

# Kalamazoo Area Transportation Study 2035 Metropolitan Transportation Plan

## *Table of Contents*

Executive Summary .....	i
Acronyms .....	iv
<b>CHAPTER 1: INTRODUCTION .....</b>	<b>1</b>
Kalamazoo Area Transportation Study History .....	2
Kalamazoo Area Transportation Study Staff .....	3
Policy Committee Voting Membership .....	5
Technical Committee Voting Membership .....	5
<b>CHAPTER 2: GOALS AND OBJECTIVES .....</b>	<b>6</b>
<b>CHAPTER 3: EXISTING TRANSPORTATION SYSTEM FACILITIES .....</b>	<b>10</b>
Existing Major Roadways .....	10
Existing Public Transit .....	10
Existing Bicycle and Pedestrian Facilities .....	14
Airport .....	14
Rail .....	15
Intercity and Charter Bus Services .....	16
Taxicab/Limousine Services .....	16
Ridesharing .....	16
Other Transportation Providers .....	16
Kalamazoo Transportation Center .....	17
Identification of Existing Intermodal Connections .....	17
Existing Multimodal Transportation System .....	17
<b>CHAPTER 4: FREIGHT .....</b>	<b>18</b>
Importance of Freight Movement .....	18
Existing Companies and Infrastructure .....	22
Rail Freight .....	26
<b>CHAPTER 5: PROJECTED TRANSPORTATION DEMAND .....</b>	<b>27</b>
Methodology for Determining 2008 Base Data .....	27
Methodology for Determining 2035 Forecast Data .....	28
Methodology for Determining Intermediate Target Year Forecast Data .....	29
Statements of Error in the Forecasting Process .....	29
Future Updates .....	30
<b>CHAPTER 6: TRAVEL DEMAND MODEL .....</b>	<b>37</b>
Network .....	38
Socio-Economic Data .....	42
Trip Generation .....	42
Trip Distribution .....	44
Traffic Assignment .....	45
Model Calibration/Validation .....	45
Calibration Results .....	45
Applications of the Calibrated/Validated Model .....	46

<b>CHAPTER 7: DEFICIENCIES</b> .....	<b>47</b>
Capacity Deficiencies .....	47
Public Transportation System Deficiencies .....	52
<b>CHAPTER 8: OPERATIONAL AND MANAGEMENT STRATEGIES</b> .....	<b>54</b>
Overview of MDOT Management Systems Activities .....	55
Overview of KATS Management Systems Activities .....	55
The Transportation Management Systems Used by KATS and Local Agencies .....	55
Future Directions .....	58
<b>CHAPTER 9: PUBLIC PARTICIPATION</b> .....	<b>59</b>
2035 Transportation Plan Public Participation .....	61
<b>CHAPTER 10: ENVIRONMENTAL JUSTICE</b> .....	<b>69</b>
Environmental Justice Process .....	69
Environmental Justice Finding .....	70
<b>CHAPTER 11: CONSULTATION</b> .....	<b>76</b>
Summary of Consultation Letters .....	77
<b>CHAPTER 12: ENVIRONMENTAL MITIGATION</b> .....	<b>80</b>
Project Buffers by Resource Type .....	80
Best Practice Guidelines .....	81
Environmental Mitigation Finding .....	83
<b>CHAPTER 13: NON-MOTORIZED REVIEW</b> .....	<b>90</b>
Non-Motorized and Pedestrian Provisions in Legislation .....	90
Benefits of Non-Motorized Transportation .....	90
Types of Bicycle Facilities .....	91
Current Non-Motorized Facilities .....	92
Current Pedestrian Facilities .....	94
<b>CHAPTER 14: FINANCIAL PLAN</b> .....	<b>96</b>
History of Transportation Financing .....	97
Sources of Transportation Funding .....	97
Revenues Projected for the 2035 Transportation Plan .....	99
Transportation Expenditures .....	101
Illustrative Projects .....	103
Transportation Control Measures Contained in the State Implementation Plan .....	103
Comparison of Transportation System Revenues to Expenditures .....	103
Operation and Maintenance of the Transportation System .....	103
2035 Transportation Plan Financial Constraint .....	103
<b>CHAPTER 15: FUTURE TRANSPORTATION SYSTEM FACILITIES</b> .....	<b>104</b>
Future Major Roadway Facilities .....	105
Expand Projects .....	117
Future Public Transportation .....	121
Future Non-Motorized Facilities and Planning Efforts .....	124
Future Pedestrian Facilities .....	127
Other Future Intermodal Transportation Facilities .....	130
Freight .....	130
Airport .....	131
Rail .....	131

Intercity and Charter Bus Services . . . . .	132
Taxicab/Limousine Services . . . . .	132
Ridesharing . . . . .	132
Other Transportation Providers . . . . .	132
Identification of Future Intermodal Connections . . . . .	133
Future Multimodal Transportation System . . . . .	133
<b>CHAPTER 16: AIR QUALITY ANALYSIS . . . . .</b>	<b>134</b>
Air Quality Assessment Criteria . . . . .	134
Background . . . . .	135
Modeling Procedures . . . . .	136
Highway Performance Monitoring System (HPMS) Data . . . . .	137
Model Vehicle Miles of Travel (VMT) . . . . .	137
Model Speed . . . . .	139
Conformity Analysis . . . . .	140
Conformity Determination . . . . .	141
MPO Action . . . . .	142
<b>CHAPTER 17: UNFUNDED TRANSPORTATION PROJECTS AND NEEDS . . . . .</b>	<b>143</b>
Public Transportation System Illustrative Projects . . . . .	144
Illustrative Non-Motorized Facilities . . . . .	145
Summary of Illustrative Needs . . . . .	145
<b>CHAPTER 18: FUTURE METROPOLITAN PLANNING AREA . . . . .</b>	<b>147</b>
Defining the Metropolitan Area Boundary . . . . .	147
Other Areas Likely to Become Urbanized . . . . .	147

## Tables

Kalamazoo County Gross Regional Product Projections . . . . .	19
2008 and 2035 Demographic Data Comparison . . . . .	29
Kalamazoo County Population Estimates 2008 - 2035 . . . . .	32
Kalamazoo County Dwelling Units 2008 - 2035 . . . . .	33
Kalamazoo County Employment 2008 - 2015 . . . . .	34
Kalamazoo County Employment 2018 - 2025 . . . . .	35
Kalamazoo County Employment 2030 - 2035 . . . . .	36
Time Penalty Table . . . . .	39
Kalamazoo Cordon Information . . . . .	43
2008 Kalamazoo Area Trip Generation Summary . . . . .	44
2035 Kalamazoo Area Trip Generation Summary . . . . .	44
Vehicle Miles of Travel (VMT) Comparison vs. Targets by Link Classification . . . . .	46
Kalamazoo Area Travel Characteristics Network Summaries . . . . .	48
24-Hour Volume to 24-Hour Capacity Ratio by Group . . . . .	49
Segments with V/C Ratio 0.80 to 1.00 by Agency . . . . .	49
Capacity Deficient Segments to be Addressed Without Adding Lanes . . . . .	50
Kalamazoo County PASER Ratings 2009 - 2010 . . . . .	51
PASER Ratings - Federal Aid Road Miles by Year . . . . .	52
Fatal and Incapacitating Injury Crashes . . . . .	57
Environmental Justice Finding Summary . . . . .	70
Capacity Projects Within Environmental Justice Areas . . . . .	71
Environmental Factors near Capacity Projects . . . . .	84
Sources of Revenue for Plan Development . . . . .	98

2035 Transportation System Revenues .....	100
Total Transportation System Expenditures .....	102
Total Transportation System Revenues and Expenditures .....	103
Deficient Segments Addressed Without Added Lanes .....	106
2035 Transportation Plan Projects (2011 - 2035) .....	108
2035 Transportation Plan Capacity Projects - Kalamazoo County .....	119
2035 Transportation Plan Projected Expenses and Revenues - Public Transportation .....	122
Public Transportation 2035 Transportation Plan Projects .....	122
2010 - 2035 Identified Non-Motorized Pathway Projects .....	125
Key Missing Sidewalk Segments on Federal Aid System .....	127
Results for the Kalamazoo-Battle Creek-MI Maintenance Area 8 Hour Ozone Standard .....	136
Calhoun County Vehicles Miles of Travel .....	138
Kalamazoo County Vehicles Miles of Travel .....	138
Van Buren County Vehicle Miles of Travel .....	138
Calhoun County Speed .....	139
Kalamazoo County Speed .....	139
Van Buren Speed .....	139
Calhoun County Emissions .....	140
Kalamazoo County Emissions .....	141
Van Buren County Emissions .....	141
Results of Kalamazoo-Battle Creek-MI Maintenance Area 8 Hour Ozone Standard .....	142
Street/Highway System Illustrative Projects .....	143

## Maps

Kalamazoo County Street Network .....	4
Federal Aid Road Network .....	11
Kalamazoo Metro Fixed Route Service .....	13
Starting Point: Kalamazoo/Battle Creek Michigan .....	19
One Day of Travel (24 Hours After Start) .....	20
Two Days of Travel (48 Hours After Start) .....	20
Three Days of Travel (72 Hours After Start) .....	21
Four Days of Travel (96 Hours After Start) .....	21
Five Days of Travel (120 Hours After Start) .....	22
Locations of Manufacturing Businesses by Number of Employees .....	23
Locations of Transportation and Warehousing Businesses by Number of Employees .....	24
Locations of Large Waste Hauling Businesses .....	25
KATS 2035 Model Traffic Analysis Zones (TAZ) .....	31
KATS Model Network .....	40
KATS Urban Area Model Network .....	41
Capacity Projects and Low Income Populations .....	72
Low Income Populations and Kalamazoo Metro Transit Fixed Route Service .....	73
Capacity Projects and Minority Populations .....	74
Minority Populations and Kalamazoo Metro Transit Fixed Route Service .....	75
Capacity Projects Near Schools .....	85
Capacity Projects Near Parks .....	86
Capacity Projects Near Cemeteries .....	87
Wetlands Near Capacity Projects .....	88
Probability of Rare Species or High Quality Natural Community Within 1/4 Mile of Capacity Projects .....	89
Existing Non-motorized Facilities .....	93

Gaps in Pedestrian Facility Locations on Federal Aid Roads in Metropolitan Area .....	95
2035 Proposed Capacity Projects .....	118
Proposed Non-Motorized Facilities .....	126
Key Missing Sidewalk Segments on Federal Aid System .....	129

## **Appendices**

Appendix A: Public Hearing Notice .....	149
Appendix B: Resolution Adopting the 2035 Metropolitan Transportation Plan .....	150
Appendix C: Public Comment Announcement for Air Quality Test Results .....	151
Appendix D: Public Meeting Announcement for Draft 2035 Transportation Plan .....	152
Appendix E: Solicitation for Comments .....	153
Appendix F: KATS Website Transportation Plan Update Announcements .....	154
Appendix G: PowerPoint Presentation Slides Used During Information Meetings .....	155
Appendix H: Consultation Request Letter .....	158
Appendix I: Consultation Response Letters .....	159

Appendix J: Air Quality Conformity Demonstration Readout (Separate Document)