Mississippi's Unified Long-Range Transportation Infrastructure Plan

FINAL REPORT

Appendix K: Economic Impact Analysis

MAY 2011

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1. INTRODUCTION

This report presents the estimated economic impacts within the State of Mississippi resulting from the capital expenditures on transportation infrastructure projected for the 2035 Statewide Multimodal Long-Range Transportation Plan for Mississippi (MULTIPLAN 2035). Derived economic impacts for the State are presented by transportation modal-related expenditures, economic impact variable and type, and time period.

Injection of capital infrastructure spending into the State economy leads to direct construction-related jobs, as well as to indirect jobs related to industries supporting the construction through supplying materials and equipment. In turn, these direct and indirect jobs support additional jobs within the region's economy (induced impacts), all of which, in combination, can generate a boost to the State economy.

Capital expenditures on transportation support the creation of new, and retention of existing, construction jobs, and contribute to the total economic production (value added) of the impacted economy. As transportation expenditures are made within the construction industry, the construction industry, in turn, purchases intermediate production inputs from the other industries in the rest of the regional economy. As a result, and as the other non-construction industries in the economy follow-suit by making further intermediate production input purchases, the initial construction expenditures trickle throughout the State, economically impacting the affected geography beyond just the construction industry.

Based on estimated direct capital expenditures, the total economic impacts, as measured in terms of employment and value added economic activity are derived by means of utilizing an economic impact assessment modeling software program: IMPLAN® Professional 3.0.

2. METHODOLOGY

Provided with inputs identifying estimated capital expenditures over the planning time periods, and by transportation mode, the resulting total economic impacts are calculated utilizing the social accounting and impact analysis computer software, developed by the Minnesota IMPLAN Group, Inc.; the IMPLAN Professional 3.0 model (IMPLAN®) – a model summary description is provided within **Appendix A**.

Estimated capital expenditures are entered into IMPLAN® to calculate the respective total economic impacts of the direct expenditures. All input data runs through the internal social account matrix to account for industry interdependencies.

2.1 Modeling Inputs – Capital Expenditures

Total periodical capital expenditure estimates were developed separately for each of the transportation modes and by each of the seven time intervals through the 2035 planning horizon, as shown in **Table 2-1**. The grand total projected capital expenditures on all applicable modes amount to almost $14.5 billion (expressed in constant 2008 dollar terms).

Table 2-1: Capital Expenditures with Conservative Funding Projections by Mode

Mode	'08-'11	'12-'15	'16-'19	'20-'23	'24-'27	'29-'31	'32-'35	Total
Highways	$1,704	$1,380	$1,325	$1,271	$1,220	$1,171	$1,124	**$9,195**
Bridges	$537	$378	$362	$349	$334	$321	$308	**$2,589**
Transit	$176	$154	$148	$142	$136	$131	$126	**$1,013**
Bicycle/Pedestrian	$23	$21	$21	$20	$19	$18	$18	**$140**
Aviation	$232	$243	$234	$225	$216	$208	$200	**$1,556**
Total	**$2,672**	**$2,176**	**$2,089**	**$2,007**	**$1,926**	**$1,849**	**$1,775**	**$14,493**

Note: The amounts are in millions of 2008 constant dollars

Source:
Highways: TM 6, Highway and Bridge Need Assessment, Table 3-6.
Bridges: TM 6, Highway and Bridge Needs Assessment, Table 5-3
Transit: TM 5, Baseline Revenue Forecasts, Table 9-3 (plus expenditures between 2008 and 2010, inclusive)
Bicycle/Pedestrian: Assumes 50 percent of Transportation Enhancement Funds and Recreational Trails Funds
Aviation: TM5, Baseline Revenue Forecasts, Table 9-3 (plus expenditures between 2008 and 2010, inclusive)

2.2 Terms and Definitions

Economic impacts calculated with the application of the IMPLAN® model include employment and economic activity impacts. All dollar-value economic impacts (i.e., economic activity/value added) pertaining to this analysis and are shown in constant year 2008 dollars (in thousands), rounded to the nearest $100,000.

Industry-specific expenditures (model inputs) are spent within the defined impact areas and then circulated throughout these impact areas. Spending and the circulation of industry-specific expenditures result in direct, indirect and induced economic impacts in terms of the following indicators: employment and economic activity. ***Employment*** refers to the number of job-years created[1]. ***Economic activity/value added*** is the dollar value measure of the supplementary contribution to the intermediate production inputs of the final goods and services produced within the defined impact area. In a geographically defined impact area, value added is the measure of the total additional, dollar-value inputs into the production process. In

[1] Employment impacts estimated are presented in job-years, and the cumulative total employment impact over the analysis period does not necessarily reflect the total number of employed *persons* impacted resulting from the transportation developments. Because IMPLAN® is a static model, the economic impacts are a snapshot in time (i.e., one year snapshots) and thus, the model is incapable of identifying which precise employment impacts carry from one year to the next. Resultantly, the annual employment impacts, measured in job-years, may be accounting for the same employed person over multiple years in the analysis, or alternatively, the same employment position with personnel turnover. Impacts in terms of the number of total employed persons resulting from transportation developments (though incalculable from the estimated job-years without an application of a loose assumption pertaining to the average length of employment, which varies by industry) are below the estimated total job-years, because invariably some of the employed persons are employed for more than one year.

macroeconomics, value added refers to the contribution of the factors of production, i.e., labor, and capital goods, to raising the value of a product.

Direct impacts are impacts that affect only the specific industry in which expenditures are spent or job-years generated, i.e., the direct impacts resulting from construction expenditures occur only within the construction industry. ***Indirect and induced impacts***, commonly referred to as ***multiplier*** impacts, occur in all other applicable industries within the defined impact area (via industry interdependencies). Purchases of goods and services by the construction industry from other industries and the purchases by those industries, in turn, of goods and services from other industries create the *indirect* impacts. *Induced* impacts are the result of the purchases by employees and proprietors with earned labor income received from the directly and indirectly impacted industries. *Total* economic impacts are the cumulative direct, indirect, and induced impacts.

IMPLAN® is a static model, with the economic impacts estimated only for a specific time period. It is incapable of estimating changing economic impacts beyond one-year intervals. Economic impacts calculated by IMPLAN® in this analysis are expressed and represent impacts only during the capital spending timeframe, based on expenditures in those years. Because the construction expenditures do not occur in perpetuity, the estimated economic impacts will only occur once, during the expenditure years, and thereafter, eventually taper off.

3. IMPACTS FINDINGS

IMPLAN® estimates the following impact variables: employment and economic activity/value added impacts, resulting from the projected direct capital expenditures. These impacts are only expenditure based, and do not include other impact types such as those related to travel efficiency savings or additional development in the State that would also be expected to occur.

Impact estimates are calculated through a model application once the direct capital expenditures are applied to the appropriate industry sector and the model run. Presented below are the associated expenditures-related economic impacts with multiple dimensions. These include impacts by transportation mode, impact variable (i.e., job-years and economic activity), variable type (i.e., direct and total), and time period. In addition, the cumulative total for the overall period is presented[2].

3.1 Employment Impacts

As shown in **Table 3-1**, the projected direct capital expenditures are expected to yield a cumulative total of about 113,430 *direct* job-years (ranging from 1,100 job-years related to pedestrian/bike programs to almost 72,000 highways-related job-years across the entire planning horizon) in the State. The corresponding cumulative planning period sum of the *total* (i.e., inclusive of the multiplier effects) job-years in Mississippi is projected at 189,930, ranging from

[2] Cumulative employment impacts across the analysis horizon are measured in job-years (see footnote 2).

a cumulative period total of 1,840 in case of the pedestrian/bike programs to over 120,000 job-years for the highway mode statewide.

Table 3-1: Employment Impacts

Impact Measure		Years							Cumulative Period Total
	Mode	'08-'11	'12-'15	'16-'19	'20-'23	'24-'27	'29-'31	'32-'35	
Direct Effect	Highways	13,330	10,800	10,370	9,950	9,550	9,170	8,800	71,970
	Bridges	4,200	2,960	2,830	2,730	2,610	2,510	2,410	20,250
	Transit	1,380	1,200	1,160	1,110	1,070	1,030	990	7,940
	Bicycle/Pedestrian	180	170	160	160	150	140	140	1,100
	Aviation	1,810	1,900	1,830	1,760	1,690	1,620	1,560	12,170
	Total	**20,900**	**17,030**	**16,350**	**15,710**	**15,070**	**14,470**	**13,900**	**113,430**
Total Effect	Highways	22,330	18,080	17,360	16,660	15,990	15,350	14,730	120,500
	Bridges	7,040	4,950	4,740	4,570	4,380	4,200	4,030	33,920
	Transit	2,310	2,010	1,940	1,860	1,790	1,720	1,650	13,280
	Bicycle/Pedestrian	300	280	270	260	250	240	230	1,840
	Aviation	3,030	3,180	3,060	2,940	2,830	2,720	2,620	20,390
	Total	**35,010**	**28,520**	**27,370**	**26,300**	**25,240**	**24,230**	**23,270**	**189,930**

Source: Wilbur Smith Associates' application of the Minnesota IMPLAN Group, Inc. IMPLAN Pro model.

**Employment is measured in job-years, rounded to the nearest ten job-years.*

3.2 Economic Activity Impacts

As shown in **Table 3-2**, the economic activity impacts related to the transportation expenditures by mode in the State is projected to amount to about $4.65 billion in terms of *direct* value added, and almost $9.3 billion in *total* value added to the State, with the modal pattern of contribution to the total estimate similar to the compositional scheme for employment.

Table 3-2: Economic Activity Impacts

Impact Measure		Years							Cumulative Period Total
	Mode	'08-'11	'12-'15	'16-'19	'20-'23	'24-'27	'29-'31	'32-'35	
Direct Effect	Highways	$547,100	$443,100	$425,300	$408,200	$391,800	$376,100	$361,000	$2,952,700
	Bridges	$172,400	$121,400	$116,200	$112,100	$107,200	$103,000	$98,900	$831,200
	Transit	$56,500	$49,300	$47,400	$45,600	$43,800	$42,100	$40,500	$325,200
	Bicycle/Pedestrian	$7,400	$6,900	$6,600	$6,400	$6,100	$5,900	$5,700	$45,000
	Aviation	$74,400	$78,000	$75,000	$72,100	$69,300	$66,700	$64,100	$499,600
	Total	**$857,800**	**$698,800**	**$670,600**	**$644,400**	**$618,300**	**$593,800**	**$570,200**	**$4,653,800**
Total Effect	Highways	$1,092,700	$885,100	$849,500	$815,400	$782,600	$751,200	$721,000	$5,897,600
	Bridges	$344,400	$242,400	$232,200	$223,800	$214,200	$205,800	$197,400	$1,660,200
	Transit	$112,900	$98,500	$94,700	$91,000	$87,500	$84,100	$80,900	$649,600
	Bicycle/Pedestrian	$14,800	$13,800	$13,200	$12,700	$12,200	$11,800	$11,300	$89,800
	Aviation	$148,500	$155,900	$149,800	$144,000	$138,500	$133,100	$128,000	$997,900
	Total	**$1,713,400**	**$1,395,700**	**$1,339,500**	**$1,287,000**	**$1,235,100**	**$1,186,000**	**$1,138,600**	**$9,295,300**

Source: Wilbur Smith Associates' application of the Minnesota IMPLAN Group, Inc. IMPLAN Pro model.

**Economic Activity is measured as the value added dollar production, presented in thousands of 2008 dollars (rounded to the nearest hundred thousand).*

4. CONCLUSION

In summary, capital transportation expenditures included in MULTIPLAN 2035 will bring significant employment and economic activity generation to the economy of the State of Mississippi. Statewide, the total cumulative employment impacts from 2008 through year 2035 are projected to sum to about 190,000 job-years, with the corresponding economic activity/value added of about $9.3 billion.

APPENDIX A: IMPLAN® MODEL SUMMARY DESCRIPTION

IMPLAN® Professional 3.0 is an economic modeling, input-output based, social account matrix software with the capability of estimating the economic impacts to a defined geography ensuing from expenditures in an industry or group of industries. A social account matrix reflects the economic interrelationships between the various industries, households, and governments in an economy and measures the economic interdependency of each industry on others through impact multipliers. Impact multipliers are internally developed within IMPLAN®, derived from the regional purchase coefficients, production functions, and socioeconomic data for the defined economy, for each of the economic impact variables and are geographically-specific.

Although a capable model for determining the annual economic impact from expenditures within an industry or group of industries, a limitation of IMPLAN® is that it is static, since it estimates impacts only for a specific annual period – without any dynamic effects. An underlying assumption of the model is that the economic impacts will occur only in the year in which the expenditures occur and would not carry over into subsequent years, which could occur in certain instances.

Another limitation of this economic impact analysis is that the IMPLAN® model does not account for economic impacts beyond the predefined study area resulting from expenditure leakages outside that study area, despite the fact that expenditure leakages outside the study area result in economic impacts there. It is assumed that the economic impacts to the defined study area resulting from expenditure leakages outside the defined area are relatively negligible.

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