August 2004

Item No. 01-183.00

US 51 Planning Study

Bardwell, Kentucky Carlisle County

Final Report



Prepared for:

Kentucky Transportation CabinetDivision of Planning

Kentucky Transportation CabinetDistrict 1

Prepared by:



In Association With:

Jordan, Jones and Goulding, Inc. Third Rock Consultants, LLC Cultural Resource Analysts, Inc. Summary of Findings and Recommendations

TABLE OF CONTENTS

EX	ECL	JTIVE SUMMARYI	ES 1
1.0)	INTRODUCTION	1
	1.1	Study Objectives	1
	1.2	Project Location and Study Area	2
	1.3	Study Process	3
2.0		STUDY ISSUES AND GOALS	4
	2.1	Project Issues	4
	2.2	Project Goals	5
3.0)	EXISTING AND FUTURE NO-BUILD CONDITIONS	7
	3.1	US 51 Highway Characteristics and Average Daily Traffic Volumes	7
	3.2	Other Study Area Roadways and Average Daily Traffic Volumes	8
	3.3	Truck Volumes	8
	3.4	Spot Speeds	9
	3.5	Traffic Analysis Methodology	10
	3.6	Existing Traffic Operating Conditions	12
	3.7	Future No-Build Traffic Operating Conditions	12
	3.8	Crash Analysis	14
	3.9	Pedestrian and Bicycle Facilities	16
	3.10	Existing and Future No-Build Traffic and Highway Conditions Summary	16
4.0)	REVIEW OF RELATED STUDIES	17
5.0)	PAST AND FUTURE TRANSPORTATION PROJECTS	18
6.0)	HUMAN ENVIRONMENT OVERVIEW	19
	6.1	Socioeconomic Profile	19
	6.2	Environmental Justice	20
	6.3	Land Use	20
	6.4	Agricultural Activity and Prime and Unique Farmland	20
	6.5	Underground Storage Tanks/Hazardous Materials	21
	6.6	Previously Documented Cultural Historic and Archeological Sites	21
7 (NATUDAL ENVIDONMENT OVEDVIEW	22

-	7.1	Aquatic Ecosystems	22
•	7.2	Terrestrial Ecosystems	22
8.0		GEOTECHNICAL OVERVIEW	24
9.0		PUBLIC INVOLVEMENT AND AGENCY COORDINATION	25
(9.1	Public Involvement Program Summary	25
(9.2	Agency Coordination	27
10.0)	ALTERNATIVES DEVELOPMENT	29
	10.1	1 Alternatives Development Process	29
		Preliminary Alternatives	29 Jrn 30 31 31 32
		10.2.8 Alternative 6 – US 51 Western Bypass	32
11.0		10.2.9 Alternative 7 – One-Way Street System (US 51 and Front Street) EVALUATION METHODOLOGY	
12.0		LEVEL 1 EVALUATION – INITIAL SCREENING	
	12.1		
	 12.2		
13.0		LEVEL 2 EVALUATION – PRELIMINARY ANALYSIS	
	13.1	1 Level 2 Evaluation Summary	41
	13.2	2 Level 2 Analysis Summary	47
14.0)	LEVEL 3 EVALUATION – DETAILED ANALYSIS	
	14.1	1 Final Refinement	48
	14.2	2 Alternative Refinement and Phasing	48
	14.3	3 Level 3 Analysis Summary	50
15.0)	RECOMMENDED PLAN	59
	15.1	1 Recommended Alternatives	59
	15.2	2 Comparison of Recommendation to Project Goals	59
16.0)	PROPOSED DESIGN / MITIGATION AND NEXT STEPS	62
	16 1	1 Design Flements	62

16.2	Bicycle / Pedestrian Facilities	62
16.3	Intelligent Transportation Systems (ITS)	62
16.4	Phasing and Funding	62
16.5	Commitment Action Plan	63
16.6	Next Steps / Implementation	63

APPENDIX A: TABLES

APPENDIX B: FIGURES

APPENDIX C: ENVIRONMENTAL JUSTICE REVIEW

APPENDIX D: ENVIRONMENTAL OVERVIEW AND AGENCY CORRESPONDENCE

APPENDIX E: MEETING MINUTES

APPENDIX F: EVALUATION METHODOLOGY

APPENDIX G: TRAFFIC FORECAST SUMMARY

TABLE OF TABLES

IN	REP	ORT	:
•••		\sim . \cdot .	•

TABLE 2: S	SUMMARY OF STUDY AREA ROADWAY CHARACTERISTICS	8
TABLE 3: 2	002 VEHICLE CLASSIFICATION COUNTS	9
TABLE 4: H	IISTORIC VEHICLE CLASSIFICATION COUNTS ON US 51	9
TABLE 5: U	IS 51 SPEED DATA SUMMARY	10
TABLE 6: L	OS CRITERIA FOR INTERSECTIONS	11
TABLE 7: L	OS CRITERIA FOR TWO-LANE HIGHWAYS	11
TABLE 8: 2	002 INTERSECTION LOS SUMMARY	12
	M PEAK HOUR INTERSECTION LEVELS OF SERVICE FOR NO-BUILD CENARIO	
TABLE 10:	PM PEAK HOUR TWO-LANE LEVELS OF SERVICE FOR NO-BUILD	
	SCENARIO	14
TABLE 11:	SEGMENT CRASH ANALYSIS	15
TABLE 12:	SPOT CRASH ANALYSIS	15
TABLE 20:	KNOWN ARCHAELOGICAL SITES IN BARDWELL	21
IN APPEND	DIX A:	
TABLE 13: TABLE 14: TABLE 15: TABLE 16: TABLE 17: TABLE 18: TABLE 19: TABLE 21: TABLE 22:	US 51 HIGHWAY CHARACTERISTICS DATA SUMMARY US 51 BETWEEN JENNINGS STREET AND KY 123 CRASH DETAILS US 51 NEAR METHODIST CHURCH CRASH DETAILS US 51 NEAR MP 5.5 CRASH DETAILS CARLISLE COUNTY EMPLOYMENT BY MAJOR INDUSTRY (2000) BARDWELL AREA MAJOR MANUFACTURERS CARLISLE COUNTY COMMUTING PATTERNS CULTURAL HISTORIC OVERVIEW SURVEY THREATENED OR ENDANGERED SPECIES LEVEL 1 EVALUATION MATRIX LEVEL 2 TRAFFIC OPERATIONS AND ENVIRONMENT EVALUATION	
TABLE 24:	MATRIX LEVEL 2 COMMUNITY AND IMPLEMENTATION / CONSTRUCTION EVALUATION MATRIX	
TABLE 26: TABLE 27:	LEVEL 3 TRAFFIC OPERATIONS EVALUATION MATRIX LEVEL 3 ENVIRONMENT EVALUATION MATRIX LEVEL 3 COMMUNITY EVALUATION MATRIX LEVEL 3 IMPLEMENTATION / CONSTRUCTION EVALUATION MATRIX	,
TARLE 1X.		4

TABLE OF FIGURES

IN REPORT:

FIGURE 1: LOCATION OF STUDY AREA IN KENTUCKY	2
FIGURE 2: STUDY LOCATION	2
FIGURE 10: US 51 HISTORIC TRAFFIC VOLUMES (1987 TO PRESENT)	13
FIGURE 14: HISTORIC POPULATION DATA	19
FIGURE 16: LAND USE	20
FIGURE 23: THREE-LEVEL EVALUATION PROCEDURE	33
IN APPENDIX B:	
FIGURE 3: STUDY AREA MAP FIGURE 4: 2002 AVERAGE DAILY TRAFFIC VOLUMES FIGURE 5: US 51 HIGHWAY CHARACTERISTICS SUMMARY FIGURE 6: SELECTED STUDY AREA PICTURES	
FIGURE 7: VEHICLE CLASSIFICATION COUNT LOCATIONS, POSTED LIMITS, AND SPEED SURVEY LOCATIONS FIGURE 8: INTERSECTION CONTROLS AND 2002 PEAK HOUR VOLUME FIGURE 9: INTERSECTION AND SEGMENT 2002 PEAK HOUR LEVELS	MES
SERVICE FIGURE 11: EXISTING AND FUTURE NO-BUILD AVERAGE DAILY TRA VOLUMES	FFIC
FIGURE 12: NO-BUILD INTERSECTION AND SEGMENT 2030 PM PEAK LEVELS OF SERVICE	(HOUR
FIGURE 13: CRASH RATES AND CRASH LOCATIONS BY SEVERITY FIGURE 15: HUMAN ENVIRONMENT MAP FIGURE 17: CULTURAL HISTORIC OVERVIEW SURVEY FIGURE 18: SITES POTENTIALLY ELIGIBLE FOR THE NATIONAL REG HISTORIC PLACES	ISTER OF
FIGURE 19: NATURAL ENVIRONMENT MAP FIGURE 20: GEOLOGIC UNIT MAP FIGURE 21: ALL PRELIMINARY ALTERNATIVES FIGURE 22: CONCEPTUAL TYPICAL SECTIONS	
FIGURE 24: ALTERNATIVE 4A IMPACTS FIGURE 25: ALTERNATIVE 5A IMPACTS FIGURE 26: ALTERNATIVE 2A – US 51 AT US 62 FIGURE 27: ALTERNATIVE 2B – US 51 AT JENNINGS STREET FIGURE 28: ALTERNATIVE 2C – US 51 AT KY 123	
FIGURE 29: ALTERNATIVE 2D – US 51 AT CURVE BY METHODIST CH FIGURE 30: ALTERNATIVE 3 – RECONSTRUCT US 51	URCH