ECONOMIC, TRANSPORTATION, AND ENVIRONMENTAL IMPACTS ANALYSES MEMORANDUM

STATE PROJECT NO. 700-37-0015
FEDERAL AID PROJECT NO. NH-5002(031)

I-20 OUACHITA LOOP
MAJOR INVESTMENT STUDY
OUACHITA PARISH

MAY, 1999

TABLE OF CONTENTS

PAGE

TABLES

PAGE

FIGURES

FOLLOWS PAGE

DRAFT

OUACHITA LOOP MAJOR INVESTMENT STUDY

ECONOMIC, TRANSPORTATION, AND ENVIRONMENTAL IMPACTS ANALYSES MEMORANDUM

1.0 Introduction, Summary and Evaluation Matrix

1.1 Introduction

Based on input from state and federal agencies, the general public, and the official Steering Committee for this project, alternative locations have been developed and refined. Based on the results of the traffic modeling, the loop was found to require a two-lane roadway. For this major investment study, two of the potential alternative locations were proposed for further comparative studies as to their environmental, economic, and transportation impacts. The Louisiana Department of Transportation and Development in conjunction with the Federal Highway Administration - Louisiana Division requested and received written concurrence for the alternative roadway locations to be studied from the Corps of Engineers, Environmental Protection Agency, and the US Fish and Wildlife Service. This selection of locations for further analyses in the Major Investment Study does not preclude the introduction of other alternative locations in future studies.

Figure 1 is a map that illustrates the potential alternative locations for the Ouachita Loop. The following are descriptions of each alternative.

Alternative 1 - This alternative location was placed to take maximum advantage of existing roads. The lettered segments that form this alternative location are **ABDFJLMOPRVW**. Lettered segments that utilize existing roads are: **A**(Millhaven Road/State Highway 594 - 100%), **B**(Love Road/State Highway 594 - approximately 50%), **F**(Finks Hideaway Road - approximately 33%),

M(Arkansas Road/Cheniere-Drew Road - approximately 50%), **O**(Cheniere-Drew Road - approximately 86%), **P**(Caples Road - approximately 15%), **R**(Caples Road - approximately 48%), and **V**(Buckhorn Bend Loop Road/Richwood Road No. 2 - approximately 53%).

Alternative 2 - This alternative location has been placed to take minimum advantage of existing roads. The lettered segments that form this alternative location are **ACDEHKLNOQSUW**. Lettered segments that utilize existing roads are: **A**(Millhaven Road/State Highway 594 - 100%), and **O**(Cheniere-Drew Road - approximately 86%).

1.2 Summary and Evaluation Matrix

There were three items that separated the two alternatives by their substantial differences in impacts. Total cost was lowest for Alternative 1 at $ 243,315,479 while Alternative 2 had the highest total cost of $ 273,786,055. Relocations of mobile homes caused by Alternative 1 were higher than relocations of mobile homes caused by Alternative 2 - 58 versus 33. Wetlands impacted by Alternative 1 at 84 acres were lower than the 115 acres of wetlands impacted by Alternaive 2. The following Table 1.0 is an evaluation matrix that compares the impacts on nine indicators by the "no build" Alternative and the two "build" alternatives - Alternative 1 and Alternative 2.

TABLE 1.0
EVALUATION MATRIX

INDICATORS	ALTERNATIVES		
	NO BUILD	ALTERNATIVE 1	ALTERNATIVE 2
TOTAL COST	NA	$243,315,479	$273,786,055
TRAFFIC SERVICE	Increased Congestion	Reduces Congestion	Reduces Congestion
ECONOMIC	No Impact	Positive Impact	Positive Impact
RELOCATIONS	No Impact	68 Houses 58 Mobile Homes 2 Businesses 2 Apartments	68 Houses 33 Mobile Homes 2 Businesses 2 Apartments
WETLANDS	No Impact	84 Acres	115 Acres
ENDANGERED & THREATENED SPECIES	No Impact	Unlikely Jeopardy	Unlikely Jeopardy
4(f) / 6(f) LANDS	No Impact	No Impact	No Impact
ARCHAEOLOGICAL/ HISTORICAL RESOURCES	No Impact	Potential Impact	Potential Impact
HAZARDOUS MATERIALS	No Impact	Potential Impact 1 site	Potential Impact 1 site

2.0 Economic Analysis

2.1 Estimated Project Costs

The estimated project costs by Alternative are presented in Table 2.1. Total project cost for Alternative 1 was estimated to be $243,315,478.52. Total project cost for Alternative 2 was estimated to be $273,786,054.90. The initial cost item shown in Table 2.1 for each Alternative is for the Environmental Impact Statement. The cost is further divided into construction cost, right-of-way cost, engineering cost, mitigation cost, and operation and maintenance costs to the year 2025. Each of those costs are subdivided into the costs by segments of independent utility.

Assumptions used in making these costs estimates included:

- New Alignment = $1,700,000/mile
- Reconstruction Along Existing Alignment = $1,500,000/mile
- Widening Along Existing Alignment = $1,000,000/mile
- Bridge Structure = $70.00/square foot (assumed girder bridges)
- River Crossing Bridge Structure = $110.00/square foot
- Two-lane roadway with 12-foot lanes and 10-foot paved shoulders
- Bridges were assumed to have a width of 46 feet 10 inches with a clear roadway width of 44 feet 0 inches
- Houses = $100,000 each
- Mobile Homes = $5,000 each
- Apartments = $50,000 each
- Businesses = $150,000 each
- Land - NE quadrant South of US 80 = $20,000/acre
- Land - NE quadrant North of US 80 = $35,000/acre
- Land - NW quadrant = $25,000/acre
- Land - SW quadrant = $10,000/acre
- Land - SE quadrant = $10,000/acre

- Utility Relocation Along Existing Alignment = $365,000/mile
- Utility Relocation Along New Alignment = $100,000/mile
- 60 feet of existing right-of-way along Parish routes
- 80 feet of existing right-of-way along State routes
- 120 feet of right-of-way required for the proposed loop

The unit costs for new roadway construction, reconstruction of existing roadways, and widening of existing roadways were based on average estimated construction costs of similar projects recently completed. The estimated unit costs for bridge structures were obtained from LDOTD's bridge design section. The estimated unit costs for acquiring right-of-way and relocating utilities were obtained from the local LDOTD real estate and utilities sections. The costs for purchasing a home, relocating a mobile home, etc. were based on estimates representative of the overall study area. The 120 feet of right-of-way required for the proposed loop accounts for clear zone requirements that were not in effect when the existing state highways were constructed.

TABLE 2.1 - ESTIMATED PROJECT COSTS

	Alternative 1	Alternative 2
EIS Cost	$1,500,000.00	$1,500,000.00
Construction Cost		
I-20 to US 165 North	$21,708,193.84	$24,865,757.04
US 165 North to White's Ferry Road	$76,378,851.43	$79,840,797.80
White's Ferry Road to I-20	$11,156,350.00	$11,528,000.00
I-20 to LA 34	$19,851,117.54	$26,459,359.26
LA 34 to US 165 South	$28,399,547.76	$36,303,597.89
US 165 South to I-20	$14,170,558.77	$14,990,958.77
sub-total	$171,664,619.34	$193,988,470.76
Right-of-way Cost		
I-20 to US 165 North	$7,521,762.10	$8,170,495.27
US 165 North to White's Ferry Road	$4,388,901.71	$5,444,628.70
White's Ferry Road to I-20	$6,935,852.97	$7,334,681.74
I-20 to LA 34	$5,307,070.36	$5,801,700.98
LA 34 to US 165 South	$2,802,027.68	$3,217,496.88
US 165 South to I-20	$3,601,320.49	$4,042,586.42
sub-total	$30,556,935.31	$34,011,589.99
Engineering Cost		
I-20 to US 165 North	$4,341,638.77	$4,973,151.41
US 165 North to White's Ferry Road	$15,275,770.29	$15,968,159.56
White's Ferry Road to I-20	$2,231,270.00	$2,305,600.00
I-20 to LA 34	$3,970,223.51	$5,291,871.85
LA 34 to US 165 South	$5,679,909.55	$7,260,719.58
US 165 South to I-20	$2,834,111.75	$2,998,191.75
sub-total	$34,332,923.87	$38,797,694.15
Mitigation Cost		
I-20 to US 165 North	$24,000.00	$26,700.00
US 165 North to White's Ferry Road	$511,000.00	$570,300.00
White's Ferry Road to I-20	$0.00	$0.00
I-20 to LA 34	$15,000.00	$95,300.00
LA 34 to US 165 South	$166,500.00	$215,200.00
US 165 South to I-20	$43,500.00	$129,500.00
sub-total	$760,000.00	$1,037,000.00
Operation & Maintenance Costs to 2025		
I-20 to US 165 North	$970,200.00	$970,200.00
US 165 North to White's Ferry Road	$655,200.00	$680,400.00
White's Ferry Road to I-20	$808,500.00	$766,500.00
I-20 to LA 34	$954,800.00	$870,100.00
LA 34 to US 165 South	$482,300.00	$500,500.00
US 165 South to I-20	$630,000.00	$663,600.00
sub-total	$4,501,000.00	$4,451,300.00
TOTAL PROJECT COST	**$243,315,478.52**	**$273,786,054.90**

2.1 Economic Modeling Results

The Regional Economic Models, Inc. (REMI) Model was used to determine the economic impacts of the Ouachita Loop. The REMI Model is designed with the objective of improving the quality of research-based decision making in the public and private sectors. It is calibrated to many sub-national areas for forecasting and policy analysis by government agencies, consulting firms, nonprofit institutions, universities and public utilities throughout the United States. Simulations with the model are used to estimate the economic and demographic effects of economic development programs, transportation policies, infrastructure investments, environmental improvements, energy and natural resource conservation programs, state and local tax changes, and other policy initiatives.

The structure of the model incorporates inter-industry transactions and endogenous final demand feedbacks. In addition, the model includes substitution among factors of production in response to changes in relative factor costs, migration in response to changes in expected income, wage responses to changes in labor market conditions, and changes in the share of local and export markets in response to changes in regional profitability and production costs. The essence of the REMI model is the extent that theoretical structural restrictions are used instead of individual econometric estimates based on single time-series observations for each region. The explicit structure of the model facilitates the use of variables that represent a wide range of options and the tracking of the effects on all the variables in the model.

The direct effects of transportation infrastructure investments fall into various categories. The key categories are as follows:

1. construction and construction financing effects;
2. operating effects;
3. environmental effects;

4. tourism effects;
5. cost savings for businesses; and
6. cost savings (including safety improvements) for consumers and commuters.

The basic information input into the model was the estimated project costs anticipated over the period from 1999 through 2025. These costs are shown in Tables 2.2.1 and 2.2.2. In the year 2025, it is anticipated that the study area driving public would save 824 hours of travel time per day, 20 percent or 165 hours would be truck traffic and 80 percent or 659 hours would be automobile traffic. Travel time savings would begin in 2006 and increase each year as traffic volumes increase.

TABLE 2.2.1

PROJECT COSTS OVER TIME 1999-2025
ALTERNATIVE 1

	EIS	CONSTRUCTION	ENGINEERING	RIGHT-OF-WAY	MITIGATION	OPERATION & MAINTENANCE	TOTAL
1999	$500,000.00						$500,000.00
2000	$500,000.00						$500,000.00
2001	$500,000.00						$500,000.00
2002			$7,637,885.15				$7,637,885.15
2003			$8,195,702.65				$8,195,702.65
2004			$1,643,227.19	$4,388,901.71			$6,032,128.90
2005		$38,189,425.72	$3,063,204.58	$3,467,926.49			$44,720,556.79
2006		$40,978,513.22	$3,771,732.52	$3,760,881.05			$48,511,126.79
2007		$8,216,135.96	$4,206,470.90	$4,868,940.33	$511,000.00		$17,802,547.19
2008		$15,316,022.90	$3,121,061.21	$5,561,541.30		$36,400.00	$24,035,025.41
2009		$18,858,662.59	$1,701,083.82	$4,054,549.02	$24,000.00	$36,400.00	$24,674,695.43
2010		$21,032,354.47	$992,555.85	$1,800,660.25	$166,500.00	$36,400.00	$24,028,470.57
2011		$15,605,306.01		$2,653,535.16	$43,500.00	$90,300.00	$18,392,641.17
2012		$8,505,419.07			$15,000.00	$159,600.00	$8,680,019.07
2013		$4,962,779.40				$196,700.00	$5,159,479.40
2014						$249,200.00	$249,200.00
2015						$336,000.00	$336,000.00
2016						$336,000.00	$336,000.00
2017						$336,000.00	$336,000.00
2018						$336,000.00	$336,000.00
2019						$336,000.00	$336,000.00
2020						$336,000.00	$336,000.00
2021						$336,000.00	$336,000.00
2022						$336,000.00	$336,000.00
2023						$336,000.00	$336,000.00
2024						$336,000.00	$336,000.00
2025						$336,000.00	$336,000.00
TOTAL	$1,500,000	$171,664,619.34	$34,332,923.87	$30,556,935.31	$760,000.00	$4,501,000.00	$243,315,478.52

Note: Values shown in table are present worth dollars.

TABLE 2.2.2

PROJECT COSTS OVER TIME 1999-2025
ALTERNATIVE 2

	EIS	CONSTRUCTION	ENGINEERING	RIGHT-OF-WAY	MITIGATION	OPERATION & MAINTENANCE	TOTAL
1999	$500,000.00						$500,000.00
2000	$500,000.00						$500,000.00
2001	$500,000.00						$500,000.00
2002			$7,984,079.78				$7,984,079.78
2003			$8,560,479.78				$8,560,479.78
2004			$1,819,687.85	$5,444,628.70			$7,264,316.55
2005		$39,920,398.90	$3,634,867.74	$3,667,340.87			$47,222,607.51
2006		$42,802,398.90	$4,384,415.68	$4,085,247.64			$51,272,062.22
2007		$9,098,439.26	$5,130,983.64	$5,276,089.31	$570,300.00		$20,075,812.21
2008		$18,174,338.73	$3,887,695.79	$6,106,540.85		$37,800.00	$28,206,375.37
2009		$21,922,078.42	$2,072,515.90	$4,509,598.93	$26,700.00	$37,800.00	$28,568,693.25
2010		$25,654,918.23	$1,322,967.99	$2,021,293.21	$215,200.00	$37,800.00	$29,252,179.43
2011		$19,438,478.97		$2,900,850.48	$129,500.00	$88,900.00	$22,557,729.45
2012		$10,362,579.50			$95,300.00	$158,200.00	$10,616,079.50
2013		$6,614,839.85				$196,700.00	$6,811,539.85
2014						$252,000.00	$252,000.00
2015						$331,100.00	$331,100.00
2016						$331,100.00	$331,100.00
2017						$331,100.00	$331,100.00
2018						$331,100.00	$331,100.00
2019						$331,100.00	$331,100.00
2020						$331,100.00	$331,100.00
2021						$331,100.00	$331,100.00
2022						$331,100.00	$331,100.00
2023						$331,100.00	$331,100.00
2024						$331,100.00	$331,100.00
2025						$331,100.00	$331,100.00
TOTAL	$1,500,000	$193,988,470.76	$38,797,694.15	$34,011,589.99	$1,037,000.00	$4,451,300.00	$273,786,054.90

Note: Values shown in table are present worth dollars.

Data for the year 1995 is presented to serve as a base line for the following discussion. In that year, the total employment in Ouachita Parish was 78,429 persons, of which 64,739 persons were private, non-farm employees. Of this, 23,760 of the jobs were directly dependent upon export of product to the rest of the United States and the world, and 5,088 were dependent upon export of

products to the six surrounding parishes – Caldwell, Jackson, Lincoln, Union, Morehouse, and Richland. The remaining jobs were created by demand in the following areas: 21,458 in local consumption demand, 12,138 in the purchase of inputs by other local firms (called intermediate demand), 689 in government purchases from the private sector, and 1,605 in local investment activity.

Construction of the proposed Ouachita Loop is expected to be a positive impact to the local economy. Most of the economic benefits, in terms of population growth and job growth, would be confined to Ouachita Parish. However, some benefits would be felt in the six surrounding parishes. The estimated costs of the two build alternatives are so similar that the differences in anticipated impacts are insignificant. The proposed project is expected to create 489 private, non-farm jobs in 2010. Of these, 161 would be in services, 149 would be in retail trade, and 140 would be in contract construction. By the year 2025, the proposed project would add 481 private, non-farm jobs to the Ouachita Parish economy, including 224 service jobs and 186 retail trade jobs. The Ouachita Loop would increase disposable personal income in Ouachita Parish by $19,820,000 in 2010 and $33,600,000 in 2025.

2.2 Potential Funding Sources

The total capital cost of the Ouachita Loop ranges from an estimated $243,315,479 to $273,786,055. The *1996 Monroe, Louisiana Metropolitan Area Transportation Plan* included the Ouachita Loop as an unfunded need.

Potential sources that can be considered for funding this project include:

- Existing State of Louisiana Transportation Program funds.
- Existing Federal Transportation Program funds.
- Transportation facility user fees, i.e. tolls.
- Existing Local sources.
- Potential new sources at the Federal, State, and local levels.

- Privitazation of Ouachita River bridge crossings.

3.0 Transportation Analysis

3.1 TranPlan Model Results

In order to evaluate the potential impacts of the Ouachita Loop, the effect the Loop would have on traffic patterns and transportation network usage in the future are important to understand. Project consultants have utilized computer transportation modeling techniques to evaluate the area's transportation network in the year 2025 both with and without the Ouachita Loop. The *1996 Monroe, Louisiana Metropolitan Area Transportation Plan Update* extends to the year 2020 so the existing model was extended to 2025 to match the designated design year for the Ouachita Loop of 2025. The TranPlan (**Tran**sportation **Plan**ning) model is a set of integrated programs for the transportation planning process. It encompasses the four-step travel demand model of trip generation, trip distribution, mode choice, and trip assignment for highway systems.

The Monroe/West Monroe metropolitan area was divided into six major planning district areas (the City of Monroe, the City of West Monroe, and four quadrants). Within each of these planning district areas, U.S. Census data were used to create traffic zones and to serve as a basis for analysis. Five principal demographic factors were examined within each area -- total population, total households, total retail jobs, total jobs, and school attendance (kindergarten through college).

Six scenarios for the year 2025 were examined :

1) the existing transportation network plus committed projects (henceforth referred to as E+C),
2) the existing transportation network plus committed projects and the Ouachita Loop (henceforth referred to as E+C+L),
3) Stage 2 that contains the existing transportation network plus committed projects and the remainder of the LA DOTD ten year construction program,

4) Stage 2 that contains the existing transportation network plus committed projects, the remainder of the LA DOTD ten year construction program, and the Ouachita Loop,
5) Stage 3 that contains the existing transportation network plus committed projects, the remainder of the LA DOTD ten year construction program, and the adopted long-range financially constrained plan for the study area, and
6) Stage 3 that contains the existing transportation network plus committed projects, the remainder of the LA DOTD ten year construction program, the adopted long-range financially constrained plan for the study area, and the Ouachita Loop.

Table 3.1 displays the network characteristics per day for each of the six networks that were examined for the year 2025. Three of the network characteristics (total trips, total vehicle miles, and average speed) showed only minor differences for the six networks. Total vehicle hours showed that under Stage 3 the Ouachita Loop in 2025 would result in a long term saving for the total population of 824 hours per day. This translates to approximately 2 hours saved per year per person in the year 2025.

Table 3.1.1
Network Characteristics per Day

Network Description	Total Trips	Total Vehicle Miles	Total Vehicle Hours	Average Speed
Existing + Committed	604,720	3,216,046	94,542	34.02
Existing + Committed with Loop	604,724	3,292,084	94,540	34.82
Stage 2	604,727	3,209,393	92,839	34.57
Stage 2 with Loop	604,730	3,279,446	93,777	34.97
Stage 3	604,727	3,203,598	91,814	34.89
Stage 3 with Loop	604,728	3,272,979	90,990	35.97

Traffic volumes at several locations were also examined as part of the modeling process (see Table 3.2). For the long term, two of the three existing Ouachita River crossings (Interstate 20 and US 80[Louisville]) were predicted to experience decreased traffic volumes with the addition of the Ouachita Loop. With the Ouachita Loop in place under Stage 3, I-20 at the Ouachita River showed a decrease of 11,603 vehicles per day, and the Louisville crossing showed a decrease of 3,268 vehicles per day. The DeSiard crossing showed an insignificant increase of 34 vehicles per day with the Loop in place. The model showed that a new bridge at the northern section of the Loop would carry approximately 11,265 vehicles per day, and a new bridge on the southern portion of the Loop would carry approximately 7,352 vehicles per day. The Loop was shown to relieve portions of US 165 north of I-20. The US 165/Fink's Hideaway intersection and US 165 at the crossing of the Kansas City Southern Railroad were projected to have lower traffic volumes of 5,685 and 6,555 vehicles per day with the addition of the Ouachita Loop. US 165 at Richwood showed an increase of 3,897 vehicles per day with the Loop. LA 34 (Jonesboro Road) showed a decrease in traffic volume of 1,914 vehicles per day with the Ouachita Loop.

Generalized capacities in vehicles per day were assigned to each roadway in the network model. These capacities represent an assumed maximum number of vehicles that are accommodated by the roadway on a daily basis. Dividing the total volume projected for the roadway by the capacity yields the volume/capacity (v/c) ratio, which is a general indication of the level of service provided by the roadway facility. In the modeling process, v/c ratios of greater than 1.0 are used to indicate which roadways provide a poor level of service and are deficient in supplying the projected transportation demand.

The v/c ratios shown for Stage 3 in Table 3.1.2 indicate that the Loop would reduce the projected volume/capacity ratios at all locations except at the DeSiard crossing of the river and on US 165 at Richwood.

These projections indicated that the Ouachita Loop should fulfill one of the purposes set forth in the concurred upon Purpose and Need that was: *"Reduces congestion on Louisville Avenue, DeSiard Street, US 165, and Jonesboro Road and in so doing moves people and goods more efficiently across the Ouachita River and within Ouachita Parish*."

Table 3.1.2
Major Arterial Volumes (vehicles/day), Capacities vehicles/day), and Volume/Capacity (V/C) Ratios

Network Description		I-20 @ River	US80 @ River	DeSiard @ River	Loop @ River (N)	Loop @ River (S)	US165 @ Richwood	US165 @ KCS R.R.	US165 @ Finks	LA 34
Existing + Committed	volume	66,352	31,336	7,054	-	-	10,178	39,218	42,017	12,274
	capacity	102,000	23,000	11,000	-	-	27,000	27,000	27,000	11,000
	v/c ratio	0.65	1.36	0.64	-	-	0.38	1.45	1.56	1.12
Existing + Committed with Loop	volume	57,195	26,428	5,720	12,259	7,059	13,365	39,759	38,492	10,296
	capacity	102,000	23,000	11,000	15,000	15,000	27,000	27,000	27,000	11,000
	v/c ratio	0.56	1.15	0.52	0.82	0.47	0.50	1.47	1.43	0.94
Stage 2	volume	66,288	32,554	5,844	-	-	10,593	38,732	37,448	12,274
	capacity	102,000	25,300	15,000	-	-	27,000	29,700	29,700	11,000
	v/c ratio	0.65	1.29	0.39	-	-	0.39	1.30	1.26	1.12
Stage 2 with Loop	volume	58,079	27,069	4,614	11,764	6,963	14,295	46,217	36,522	10,669
	capacity	102,000	25,300	15,000	15,000	15,000	27,000	29,700	29,700	11,000
	v/c ratio	0.57	1.07	0.31	0.78	0.46	0.53	1.56	1.23	0.97
Stage 3	volume	70,177	30,292	4,153	-	-	11,487	59,855	46,150	12,274
	capacity	102,000	25,300	15,000	-	-	27,000	52,000	42,900	27,000
	v/c ratio	0.69	1.20	0.28	-	-	0.43	1.15	1.08	0.45
Stage 3 with Loop	volume	58,574	27,024	4,187	11,265	7,352	15,384	53,300	40,465	10,360
	capacity	102,000	25,300	15,000	15,000	15,000	27,000	52,000	42,900	27,000
	v/c ratio	0.57	1.07	0.28	0.75	0.49	0.57	1.03	0.94	0.38

Based on the results of the traffic modeling process, the projections would not warrant a freeway-type, controlled access facility. Two lane roads would often suffice, and existing roadways could be incorporated into the Loop. New construction would be required to fill in the gaps between existing roadways.

3.2 Changes in energy consumption

Table 3.1.1 shows that in the year 2025 the projected Total Vehicle Miles for Stage 3 would be 3,203,598 while for Stage 3 with the Loop the projected Total Vehicle

Miles would be 3,272,979. The model demonstrates that people will travel further to get to the loop to take advantage of the time savings it gives them. Thus with the Loop total vehicle miles would increase by 69,381 miles per day. This can be projected to represent an increase in fuel usage of 1,266,185 gallons in the year 2025 with the loop which translates to 8.3 gallons of fuel per year for each individual in the study area.

Motor vehicles operate most efficiently under free-flow conditions. Within limits the higher the average speed of traffic, the greater the fuel economy of the fleet operating on the transportation system. Congested travel results in wasted fuel. The methodology used by the Texas Transportation Institute (TTI) in the preparation of the Urban Mobility Study was used to develop an area-wide fuel economy approximation for the Ouachita Parish study area. The equation shown below yields a fuel economy value (miles per gallon) that is higher at higher speeds. While this does not reflect individual vehicle fuel economy rates which peak at around 40 miles per hour and are lower at lower and higher speeds, it does provide reasonable estimates for area-wide analysis.

$$\text{Average Fuel Economy} = 8.8 + 0.25 \left[\frac{\text{Average Peak Period}}{\text{Congested System Speed}} \right]$$

Calculations were made for peak period speeds and for free-flow speeds on I-20 and the principal arterial street system for four network alternatives – Existing + Committed, Existing + Committed with Loop, Stage 3, and Stage 3 with Loop. Travel delay includes recurring or usual delays resulting from volume to capacity relationships and incident delays, those caused by accidents and disabled vehicles. The following Table 3.2 shows the annual excess fuel that would be consumed in

the year 2025 due to both recurrent and incident delay. As can be seen, the proposed Ouachita Loop would have a positive impact on energy consumption due to a reduction in congestion. Stage 3 with the Loop in 2025 would result in a toal savings of 58,091 gallons of fuel per year. This translates into a savings of approximately 0.4 gallons of fuel per individual in the study area per year.

As noted in the first paragraph of this section, people traveling further to get to the loop to take advantage of the time savings it gives them would result in a total increased fuel consumption of 1,266185 gallons. Subtracting the above calculated savings due to fuel saved due to reduced congestion of 58,091 gallons shows that with the Loop in the year 2025 total fuel consumption would increase by 1,208,094 gallons. This translates into an increased fuel consumption per individual per year of 7.9 gallons.

Table 3.2

Annual Wasted Fuel Due to Congestion (gallons)-Year 2025	
Existing + Committed	1,019,778
Existing + Committed with Loop	901,998
Stage 3	887,196
Stage 3 with Loop	829,105

3.3 Changes in vehicle operating costs

Another way of assessing the impact of congestion is to look at the dollar value of travel delay and wasted fuel. The variables – fuel cost, commercial vehicle operating cost, and the average cost of time for private motorists and their passengers – vary over time. The values used by TTI in its latest Mobility Study were used in this analysis and will provide relative differences among the alternative networks evaluated. The assumptions used were: an average passenger vehicle occupancy of 1.25; the value of a persons time is $12 per hour; the average cost of

gasoline is $1.19 per gallon; the average commercial vehicle operating cost is $2.55 per mile; and there are 250 working days per year.

Table 3.3

Annual Vehicle Operating Costs due to Congestion-Year 2025

Alternative	Recurring Delay Cost	Incident Delay Cost	Total Congestion Cost
Existing + Committed	$33,125,737	$37,409,566	$70,535,303
Existing + Committed with Loop	$16,780,826	$18,461,535	$35,242,361
Stage 3	$21,237,319	$24,574,799	$45,812,118
Stage 3 with Loop	$15,070,601	$16,655,249	$31,725,850

As shown in Table 3.3, the addition of the Ouachita Loop would substantially reduce the annual vehicle operating costs by reducing the costs resulting from traffic congestion. The $ 14,086,268 savings between Stage 3 and Stage 3 with the loop for 2025 equals a yearly savings of $ 92.35 for each individual in the study area. Recurring delays are the usual delays resulting from normal congestion on the system. Incident delays are delays that result from accidents or disabled vehicles.

3.4 Changes in travel times

Congestion reduction on existing roadways by creating additional river crossings would be the primary cause of travel time reduction in the Monroe/West Monroe metropolitan area. The system-wide analysis suggests that in the year 2025, the Existing + Committed network would result in 1,763,300 person-hours of delay in the study area. The Existing + Committed with the Loop would result in approximately 879,000 annual person-hours of delay, a savings of 884,300

person-hours or 5.8 hours per year for each person in the study area. The Stage 3 network would result in approximately 1,178,200 annual person-hours of delay. The Stage 3 with the Loop would result in approximately 791,700 annual person-hours of delay, a savings of 386,500 person-hours or 2.53 hours per year for each person in the study area. These savings based on delay illustrate the positive impact that the proposed Ouachita Loop would have on travel times.

3.5 Changes in the safety aspect

Transportation accidents result in significant adverse consequences for society in the form of high medical, property, and social costs. The personal, social, and economic costs of transportation accidents include pain and suffering, direct costs sustained by the injured people and their insurers, and for many traffic accident victims, a lower standard of living or quality of life. The taxpayer and society may be burdened by health care costs not paid by individuals or insurers, lost productivity and associated loss of tax revenues, and public assistance for injured people.

The usual causes of accidents include:
Human error due to drowsiness and fatigue, operator distractions, or negligence;
Alcohol and/or drug consumption;
Excessive speed;
Equipment or mechanical failure;
Deteriorating infrastructure;
Converging, meeting, overtaking, or crossing mistakes;
Faulty navigation or traffic control devices;
Miscommunication; and
Adverse environmental or weather conditions.

According to the U.S. Department of Transportation, several studies suggest that about 85 percent of the factors contributing to motor vehicle accidents were

associated with the driver, 10 percent involved the highway, and 5 percent involved the vehicle. It would therefore appear that the construction of the Ouachita Loop would address a small segment of the safety issues. However, the proposed highway would replace large segments of old, narrow, substandard rural arterial highway with modern urban arterial street designed to modern design standards. Further, the proposed roadway is expected to significantly reduce peak period congestion. This would reduce the number of accidents caused by human factors. The net result would be improved safety on the Monroe/West Monroe Metropolitan Area transportation system.

3.6 Traffic Benefits

The preceding subsections have discussed the benefits to society and the motorists of improvements to the Monroe Metropolitan Area transportation system. In addition to providing two additional bridges over the Ouachita River to link the two halves of the Parish, significant lengths of existing rural highway would be upgraded to modern standards. The results should be safer routes for Ouachita Parish motorists. The additional bridge on the north would enhance travel from the rapidly developing area to the north and west of West Monroe, reducing the amount of traffic that now must travel south to I-20 to cross the Ouachita River to get to the employment centers in Monroe. The bridge on the southern portion of the proposed loop would similarly increase mobility for residents of the southern portion of Ouachita Parish.

4.0 Environmental Analysis

4.1 Land Use

4.1.1 Existing Land Use

Within the limits of the Ouachita Loop study area, agricultural/ undeveloped land comprised the largest percentage of use of land accounting for approximately 51%. Residential development use occupied

approximately 35%. Industrial/commercial uses accounted for approximately 14% of all land within the study area.

4.1.2 Future Land Use

For the project area east of the Ouachita River, few major changes are predicted to occur in development patterns. Projections indicated that most new residential construction would be concentrated in the northeast with agricultural/undeveloped lands being converted. With this increase in residential area, the northeast part of the study area will also experience corresponding increases in the amount of acreage devoted to transportation, communication, utilities, and trade and service establishments needed to serve the expanding population.

West of the Ouachita River, the study area is projected to experience large amounts of residential growth. Growth in other land use categories is expected to be relatively small.

Projections for the study area indicated that existing trends and patterns would apparently continue with the majority of new development being in residential use. This development will mainly occur west of the Ouachita River. Logically, projections indicated conversion of a large amount of agricultural/undeveloped lands to residential use.

Future land use impacts would be of two types. One is the impact on existing development as the result of the imposition of a new arterial roadway into the area. Segment L of Alternative 1 and segments E, H, and L of Alternative 2 would introduce a new arterial street into an area of primarily moderate to upscale residential development. Much of the impact on existing development would occur in the northwest portion of the study corridor (Segments K and L). Here, the proposed project would

introduce an arterial thoroughfare into an area of recently developed residential subdivisions. This would introduce relatively high volumes of traffic in close proximity to the existing subdivisions, including Indian Lakes, Northwood Estates, Hidden Lakes and D'Arbonne Hills subdivisions. It is quite possible for commercial development to occur along the new thoroughfare and in close proximity to the residential development. Segment V in the southern portion of the proposed loop would be in close proximity to an existing subdivision, introducing a relatively high traffic volume facility where none presently exists.

The second impact is on regional growth and development. Since at least 1960, suburban Ouachita Parish has been growing at a faster rate than either Monroe or West Monroe. This trend continues. Between 1990 and 1996, the population of suburban Ouachita Parish grew by 3,358 persons while Monroe grew by 987 persons and West Monroe grew by 232 persons. More than 73 percent of the Parish growth was in the suburban portion.

A recent study utilized realtor multiple listings of existing home sales and new residential construction data to map the migration pattern of families in owner-occupied housing and income migration. The study subdivided the Parish into the quadrants formed by I-20 and the Ouachita River. The City of Monroe was identified separately, serving as a benchmark for the analysis. The study found a strong westward population migration pattern, particularly in the northwestern quadrant of the Parish. Sale prices of homes in the northwest quadrant of the Parish tend to be higher (in terms of actual sales price as well as price per square foot) than those found elsewhere in the Parish. On the other hand, the sales prices of homes in the southeast quadrant tend to be the lowest in the Parish. It is not clear

how much of the growth of the northwest quadrant has been migration of more affluent families from Monroe and how many are families moving into the area who can afford the more expensive housing in a more attractive physical setting. With regard to building permits issued from 1991 through 1996, *Multiple Listings* suggest that home sales in Monroe have remained stable and that numerous homes have become available as a result of suburban growth. Eisenstadt and Nelson (1997) found that about 39 percent of the permits issued over the six-year period were in the northwest quadrant, slightly more than 25 percent were in the southwest quadrant, and slightly more than 20 percent were in the northeast quadrant. Less than two percent of the building permits issued during the six-year period were in the southeast quadrant of the Parish.

The construction of the proposed Ouachita Loop is not expected to significantly modify the basic development trends. The rolling topography found west of the Ouachita River, the forested northeast, and other perceived factors, such as relative quality of schools, lower crime, and larger lots, will likely continue to attract those who can afford the amenities of the northwest, southwest, and northeast quadrants. By increasing mobility in the suburban ring, assuming major efforts by the City of Monroe to maintain the attractiveness of city living, the proposed thoroughfare would encourage continuation of the low density suburban development.

A large portion of segment F of Alternative 1 would utilize Finks Hideaway Road, which is now classified as a collector and minor arterial. This road would be upgraded to current arterial standards. The Bayou de Siard floodplain and numerous wetlands in the area would limit future land development in the northeast quadrant of the study area, in the vicinity of segments F, J, and a portion of Segment D. Improvement of

Millhaven Road should not necessarily encourage land development in this portion of the study area, but it would accommodate the traffic expected from future development.

4.2 Sections 4(f) and 6(f) Land

Section 4(f) of the U. S. Department of Transportation Act of 1966 (80 Stat. 931, Public Law 89-670) and section 18(a) of the Federal-Aid Highway Act of 1968 require that special effort should be made to preserve public parks, recreational lands, wildlife and waterfowl refuges, and important historic sites.

State and local governments often obtain grants through the Land and Water Conservation Fund Act to acquire or make improvements to parks and recreation areas. Section 6(f) of this Act prohibits the conversion of property acquired or developed with these grants to a non-recreational purpose without the approval of the Department of Interior's (DOI) National Park Service.

No known lands covered by either Section 4(f) or Section 6(f) will be impacted by this project.

4.3 Cultural Features and Community Services

Within the Ouachita Loop study area, the following cultural features and community services were identified: 17 churches, 5 schools, 2 fire stations, 2 cemeteries, 1 park, 3 wildlife refuges, and the State Police Troop F Headquarters. None of these would be impacted by either of the two proposed alternatives.

4.4 Potential Relocations

The estimated potential relocations are presented in Table 4.4 by Alternative. Each Alternative was subdivided by segments to illustrate the approximate areas that

would be affected. The categories of potential relocations that are shown are houses, mobile homes, businesses, and apartments.

Alternative 1 was estimated to cause the displacement of 68 houses, 58 mobile homes, 2 businesses, and 2 apartments. Alternative 2 was estimated to cause the displacement of 68 houses, 33 mobile homes, 2 businesses, and 2 apartments. The two businesses projected to be displaced by both Alternatives are Carl Brady's Auto Sales and Simmons Vegetable and Fruit Stand and Garage. The apartment complex affected by both Alternatives is Ole Susanna's Cottage Apartments.

TABLE 4.4
POTENTIAL RELOCATIONS
ALTERNATIVE 1

SEGMENT DESCRIPTION	POTENTIAL RELOCATIONS			
	HOUSES	MOBILE HOMES	BUSINESSES	APARTMENTS
A	5	8	2	0
B	6	0	0	0
D	2	0	0	0
F (EAST OF US 165)	12	0	0	0
F (WEST OF US 165)	0	0	0	0
J	0	0	0	0
L (EAST OF WHITE'S FERRY RD.)	6	0	0	0
L (WEST OF WHITE'S FERRY RD.)	18	6	0	0
M	3	24	0	0
O (NORTH OF I-20)	0	2	0	2
O (SOUTH OF I-20)	2	4	0	0
P	2	2	0	0
R (ENDING AT LA 34)	3	6	0	0
V (WEST OF US 165)	9	4	0	0
V (EAST OF US 165)	0	0	0	0
W	0	2	0	0
TOTAL	68	58	2	2

ALTERNATIVE 2

SEGMENT DESCRIPTION	POTENTIAL RELOCATIONS			
	HOUSES	MOBILE HOMES	BUSINESSES	APARTMENTS
A	5	8	2	0
C	5	2	0	0
D	2	0	0	0
E (EAST OF US 165)	5	0	0	0
E (WEST OF US 165)	2	0	0	0
H	5	0	0	0
K	2	2	0	0
L (EAST OF WHITE'S FERRY RD.)	6	0	0	0
L (WEST OF WHITE'S FERRY RD.)	18	6	0	0
N	7	3	0	0
O (NORTH OF I-20)	0	2	0	2
O (SOUTH OF I-20)	2	4	0	0
Q	0	0	0	0
S (ENDING AT LA 34)	5	2	0	0
U (WEST OF US 165)	4	2	0	0
U (EAST OF US 165)	0	0	0	0
W	0	2	0	0
TOTAL	68	33	2	2

4.5 Wetlands

Impacts to project wetlands are regulated under Section 404 of the Clean Water Act of 1973. This is the regulatory authority over all activities in "waters of the United States", which include wetlands and other aquatic habitats.

Wetland impacts have been estimated using aerial photography and soils maps. No field inspection has been performed at this stage of study. Alternative 1 appears to impact approximately 84 acres of wetlands. Alternative 2 potentially impacts an estimated 115 acres of wetlands. The most sizeable wetland areas impacted by both alternatives are associated with the northern and southern crossings of the Ouachita River.

The final extent of wetland involvement and the degree of impact to existing wetlands will depend on the final alignment, design features, and construction methods chosen. Accurate mapping will require a Routine Jurisdictional Determination and Delineation at a later stage.

4.6 Scenic Streams

Only a portion of the Ouachita River is considered a scenic stream. This portion is north of the Ouachita Loop study area and flows for approximately 22 miles southward from the Louisiana-Arkansas state line to its intersection with the north bank of Bayou Bartholomew defining the border between Union and Morehouse Parishes. None of the proposed alternatives impact this portion of the Ouachita River.

Bayou D'Arbonne within the Ouachita Loop study area is classified as a scenic stream. The scenic stream portion of Bayou D'Arbonne meanders for 31 miles from D'Arbonne Lake Dam in Union Parish to its entrance into the Ouachita River in Ouachita Parish. None of the proposed alternatives impact this portion of Bayou D'Arbonne.

4.7 Floodplain and Floodway

Protection of floodplains and floodways is required by Executive Order 11988 - "Floodplain Management" and 23 CFR 650, Subpart A. The intent of these regulations is to avoid or minimize highway encroachments within the 100-year (base) floodplain, where practicable, and to avoid supporting land use development that is incompatible with floodplain values. Where encroachment is unavoidable, the regulations require the project agency to take appropriate measures to minimize impacts.

Essentially the entire portion of the Ouachita Loop study area that lies between its easternmost point and the Pleistocene terrace on the west crosses floodplains identified on the Ouachita Parish Flood Insurance Rate Maps (FIRM's). Any cross-parish highway will encroach upon the 100-year floodplain. The proposed action also crosses the Ouachita River floodway which is essentially that area occurring between the river's east flood protection levee and the Pleistocene terrace to the west.

Maximum use of structure will be incorporated in order to minimize effects on the hydraulics of the area. Sections that are to be built at-grade will use properly sized and located culverts or bridges to avoid ponding and irreversible alteration of existing drainages.

4.8 Farmlands

Because of the rich alluvial soils found in Ouachita Parish, there is an abundance of prime farmland in the project area. The United States Department of Agriculture, Natural Resources Conservation Service (formerly the Soil Conservation Service), defines prime agricultural land as: "soils that are best suited to producing food, feed, forage, fiber, and oilseed crops."

In a future Environmental Impact Statement phase of this project, coordination with the Natural Resources Conservation Service (NRCS) office in Monroe will be required to determine if any of the alternatives would be expected to have a substantial impact on agriculture in the area. Form AD-1006-Farmland Conversion Impact will be used to determine the level of consideration for protection to be given and to determine if additional sites need to be evaluated.

In order to minimize farmland severance, alternatives can be located along property lines, existing highways, utility rights-of-way, and natural breaks where possible.

4.9 Endangered and Threatened Species

Database files of the Louisiana Natural Heritage Program and the USFWS Red Book for this region were searched to determine the existence in the project area of any known threatened and/or endangered species protected under the Endangered Species Act of 1973.

Although suitable habitat exists in Ouachita Parish for a number of federally listed species, the proposed action does not directly threaten the critical habitat of any species known to currently exist in Ouachita Parish. There are recorded sightings of the endangered red-cockaded woodpecker (*Picoides borealis*) and the threatened bald eagle (*Haliaeetus leucocephalus*). However, these sightings have occurred in other parts of the Parish outside of the proposed loop. Therefore, unless a phase II investigation yields new information, the proposed action is unlikely to place any federally protected species in a jeopardy position.

The Louisiana Natural Heritage statewide list contains several federally listed species -- threatened, endangered or candidates for the list -- whose historic ranges include the northern tier of Louisiana. The following Table 4.9 is a compilation of these species and their current status on Federal and state lists:

Table 4.9

Federally Endangered, Threatened, or Rare Species with Habitat in Ouachita Parish

Common Name	Scientific Name	Federal Status	State Status
Louisiana black bear	*Ursus americanus luteolus*	T	S2
Florida panther	*Felis concolor coryi*	E	S1
eskimo curlew	*Numenius borealis*	E	SH
bald eagle	*Haliaeetus leucocephalus* *	T	S3
Bachman's warbler	*Vermivora bachmanii*	E	SH
ivory-billed woodpecker	*Campephilus principalis*	E	SH
red-cockaded woodpecker	*Picoides borealis* *	E	S2
Bachman's sparrow	*Aimophila aestivalis*	C2	S3
cerulean warbler	*Dendroica cerulea*	C2	S1
pink mucket	*Lampsilis abrupta*	E	S1
Ouachita kidneyshell	*Ptychobranchus occidentalis*	C2	S1
Alligator snapping turtle	*Macroclemys temminckii* *	C2	S3?
cypress-knee sedge	*Carex decomposita*	3C	S1
southern lady's-slipper	*Cypripedium kentuckiense* *	C2	S1
wolf spikerush	*Eleocharis wolfii*	C2	S1?

Federal Status: **E** = endangered; **T** = threatened; **C2** = candidate, substantially more biological information needed to support listing; **3C** = proven to be more abundant than originally believed, and/or not subject to any identifiable threat

State Status: **S1** = Critically imperiled in Louisiana; **S2** = imperiled in Louisiana; **S3** = rare and local throughout state or range restricted; **SH** = historical occurrence in Louisiana, no recent records; **?** = rank uncertain

- Record of Occurrence in Ouachita Parish

4.10 Hazardous Materials

Both Alternative 1 and Alternative 2 may impact one potential site. This site, located at the northeast corner of Millhaven Road (LA HWY 594) and US HWY 80, was formerly used as a gasoline station and is currently the location of Simmons Vegetable and Fruit Stand and Garage. The presence of a concrete island used for holding gasoline pumps indicates that this site was the location of a gasoline station and may still contain underground storage tanks. Because the site predates the Louisiana Department of Environmental Quality's underground storage tank closure requirements, it is unknown if the tanks were voluntarily removed or rendered inert (filled with sand or water) after gasoline was no longer sold or stored at the site. The confirmation and status of tanks should be accomplished at the Environmental Impact Statement stage and further action may be required to either miss the site or during construction to initiate closure and removal of the tanks. The potential also exists that the site may be contaminated from past releases of petroleum products such as hydraulic oil containing a polychlorinated biphenyl (PCB).

4.11 Surface Water Quality

The Louisiana Department of Environmental Quality's (LDEQ) Water Quality Management Division rates streams on their overall water quality. Streams are evaluated by regional personnel familiar with that stream. When it is available, data collected by personnel from water quality monitoring stations in the area is also utilized. Designated water uses considered in the ratings are primary contact recreation (swimming), secondary contact recreation (boating), fish and wildlife propagation, and outstanding natural resource. Water quality uses for each stream are rated and use designations are referred to. These designations are fully supporting, partially supporting and not supporting. Fully supporting indicates excellent water quality; partially supporting indicates moderate water quality where one or more measured water quality parameters are not meeting standards;

and not supporting indicates poor water quality where most measured water quality parameters are not meeting standards.

The Ouachita River has a water quality monitoring station (58010013) at Sterlington, Louisiana north of the Ouachita Loop study area. A combination of data and field evaluation rates the overall water quality as partially supported. Primary contact recreation is partially supported, secondary contact recreation is threatened, and fish and wildlife propagation which is not supported. Previous dioxin problems in the area may be improving due to new processes at a paper mill in Arkansas; however, no recent samples have been taken to confirm this assumption. There is a fish consumption advisory on bass in this area issued by the Louisiana Department of Health and Hospitals (LDHH) and the Louisiana Department of Environmental Quality (LDEQ) due to mercury contamination. The most probable suspected major source of mercury is natural causes; however, atmospheric deposition may be an additional source of mercury. The advisory has resulted in a significant drop in the fishing activity on the river. Problems with low dissolved oxygen in the area have been addressed by manipulation of a lock and dam system to maintain a flow even during low stages of the river.

This project will not impact the water quality of the Ouachita River.

4.12 Water Wells

The locations of 89 registered water wells within the Ouachita Loop study area as reported by the Louisiana Department of Transportation and Development, Public Works and Flood Control Division, Water Resources Section were plotted as a planning device. All alignments were established to avoid the known water wells locations. Any impacts associated with final alignment locations should be investigated further in order to prescribe appropriate capping procedures.

4.13 Air Quality

The Federal Clean Air Act of 1970 required the adoption of ambient air quality standards. These were established in order to protect public health, safety, and welfare from known or anticipated effects of sulfur dioxide (SO_2), particulates (PM-10, 10-micron and smaller), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and lead (Pb). The Louisiana and National Ambient Air Quality Standards (NAAQS) for these pollutants are listed in Table 4.13.

Congress directed that the standards should be reviewed at least every five years by EPA to keep up with current science, and that proposals to revise them should be based solely upon the best current scientific opinion on public health effects, not economic impacts. Since initially setting standards in the early 1970s, EPA has changed the standards only twice: Once, in 1979, and once in 1987. Under the most recent review, 1997, EPA concluded that the current primary standards for ozone and particulate matter were not adequate to protect the public from adverse health effects.

The Clean Air Act Amendments (CAAA) of 1977 and 1990 required all states to submit to the United States Environmental Protection Agency (EPA) a list identifying those air quality regions, or portions thereof, which meet or exceed the NAAQS or cannot be classified because of insufficient data. Portions of air quality control regions which are shown by monitored data or air quality modeling to exceed the NAAQS for any criteria pollutant are designated “non-attainment” areas for that pollutant. The CAAA also established time schedules for the states to attain the NAAQS.

EPA is phasing out and replacing the previous 1-hour primary ozone standard (health-based) with a new 8-hour standard to protect against longer exposure periods. In establishing the 8-hour standard, EPA is setting the standard at 0.08 parts per million (ppm) and defines the new standard as a “concentration-based”

form, specifically the 3-year average of the annual 4th-highest daily maximum 8-hour ozone concentrations. EPA also replaced the previous secondary standard (to protect the environment, including agricultural crops, national parks, and forests) with a standard identical to the new primary standard.

The previous 0.12 ppm 1-hour standard will not be revoked in a given area until that area has achieved 3 consecutive years of air quality data meeting the 1-hour standard. The purpose of retaining the 0.12 ppm 1-hour standard is to ensure a smooth, legal, and practical transition to the new standard.

The primary (health-based) PM standards is being revised by adding a new annual PM2.5 standard set at 15 micrograms per cubic meter (µg/m3) and a new 24-hour PM2.5 standard set at 65 µg/m3. EPA is retaining the current annual PM10 standard of 50 µg/m3 and adjusting the PM10 24-hour standard of 150 µg/m3 by changing the form of the standard. PM10 particulates are coarse particles, such as windblown dust from fields and unpaved roads. PM2.5 particulates are fine particles generally emitted from activities such as industrial and residential combustion and from vehicle exhaust.

EPA is also revising the secondary (welfare-based) standards by making them identical to the primary standards. EPA believes that the PM2.5 and PM10 standards, combined with the Clean Air Act-required regional haze program, will provide protection against the major PM-related welfare effects, including visibility impairment, soiling and materials damage.

In addition to the standards, EPA is issuing new rules related to PM monitoring requirements. One rule addresses the monitoring network design needed for the new PM2.5 standards. Other rules establish a new federal reference and equivalent methods for monitoring PM2.5.

The proposed project is in the Monroe (Louisiana) - El Dorado (Arkansas) Interstate Air Quality Control Region (AQCR # 19). The study area is located in Ouachita Parish, which is in attainment for all the criteria pollutants of the National Ambient Air Quality Standards (NAAQS).

Under the new 8-hour 0.08 ppm ozone standard, LDEQ's preliminary modeling projects that Ouachita Parish would still be in attainment. For the new fine particulate (PM2.5) standard, Louisiana and most other states have insufficient data to project attainment status, due to the fact that fine particulates were not regulated or monitored in the past. Louisiana has always been in compliance with the coarse particulates (PM10) standard, and it is projected that the state will continue to maintain attainment status for PM10.

Table 4.13
LOUISIANA AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	Louisiana and National Standards
Sulfur Oxides (Measured as SO_2)	Annual Arithmetic Mean	0.03 ppm
	Twenty-Four Hour*	0.14 ppm
	Three-Hour* Secondary	0.50 ppm
Particulate Matter (PM-10)	Annual Arithmetic Mean: Primary & Secondary	50 ug/m^3
	Twenty-Four Hour:** Primary & Secondary	150 ug/m^3
Carbon Monoxide (CO)	One Hour*	35 ppm
	Eight Hour*	9 ppm
Ozone (O_3)	One Hour***	0.12 ppm
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.053 ppm
Lead (Pb)	Three Month Arithmetic Mean	1.5 ug/m^3

***** Not to be exceeded more than once per year.
****** Statistically estimated number of days with exceedances is not to be more than 1 per year.
******* Not more than one expected exceedance per year on a three year average.
ppm Parts of pollutant per million parts of air (by volume) at 25°C.
ug/m^3 Micrograms of pollutant per cubic meter of air.

Source: Code of Federal Regulations; Title 40 Part 50: Amended July, 1991.; Louisiana Administrative Code, Title 33 - Environmental Quality, Part III - Air, Chapter 7; Amended June 20, 1988.

4.14Noise

All traffic noise levels mentioned in this text are in units of dBA L_{eq}. dBA refers to the A-weighted decibel scale. Table 4.14.1 provides an illustration of typical sound levels in dBA. L_{eq} is defined as the equivalent steady-state sound level

which, in a stated period of time (usually one hour), contains the same acoustic energy as the time-varying sound level during the same period.

The existing peak-hour noise level ranges presented for the areas listed below are based on past environmental studies in Louisiana. Residential and public receptors closest to roads experience the higher L_{eq} noise levels.

- North of Rowland Road, between SH 139 and Patrick Bayou, 45 - 55 dBA L_{eq}.
- North of I-80, between SH 139 and Bayou De Siard, 42 - 53 dBA L_{eq}.
- North of Chauvin Bayou, between US 165 and Bayou De Siard, 42 - 65 dBA L_{eq}.
- North of Tupawek Bayou, east and west of SH 143, 45 - 57 dBA L_{eq}.
- North of SH 616, between Good Hope Road and Johnson Road, 42 - 50 dBA L_{eq}.
- North of Bayou Mouchoir De L Ourse, between US 165 and Raccoon Bayou, 42 - 65 dBA L_{eq}.
- Adjacent to US 165, US 165 BUS., US 80, I-20, LA 15, 841, 34, 3033, 838, 616, 546, 139, and 143, 65 - 75 dBA L_{eq}.

In addition to the above areas, there are scattered residences throughout the study area that are exposed to various levels of traffic noise depending on proximity to the roads and the traffic volume on the roads.

TABLE 4.14.1
TYPICAL A-WEIGHTED SOUND LEVELS IN INDOOR AND OUTDOOR ENVIRONMENTS

Sound Source	Sound Level (dBA)	Subjective Response
	140	(Threshold of Pain)
Military Jet Takeoff with after-burner @ 50'	130	
	120	(Uncomfortably Loud)
Rock and Roll Band	110	
Jet Fly-Over @ 1,000'	100	(Very Loud)
Power Lawn Mower @ Operator	90	
Diesel Truck (55 mph) @ 50' High Urban Ambient Sound Automobile (55 mph) @ 50'	80	(Moderately Loud)
TV-Audio, Vacuum Cleaner	70	
Normal Conversation	60	
	50	(Quiet)
Lower Limit Urban Ambient Sound	40	
	30	(Very Quiet)
Unoccupied Broadcast Studio	20	
	10	
	0	(Threshold of Hearing)

Sources: **Noise Assessment Guidelines Technical Background, HUD Report No. TE/NA 172; Handbook of Noise Control, C.M. Harris, 1979; FHWA Highway Traffic Noise Prediction Model, FHWA-RD-77-108, 1978.**

The FHWA's Noise Abatement Criteria (NAC) is presented in the Code of Federal Regulations, Title 23 Part 772, revised August, 1982, and provides procedures

whereby the acoustic impact of a proposed action can be assessed. The NAC for the various land uses are presented in Table 4.14.2. The noise level descriptor used is the equivalent sound level, Leq, defined as the steady state sound level which, in a stated time period (usually one hour), contains the same sound energy as the actual time-varying sound.

Table 4.14.2
NOISE ABATEMENT CRITERIA
HOURLY A-WEIGHTED SOUND LEVEL - DECIBELS (dBA)

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

Source: Code of Federal Regulations, Title 23 Part 772, Revised August 1982.

Noise abatement measures are considered when the predicted noise levels approach or exceed those values shown for the appropriate activity category of the NAC, or when the predicted traffic noise levels substantially exceed the existing noise levels. Approach values are defined as being 1 dBA less than the noise levels shown in Table 4.13.2.

Neither field noise data collection nor noise modeling were conducted at this time for this project, but they will be required once the project proceeds into the Environmental Impact Statement phase. However, no impacts are expected based

on the measured existing levels reported in other studies and past experiences with similar projects.

4.15 Archaeological/Historical Resources

Alternative 1 may impact two previously recorded archaeological sites, three historic structures, and five potential historic sites (Table 4.15.1). The two archaeological sites are 16OU58, which has not been evaluated, and 16OU87, which has been assessed as being not significant. The historic structures all date from the 1930s, and none of them have been evaluated in terms of eligibility for the National Register of Historic Places. The potential historic sites are locations which, on the basis of historic map information, may contain archaeological or structural remains. Surveys will be required during the Environmental Impact Statement phase to determine if cultural resources are present at these locations, but in one case (16OU58) an archaeological site has already been recorded at one of them. It should be noted that, even if any of these cultural resources are evaluated as being significant, avoidance by making slight adjustments to the final alignment is a possibility.

One previously recorded archaeological site and four historic structures may be impacted by Alternative 2 (Table 4.15.2). None of these properties has been evaluated in terms of their eligibility for the National Register of Historic Places. As with Alternative 1, if some of them are determined to be significant, it may be possible to avoid them by making adjustments to the final alignment.

TABLE 4.15.1

CULTURAL RESOURCES THAT MAY BE IMPACTED BY ALTERNATIVE 1

Archaeological Sites

Site No.	Description	Site Size	Age	Comments	Significance
16OU58	prehistoric and historic artifact scatter	Unknown	Mississippi period		unknown
16OU87	historic house site	Unknown	19th-20th c.	examined by Price (1978)	not significant

Historic Structures

Number	Description		Age	Comments	Significance
22	frame bungalow		1930	recorded by La. Tech (1988)	unknown
25	frame bungalow with attached porch		ca. 1935	recorded by La. Tech (1988)	unknown
44	transverse crib barn		1935	recorded by La. Tech (1988)	unknown

Potential Historic Sites

Number	Name		Description	Source	
1	C. and W. Brooks Plantation		late 19th century plantation	U.S. Engineer Dept. 1895	
10	W. Marlow		mid-19th century farmstead	Confederate States of America ca. 1864	
12	Netherland		mid-19th century mill	Confederate States of America ca. 1864	
13	J. Nettles		mid-19th century farmstead	Confederate States of America ca. 1864	
14	J. Parker		early 19th century farmstead	Plat map T17N, R3E	

TABLE 4.15.2

CULTURAL RESOURCES THAT MAY BE IMPACTED BY ALTERNATIVE 2

Archaeological Sites

Site No.	Description	Site Size	Age	Comments	Significance
16OU53	prehistoric and historic artifact scatter	30 m x ?	unknown	examined by Price (1978)	unknown

Historic Structures

Number	Description		Age	Comments	Significance
22	frame bungalow		1930	recorded by La. Tech (1988)	unknown
25	frame bungalow with attached porch		ca. 1935	recorded by La. Tech (1988)	unknown
44	transverse crib barn		1935	recorded by La. Tech (1988)	unknown
113	frame bungalow with integral gallery		ca. 1930	recorded by La. Tech (1988)	unknown

4.16 Permits

If a build alternative is selected, the Louisiana Department of Environmental Quality must be satisfied that the project qualifies for water quality certification under Sections 401 and 402 of the Clean Water Act. Section 313 of the Clean Water Act requires that the project must meet the state's water quality standards. The 401 Certification indicates that discharges into the project area's surface waters will not violate the state water quality standards. The certification is coordinated with and is a condition of the Section 404 wetlands permit. Section 402 requires that a National Pollutant Discharge Elimination System (NPDES) Storm Water Permit be obtained. The conditions of this permit include that a Stormwater Pollution Prevention Plan be formulated and made a stipulation of the

construction contract. These requirements will insure that appropriate measures will be carried out to protect water quality.

A U. S. Coast Guard Bridge Permit, Section 9, Rivers and Harbors Act of 1899 will be required for crossings of the Ouachita River.

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP). FEMA has established regulations for modifications to floodways and floodplains. Coordination with FEMA is required when a proposed crossing encroaches on a regulatory floodway and would require an amendment to the floodway map. The proposed action crosses the Ouachita River floodway which is essentially that area occurring between the river's east flood protection levee and the Pleistocene terrace to the west. Upon completion of the project design, hydraulic data and construction plans will be submitted to Ouachita parish for review, approval, and permitting as specified by local floodplain ordinances.

The Clean Water Act (CWA) and its Section 404(b)(1) Guidelines ("Guidelines") set forth a goal of restoring and maintaining existing aquatic resources, including waters of the United States and wetlands. The U.S. Army Corps of Engineers (COE), through the Section 404 permitting process, evaluates proposed actions.

4.17 Potential Mitigation Features and Their Estimated Costs

4.17.1 Wetlands

Alternative 1 impacts an estimated total of 84 acres of wetlands. Mitigation at an assumed ratio of 3:1 would require the replacement of 252 acres. Mitigation costs at an assumed rate of $ 3,000 per acre results in an estimated total for Alternative 1 of $ 760,000.

Alternative 2 impacts an estimated total of 115 acres of wetlands. Mitigation at an assumed ratio of 3:1 would require the replacement of 345 acres. Mitigation costs at

an assumed rate of $ 3,000 per acre results in an estimated total for Alternative 2 of $ 1,037,000.

References

Brown, C.A. 1945. Louisiana trees and shrubs. La. Forestry Commission Bul. No. 1. Claitor's Publishing Division, Baton Rouge, La. 262 pp.

Brown, C.A. 1972. Wildflowers of Louisiana and adjoining states. Louisiana State University Press, Baton Rouge. 247 pp.

Confederate States of America ca. 1864. Map of Ouachita Parish, Louisiana. Map on file, Record Group 77, Z-33, No. 26, National Archives, Washington, D.C.

Cowardin, L.M., Carter, V., Golet, F.C., and LaRoe, E.T. 1979. "Classification of Wetlands and Deepwater Habitats of the United States," FWS/OBS-79/31, U.S. Fish and Wildlife Service, Office of Biological Services, Washington, D.C. 103 pp.

Craig, N.J., Smith, L.M., Gilmore, N.M., Lester, G.D., Williams, A.M. 1987. The Natural communities of coastal Louisiana classification and description. Louisiana Natural Heritage Program, Louisiana Department of Wildlife and Fisheries. 149 pp.

Department of Defense, Corps of Engineers, Department of the Army, November 13, 1986, "Federal Register", 33 CFR, Parts 320 through 330.

Department of Defense, Corps of Engineers, Department of the Army, November 22, 1991, "Federal Register"' 33 CFR, Part 330.

Eisenstadt, Robert C., PhD and Paul S. Nelson, PhD., April 28, 1997. *An Analysis of Intra-Regional Migration Patterns: Population and Household-Income Dynamics for Ouachita Parish, Louisiana*. Northeast Louisiana University, Monroe, LA.

Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineaton Manual," Technical Report Y-87-1, U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS.

Heartfield, Lorraine, Kay Hudson, G.R. Dennis Price, Samuel W. Mitcham, Jr., and Glen S. Greene, 1977. Cultural Resource Survey and Evaluation of the 165 Portion of the Proposed Louisiana North-South Expressway: Phases I and II. Submitted to Howard, Needles, Tammen, and Bergendoff, Baton Rouge, Louisiana.

Heartfield, Lorraine, and G.R. Dennis Price, 1976. An Archaeological Survey of Portions of the Monroe to Sandy Bayou Levee, Ouachita River Levees, Louisiana. The Research Institute, Northeast Louisiana University. Submitted to the U.S. Army Corps of Engineers, Vicksburg District.

Kelley, David B., 1982. A Cultural Resources Survey of Proposed Alignments for the Ouachita River Bridge-North Loop. Coastal Environments, Inc. Submitted to Modjeski and Masters, Inc., New Orleans, Louisiana.

Louisiana Department of Transportation and Development, 1980. Ouachita River Bridge Study, Monroe/West Monroe, LA, State Project 700-11-23. Louisiana Department of Transportation and Development.

Louisiana Tech University, 1988. Ouachita Parish. The Architecture of the North Louisiana River Parishes Vol. 1. The Department of Architecture, Louisiana Tech University.

Lowery, G.H. 1974a. Louisiana Birds. Louisiana State University Press, Baton Rouge, La. 565 pp.

Ouachita Council of Governments, 1976. Historic Preservation: A Resource Survey of Ouachita Parish. Ouachita Council of Governments, Monroe, Louisiana.

Ouachita Council of Governments, 1978. Twin Cities Loop Parkway, Report # 2, Selection & Evaluation of Preliminary Routes. Ouachita Council of Governments, Monroe, Louisiana.

Price, G.R. Dennis, 1978. Twin Cities Loop Parkway Corridor Study: A Cultural Resources Assessment; Phase II: On the Ground Survey. The Research Institute, Northeast Louisiana University. Submitted to Jenkins, Lazenby, Luttrell & Associates Consulting Engineers, West Monroe, Louisiana.

Price, G.R. Dennis, and Lorraine Heartfield, 1977. Archeological Test Excavation of Site 16OU15 Located on the Monroe to Sandy Bayou Levee, Ouachita River Levees, Ouachita Parish, Louisiana. The Research Institute, Northeast Louisiana University. Submitted to the U.S. Army Corps of Engineers, Vicksburg District.

Reed, P.B., Jr. 1988. "National List of Plant Species that Occur in Wetlands: Southeast (Region 2)." U.S. Fish and Wildlife Biological Report 88(26.2). 124 pp.

Regional Economic Models, Inc. (REMI). multi-region EDFS-53 study model. 306 Lincoln Avenue, Amherst, MA 01002

Texas Transportation Institute, The Texas A&M University System. Mobility Study Methodology. College Station, TX 77843-3135. Copies available at LDOTD. http://mobility.tamu.edu/study/methodology.stm

United States Department of Agriculture, Soil Conservation Service, June 1991, "Hydric Soils of the United States." Washington, D.C.

United States Department of Agriculture, Soil Conservation Service, February, 1974, "Soil Survey of Ouachita Parish, Louisiana."

U.S. Bureau of the Census, March, 1997. *County Income and Poverty Estimates - Estimates for Louisiana: 1993 Table P93-22.*

U.S. Bureau of the Census, April 8, 1997. *County Income and Poverty Estimates - 1990 Census Estimates: Louisiana 1989. Table 22A.*

U.S. Department of Transportation, Bureau of Transportation Statistics. *Transportation Statistics Annual Report 1996*. Washington, D.C. 1996.

U.S. Department of Transportation, Bureau of Transportation Statistics. *Transportation Statistics Annual; Report 1997*. Washington, D.C. 1997.

U.S. Engineer Department, 1895. Ouachita River Survey. Map series on file, U.S. Army Corps of Engineers, Vicksburg District.

Historic Quadrangle Maps Consulted:

U. S. Department of Army, 1931. 1:62,500 advance sheet topographic quadrangle map (Collinston, Louisiana). U. S. Army Corps of Engineers, Vicksburg, MS.

U. S. Department of Army, 1933. 1:62,500 advance sheet topographic quadrangle map (Collinston, Louisiana). U. S. Army Corps of Engineers, Vicksburg, MS.

U. S. Department of Army, 1935. 1:62,500 topographic quadrangle map (Collinston, Louisiana). U. S. Army Corps of Engineers, Vicksburg, MS.

U. S. Department of Army, 1931. 1:62,500 advance sheet topographic quadrangle map (Drew, Louisiana). U. S. Army Corps of Engineers, Vicksburg, MS.

U. S. Department of Army, 1933. 1:62,500 advance sheet topographic quadrangle map (Drew, Louisiana). U. S. Army Corps of Engineers, Vicksburg, MS.

U. S. Department of Army, 1935. 1:62,500 topographic quadrangle map (Drew, Louisiana). U. S. Army Corps of Engineers, Vicksburg, MS.

U. S. Department of Army , 1933. 1:62,500 topographic quadrangle map (Monroe, Louisiana). U. S. Army Corps ,of Engineers, Vicksburg, MS.

U. S. Department of Army, 1935. 1:62,500 topographic quadrangle map (Monroe, Louisiana). U. S. Army Corps of Engineers, Vicksburg, MS.

U. S. Department of Army, 1940. 1:62,500 topographic quadrangle map (Monroe, Louisiana). U. S. Army Corps of Engineers, Vicksburg, MS.

Recent Quadrangle Maps Consulted:

U. S. Geological Survey, 1975 Photorevised. 1:24,000 topographic quadrangle map (West Monroe South, Louisiana). U. S. Department of the Interior, U. S. Government Printing Office, Denver, CO.

U. S. Geological Survey, 1982. 1:24,000 topographic quadrangle map (Cadeville, Louisiana). U. S. Department of the Interior, U. S. Government Printing Office, Denver, CO.

U. S. Geological Survey, 1982. 1:24,000 topographic quadrangle map (Calhoun, Louisiana). U. S. Department of the Interior, U. S. Government Printing Office, Denver, CO.

U. S. Geological Survey, 1982 Provisional Edition. 1:24,000 topographic quadrangle map (Crew Lake, Louisiana). U. S. Department of the Interior, U. S. Government Printing Office, Denver, CO.

U. S. Geological Survey, 1994. 1:24,000 topographic quadrangle map (Monroe North, Louisiana). U. S. Department of the Interior, U. S. Government Printing Office, Denver, CO.

U. S. Geological Survey, 1994. 1:24,000 topographic quadrangle map (Monroe South, Louisiana). U. S. Department of the Interior, U. S. Government Printing Office, Denver, CO.

U. S. Geological Survey, 1994 Provisional Edition. 1:24,000 topographic quadrangle map (Swartz, Louisiana). U. S. Department of the Interior, U. S. Government Printing Office, Denver, CO.

U. S. Geological Survey, 1994. 1:24,000 topographic quadrangle map (West Monroe North, Louisiana). U. S. Department of the Interior, U. S. Government Printing Office, Denver, CO.

Additional Maps Consulted:

Ouachita Council of Governments, 1975. Ouachita Parish, Louisiana Existing Land Use.

Rand McNally, Revised 1995. Monroe, Louisiana City Map. San Antonio Cartographic Services, Inc., San Antonio, TX.

Aerial Photographs Consulted:

Aerial photographs were indexed as follows:

- U. S. Department of Agriculture, Agricultural Adjustment Administration, Ouachita Parish, LA
- Symbol CQK, USDA 8965, Item 7
- Scale 1:20000, Flying Completed 1-5-42, Index Copied 1-21-42
- Aero Exploration Co., Tulsa, Okla.

DATE	FRAME NO.
11-11-41	CQK-3A-62
11-11-41	CQK-3A-63
1-5-42	CQK-9A-38
1-5-42	CQK-9A-39
11-11-41	CQK-4A-63
11-11-41	CQK-4A-64
11-12-41	CQK-5A-34
11-12-41	CQK-5A-35
11-12-41	CQK-5A-75
11-12-41	CQK-5A-76
11-12-41	CQK-5A-77
11-12-41	CQK-5A-78
11-12-41	CQK-6A-25
11-12-41	CQK-6A-24
11-12-41	CQK-6A-23
11-12-41	CQK-6A-22
11-12-41	CQK-6A-21
11-12-41	CQK-6A-20
11-12-41	CQK-6A-19
11-12-41	CQK-6A-18
1-5-42	CQK-9A-81
1-5-42	CQK-9A-80
1-5-42	CQK-9A-18

DATE	FRAME NO.
1-5-42	CQK-9A-19
11-11-41	CQK-4A-75
11-11-41	CQK-4A-76
11-11-41	CQK-4A-77
11-11-41	CQK-4A-4
11-11-41	CQK-4A-5
11-11-41	CQK-4A-6
1-5-42	CQK-8A-81
1-5-42	CQK-8A-80
11-11-41	CQK-3A-10
11-11-41	CQK-3A-11
11-11-41	CQK-2A-89
11-11-41	CQK-2A-90
11-11-41	CQK-2A-92
11-11-41	CQK-2A-88
11-11-41	CQK-2A-38
11-11-41	CQK-2A-39
11-11-41	CQK-2A-41
11-11-41	CQK-2A-42
11-11-41	CQK-2A-43
11-11-41	CQK-2A-83
11-11-41	CQK-2A-82
11-11-41	CQK-3A-21