage involved. **THIS MUST BE PROVIDED.** If more than one project/activity is involved, provide one map for each project/activity. **Project location must be clearly indicated.**

b. Approximately how many acres are in the project area? 750 acres

c. Give legal description of project area (Township, Range, Section, 1/4 Section, etc.)

Parts of sections: 12, 13, 24, 25, + 36 T57N, R6W; 318, 19, 30, + 31 T57N, R5W; 5, 6, 8, 9, 14, 15, 16, 23, + 24 T56N, R5W.

If inside city limits, give street address and city involved

4. To your knowledge, has a cultural resources survey been conducted of the project area? If YES, attach survey report or reference and related correspondence. ☒ YES ☐ NO A historic structures inventory is presently being conducted.

5. To your knowledge, will the project involve building(s) or structure(s) listed on the National Register of Historic Places or included in a National Register District? If YES, provide property or district name(s), address(es) and related documentation. ☐ YES ☒ NO

FOR MO. HPP USE

☐ SN

☐ PD

☐ NE

☐ PE

☐ LP

☐ HP

6. To your knowledge, will the project involve building(s) or structure(s) listed on a local historic register or included in a local historic district? If YES, provide property or district name(s), address(es) and related documentation.

☐ YES ☒ NO

III. 7. a. Will the project involve an addition to, destruction of, alteration of, or renovation of any structure? If NO, proceed to item 8.

☒ YES ☐ NO

b. Was the affected structure built before World War II? If NO, provide photograph of structure(s) and proceed to item 8. If YES, complete Missouri Historic Preservation Program Architectural/Historic Inventory Survey Form(s) (available from State Historic Preservation Program) and return with this form.

☒ YES ☐ NO

c. Who owns the structure? _____

d. What was the approximate date of construction of structures to be affected? _____

e. Attach photographs of front and rear elevations; another photograph(s) should indicate the location of any proposed addition/alteration.

f. Have plans and specifications for the renovation, alteration, or addition been completed? If YES, attach plans (plans for a new structure to replace a demolished one should not be attached.)

☐ YES ☐ NO

8. a. Will construction take place adjacent to any structure that is approximately fifty years old or older? If NO, proceed to item 9.

☐ YES ☐ NO

b. Give approximate construction date of structure(s) _____

c. Attach photographs of structure(s) and indicate its location in relation to the project on the project map.

*Historic structures
are being
addressed
separately.
See L. Sparkes
related
correspondence.*

IV. 9. Has the ground at the project been previously cultivated or farmed? If YES, briefly describe type and indicate on topographic and project map(s). corn/soybeans/

☒ YES ☐ NO

pasture

10. Has the ground at the project location been previously developed, graded, or disturbed (for other than agricultural purposes)? If YES, describe disturbed/developed portion (graded, etc.) and indicate on topographic and project map(s). highway/road/

☒ YES ☐ NO

private drive construction

11. a. Will this project necessitate the acquisition of fill material? If NO, proceed to item 12.

☐ YES ☒ NO

b. Approximately how many cubic yards of material will be acquired?

c. Has the site from which material will be acquired been selected? If NO, proceed to item 12.

☐ YES ☐ NO

d. Indicate borrow area(s) on U.S.G.S. topographic and project map and GIVE APPROXIMATE ACREAGE of each borrow site. _____

12. If necessary, elaborate on the above questions and/or include any additional information that you think would be helpful in the review of this project. Use additional sheets if necessary.

MAIL COMPLETED FORM TO: CHIEF, REVIEW AND COMPLIANCE, HISTORIC PRESERVATION PROGRAM,
MISSOURI DEPARTMENT OF NATURAL RESOURCES, P.O. BOX 176, JEFFERSON CITY, MISSOURI 65102
TELEPHONE 314/751-2479

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

McLarnahan, Governor • David A. Shorr, Director

DIVISION OF STATE PARKS

P.O. Box 176 Jefferson City, 65102-0176 (314) 751-2479

FAX (314) 751-8050

18 January 1996

Mark W. Kelly
George Butler Associates, Inc.
8207 Melrose Drive
Lenexa, Kansas 66214

Re: Route 61 Relocation (FHWA) MHTD Job No. J3P0426 and J3P0427, Marion and Ralls Counties,
Missouri

Dear Mr. Kelly:

Staff of the Historic Preservation Program, Missouri Department of Natural Resources have reviewed the information provided concerning the above referenced project. Due to the moderate to high potential for the occurrence of archaeological resources, the determination has been made that an archaeological assessment should be conducted prior to the initiation of project-related construction activities pursuant to the National Historic Preservation Act (P.L. 89-665, as amended), the Advisory Council on Historic Preservation's regulation 36CFR Part 800, and Executive Order 11593 of 13 May 1971, which require identification and evaluation of such cultural resources.

We would appreciate two (2) copies of the cultural resource assessment when it is finished so we may complete the review and comment process.

If you have any questions, please write or call Judith Deel at 573/751-7862.

Sincerely,

HISTORIC PRESERVATION PROGRAM



Claire F. Blackwell, Director and
Deputy State Historic Preservation Officer

c Don Neumann
Mark Kross
Bob Reeder

RECEIVED

JAN 23 1996

George Butler Associates, Inc.

Post-it* Fax Note	7671	Date	12-7-95	# of pages	1
To	Mark Kelly	From	Stacy Sone		
Co/Dept	George Butler	Co.	MHTD		
Phone #	913-492-0400	Phone #	314-526-3590		
Fax #	913-894-1878	Fax #	526-1300		

STATE OF MISSOURI
DEPARTMENT OF NAT

Mel Can

DIVISION OF STATE PARKS
P.O. Box 176 Jefferson City, MO 65102-0176 (314) 751-2479
FAX (314) 751-9656



November 17, 1995

Stacy Sone
Cultural Resources Division
Missouri Highway and Transportation Department
PO BOX 270
Jefferson City, MO 65102

RE: Rt. 61 to south of Route M (Hannibal Relocation), job Nos. J3P0426, J3P0427, Marion and Ralls Counties

Dear Stacy:

This letter is a follow-up to conversations we have had regarding a request for more information on several properties involved in this project. I hope this will explain what information is necessary.

Property 3, the Terry Hubbard Place, is a well-preserved example of a small early twentieth-century farmstead. Floorplans for, construction type and date of the barn and a precise date for the quonset-type hut will help determine the significance of this farm.

It is unclear from the information provided whether Property 7, the Thomas White barn, is now or was formerly part of a farm. In addition, a floorplan, function, and type and date of construction is necessary before we can make a decision on eligibility. For Property 8, a floorplan, type and date of construction is also necessary.

Property 9, the Harol Schwartz property, appears to be a small agricultural district with an intact Italianate farmhouse. The house retains a number of its details and the alterations appear to be historic. We were only provided photographs of the house and one outbuilding, however there are up to three additional outbuildings noted on the maps. It appears that no research has been performed on the previous owners of this house, since no historic name is indicated. We will need to know previous owners, their place in local or regional history and a construction date and dates of alterations, before we can make a determination of eligibility.

I hope this helps clear up any confusion. If you have any questions, please contact me at 751-9501.

Sincerely,

HISTORIC PRESERVATION PROGRAM

Laura L. Sparks
Architectural Historian
Review and Compliance



CULTURAL RESOURCE SURVEY PROJECT SUMMARY SHEET

Missouri Department of Natural Resources Historic Preservation Program

Report Title: A Phase I Cultural Resources Investigation of the Proposed U.S. 61 Highway Relocation Corridor Project
 Counties: Ralls and Marion Author(s): Mark W. Kelly
 Institutional Affiliation of Author(s): MAS Member; Non-educational Institution
 Federal Agency Involved/Client: Federal Highway Administration MHTD
 Date of Report: January 12, 1996 Date of Field Invest.: December 1995
 Legal Description of Survey Area/Unit: Parts of sections: 12, 13, 24, 25, 36 T57N, R6W; 7, 18, 19, 30, 31 T57N, R5W; 5, 6, 8, 9, 14, 15, 16, 23, 24 Total Acres Surveyed: Approximately 550
T56N, R5W
 Historic Preservation Program Drainage: 1 Upper Mississippi; North River; 2 Salt, Salt 1

Elevation of Survey Area/Unit: Max. 760 msl Min. 570 msl Avg. 665 msl
 Terrain: disected uplands
 Vegetation: originally: oak/hickory, Presently: soybean/corn rotation
 Visibility (as % of survey area/unit): soybean fields-25%; corn-35-50%; pasture-0-15%; trees-35-50%
 Type: _____
 Nature of Soil (as % of survey area/unit): Aeolian 98+ % Colluvial _____ % Alluvial _____ % Other 2 % or less
 Raw Lithic Material Available: Type _____ Source _____ residuum
 Legal Location: _____
 Nearest Permanent Water Source: Spring _____ Stream (s) X River _____ Lake _____ Other _____
 Distance see attached map Name Bear Creek
 Closest Tributary: Distance see attached map Name Little Bear Creek Order _____

Number of Sites in Survey Area/Unit:
 Prev. Recorded 7 Prehistoric Rec. by Pres. Invest. 2 Prehistoric
3 Historic Archaeo. _____ Historic Archaeo.
 _____ Historic 1 Historic / Pre Mixed
 _____ Architectural _____ Architectural
 _____ None _____ None

Type of Investigations (Mark all applicable):
X Literature Search _____ Testing (Phase II)
 _____ Reconnaissance Survey _____ Excavation (mitigation)
X Intensive Survey - All resources _____ Research only
 _____ Intensive Survey - Archaeological only _____ Other Fieldwork _____
 _____ Intensive Survey - Architec.-Historic only _____ Other

List all sites located within survey area/unit or discussed in report (attach continuation sheet if necessary).
 Previously recorded sites: New sites: 23MA202
23MA177 23MA162 23RA797 23MA176 23MA203
23MA161 23RA128 23MA164 23MA83 23RA824
23MA163 23MA38

Types of Site(s) Light density prehistoric lithic scatters; historic debris

Range of Cultural Affiliation(s) of Site(s) All unknown except 23RA128 - "Archaic - Hannibal Complex type site"

Direct Impact(s) to Site(s): Total Destruction Disruption
 X Partial Destruction X No Impact to previously recorded sites

Nature of Direct Impact(s) Highway construction will destroy 23MA202, 23MA203, 23RA824

Nature of Indirect/Long-Range Impact to Site(s): -

Significance (Mark all applicable):

 High (National or regional research applicable)

 Moderate (Local or state research applicable)

 X Low

 1 Disturbed

 2 Lacks context

 3 Redundant data

 4 Future utility uncertain

 Insufficient Information

Future Work Recommendations (Mark all applicable):

 X No further work needed

 Preserve/avoid

 Test

 Excavate

 Monitor construction

(must justify by high potential
of buried sites)

 Nominate to Register

 Restrict access

 Other

Comments:

A U.S.G.S. 7.5 min. topographic map indicating **all** areas actually surveyed and locations of all sites **must** be attached.

Return to Michael Weichman, Chief, Review & Compliance, Historic Preservation Program, Missouri Department of Natural Resources, P.O. Box 176, Jefferson City, Missouri 65102.

APPENDIX D

REFERENCES

APPENDIX D REFERENCES

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- Garner, James D. and James E. Gardner, 1991. Summer Roost Selection and Roosting Behavior of *Myotis sodalis* (Indiana Bat) in Illinois, Final Report, joint project of the Center for Biogeographic Information (Illinois Natural History Survey), the Division of Natural Heritage (Illinois Department of Conservation), the Bureau of Location and Environment (Illinois Department of Transportation) and Shawnee Natural Forest (U.S. Forest Service) (February 5, 1991).
- George Butler Associates, Inc., 1993. Environmental Assessment, O'Fallon Corporate Centre Proposed Site, St. Charles County, Missouri, Exhibit No. VI-B-3A (DOC).
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APPENDIX E

AGENCY CORRESPONDENCE

Woodward-Clyde
Consultants
Engineering & sciences applied to the earth & its environment

June 13, 1994
93C8172

Mr. Michael Brazier
Chief Regulatory Branch
U.S. Army Corps of Engineers
St. Louis District
1222 Spruce Street
St. Louis, Missouri 63103-2833

**Subject: Corps of Engineers District Jurisdictional Boundaries
Environmental Studies
U.S. Route 61 Relocation and U.S. Route 36 Improvements
Marion and Ralls Counties, Missouri**

Dear Mr. Brazier:


In April, we sent you a letter requesting your attendance at a scoping meeting for the Route 61 relocation and Route 36 improvements in Marion and Ralls Counties, Missouri. Copies of the study area maps that were sent with the invitation are attached for your reference.

An environmental assessment will be done for the Route 36 project and an environmental impact statement will be done for the Route 61 relocation.

In your reply, you indicated that none of the Route 36 project area is within your jurisdictional boundaries, and that only about one mile of the Route 61 project may be within your boundaries. All of the Route 36 project area and the majority of the Route 61 project area are within the jurisdictional boundaries of the Rock Island District.

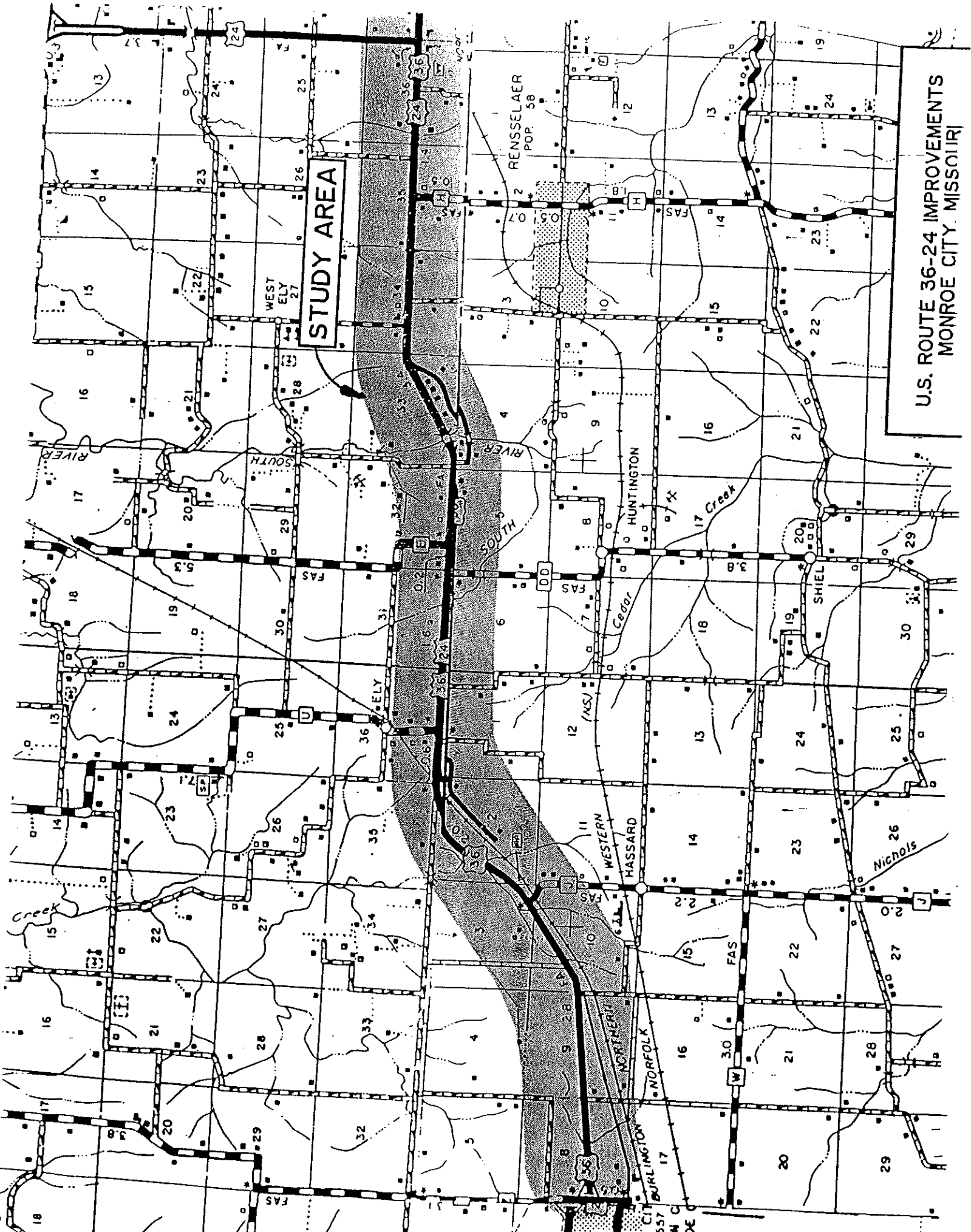
This letter requests that the St. Louis District Corps of Engineers transfer jurisdictional authority to the Rock Island District Corps of Engineers for the entire Route 61 relocation project. Thank you for your attention and we would appreciate your response as soon as possible.

Sincerely,



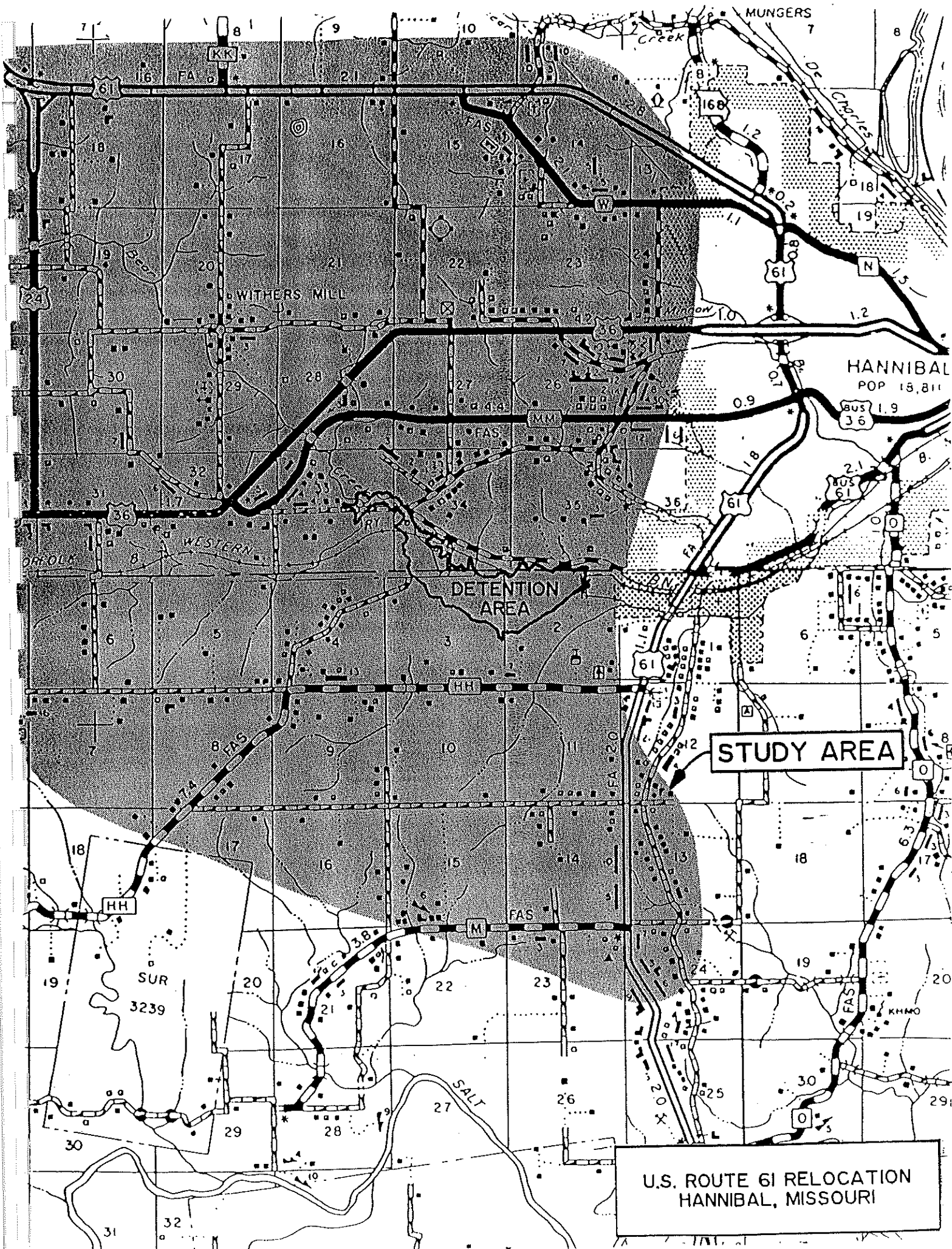
Mary Hagerty, P.E.
Senior Project Engineer

cc: Mr. Steve Vanderhorn, Chief, Regulatory Branch, Rock Island District
Mr. Gerald Hurlbert, George Butler Associates (without attachments)



STUDY AREA

U.S. ROUTE 36-24 IMPROVEMENTS
MONROE CITY, MISSOURI



**Woodward-Clyde
Consultants**

TELEPHONE MEMO

Date: July 1, 1994

Time: am

TO: John Bedker

Company: USACE--Rock Island

Phone No.: (309) 794-5380

Recorded by: Mary Hagerty

Project: MHTD Hannibal

Project No. 93C8172

Route:

J. Hurlbert

C. Kuhn

File

Got John's name from his reply to our scoping meeting request--he had called to say that the Rock Island District wouldn't be attending. John is responsible for individual 404 permits.

I called to see what their reaction to our request from the St. Louis District USACE that jurisdiction for 404 permitting be transferred to Rock Island since St. Louis covered only a small part of the area. He said they would not be interested if an individual permit was involved, because of the extra workload. If only nationwide permits were involved, it would probably be OK. After looking at the map, he concluded that since all the stream crossings are small, and there probably are not other natural wetlands (based on NWI maps and his knowledge of the area), most likely individual permits would not be required for either project. Also, there may be no permits required for the southern area covered by St. Louis District (part of Salt River drainage).

Other notes:

- Will need nationwide for each bridge crossing
- All alternates should be delineated
- They don't regulate streams that don't show up on county maps
- For nationwide, our contact is Donna Jones (309) 794-5371. Mike Hayes and Jeff Snyder also handle nationwides



**WOODWARD-CLYDE
CONSULTANTS**

Date July 18, 1994

Name MHTD Hannibal

Project No. J3P0411, J3P0412, J3P0426,
J3P0427

TO Mark Kross

ADDRESS MO Highway and Transportation Dept.

P.O. Box 270

Jefferson City, Missouri 65102

NO PRD REQUIRED

TRANSMITTAL

- ☒ ENCLOSED
☐ UNDER
SEPARATE COVER
☐ MESSENGER
☒ FIRST CLASS MAIL

- ☐ TRACINGS
☐ PHOTOSTATS
☐ PRINTS
☐ SPECIFICATIONS

- ☐ SPECIAL DELIVERY
☐ AIR MAIL
☐ COPY OF LETTER
☐ REPORT
☐ PHOTOS

- ☐ DRILLING LOGS
☐ TEST RESULTS

- ☐ DOCUMENTS
☐ CONTRACTS

- ☐ FOR APPROVAL
☐ FOR YOUR USE
☐ AS REQUESTED

- ☐ APPROVED
☐ APPROVED
AS NOTED
☐ RESUBMIT
☐ RETURN
CORRECTED PRINTS
☐ FOR COMMENT
☐ PRELIMINARY
☐

NO. OF COPIES	DESCRIPTION	DATE
1	Phone memo and attachments regarding Indiana Bat studies for project	7/18/94

REMARKS

COPY Rick Clawson, Missouri Depart. Conservation
Gene Gardner, MO Highway and Transportation Dept.
Mick Harvey, Tennessee Tech. U.
Kelly Srigley Werner, U.S. Fish & Wildlife Service
Tom Pride, WCC Tampa

2318 MILLPARK DRIVE
ST. LOUIS, MISSOURI 63043
314/429-0100
FAX 314/429-0462

FROM

Mary Hagerty
Mary Hagerty, P.E.

TELEPHONE MEMO

Date: July 18, 1994

Time: 9:00am

Project No. 93C8172

Conference Call: Rick Clawson, MO Dept Cons.
Gene Gardner, MHTD
Mick Harvey, Tennessee Tech. U.
Mary Hagerty, WCC
Tom Pride, WCC

Recorded by: Mary Hagerty

Project: MHTD Hannibal: MHTD Project Nos. J3P0411, J3P0412, J3P0426, J3P0427

Note to participants: please notify Mary Hagerty (314) 429-0100 of any corrections or clarifications to this phone memo.

Summary of Call

Conference call was held to establish protocol for bat studies for MHTD Hannibal projects (Marion and Ralls Counties: Relocation of U.S. Route 61 near Hannibal, and adding lanes to Route 36 between Route Z and Route 24).

Woodward-Clyde Consultants (WCC) will follow the procedure summarized in the attached two pages for field surveys and foraging habitat assessment for Indiana bats (supplied by Gene Gardner).

Mitigation is not addressed in the attached summary. Mitigation will be addressed in detail following the habitat assessment and will consist of seasonal restrictions on tree cutting and a two for one tree replacement policy.

Notes

Gene will send Tom copies of referenced publications:

- Brower and Zar, 1984
- Gardner et al., 1991

**Woodward-Clyde
Consultants**

- Garner and Gardner, 1992.

Work should be done when trees have foliage. August would be suitable.

Gene and Rick asked if there was access to bat detector. Mick has one. Gene indicated that the possibility of finding a bat with one is not good. In Illinois, they sounded 2,000 trees before they found one.

Category species will not be addressed. For category species the issue is whether or not the project might impact the listing. This is very unlikely. This item will not be addressed.

Regarding gray bats, Gene and Rick indicated that gray bats have been found in caves in southern Ralls County, and our area is north of their known habitat area. Mary said locals said there is a cave near one of the corridors ("White Bear Cave"), but no caves near the area showed up on MSS data base. Cave may be quarry. Natural caves are best habitat. Easy to recognize if gray bat habitat. WCC will investigate this "cave" for gray bat habitat.

Gene will send Mary information on Indiana bat studies done in surrounding counties.

MATERIALS AND METHODS

Materials

The following maps and photographs were used throughout the field survey and foraging habitat assessment:

- USGS Quadrangle Topographic Maps - 1"=2,000'
- Aerial Photographs - 1"=400' (15 May, 1992)
- Aerial Photographs - 1"=400' (11 September, 1979)

Field Survey Methods - Roost Trees

Walking surveys of the forested portions of each alternative were conducted by RUST Environment & Infrastructure biologists from 4-15 April, 1994. Each woodland was assessed as to its potential to provide appropriate roost trees for Indiana bats. Potential roost tree density was calculated for those woodlands possessing trees with adequate morphological characteristics (see below) using point-quarter sampling (Brower and Zar, 1984). The center lines of the proposed west and east alternatives were used as a transect line, and sampling points were randomly chosen along the transect. Potential roost trees were considered to be those trees with

>25 percent exfoliating bark and ≥ 22 cm (9 in) dbh (diameter at breast height). Dead trees were chosen over live trees; but if no dead trees were present, live trees with appropriate characteristics were sampled. Information collected about each tree included:

- Identity (To the Lowest Taxonomic Level Possible)
- Distance From the Transect
- Percent Exfoliating Bark
- Condition (Alive or Dead)
- Presence of Hollow Cavities

Since the project corridor, including the right-of-way, is approximately 122 m (400 ft) wide, only trees within a 61 m (200 ft) radius of the transect line were sampled. If a quadrant did not contain a potential roost tree within 61 m (200 ft), it was assigned a distance of 61 m (200 ft). This method may result in a slight overestimate of the density of potential roost trees, but should not significantly affect the results of the survey. In addition to potential roost tree density, the general plant community quality of each woodland was assessed.

Foraging Habitat Assessment

Previous studies have had the benefit of radio telemetry technology in estimating Indiana bat foraging ranges (Gardner et al., 1991). Foraging range was centered around a capture site, and habitat within the range was evaluated. Based on these studies, Garner and Gardner (1992) suggest that the size of the foraging area utilized by adult *M. sodalis* is accurately represented by a 344 ha (850 ac) circular plot.

In order to completely assess the impacts of road construction on foraging habitat, the present survey centered potential foraging habitat, along both alternatives, on:

- Woodlands Containing Potential Roost Trees
- Stream Crossings

Aerial photographs of the project area were used to evaluate the foraging habitat quality of each alternative. A 344 ha (850 ac) circular plot, centered on the proposed center line, was drawn around stream crossings and woodlands containing potential roost trees within the corridors of both the east and west alternatives. Foraging habitat quality was determined for the area within each circle and was based on percent cover of habitat types using a system developed by Garner and Gardner (1992). Optimal foraging habitat consists of >33 percent forest and ≥ 0.1 percent water. Suitable foraging habitat consists of <33 percent but ≥ 5 percent forest and < 0.1 percent but >0 percent water. Unsuitable habitat would be considered <5 percent forest and < 0.1 percent water.

Overall Habitat Suitability

The area within the 344 ha (850 ac) circular plots was also evaluated as to its overall suitability as Indiana bat summer habitat using a system developed by Garner and Gardner (1992). Essential habitat consists of deciduous forest cover ≥ 30 percent and permanent water available

within a 1 km (0.62 mi) circle and suitable roost trees available within 0.4 km (0.2 mi). Suitable habitat consists of deciduous forest cover ≥ 5 percent and permanent water available within a 1 km (0.62 mi) circle and suitable roost trees available within 0.4 km (0.2 mi). Unsuitable habitat would be considered <5 percent deciduous forest cover, and/or no water available within a 1 km (0.62 mi) circle, and/or the absence of suitable roost trees within 0.4 km (0.2 mi).



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Fish and Wildlife Enhancement

Columbia Field Office

608 East Cherry Street

Columbia, Missouri 65201

IN REPLY REFER TO:

FWS/AES-CMFO

JUL 2 8 1994

Ms. Carol Kuhn
George Butler Associates, Inc.
One Pine Ridge Plaza
8207 Melrose Drive
Lenexa, KS 66214-3621

Dear Ms. Kuhn:

This is in reference to your request of April 8, 1994, for comments on the proposed widening of existing Route 36 and the construction of a new segment of Route 61 in Marion and Ralls Counties, Missouri. Our comments concern the presence of federally-listed threatened or endangered species or wetland habitats within the area of influence of the proposed project. This response is provided by the U.S. Fish and Wildlife Service (Service) under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.), the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4327), the Endangered Species Act of 1973, (16 U.S.C. 1531-1543), as amended, among other statutes, regulations and guidance information.

In the interest of efficiently addressing the large number of requests received in this office for preliminary information concerning federally-listed threatened and endangered species, designated critical habitat, wetlands, and other important fish and wildlife resources and habitats, the following checklist response is provided to guide your further actions in assuring appropriate environmental review and consideration in relation to this project. Only the items checked pertain to your project.

☒ No federally-listed or proposed threatened or endangered species or designated or proposed critical habitat occur within the project area of influence. However, should additional information indicate that federally-listed or proposed species, or designated or proposed critical habitat may occur within the area of influence of the proposed action, coordination with this office should be reinitiated. Please contact the Missouri Department of Conservation (Planning Division, P.O. Box 180, Jefferson City, Missouri 65102-0180) for information concerning State-listed rare and endangered species.

☐ No wetlands occur within the project area of influence, based on a review of available Service National Wetland Inventory information.

☐ See enclosure 1 for the federally-listed or proposed threatened or endangered species or designated or proposed critical habitat that may

RECEIVED

JUL 2 8 1994

Ms. Carol Kuhn

2

occur within the project area of influence. It is the responsibility of the Federal action agency involved in funding, permitting, licensing, or otherwise authorizing this action to determine whether federally-listed species may be adversely affected, whether proposed species may be jeopardized, or whether designated or proposed critical habitat may be adversely modified or destroyed. If these resources may be adversely affected, formal consultation (50 CFR 402.14) or a conference (for proposed species or proposed designated critical habitat, 50 CFR 402.10) should be initiated by the agency with the Service. An exception to formal consultation is informal consultation (50 CFR 402.13) whereby the Service concurs in writing with measures adopted by the agency to avoid the likelihood of adverse effects.

~~KSW~~X Based on a review of available information, it appears that wetland habitat may occur within the project area of influence due to the multitude of stream crossings within each corridor. The Service recommends that you contact the appropriate office of the U.S. Army Corps of Engineers concerning the need for a Rivers and Harbors Act Section 10 or Clean Water Act Section 404 permit for the proposed activities.

— Please review enclosure 2 for additional comments concerning activities which will help minimize potential environmental impacts of the project area of influence.

We appreciate the opportunity to review the proposed project. Should you have questions, or if we can be of any further assistance, please contact Ms. Kelly Srigley Werner at the address above, or by telephone at (314) 876-1911 or FAX at (314) 876-1914.

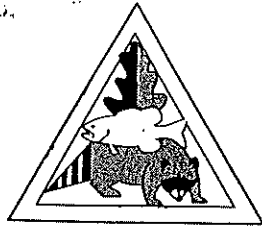
Sincerely,

Mamie Parker

Dr. Mamie Parker
Acting Field Supervisor

cc: FWS; Twin Cities, MN (Attn: Bob Krska)
MDC; Jefferson City, MO (Attn: Dan Dickneite)
MDC; Jefferson City, MO (Attn: Dennis Figg)
MDNR; Jefferson City, MO (Attn: John Madras)
EPA; Kansas City, KS (Attn: Kathy Mulder)
COE; St. Louis, MO (Attn: Bill Groth)
COE; Rock Island, IL

KSW:ksw:1670/XC6136XA



MISSOURI DEPARTMENT OF CONSERVATION

8-9-94

Dear Mary,

Sorry it took so long to get this to you. I've checked my files and have only one location in Marion County where a rodalia (a male) was caught -- on 6 June 1978. None have been caught in Ralls County.

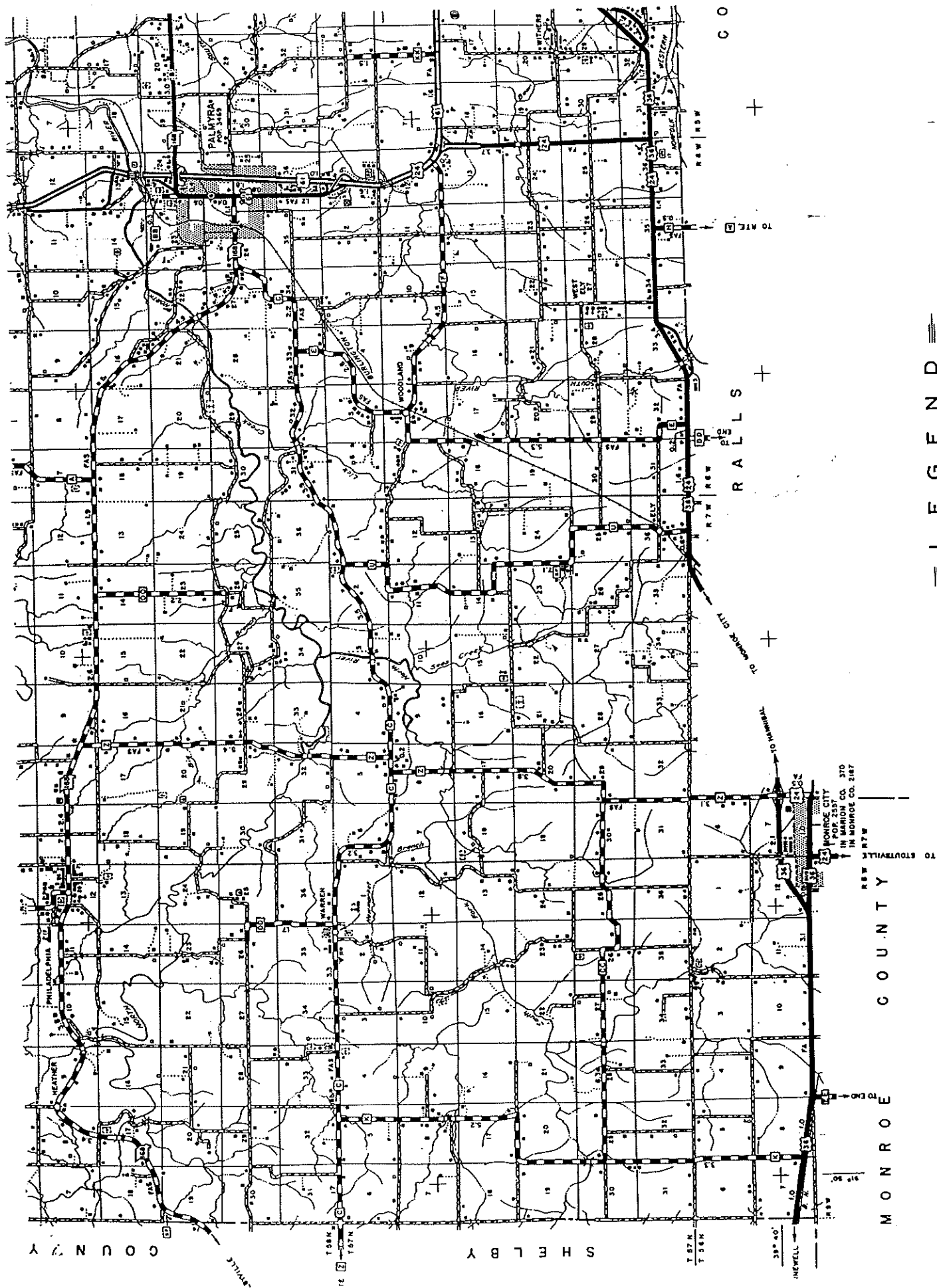
The enclosed map shows the location of the Marion Co. capture (a highlighted spot).

Good luck with your project.

Sincerely,

Rick Glendon





LEGEND

(21) Tourist Court or Motel

Passenger Station

MARION COUNTY PLANNING & ZONING

COUNTY HWY. DEPT. OFFICE • %COURT HOUSE • PHONE 314-769-3264

PALMYRA, MISSOURI 63461

NOV 3 1994

October 18, 1994

*Copy
of
File*

Dick Jones, District Engineer
US 61 South
Hannibal, Mo 63401

Dear Mr. Jones:

We the members of the Marion County Planning and Zoning Commission
recommend to the Missouri State Highway Department the proposed
Route F as the new US 61 by-pass.

*Western
alternate*

Sincerely

Drew Rothwals

Presiding Commissioner

Elmer Frankenkach

South River Township Commissioner

Robert Ingram

Miller Township Commissioner

Fred Longan

Round Grove Township Commissioner

McChur

Marion County Road Supervisor

Samuel R. R...

Liberty Township Commissioner

Fred. Cunningham

JD Union Township Commissioner

TELEPHONE MEMO

Date: February 14, 1995

Time: 3:30 pm

TO: John Ford

Company: MDNR, Water Pollution Control

Phone No.: (314) 751-1300

Recorded by: Mary Hagerty

Project: MHTD Hannibal

Project No. 93C8172

Route:

File

Called to verify that no additional water quality data for the project area are available (we have water quality data from Bear Creek downstream of the project area). Mr. Ford confirmed that no other data are available, and that MDNR has data from other agencies in their database.

March 8, 1995

Mr. Gene Gunn, Mail Code ENRV
Section Chief
Environmental Development & Coordination Section
U.S. Environmental Protection Agency
726 Minnesota Avenue
Kansas City, Kansas 66101

**Re: Environmental Impact Assessment
Relocation of Route 61, Hannibal, Missouri**

Dear Mr. Gunn:

We are transmitting the following information for your review and comment:

- Phase I Alternatives Analysis Report
- Project newsletters to date
- Summary of public involvement to date
- Preliminary draft report -- Indiana bat survey
- Draft assessment of wetlands impacts
- Outline for Draft EIS

We will include you on our list for future mailings, and as requested by Mr. Knott, we will ask Mark Kross for a convenient time for a agency review meeting in April. If you have any comments or need additional information, please call.

Sincerely,

Mary Hagerty
Senior Project Engineer

TELEPHONE MEMO

Date: April 14, 1995

Time: 3:10 pm

TO: Ira Sattlefield

Company: MDNR, Geology

Phone No.: (314) 368-2149

Recorded by: Mary Hagerty

Project: MHTD Hannibal

Project No. 93C8172

Route:

File

Called to give Mr. Sattlefield an update on the project and to find out if he is interested in more information. I told him the alternatives on new locations avoided karst areas and caves. He said that if that was the case they are really not interested and we do not need to send more information. He emphasized the importance of avoiding drainage to karst areas and caves.

U.S. DEPARTMENT OF AGRICULTURE
Soil Conservation Service

SCS-CPA-106

01-81

FARMLAND CONVERSION IMPACT RATING
FOR CORRIDOR TYPE PROJECTS

PART I (To be completed by Federal Agency)		3. Date of Land Evaluation Request March 1995		4. Sheet 1 of _____	
1. Name of Project Highway 61 Bypass; Route F		5. Federal Agency Involved FHWA			
2. Type of Project Highway		6. County and State Marion & Ralls Counties, Missouri			
PART II (To be completed by SCS)		1. Date Project Requested By SCS 04/05/95		2. Project Completion Date 2000	
3. Does the corridor contain prime, unique, statewide or nationally important farmland? (If no, the FPPA does not apply. Do not complete additional parts of this form.)		YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>		4. Acres Impacted (Approved From SCS) 2000	
5. Major Crops Corn, Soybeans		6. Farmland Land Use Government Jurisdiction Federal		7. Amount Of Farmland As Defined In FPPA Approved 2000 4000 2000 9	
8. Name Of Land Evaluation System Used Rallis		9. Name Of Local Site Assessment System		10. Date Land Evaluation Requested By SCS	
PART III (To be completed by Federal Agency)		Alternative Corridor For Segment			
		Corridor A	Corridor B	Corridor C	Corridor D
A. Total Acres To Be Converted Directly		85 ac.			
B. Total Acres To Be Converted Indirectly, Or To Receive Services		294 ac.			
C. Total Acres In Corridor		413 ac.			
PART IV (To be completed by SCS) Land Evaluation Information					
A. Total Acres Prime And Unique Farmland		266 ac.			
B. Total Acres Statewide And Locally Important Farmland		113 ac.			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted		15.4%			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value		27.5%			
PART V (To be completed by SCS) Land Evaluation Corridor Relative Value of Farmland to Be Served or Converted (Scale of 0-100 Points)		65.64			
PART VI (To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))		Maximum Points			
1. Area In Nonurban Use		15	15		
2. Perimeter In Nonurban Use		10	10		
3. Percent Of Corridor Being Farmed		20	12.6		
4. Protection Provided By State And Local Government		20	0		
5. Size Of Present Farm Unit Compared To Average		10	10		
6. Creation Of Nonfarmable Farmland		25	1		
7. Availability Of Farm Support Services		5	5		
8. On-Farm Investments		20	14		
9. Effects Of Conversion On Farm Support Services		25	0		
10. Compatibility With Existing Agricultural Use		10	3		
TOTAL CORRIDOR ASSESSMENT POINTS		160	70.6		
PART VII (To be completed by Federal Agency)					
Relative Value Of Farmland (From Part V)		100	65.64		
Total Corridor Assessment (From Part VI above or a local site assessment)		160	70.6		
TOTAL POINTS (Total of above 2 lines)		260	136.24		
1. Corridor Selected:		2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used?	
				YES <input type="checkbox"/> NO <input type="checkbox"/>	
5. Reason For Selection:					

Signature of Person Completing This Part:

DATE

NOTE: Complete a form for each segment with more than one Alternative Corridor.

U.S. DEPARTMENT OF AGRICULTURE
Soil Conservation ServiceFARMLAND CONVERSION IMPACT RATING
FOR CORRIDOR TYPE PROJECTS

ART I (To be completed by Federal Agency)		3. Date of Land Evaluation Request March 1995		4. Sheet 1 of _____	
Name of Project Highway 61 Bypass, Route F		5. Federal Agency Involved FHWA			
Type of Project Highway		6. County and State Marion & Ralls Counties, Missouri			
ART II (To be completed by SCS)		1. Date Request Received By SCS 04/03/95		2. Request Completing Form	
Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply - Do not complete additional portion of this form.)		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		A. Acres Projected <input type="checkbox"/> Average Farm Size <input type="checkbox"/>	
Major Crops Corn, Soybeans		B. Farmable Land In Government Jurisdiction Acres: 270,853		7. Amount Of Farmland As Defined In FPPA Acres: 241,218	
Name Of Land Evaluation System Used Marion LESA		8. Name Of Local Site Assessment System		10. Date Land Evaluation Received By SCS	
ART III (To be completed by Federal Agency)		Alternative Corridor For Segment			
		Corridor A	Corridor B	Corridor C	Corridor D
Total Acres To Be Converted Directly		75 AC.			
Total Acres To Be Converted Indirectly, Or To Receive Services		326 AC.			
Total Acres In Corridor		387 AC.			
ART IV (To be completed by SCS) Land Evaluation Information					
Total Acres Prime And Unique Farmland		355 AC.			
Total Acres Statewide And Local Important Farmland		32 AC.			
Percentage Of Farmland In County Or Local Govt. Unit To Be Converted		17			
Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value		39.9			
ART V (To be completed by SCS) Land Evaluation Criteria Relative Value (Farmland To Be Serviced Or Converted - Score Of 0 To 100 Points)		63.75			
ART VI (To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))		Maximum Points			
1. Area In Nonurban Use	15	15			
2. Perimeter In Nonurban Use	10	10			
3. Percent Of Corridor Being Farmed	20	14.4			
4. Protection Provided By State And Local Government	20	0			
5. Size Of Present Farm Unit Compared To Average	10	10			
6. Creation Of Nonfarmable Farmland	25	7			
7. Availability Of Farm Support Services	5	5			
8. On-Farm Investments	20	15.8			
9. Effects Of Conversion On Farm Support Services	25	0			
10. Compatibility With Existing Agricultural Use	10	3			
TOTAL CORRIDOR ASSESSMENT POINTS	160				
ART VII (To be completed by Federal Agency)					
Relative Value Of Farmland (From Part V)	100	63.75			
Total Corridor Assessment (From Part VI above or a local site assessment)	160	74.2			
TOTAL POINTS (Total of above 2 lines)	260	137.95			
Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES <input type="checkbox"/> NO <input type="checkbox"/>		
Reason For Selection:					

Signature of Person Completing This Part:

DATE

NOTE: Complete a form for each segment with more than one Alternative Corridor.

U.S. DEPARTMENT OF AGRICULTURE
Soil Conservation ServiceSCS-CPA-106
01-81FARMLAND CONVERSION IMPACT RATING
FOR CORRIDOR TYPE PROJECTS

PART I (To be completed by Federal Agency)		3. Date of Land Evaluation Request March 1995		4. Sheet 1 of _____	
1. Name of Project Highway 61 Bypass; Route EF		5. Federal Agency Involved FHWA			
2. Type of Project Highway		6. County and State Marion & Ralls Counties, Missouri			
PART II (To be completed by SCS)		Date Request Received By SCS 04/05/95		2. Person Completing Form	
7. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply. Do not complete additional parts of this form.) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		8. Acres Lost 335		Average Farm Size 335	
9. Major Crops Cotton, Soybeans		10. Amount of Farmland As Defined in FPPA Acres 253,484		11. Amount of Farmland As Defined in FPPA Acres 253,484	
12. Name of Land Evaluation System Used Ralls LEPA		13. Name of Local Site Assessment System		14. Date Land Evaluation Received By SCS	
PART III (To be completed by Federal Agency)		Alternative Corridor For Segment			
		Corridor A	Corridor B	Corridor C	Corridor D
1. Total Acres To Be Converted Directly		75 ac.			
2. Total Acres To Be Converted Indirectly, Or To Receive Services		335 ac.			
3. Total Acres In Corridor		420 ac.			
PART IV (To be completed by SCS) Land Evaluation Information					
1. Total Acres Prime And Unique Farmland		248 ac.			
2. Total Acres Statewide And Local Important Farmland		95 ac.			
3. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted		135			
4. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value		23			
PART V (To be completed by SCS) Land Evaluation Criteria Relative Value Of Farmland To Be Serviced Or Converted (Scale 1 To 100 Points)		66			
PART VI (To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))		Maximum Points			
1. Area In Nonurban Use		15	15		
2. Perimeter In Nonurban Use		10	10		
3. Percent Of Corridor Being Farmed		20	13.5		
4. Protection Provided By State And Local Government		20	0		
5. Size Of Present Farm Unit Compared To Average		10	10		
6. Creation Of Nonfarmable Farmland		25	1		
7. Availability Of Farm Support Services		5	5		
8. On-Farm Investments		20	15		
9. Effects Of Conversion On Farm Support Services		25	0		
10. Compatibility With Existing Agricultural Use		10	3		
TOTAL CORRIDOR ASSESSMENT POINTS		160	72.5		
PART VII (To be completed by Federal Agency)					
Relative Value Of Farmland (From Part V)		100	66		
Total Corridor Assessment (From Part VI above or a local site assessment)		160	72.5		
TOTAL POINTS (Total of above 2 lines)		260	138.5		
Corridor Selected:		2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used?	
				YES <input type="checkbox"/> NO <input type="checkbox"/>	
Reason For Selection:					

Signature of Person Completing This Part:

DATE

NOTE: Complete a form for each segment with more than one Alternative Corridor.

MAY-23-1995 10:23

P.05

SCS-CPA-106
01-01U.S. DEPARTMENT OF AGRICULTURE
Soil Conservation ServiceFARMLAND CONVERSION IMPACT RATING
FOR CORRIDOR TYPE PROJECTS

PART I (To be completed by Federal Agency)		3. Date of Land Evaluation Request March 1995	4. Sheet 1 of _____
1. Name of Project Highway 61 Bypass; Route EF		5. Federal Agency Involved FHWA	
2. Type of Project Highway		6. County and State Marion & Ralls Counties, Missouri	
PART II (To be completed by SCS)		7. Date Received By SCS 04/03/95	8. Person Completing Form
3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPA does not apply. Do not complete additional parts of this form.)		9. Acres Impacted (Average Farm Size) 298	
4. Major Crops Cotton, Soybeans		10. Amount Of Farmland As Defined In FPA Acres: 229, 218	
5. Name Of Land Evaluation System Used National LESA		11. Date Land Evaluation Received By SCS	
PART III (To be completed by Federal Agency)		Alternative Corridor For Segment	
		Corridor A	Corridor B
A. Total Acres To Be Converted Directly		65 ac.	
B. Total Acres To Be Converted Indirectly, Or To Receive Services		275 ac.	
C. Total Acres In Corridor		340 ac.	
PART IV (To be completed by SCS) Land Evaluation Information			
A. Total Acres Prime And Unique Farmland		229 ac.	
B. Total Acres Statewide And Local Important Farmland		120 ac.	
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted		15	
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value		25.8	
PART V (To be completed by SCS) Land Evaluation Criteria Relative Value			
off Farmland To Be Services Or Converted (Scale of 0-100 Points)		65.88	
PART VI (To be completed by Federal Agency) Corridor			
Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))		Maximum Points	
1. Area In Nonurban Use	15	15	
2. Perimeter In Nonurban Use	10	10	
3. Percent Of Corridor Being Farmed	20	6.4	
4. Protection Provided By State And Local Government	20	0	
5. Size Of Present Farm Unit Compared To Average	10	10	
6. Creation Of Nonfarmable Farmland	25	1	
7. Availability Of Farm Support Services	5	5	
8. On-Farm Investments	20	7.1	
9. Effects Of Conversion On Farm Support Services	25	0	
10. Compatibility With Existing Agricultural Use	10	3	
TOTAL CORRIDOR ASSESSMENT POINTS	160	57.5	
PART VII (To be completed by Federal Agency)			
Relative Value Of Farmland (From Part V)		100	65.88
Total Corridor Assessment (From Part VI above or a local site assessment)		160	57.5
TOTAL POINTS (Total of above 2 lines)		260	123.38
1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES <input type="checkbox"/> NO <input type="checkbox"/>
5. Reason For Selection:			

Signature of Person Completing This Part:

DATE

NOTE: Complete a form for each segment with more than one Alternative Corridor.

U.S. DEPARTMENT OF AGRICULTURE
Soil Conservation ServiceSCS-CPA-106
01-81FARMLAND CONVERSION IMPACT RATING
FOR CORRIDOR TYPE PROJECTS

PART I (To be completed by Federal Agency)		3. Date of Land Evaluation Request March 1995	4. Sheet 1 of _____
1. Name of Project Highway 61 Bypass; Alternate D	5. Federal Agency Involved FHWA		
2. Type of Project Highway	6. County and State Marion & Ralls Counties, Missouri		
PART II (To be completed by SCS)		7. Date Request Received By SCS 04/03/95	8. Person Completing Form
3. Does the corridor contain prime, unique, statewide or local important farmland? (If no, the FPPA does not apply. Do not complete additional parts of this form.) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		4. Acres Impacted 336	
5. User Group(s) Comm. Soybeans	6. Farmland Land Use Conversion Acres 336/370	7. Amount Of Farmland As Defined In FPPA Acres 253/464	
8. Name Of Land Evaluation System Used Ralls	9. Name of Local Site Assessment System	10. Date Last Evaluation Approved By SCS	
PART III (To be completed by Federal Agency)		Alternative Corridor For Segment	
		Corridor A	Corridor B
A. Total Acres To Be Converted Directly		67 ac.	
B. Total Acres To Be Converted Indirectly, Or To Receive Services		290 ac.	
C. Total Acres In Corridor		357 ac.	
PART IV (To be completed by SCS) Land Evaluation Information			
A. Total Acres Prime And Unique Farmland		101 ac.	
B. Total Acres Statewide And Local Important Farmland		168 ac.	
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted		.14	
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value		20	
PART V (To be completed by SCS) Land Evaluation Criteria Relative Value of Farmland to Be Converted or Converted (Scale of 0 - 100 Points)		68.3	
PART VI (To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))			
	Maximum Points		
1. Area In Nonurban Use	15	15	
2. Perimeter In Nonurban Use	10	10	
3. Percent Of Corridor Being Farmed	20	11.1	
4. Protection Provided By State And Local Government	20	0	
5. Size Of Present Farm Unit Compared To Average	10	10	
6. Creation Of Nonfarmable Farmland	25	1	
7. Availability Of Farm Support Services	5	5	
8. On-Farm Investments	20	12.4	
9. Effects Of Conversion On Farm Support Services	25	0	
10. Compatibility With Existing Agricultural Use	10	3	
TOTAL CORRIDOR ASSESSMENT POINTS		160	67.5
PART VII (To be completed by Federal Agency)			
Relative Value Of Farmland (From Part V)		100	68.3
Total Corridor Assessment (From Part VI above or a local site assessment)		160	67.5
TOTAL POINTS (Total of above 2 lines)		260	135.8
1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used?
			YES <input type="checkbox"/> NO <input type="checkbox"/>
5. Reason For Selection:			

Signature of Person Completing This Part:

DATE

NOTE: Complete a form for each segment with more than one Alternative Corridor.

U.S. DEPARTMENT OF AGRICULTURE
Soil Conservation ServiceSCS-CPA-106
01-01FARMLAND CONVERSION IMPACT RATING
FOR CORRIDOR TYPE PROJECTS

PART I (To be completed by Federal Agency)		3. Date of Land Evaluation Request March 1995		4. Sheet 1 of _____	
1. Name of Project Highway 61 Bypass, Alternate D		5. Federal Agency Involved FHWA			
2. Type of Project Highway		6. County and State Marion & Ralls Counties, Missouri			
PART II (To be completed by SCS)		1. Date Request Received By SCS 05/11/95		2. Person Completing Form	
3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply. Do not complete additional parts of this form.)		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		4. Acres Involved Average Farm Size	
5. Major Crops Corn, Soybeans		6. Farmable Land in Government Jurisdiction Acres 235.5		7. Amount of Farmland As Defined in FPPA Acres 235.5	
8. Name Of Land Evaluation System Used Marion LESA		9. Name of Local Site Assessment System		10. Date Land Evaluation Received By SCS	
PART III (To be completed by Federal Agency)		Alternative Corridor For Segment			
		Corridor A	Corridor B	Corridor C	Corridor D
A. Total Acres To Be Converted Directly		73 ac.			
B. Total Acres To Be Converted Indirectly, Or To Receive Services		270 ac.			
C. Total Acres In Corridor		343 ac.			
PART IV (To be completed by SCS) Land Evaluation Information					
A. Total Acres Prime And Unique Farmland		235 ac.			
B. Total Acres Statewide And Local Important Farmland		108 ac.			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted		15			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value		25.8			
PART V (To be completed by SCS) Land Evaluation Criterion: Relative Value of Farmland to Be Serviced or Converted (Scale of 0 = 100 Points)		68.9			
PART VI (To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))		Maximum Points			
1. Area In Nonurban Use		15	15		
2. Perimeter In Nonurban Use		10	10		
3. Percent Of Corridor Being Farmed		20	5.5		
4. Protection Provided By State And Local Government		20	0		
5. Size Of Present Farm Unit Compared To Average		10	10		
6. Creation Of Nonfarmable Farmland		25	1		
7. Availability Of Farm Support Services		5	5		
8. On-Farm Investments		20	6.2		
9. Effects Of Conversion On Farm Support Services		25	0		
10. Compatibility With Existing Agricultural Use		10	3		
TOTAL CORRIDOR ASSESSMENT POINTS		160	55.7		
PART VII (To be completed by Federal Agency)					
Relative Value Of Farmland (From Part V)		100	68.9		
Total Corridor Assessment (From Part VI above or a local site assessment)		160	55.7		
TOTAL POINTS (Total of above 2 lines)		200	124.6		
1. Corridor Selected:		2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used?	
				YES <input type="checkbox"/> NO <input type="checkbox"/>	
5. Reason For Selection:					

Signature of Person Completing This Part:

DATE

NOTE: Complete a form for each segment with more than one Alternative Corridor.

U.S. DEPARTMENT OF AGRICULTURE
Soil Conservation Service

SCS-CPA-106

01-01

FARMLAND CONVERSION IMPACT RATING
FOR CORRIDOR TYPE PROJECTS

PART I (To be completed by Federal Agency)		3. Date of Land Evaluation Request March 1995	4. Sheet 1 of _____
1. Name of Project Highway 61 Bypass, Link 1		5. Federal Agency Involved FHWA	
2. Type of Project Highway		6. County and State Marion & Ralls Counties, Missouri	
PART II (To be completed by SCS)		1. Date Review Received By SCS 04/10/95	2. Periods Completing Form
Does the corridor contain prime, unique statewide or local important farmland? (If so, the FPPA does not apply. Do not complete additional parts of this form.)		3. Acres Impacted 296	4. Average Farm Size 226/218
5. Major Crops Corn, Soybeans		6. Farmland Land Use Conversion Analysis 95	7. Amount Of Farmland As Defined In FPPA Acres: 226/218
8. Name Of Land Evaluation System Used Marion: LBSA		9. Name of Local Site Assessment System	10. Date Unit Evaluation Received by SCS 84.3
PART III (To be completed by Federal Agency)		Alternative Corridor For Segment	
		Corridor A	Corridor B
1. Total Acres To Be Converted Directly		10 ac.	
2. Total Acres To Be Converted Indirectly, Or To Receive Services		20 ac.	
3. Total Acres In Corridor		30 ac.	
PART IV (To be completed by SCS) Land Evaluation Information			
4. Total Acres Prime And Unique Farmland		30 ac.	
5. Total Acres Statewide And Local Important Farmland			
6. Percentage Of Farmland In County Or Local Gov. Unit To Be Converted		0.13	
7. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value		33.9	
PART V (To be completed by SCS) Land Evaluation Criteria Relative Value Of Farmland To Be Serviced Or Converted (Scale of 0-100 Points)		55.45	
PART VI (To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))		Maximum Points	
1. Area In Nonurban Use	15	15	
2. Perimeter In Nonurban Use	10	10	
3. Percent Of Corridor Being Farmed	20	17.9	
4. Protection Provided By State And Local Government	20	0	
5. Size Of Present Farm Unit Compared To Average	10	10	
6. Creation Of Nonfarmable Farmland	25	1	
7. Availability Of Farm Support Services	5	5	
8. On-Farm Investments	20	16.5	
9. Effects Of Conversion On Farm Support Services	25	0	
10. Compatibility With Existing Agricultural Use	10	3	
TOTAL CORRIDOR ASSESSMENT POINTS		180	75.4
PART VII (To be completed by Federal Agency)			
Relative Value Of Farmland (From Part V)		100	65.45
Total Corridor Assessment (From Part VI above or a local site assessment)		180	75.4
TOTAL POINTS (Total of above 2 lines)		260	140.85
Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES <input type="checkbox"/> NO <input type="checkbox"/>
Reason For Selection:			

Signature of Person Completing This Part:

DATE

NOTE: Complete a form for each segment with more than one Alternative Corridor.

U.S. DEPARTMENT OF AGRICULTURE
Soil Conservation ServiceFARMLAND CONVERSION IMPACT RATING
FOR CORRIDOR TYPE PROJECTS

PART I (To be completed by Federal Agency)		3. Date of Land Evaluation Request March 1995	4. Sheet 1 of _____
1. Name of Project Highway 61 Bypass; Link 2		5. Federal Agency Involved FHWA	
2. Type of Project Highway		6. County and State Marion & Ralls Counties, Missouri	
PART II (To be completed by SCS)		1. Date Report Prepared By SCS 04/03/95	2. Person Completing Form
3. Does the corridor contain prime, unique statewide or local important farmland? (If not, the FPPA does not apply - Do not complete additional parts of this form.)		4. Acres Impacted (Average Farm Size)	
5. Major Crops Corn, Soybeans	6. Farmland Lost in Government Acquisition Acres: 207.4/2	7. Amount Of Farmland As Defined in FPPA Acres: 253.404	9
8. Name Of Land Evaluation System Used Ralls LESA	9. Name of Local Site Assessment System	10. Date Land Evaluation Prepared By SCS	
PART III (To be completed by Federal Agency)		Alternative Corridor For Segment	
		Corridor A	Corridor B
1. Total Acres To Be Converted Directly		20 ac.	
3. Total Acres To Be Converted Indirectly, Or To Receive Services		80 ac.	
2. Total Acres In Corridor		100 ac.	
PART IV (To be completed by SCS) Land Evaluation Information			
A. Total Acres Prime And Unique Farmland		9 ac.	
B. Total Acres Statewide And Local Important Farmland		58 ac.	
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted		.026	
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value		81.4	
PART V (To be completed by SCS) Land Evaluation Criterion Relative Value of Farmland to Be Serviced or Converted (Scale of 0 = 100 Points)		51.9	
PART VI (To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))		Maximum Points	
1. Area In Nonurban Use	15	15	
2. Perimeter In Nonurban Use	10	10	
3. Percent Of Corridor Being Farmed	20	1.8	
4. Protection Provided By State And Local Government	20	0	
5. Size Of Present Farm Unit Compared To Average	10	10	
6. Creation Of Nonfarmable Farmland	25	1	
7. Availability Of Farm Support Services	5	5	
8. On-Farm Investments	20	2	
9. Effects Of Conversion On Farm Support Services	25	0	
10. Compatibility With Existing Agricultural Use	10	3	
TOTAL CORRIDOR ASSESSMENT POINTS	160	47.8	
PART VII (To be completed by Federal Agency)			
Relative Value Of Farmland (From Part V)		100	51.9
Total Corridor Assessment (From Part VI above or a local site assessment)		160	47.8
TOTAL POINTS (Total of above 2 lines)		260	99.7
1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES <input type="checkbox"/> NO <input type="checkbox"/>
5. Reason For Selection:			

Signature of Person Completing This Part:

DATE

NOTE: Complete a form for each segment with more than one Alternative Corridor.

U.S. DEPARTMENT OF AGRICULTURE
Soil Conservation Service

SCS-CPA-106
01-81

FARMLAND CONVERSION IMPACT RATING FOR CORRIDOR TYPE PROJECTS

PART I (To be completed by Federal Agency)		3. Date of Land Evaluation Request March 1995		4. Sheet 1 of _____	
1. Name of Project Highway 61 Bypass; Alternate CW		5. Federal Agency Involved FHWA			
2. Type of Project Highway		6. County and State Marion & Ralls Counties, Missouri			
PART II (To be completed by SCS)		1. Date Request Received By SCS 4/20/95		2. Requesting Agency	
3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply. Do not complete additional parts of this form.) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		4. Assessment Method A. From Farm Data B. From Aerial Photo C. From Other			
5. Major Crops Corn, Soybeans		6. Farmland Used in Conversion A. Acres B. Percent		7. Percent of Farmland As Defined in FPPA A. From Farm Data B. From Aerial Photo C. From Other	
8. Name of Land Evaluation System Used Ralls		9. Name of Local Site Assessment System		10. Date Land Evaluation Requested by SCS	
PART III (To be completed by Federal Agency)		Alternative Corridor For Segment			
		Corridor A	Corridor B	Corridor C	Corridor D
A. Total Acres To Be Converted Directly		25 ac.			
B. Total Acres To Be Converted Indirectly, Or To Receive Services		103 ac.			
C. Total Acres In Corridor		128 ac.			
PART IV (To be completed by SCS) Land Evaluation Information					
A. Total Acres Prime And Unique Farmland		9 ac.			
B. Total Acres Statewide And Local Important Farmland		101 ac.			
C. Percentage Of Farmland In County Or Local Gov. Unit To Be Converted		14.4			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value		14.6			
PART V (To be completed by SCS) Land Evaluation Conversion Relative Value of Farmland to Be Serviced or Converted (Scale of 0-100 Points)		72			
PART VI (To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))		Maximum Points			
1. Area In Nonurban Use		15	15		
2. Perimeter In Nonurban Use		10	10		
3. Percent Of Corridor Being Farmed		20	6		
4. Protection Provided By State And Local Government		20	0		
5. Size Of Present Farm Unit Compared To Average		10	10		
6. Creation Of Nonfarmable Farmland		25	1		
7. Availability Of Farm Support Services		5	5		
8. On-Farm Investments		20	6.7		
9. Effects Of Conversion On Farm Support Services		25	0		
10. Compatibility With Existing Agricultural Use		10	3		
TOTAL CORRIDOR ASSESSMENT POINTS		180	56.7		
PART VII (To be completed by Federal Agency)					
Relative Value Of Farmland (From Part V)		100	72		
Total Corridor Assessment (From Part VI above or a local site assessment)		160	56.7		
TOTAL POINTS (Total of above 2 lines)		260	128.7		
Corridor Selected:		2. Total Acres of Farmlands to be Converted by Project:		3. Date Of Selection:	
				4. Was A Local Site Assessment Used? YES <input type="checkbox"/> NO <input type="checkbox"/>	
5. Reason For Selection:					

Signature of Person Completing This Part: _____

DATE: _____

NOTE: Complete a form for each segment with more than one Alternative Corridor.

U.S. DEPARTMENT OF AGRICULTURE
Soil Conservation ServiceFARMLAND CONVERSION IMPACT RATING
FOR CORRIDOR TYPE PROJECTS

PART I (To be completed by Federal Agency)		3. Date of Land Evaluation Request March 1995		4. Sheet 1 of _____	
1. Name of Project Highway 61 Bypass; Alternate CW		5. Federal Agency Involved FHWA			
6. Type of Project Highway		8. County and State Marion & Ralls Counties, Missouri			
PART II (To be completed by SCS)		7. Date Received Request by SCS 04/03/95		9. Project Containing Farm 248	
10. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply. Do not complete sections 11-13 of this form.)		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		11. Acres Impacted 248	
12. Major Crops Corn, Soybeans		13. Farmland Land Use Conversion Justification Acres: 248/0/0/0		14. Amount Of Farmland As Defined In FPPA Acres: 248/218	
15. Name Of Land Evaluation System Used National LBSA		16. National Land Use Assessment System		17. Date Land Conversion Requested By SCS 04/03/95	
PART III (To be completed by Federal Agency)		Alternative Corridor For Segment			
		Corridor A	Corridor B	Corridor C	Corridor D
A. Total Acres To Be Converted Directly		85 ac.			
B. Total Acres To Be Converted Indirectly, Or To Receive Services		347 ac.			
C. Total Acres In Corridor		432 ac.			
PART IV (To be completed by SCS) Land Evaluation Information					
A. Total Acres Prime And Unique Farmland		248 ac.			
B. Total Acres Statewide And Local Important Farmland		161 ac.			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted		177			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value		17.8			
PART V (To be completed by SCS) Land Evaluation Criteria Relative Value of Farmland to Be Serviced or Converted (Scale of 0-100 Points)		248			
PART VI (To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))		Maximum Points			
1. Area In Nonurban Use		15	15		
2. Perimeter In Nonurban Use		10	10		
3. Percent Of Corridor Being Farmed		20	10.5		
4. Protection Provided By State And Local Government		20	0		
5. Size Of Present Farm Unit Compared To Average		10	10		
6. Creation Of Nonfarmable Farmland		25	1		
7. Availability Of Farm Support Services		5	5		
8. On-Farm Investments		20	11.7		
9. Effects Of Conversion On Farm Support Services		25	0		
10. Compatibility With Existing Agricultural Use		10	3		
TOTAL CORRIDOR ASSESSMENT POINTS		160	66.2		
PART VII (To be completed by Federal Agency)					
Relative Value Of Farmland (From Part V)		100	73.3		
Total Corridor Assessment (From Part VI above or a local site assessment)		160	66.2		
TOTAL POINTS (Total of above 2 lines)		260	139.5		
1. Corridor Selected:		2. Total Acres of Farmlands to be Converted by Project:		3. Date Of Selection:	
				4. Was A Local Site Assessment Used? YES <input type="checkbox"/> NO <input type="checkbox"/>	
5. Reason For Selection:					

Signature of Person Completing This Part:

DATE

NOTE: Complete a form for each segment with more than one Alternative Corridor.

**GEORGE BUTLER ASSOCIATES, INC.
TELEPHONE MEMORANDUM**



**PROJECT: HWY 61 EIS
CLIENT: MHTD**

**To: Neal Johnson
Affiliation: USACOE Rock Island District
Phone: 309-794-5379
Date/Time: June 15, 1995 10 a.m.
Purpose: Clarification of Corps jurisdictional for farm ponds
From: Carol Kuhn**

I called the Rock Island District for general information regarding that district's interpretation of farm pond jurisdiction. No mention was made of client, project, or type of project. The following summarizes the conversation.

Farm ponds are considered Corps jurisdictional when

1. They are part of a drainage which is a jurisdictional water of the U.S.
2. They have a substantial development of hydrophytic vegetation.
3. They have been abandoned.

Usually jurisdictional farm ponds are open water and therefore considered waters of the U.S., not wetlands.

Since Natural Resource Conservation service (NRCS) is in the process of taking over onsite and offsite wetland determinations on agricultural lands (as defined in the January 1994 MOA "Concerning the Delineation of Wetlands for Purposes of Section 404 of the Clean Water Act and Subtitle B of the Food Security Act), the Corps has advised NRCS that the above conventions for farm pond jurisdiction should be followed.

cc: Mary Hagerty, P.E. (WCC)

JUN-16-1995 08:42

HWY TRANS DEPT

P.01

TO: Carol Kuhn	FROM: Stacy Sone
Co./Dept: George Bullock Assoc.	Co: MHTD
Phone #: 913-492-0400	Phone #: 314-526-3590
Fax #: 913-894-1878	Fax #: 314-526-1300

ARCH. HIST

BRIDGE COORD.

OTHER

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF STATE PARKS
 P.O. BOX 170 Jefferson City, MO 65101-0170
 FAX: (816) 222-1100

June 5, 1995



Mr. Joe Mickes
 Chief Engineer
 Missouri Highway and Transportation Department
 PO BOX 270
 Jefferson City, MO 65102

RE: Rt. 61 to south of Route M (Hannibal Relocation) (Job Nos. J3P0426, J3P0427), Marion and Ralls Counties

Dear Mr. Mickes:

Thank you for submitting information on the above referenced project for our review pursuant to Section 106 of the National Historic Preservation Act (P.L. 89-665, as amended).

We have reviewed the information provided and determined that several of the structures involved are not eligible for listing in the National Register of Historic Places. They are: The Virginia Murphy property; The Elmer E. Lehenbauer property; The Glen E. and Grace Lee property; The Roberts Place (Barbara and Jeff Funkenbusch, owners); The Boling property; The James W. and Ella F. Woollen property; The Frank E. and Stacey H. Johann property.

We have also reviewed the information provided and decided that we cannot determine eligibility on several structures without more information. Property 3, the Terry Hubbard Place, also appears to be a small agricultural district with few alterations. Is Property 7, the Thomas White barn, part of a complex or are the residential and other outbuildings formerly associated with it gone? For Property 8, the Allen Foreman barn, we need a floorplan to help determine the purpose of the barn. Property 9, the Harold Schwartz property appears to be a small agricultural district with a well-intact Italianate farmhouse. Any alterations that occurred appear to be historic. The topographic map indicates two barns on the site. If they are extant, we need photographs of them. Has the use of the "tall shed" been determined? It may have been a tankhouse. Also, we need to know



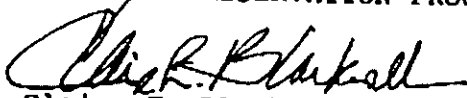
Joe Mickes
Rt. 61, Marion and Ralls Counties
June 5, 1995, p. 2

the ownership history of the house and the place of the owners in local history. Floorplans of the barns and a precise date for the Quonset hut would be helpful to determine its significance.

If you have any questions, please call Ms. Laura Sparks at 314/751-9501.

Sincerely,

HISTORIC PRESERVATION PROGRAM



Claire F. Blackwell
Director and Deputy State
Historic Preservation Officer

CFB:lls

c Mark Kross
Don Neumann
Stacy Sone

Post-it Fax Note	7671	Date	12-7-95	# of pages	1
To	Mark Kelly	From	Stacy Sone		
Co/Dept	George Butler	Co.	MHTD		
Phone #	913-492-0400	Phone #	314-526-3590		
Fax #	913-894-1878	Fax #	526-1300		

STATE OF MISSOURI
DEPARTMENT OF NAT

McCan

DIVISION OF STATE PARKS
P.O. Box 176 Jefferson City, MO 65102-0176 (314) 751-2479
FAX (314) 751-4656



November 17, 1995

Stacy Sone
Cultural Resources Division
Missouri Highway and Transportation Department
PO BOX 270
Jefferson City, MO 65102

RE: Rt. 61 to south of Route M (Hannibal Relocation), job Nos. J3P0426, J3P0427, Marion and Ralls Counties

Dear Stacy:

This letter is a follow-up to conversations we have had regarding a request for more information on several properties involved in this project. I hope this will explain what information is necessary.

Property 3, the Terry Hubbard Place, is a well-preserved example of a small early twentieth-century farmstead. Floorplans for, construction type and date of the barn and a precise date for the quonset-type hut will help determine the significance of this farm.

It is unclear from the information provided whether Property 7, the Thomas White barn, is now or was formerly part of a farm. In addition, a floorplan, function, and type and date of construction is necessary before we can make a decision on eligibility. For Property 8, a floorplan, type and date of construction is also necessary.

Property 9, the Harol Schwartz property, appears to be a small agricultural district with an intact Italianate farmhouse. The house retains a number of its details and the alterations appear to be historic. We were only provided photographs of the house and one outbuilding, however there are up to three additional outbuildings noted on the maps. It appears that no research has been performed on the previous owners of this house, since no historic name is indicated. We will need to know previous owners, their place in local or regional history and a construction date and dates of alterations, before we can make a determination of eligibility.

I hope this helps clear up any confusion. If you have any questions, please contact me at 751-9501.

Sincerely,

HISTORIC PRESERVATION PROGRAM

Laura L. Sparks
Architectural Historian
Review and Compliance



January 11, 1996

Ms. Judith Deel
Missouri Department of Natural Resources
Division of Historic Preservation
P.O. Box 176
Jefferson City, MO 65102

Re: Questionnaire to Determine Need for Cultural Resource Assessment for the following:

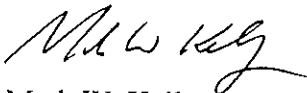
- (1) Relocation of Route 61 - Job Nos. J3P0426 and J3P0427**
- (2) Route 36 Upgrade - Job Nos. J3P0412 and J3P0411**

Dear Ms. Deel,

Please review the accompanying completed Questionnaires to Determine Need for Cultural Resource Assessment for the two jobs identified above. Copies of USGS quadrangles with the limits of the project corridors have been provided. Please note the historical structures inventory and assessment segment has been completed and cleared by personnel of your office for the Route 36 project. The historic inventory of the Route 61 project is currently being completed. If you need further information concerning these projects, please contact me at (913) 492- 0400, ext. 262.

Very truly yours,

George Butler Associates, Inc.



Mark W. Kelly
Cultural Resources



MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF HISTORIC PRESERVATION

QUESTIONNAIRE TO DETERMINE NEED FOR CULTURAL RESOURCE ASSESSMENT

P.O. BOX 176
JEFFERSON CITY,
MISSOURI 65102

Forwarding of this completed form to the Missouri Department of Natural Resources' Historic Preservation Program constitutes a request to review a proposed project/activity to determine if a cultural resource assessment will be required in accordance with the National Historic Preservation Act, 36 CFR Part 800, and other relative federal legislation. THIS ASSESSMENT, INDEPENDENT OF THE A-95 REVIEW PROCESS, IS REQUIRED FOR ALL CONSTRUCTION PROJECTS THAT WILL BE FUNDED, ASSISTED, OR LICENSED BY A FEDERAL AGENCY AND IT MUST BE COMPLETED PRIOR TO INITIATING ANY PROJECT.

I. APPLICANT <u>Mr. Joe Mickes</u>		COUNTY OF PROJECT <u>MAHON / RALLS</u>	
APPLICANT'S ADDRESS <u>Missouri Highway and Transportation Dept.</u>		CITY <u>Jefferson City, MO</u>	ZIP CODE <u>65102</u>
CONTACT PERSON <u>Mr. Mark W. Kelly</u>		TELEPHONE <u>(913) 492-0400</u>	
CONTACT PERSON'S ADDRESS, IF DIFFERENT FROM APPLICANT'S <u>8207 MELROSE DRIVE</u>		CITY <u>Lenexa, KS</u>	ZIP CODE <u>66214</u>
IF APPLICANT IS NOT A FEDERAL AGENCY, TO WHICH FEDERAL AGENCY IS APPLICANT APPLYING <u>Federal Highway Administration</u>			
FEDERAL PROGRAM			
CIRCLE TYPE OF ASSISTANCE SOUGHT GRANT LOAN <u>OTHER</u>			
SIGNATURE OF APPLICANT OR CONTACT PERSON REQUESTING THIS ASSESSMENT <u>Mark W. Kelly</u>			DATE <u>1-9-95</u>

II. 1. Briefly describe this project. A corridor alignment has been selected to relocate U.S. 61 "around" Hannibal, Missouri. The new highway will consist of 400' ROWs and interchanges as shown on the accompanying map.

If more than one project/activity is involved, complete separate assessment for each project/activity.

2. Has the identical project been previously submitted for cultural resource assessment? (If YES, enclose copy of State Historic Preservation Program's comments/response and disregard remaining questions.) ☐ YES ☒ NO

3. Project location

a. Attach a USGS 7.5 min. topographic map (15 min. if 7.5 min. not available) and project map indicating the precise location of the project and total acreage involved. **THIS MUST BE PROVIDED.** If more than one project/activity is involved, provide one map for each project/activity. Project location must be clearly indicated.

b. Approximately how many acres are in the project area? 750 acres

c. Give legal description of project area (Township, Range, Section, 1/4 Section, etc.)

Parts of sections: 12, 13, 24, 25, + 36 T57N, R6W; 31, 18, 19, 30, + 31 T57N, R5W; 5, 6, 8, 9, 14, 15, 16, 23, + 24 T56N, R5W.

If inside city limits, give street address and city involved

4. To your knowledge, has a cultural resources survey been conducted of the project area? If YES, attach survey report or reference and related correspondence. ☒ YES ☐ NO
A historic structures inventory is presently being conducted.

5. To your knowledge, will the project involve building(s) or structure(s) listed on the National Register of Historic Places or included in a National Register District? If YES, provide property or district name(s), address(es) and related documentation. ☐ YES ☒ NO

FOR MO. HPP USE

☐ SN

☐ PD

☐ NE

☐ PE

☐ LP

☐ HP

6. To your knowledge, will the project involve building(s) or structure(s) listed on a local historic register or included in a local historic district? If YES, provide property or district name(s), address(es) and related documentation.

☐ YES ☒ NO

III. 7. a. Will the project involve an addition to, destruction of, alteration of, or renovation of any structure? If NO, proceed to item 8.

☒ YES ☐ NO

b. Was the affected structure built before World War II? If NO, provide photograph of structure(s) and proceed to item 8. If YES, complete Missouri Historic Preservation Program Architectural/Historic Inventory Survey Form(s) (available from State Historic Preservation Program) and return with this form.

☒ YES ☐ NO

c. Who owns the structure? _____

d. What was the approximate date of construction of structures to be affected? _____

e. Attach photographs of front and rear elevations; another photograph(s) should indicate the location of any proposed addition/alteration.

f. Have plans and specifications for the renovation, alteration, or addition been completed? If YES, attach plans (plans for a new structure to replace a demolished one should not be attached.)

☐ YES ☐ NO

8. a. Will construction take place adjacent to any structure that is approximately fifty years old or older? If NO, proceed to item 9.

☐ YES ☐ NO

b. Give approximate construction date of structure(s) _____

c. Attach photographs of structure(s) and indicate its location in relation to the project on the project map.

*Historic structures
are being
addressed
separately.
See L. Sparks
related
correspondence*

IV. 9. Has the ground at the project been previously cultivated or farmed? If YES, briefly describe type and indicate on topographic and project map(s). corn/soybeans/

☒ YES ☐ NO

pasture

10. Has the ground at the project location been previously developed, graded, or disturbed (for other than agricultural purposes)? If YES, describe disturbed/developed portion (graded, etc.) and indicate on topographic and project map(s). highway/road/

☒ YES ☐ NO

private drive construction

11. a. Will this project necessitate the acquisition of fill material? If NO, proceed to item 12.

☐ YES ☒ NO

b. Approximately how many cubic yards of material will be acquired?

c. Has the site from which material will be acquired been selected? If NO, proceed to item 12.

☐ YES ☐ NO

d. Indicate borrow area(s) on U.S.G.S. topographic and project map and GIVE APPROXIMATE ACREAGE of each borrow site. _____

12. If necessary, elaborate on the above questions and/or include any additional information that you think would be helpful in the review of this project. Use additional sheets if necessary.

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Mel Carnahan, Governor • David A. Shott, Director

DIVISION OF STATE PARKS

P.O. Box 176 Jefferson City, 65102-0176 (314) 751-2479

FAX (314) 751-8650

18 January 1996

Mark W. Kelly
George Butler Associates, Inc.
8207 Melrose Drive
Lenexa, Kansas 66214

Re: Route 61 Relocation (FHWA) MHTD Job No. J3P0426 and J3P0427, Marion and Ralls Counties,
Missouri

Dear Mr. Kelly:

Staff of the Historic Preservation Program, Missouri Department of Natural Resources have reviewed the information provided concerning the above referenced project. Due to the moderate to high potential for the occurrence of archaeological resources, the determination has been made that an archaeological assessment should be conducted prior to the initiation of project-related construction activities pursuant to the National Historic Preservation Act (P.L. 89-665, as amended), the Advisory Council on Historic Preservation's regulation 36CFR Part 800, and Executive Order 11593 of 13 May 1971, which require identification and evaluation of such cultural resources.

We would appreciate two (2) copies of the cultural resource assessment when it is finished so we may complete the review and comment process.

If you have any questions, please write or call Judith Deel at 573/751-7862.

Sincerely,

HISTORIC PRESERVATION PROGRAM



Claire F. Blackwell, Director and
Deputy State Historic Preservation Officer

c Don Neumann
Mark Kross
Bob Reeder

RECEIVED

JAN 23 1996

George Butler Associates, Inc.

CULTURAL RESOURCE SURVEY PROJECT SUMMARY SHEET

Missouri Department of Natural Resources Historic Preservation Program

Report Title: A Phase I Cultural Resources Investigation of the Proposed U.S. 61 Highway Relocation Corridor Project

Counties: Ralls and Marion Author(s): Mark W. Kelly

Institutional Affiliation of Author(s): MAS Member; Non-educational Institution

Federal Agency Involved/Client: Federal Highway Administration MHTD

Date of Report: January 12, 1996 Date of Field Invest.: December 1995

Legal Description of Survey Area/Unit: Parts of sections: 12, 13, 24, 25, 36 T57N, R6W; 7, 18, 19, 30, 31 T57N, R5W; 5, 6, 8, 9, 14, 15, 16, 23, 24 T56N, R5W Total Acres Surveyed: Approximately 550

Historic Preservation Program Drainage: 1 Upper Mississippi; North River; 2 Salt, Salt 1

Elevation of Survey Area/Unit: Max. 760 msl Min. 570 msl Avg. 665 msl

Terrain: dissected uplands

Vegetation: originally: oak/hickory, Presently: soybean/corn rotation

Visibility (as % of survey area/unit): soybean fields-25%; corn-35-50%; pasture-0-15%; trees-35-50%

Type: _____

Nature of Soil (as % of survey area/unit): Aeolian 98+ % Colluvial _____ % Alluvial _____ % Other 2 % or less

Raw Lithic Material Available: Type _____ Source _____ residuum

Legal Location: _____

Nearest Permanent Water Source: Spring _____ Stream (s)X River _____ Lake _____ Other _____

Distance see attached map Name Bear Creek

Closest Tributary: Distance see attached map Name Little Bear Creek Order _____

Number of Sites in Survey Area/Unit:

Prev. Recorded	<u>7</u> Prehistoric	Rec. by Pres. Invest.	<u>2</u> Prehistoric
	<u>3</u> Historic Archaeo.		_____ Historic Archaeo.
	_____ Historic		<u>1</u> Historic / Pre Mixed
	_____ Architectural		_____ Architectural
	_____ None		_____ None

Type of Investigations (Mark all applicable):

<input checked="" type="checkbox"/> Literature Search	_____ Testing (Phase II)
_____ Reconnaissance Survey	_____ Excavation (mitigation)
<input checked="" type="checkbox"/> Intensive Survey - All resources	_____ Research only
_____ Intensive Survey - Archaeological only	_____ Other Fieldwork _____
_____ Intensive Survey - Architect.-Historic only	_____ Other _____

List all sites located within survey area/unit or discussed in report (attach continuation sheet if necessary).

Previously recorded sites:	New sites:
23MA177 23MA162 23RA797 23MA176	23MA202
23MA161 23RA128 23MA164 23MA83	23MA203
23MA163 23MA38	23RA824

Types of Site(s) Light density prehistoric lithic scatters; historic debris

Range of Cultural Affiliation(s) of Site(s) All unknown except 23RA128 - "Archaic - Hannibal Complex type site"

Direct Impact(s) to Site(s): Total Destruction Disruption
 X Partial Destruction X No Impact to previously recorded sites

Nature of Direct Impact(s) Highway construction will destroy 23MA202, 23MA203, 23RA824

Nature of Indirect/Long-Range Impact to Site(s):

Significance (Mark all applicable):

- High (National or regional research applicable)
 Moderate (Local or state research applicable)
 X Low
 1 Disturbed
 2 Lacks context
 3 Redundant data
 4 Future utility uncertain
 Insufficient Information

Future Work Recommendations (Mark all applicable):

- X No further work needed Nominate to Register
 Preserve/avoid Restrict access
 Test Other
 Excavate
 Monitor construction
 (must justify by high potential
 of buried sites)

Comments:

A U.S.G.S. 7.5 min. topographic map indicating all areas actually surveyed and locations of all sites **must** be attached.

Return to Michael Weichman, Chief, Review & Compliance, Historic Preservation Program, Missouri Department of Natural Resources, P.O. Box 176, Jefferson City, Missouri 65102.

Mary Haggerty

Missouri Highway and Transportation Department

CAPITOL AVE. AT JEFFERSON ST., P.O. Box 270, JEFFERSON CITY, MO 65102 (314) 751-2551 Fax (314) 751-6555

February 20, 1996



Mr. David Shorr
Director
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176

Dear Mr. Shorr:

Subject: Plan Scoping
Route 36, Marion and Ralls Counties
Ralls County to Route 24
Job Nos. J3P0426 and J3P0427
Review of Phase I Cultural Resources Survey Report

The Missouri Highway and Transportation Department (MHTD) cultural resources staff has completed the review of the report entitled Phase I Cultural Resources Investigations of the Proposed U.S. 61 Highway Relocation Corridor Project, Ralls and Marion Counties, Missouri prepared by Mark W. Kelly of George Butler Associates. Based on this report, MHTD believes that the consultant has conducted an adequate cultural resources survey. MHTD also agrees with the description of resources presented, their evaluation of significance, and the report's recommendations that no further cultural resources investigations are required for this project.

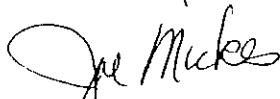
MHTD concurs with the report's findings and recommendations; however, MHTD considers this report to be a draft document and we are requesting the author to make some stylistic changes to the final version of this report.

We request that the staff of the Historic Preservation Program (HPP) review this report and concur with the conclusion that this project will not impact any

Mr. David Shorr
Page 2
February 20, 1996

significant cultural resources. Once all requested revisions are made by the author, MHTD will provide two copies of the final report to HPP.

Sincerely,



Joe Mickes
Chief Engineer

jm/br/bw-plan scoping

Enclosure

Copies: Mr. Mark Kross-plan scoping
 Mr. Mike Meinkoth-plan scoping
 Mr. Mike Stelzleni-de
 Mr. Dick Jones-3
 Ms. Mary Hagerty-Woodward-Clyde

Carol Kletterman

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Missouri National Government • David A. Shaw, Director

DIVISION OF STATE PARKS

P.O. Box 176 Jefferson City, 65102-0176 (573) 751-2479

FAX (573) 751-8656

12 March 1996

mak

Joe Mickes, Chief Engineer
Missouri Highway & Transportation
Department
P.O. Box 270
Jefferson City, Missouri 65102

Re: Route ⁶¹36, Ralls County to Route 24 (FHWA) MHTD Job Nos. J3P0426 & J3P0427, Ralls and Marion Counties, Missouri

Dear Mr. Mickes:

Staff of the Historic Preservation Program, Missouri Department of Natural Resources have reviewed the January 1996 draft report entitled "Phase I Cultural Resources Investigations of the Proposed U.S. 61 Highway Relocation Corridor Project, Ralls and Marion Counties, Missouri" by Mark W. Kelly of George Butler Associates. We concur with the Missouri Highway and Transportation Department recommendation that an adequate cultural resources survey has been completed for the project area. We agree that minimum documentation has been provided to indicate that archaeological sites 23MA202, 23MA203 and 23RA824 are not eligible for inclusion in the National Register of Historic Places.

As this is a draft document, staff has compiled the following comments on the presentation and organization of information in the report for your consideration:

- 1) In the Abstract, the sentence pertaining to cultural materials encountered during construction should direct the contractor to contact the appropriate Missouri Highway and Transportation Department staff, and the Historic Preservation Program, Department of Natural Resources, to report the findings.
- 2) It assists review greatly to incorporate maps into the report behind the relevant reference in the text, rather than bundling all of the graphics in the back of the report. The quality of the copies could be improved, such as color xerox (if available) of topographic maps. The information presented on Figures 2, 9 and 11 would be more useful to the reviewer if presented on the same topo; the project corridor boundaries should be indicated on the topo.
- 3) Archaeological sites 23RA128, 23RA797, 23MA38, 23MA83, 23MA161, 23MA162, 23MA163, 23MA164, 23MA176 and 23MA177 are described as "in the vicinity" of the project. These sites should also be included with the other pertinent information on the topographic maps.
- 4) Results: Field Investigations, should either repeat the field methodology from the front of the report, or at least reference the appropriate pages.



Joe Mickes
12 March 1996
Page Two

5) Site descriptions should specifically describe how many shovel tests, depth, soil profile, degree or extent of disturbance and other relevant information. The reviewer should not be left to infer exactly how the site was investigated and the information the assessment was based on.

If you have any questions, please write or call Judith Deel at 573/751-7862.

Sincerely,

HISTORIC PRESERVATION PROGRAM



Claire F. Blackwell, Director and
Deputy State Historic Preservation Officer

c Don Neumann

~~Mark Kross~~

Bob Reeder

Mark Kelly

