Investing in Maryland's Transportation Infrastructure: The Costs and Benefits to Workforce and Family

by
David R. Ellis, Ph.D.
and
Sharada Vadali, Ph.D.

Texas Transportation Institute
The Texas A&M University System
College Station, Texas

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Texas Transportation Institute

Report Highlights

- An efficient and reliable transportation system is itself not sufficient to guarantee a strong, competitive economy, but it is necessary. And the necessity is greater today than ever before.

- On a statewide basis (including the Baltimore urban area, the suburban areas of Washington, D.C. within the state of Maryland, and the rest of the State), it is estimated that total congestion costs are over $3.0 billion per year.

- In the Baltimore area alone, it is estimated that almost 60 million hours annually are spent sitting in traffic. As a result, over 40 million gallons of fuel are wasted. The total cost of traffic congestion is in excess of $1 billion per year. And it's getting worse.

- In Washington, D.C. metro area, the total cost of roadway congestion exceeds $2 billion annually including over 120 million hours of delay and 90 million gallons of wasted fuel.

- The reason congestion is getting worse is simple. Since 1982, the number of peak-period travelers has increased by **71 percent**. Daily vehicle miles traveled has increased an estimated **135 percent**. But, the number of lane-miles of freeways and principal arterial streets has increased by only **35 percent**. The cost of congestion has increased by almost **1,200 percent**.

- A **$600 million annual increase in transportation investment** will create **8,100 jobs** and produce an estimated **$1 billion in annual savings and benefits** – saving 1.8 million gallons of fuel and 2.6 million hours of delay each year.

- A **$400 million annual increase in transportation investment** will create **5,300 jobs** and produce an estimated **$637 million in annual savings and benefits** – while saving 1.2 million gallons of fuel and 1.7 million hours of delay each year.

- The benefits outlined here continue to accrue so long as the investments are made.

- Over the next 25 years, continuing on the **present course of action will mean:**

    - **45 million gallons of wasted fuel;**
    - **65 million hours stuck in traffic; and**
    - **$10.8 billion in lost economic opportunity.**

The Roadway System and the Economy: The Critical Link

"It is not the wealth of a nation that builds roads, but the roads that build the wealth of a nation." ***President John F. Kennedy***

Over the years, transportation in the United States has transitioned through four phases of development.

In the 18th century, water transportation was the backbone of the emerging colonial colonies. Indeed, it was cheaper to ship goods from England than to move them just a few miles inland once they arrived. As a result, development was limited to the coastal areas in large part because there was no cost effective way to distribute goods.

In the 19th century, rail helped make inland settlements possible and facilitated trade between the more established coastal cities and the emerging inland communities. Indeed, rail helped in the formation of the first inland regional centers of commerce.

In the 20th century, a road network flourished with the mass adoption of the automobile for personal transport and trucks for the movement of freight. In the second half of the 20th century, the advent of the interstate system effectively connected all of the 48 continental states in a national grid of roadways.

The late 20th century and into the 21st century has seen the development of a global economy, built on increasingly intense and price-sensitive global supply chains that allow companies of all sizes to compete in a truly international economic environment.

Through it all, the efficient movement of both people and goods has served as an integral component in this Nation's development.

To get a better appreciation for current trends and the importance of transportation to the success of the Maryland economy, let's look at the mobility issue from two different perspectives.

A macroeconomic (or large scale) view of the role of transportation and the economy tells us that transportation contributes to increases in capacity, efficiency and reliability in the movement of goods and people. The result is savings in cost and time. These savings increase productivity which, in turn, increases competitiveness. The result is economic growth. Conversely, the absence of capacity, efficiency and reliability in a transportation system causes cost increases – making businesses less competitive in regional, national and the international economy.

A microeconomic view (at the company or industry level) provides an even sharper focus through two examples – just-in-time inventory and the "pull" distribution system.

Just-in-time inventory is a relatively new concept in supply chain management that is critically dependent on an efficient and reliable transportation system. The benefit of just-in-time inventory is that it reduces inventory costs significantly, allowing businesses to be more competitive. But the concept came about only because firms believed the transportation system to be reliable enough to risk the shutdown of production lines if materials failed to arrive on schedule. Conversely, if the system becomes unreliable, inventories must rise to cover uncertainty, which, in turn, increases inventory costs and consumes capital that could be used elsewhere. As a result, production costs rise with increased inventory costs resulting in price increases and loss of market share and profit. With loss of market share and profit comes the loss of jobs.

The advent of the "pull" distribution system has the same characteristics. The "pull" system is very dependent on a reliable transportation system to "pull" products from manufacturers, warehouses or distribution centers as they are needed and delivered to manufacturing facilities or retailers. Before the "pull" system, products were "pushed" from the manufacturer or warehouse to retailers who maintained an inventory – and absorbed the costs associated with the inventory. Today, the "pull" system allows companies to keep inventory costs to an absolute minimum, but again, only because of an efficient and reliable transportation system to make it all work.

Indeed, in today's economy, facility siting and/or expansion decisions are often made based on the reliability of transportation systems and facilities.

But that's not all. This brief discussion has so far dealt only with system reliability. There is also the issue of system capacity – in other words, the size of the roadway network versus the number of vehicles trying to access it.

It is one thing for businesses to try to increase their own reliability in the delivery of goods and services by avoiding the morning and evening rush hours. Today, that is much more difficult to do. One of the major trends throughout metropolitan regions in the U.S. relative to mobility is the expansion of the traditional rush hours into other times of day. In Baltimore, for example, "rush" hour lasted a little over three hours per day in total in 1982. By 2003, that figure had grown to almost eight hours per day. Increased delivery times due to lack of system capacity increase costs with the effects as they do with lack of reliability. (The next section of this report will discuss mobility trends in Maryland in greater detail).

The same issues regarding capacity and reliability that affect manufacturing facilities also affect retail facilities. The phrase "location, location, location" has forever been the buzz word for real estate development in general, but particularly in the case of retail development. When it becomes too difficult to access a facility, either because it takes too long to get there or customers can't count on how long it will take to get there, sales suffer. From another perspective, when people can't access facilities or it gets too difficult to access retail facilities, the area becomes a less desirable place to live. The same issues affect individuals on a personal level with their personal travel – whether it's the time and trouble associated with their daily commutes to work or in other aspects

of daily life. When costs, whether in time or fuel, or in the general unreliability of a system become too great, the area becomes a less desirable place to live. When that occurs, it closes the economic loop. Here's how it can happen.

For many years, in surveys of corporate executives involved in relocations decisions, the same issues show up as the most important criteria for siting a facility and/or the desirability of particular location: an educated workforce, a fair tax system and access to markets.

Access to markets becomes jeopardized when companies can't count on a reliable and efficient transportation system. When the same system begins to deteriorate the quality of life for residents, they seek to live somewhere else. When residents seek to live elsewhere, the city loses its tax base and must increase taxes to provide consistent services. Businesses then face the inability to access markets, the inability to access a qualified workforce and a tax system that hurts their profitability – all because of the lack of a reliable and efficient transportation system.

Clearly, transit can play an important role in mitigating capacity and reliability issues with respect to personal travel. However, it is important to remember that despite transit's important role, many trips are extremely difficult, if not impossible, to conduct by any other means of transport other than private automobile on the public roadways. Retail trips on transit are difficult in terms of handling bags and boxes and persons who need to link several trips together (work-daycare-grocery store-home) often have no other choice but to use an automobile. And nothing can yet replace a reliable roadway system for the delivery of goods and services.

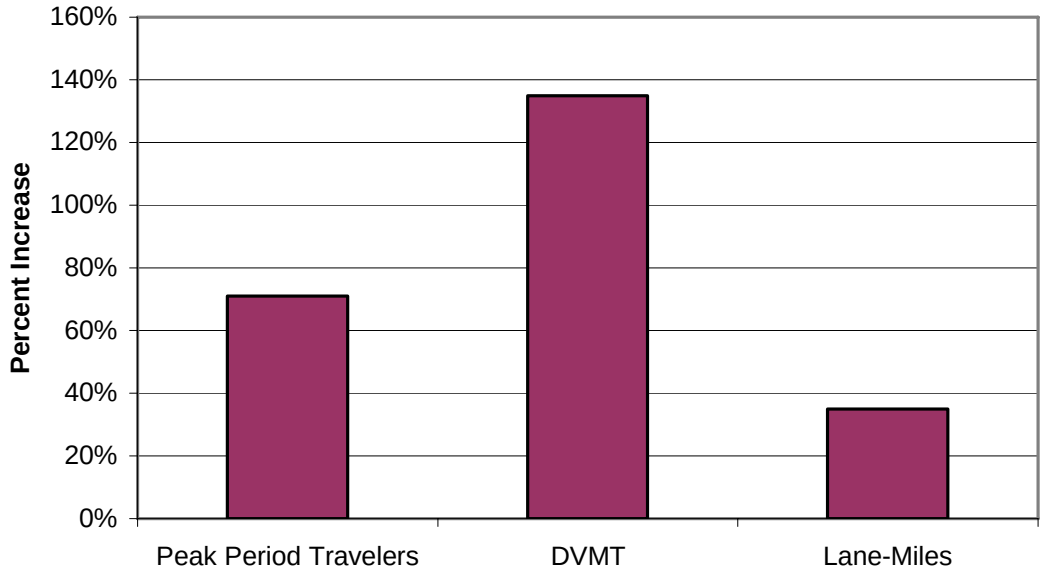
An efficient and reliable transportation system is itself not sufficient to guarantee a strong, competitive economy, but it is necessary. And the necessity is greater today than ever before.

Time and Money: Roadway Congestion in Maryland

On a statewide basis (including the Baltimore urban area, the suburban areas of Washington, D.C. within the state of Maryland, and the rest of the State), it is estimated that total roadway congestion costs the citizens of Maryland over $3.1 billion per year.

In examining the travel, population, and roadway capacity trends from 1982 to 2003, the reason for traffic congestion becomes clear. Since 1982, the number of peak-period travelers has increased by 71 percent. Daily vehicle miles traveled has increased an estimated 135 percent. However, the number of lane-miles of freeways and principal arterial streets has increased by only 35 percent. In short, the number of travelers and the number of miles they travel has increased significantly faster then the amount of roadway available. The result is that the cost of congestion has increased by almost 1,200 percent since 1982.

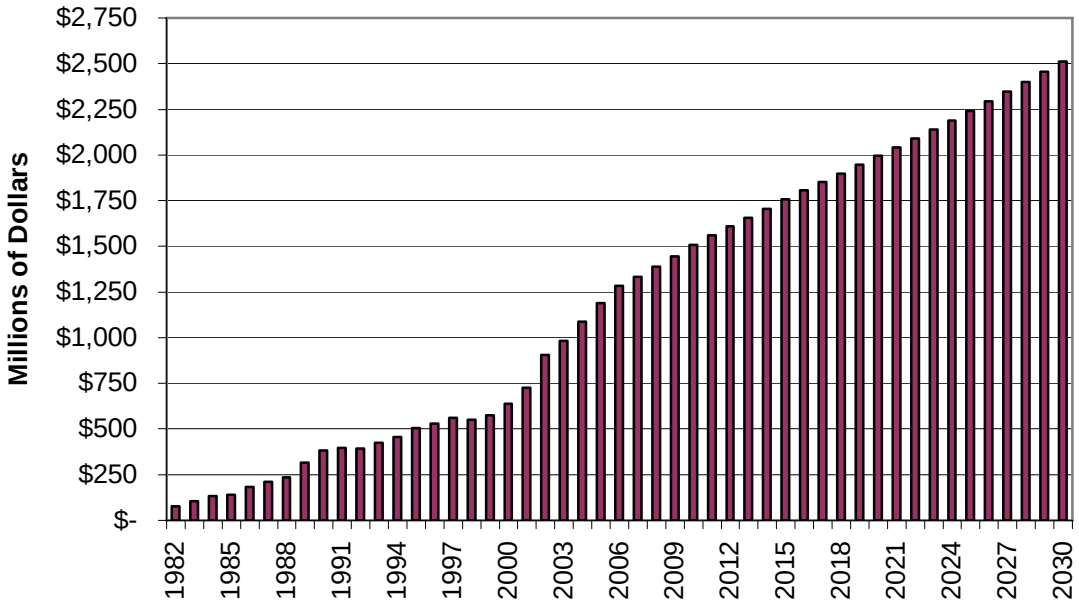
Percent Increase in Peak Period Travelers, Daily Vehicle Miles Traveled and Lane-Miles from 1982 to 2003



Note: DVMT = Daily Vehicle Miles Traveled

In 2003, in the Baltimore area alone, it is estimated that almost 60 million hours annually are spent sitting in traffic. As a result, over 40 million gallons of fuel are wasted. The total cost of congestion was almost $1 billion per year. While official data for the period 2004 to 2006 has not yet been released, early analysis indicates congestion costs are now in excess of $1 billion annually in Baltimore alone and, given current trends, could rise to $2.5 billion by 2030.

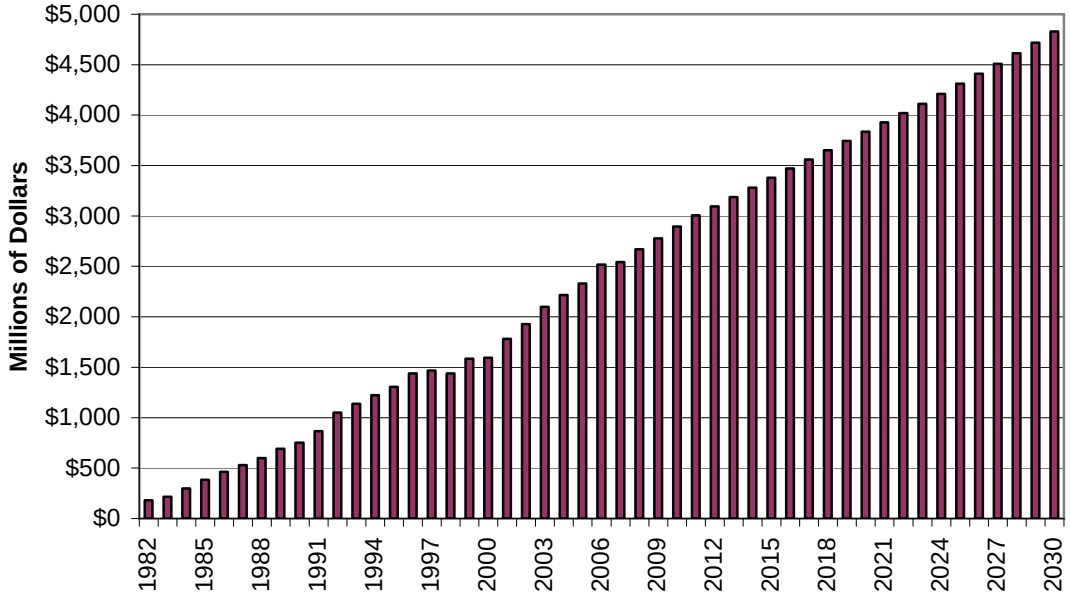
Total Estimated and Projected Congestion Cost:
Baltimore Urban Area, 1982 to 2030



Every year, each of Baltimore's 1.2 million commuters spends in excess of an entire work week stuck in traffic. On an individual basis, traffic congestion costs each peak period traveler over $800 per year.

Much the same is true in the Washington, D.C. urban area, where many of the suburbs lay within the State of Maryland. In Washington, D.C., congestion costs have grown from $182 million in 1982 to over $2 billion in 2003 and with current trends could grow to over $5 billion by 2030. Total delay has grown from 20 million hours in 1982 to over 120 million hours in 2003, with the amount of wasted fuel increasing from 12 million gallons to almost 90 million gallons. On a per traveler basis, the average commuter spent 16 hours stuck in traffic in 1982. In 2003, the annual delay per period traveler had increased to almost 60 hours.

Total Estimated and Projected Congestion Cost:
Washington, D.C. Urban Area, 1982 to 2003



Note: Congestion costs shown above for Washington, D.C. also include parts of Virginia as well as the District of Columbia.

All of this information is not to suggest that Maryland is the only state with significant traffic congestion problems. Clearly, that is not the case. Indeed, the problems faced by the citizens of Maryland relative to traffic congestion are a product of growth and affluence. The state's economy is healthy, and more growth is expected in the future. But, with this growth come challenges. As the state moves into a new era of labor force and business environment change, a new set of factors will serve to guide economic development. One of these will be the need to attract skilled workers. In many cases these workers will be working in fields, such as high technology and services, in which they can chose to live almost anywhere. Quality of life issues – mobility, beautification, housing affordability, school quality and transportation – will be the keys to successfully competing for and retaining this future work force.

As noted in the previous section, much the same is true with businesses. Increasingly their livelihood depends on their ability to compete in a time-sensitive and cost-sensitive environment of which the transportation system is the backbone.

The future of Maryland is tied to the economic health of its metropolitan regions. And in many ways, the health of Maryland's metropolitan regions is tied to transportation. This report serves to briefly examine the relationship between transportation investment and economic benefits.

What If?

The preceding sections of this report have examined the importance of the relationship between transportation and economic growth as well as looked at the effects and costs of roadway congestion in Maryland. This section of the report examines the results of asking a series of "what if" questions. For example, what if Maryland increased transportation expenditures by $600 million per year? Alternatively, what if the State increased transportation expenditures by $400 million per year? What are the economic benefits associated with the expenditures in comparison to the cost? In other words, what do we get for our investment?

First, as noted, alternative scenarios were examined. They are as follows:

- Increase transportation expenditures by $600 million annually; and

- Increase transportation expenditures by $400 million annually.

Within each of the two scenarios mentioned, the impact of both the total amount of increased spending on transportation and the impact of that portion of the total amount spent on roadways were examined.

Second, benefits that accrue to the economy as a result of improvements to the transportation system generally fall into five main categories. The categories of benefits are as follows:

- The economic impact of the construction activity expressed in terms of increased employment, income and contribution to the state economy.

- Savings from increased economic efficiencies as a result of improving mobility. These savings come from lower production costs for businesses resulting from lower delivery costs of both inputs and finished goods.

- The economic impact of the increase in economic efficiencies resulting from these lower costs mean businesses can offer more competitive prices which translate into a larger market share. That, in turn, generates more demand for products, more production, increased employment, income to employees, and profits to the business.

- Time savings to individuals as a function of reduced commute times and an increase in travel speeds.

- Fuel savings to individuals as a result of more efficient fuel burn from lower congestion levels.

To see how the benefits are calculated and what they mean, let's examine one of the "what if" scenarios.

What Is the Impact of Increasing Transportation Spending $600 Million Annually?

If Maryland were to increase transportation expenditures by $600 million per year, based on historical spending patterns, approximately 34.3 percent of that amount (or about $206 million) per year would be spent on construction of new roadways.

In calculating the economic impact of that expenditure, we first look at the impact of the construction activity itself (see Exhibit 1 below).

To arrive at a result of the economic impact of construction, the estimated amount that might be spent in Maryland under a series of alternatives was examined. These alternative scenarios were used to estimate the change in the value of production in the Maryland economy for the purpose of calculating economic impact.

As seen in Exhibit 1, an additional $600 million in annual transportation expenditures could be expected to have an annual economic impact of approximately $944 million on the Maryland economy.

Exhibit 1: New Jobs, Annual Income Increase and Total Economic Impact from $600 Million in New Annual Transportation Expenditures

New Annual Expenditures on Transportation:	**$600 million**
NEW JOBS	
Direct:	4,712
Indirect and Induced:	3,394
Total Direct, Indirect and Induced Jobs:	8,106
ECONOMIC ACTIVITY	
Increase in Economic Activity Economy-Wide	$ 944 million

Note: Job creation numbers used in the report are related to transportation investment only and do not consider the loss of jobs as a result of other tax increases.

How does an annual expenditure of an additional $600 million on roadways ultimately generate $944 million in economic impact? Using an input/output model that replicates the Maryland economy, the additional expenditure of $600 million per year generates jobs in order for the work to be accomplished, in this instance an estimated 8,100 jobs.

Note: Calculations of employment and economic impact were performed by the authors using IMPLAN Professional Version 2.0, Social Accounting and Impact Analysis Software. All other calculations including business savings, economic impact of business savings, delay and fuel cost were performed by the authors based on previous research done by the Texas Transportation Institute.

The $944 million increase in economic activity includes the primary, secondary, and tertiary effects of spending $600 million on transportation improvements.

This economy-wide impact includes direct impacts such as spending on labor, equipment, and materials on the construction activity. It would also include secondary impacts such as the spending by those who earn salaries from work performed directly or indirectly as a result of the construction activity. Finally, it includes the effects of income/spending by those who received income from the expenditures of those who were directly or indirectly associated with construction activity.

There are other impacts as well. For example, the primary reason, of course, for making the expenditures in the first place is to improve mobility. One of the major ways that improving mobility manifests itself in an economic sense is in improving business efficiencies. As an illustration, if it takes a delivery truck only 30 minutes to make a delivery instead of 45 minutes, there are savings in fuel and operating expenses because trucks run more efficiently at normal speeds as opposed to a stop and go environment. In addition, there are savings in driver time, allowing more deliveries to be made in an 8-hour day. These, and other similar factors, have the effect of reducing production costs. Lower production costs make goods less expensive and affect consumption in a positive way for business. Further, because Maryland companies compete not only in the national but international economy, the cost savings from improved mobility make Maryland goods more competitive in other, larger markets.

In previous research, (Nadiri and Mamunaes, 1998), the return on investment to the general economy of roadway expenditures was estimated to be approximately 10 percent annually in the mid-1990s. That is to say that for every $100 spent on roadways, there are $10 per year in increased economic efficiencies in producer benefits alone. The return on non-local investments (inter-city and inter-regional roadways) was reported at 16 percent. Further, that increased efficiency continues to occur every year as long as the roadway improvement is maintained.

For the purposes of this study, the return on investment was calculated at 6 percent rather than 10 percent. This reduction was adopted because the general trend since the advent of the Interstate Highway System is that return on investment has declined. If that trend has continued since the 1990s, when the last benchmark of 16 percent was established, using a 6 percent return would be a relatively safe, conservative estimate. Further buttressing this assumption is the fact that very recent studies by the same authors note that the annual return to roadway investments was 10 percent inclusive of both producer and consumer benefits. The notion of diminishing returns stands to reason in that the second and subsequent links between two or more markets has a smaller economic impact than the establishment of the first link between those markets. (It should also be noted that some believe this trend in declining return on investment may be reversing to some degree, primarily because of the increased time-sensitive demands of just-in-time inventory practices. No empirical evidence as yet has been published). Analogous data on return to business efficiencies relative to port, airport and transit expenditures is often highly variable given local conditions and the nature of

specific projects. However, assessing broad trends for total return on port, airport, and transit expenditures, it is believed that for the purposes of this analysis, the 6 percent return on investment figure used for highways is a reasonable and conservative estimate to apply to transportation investments in other modes.

When the 6 percent rate of return is applied annually to the $600 million average investment, an increase in business efficiency is created that has an estimated value of $35 million over the same period. Again, the increase in efficiency continues to occur every year as long as the roadway improvement is maintained.

Finally, the $35 million in improved efficiency has an economic impact itself. Once again using input/output modeling techniques, the impact is estimated to be $3 million annually (see Exhibit 2 below). (Note: In all exhibits, results are rounded to the nearest million dollars).

Exhibit 2: Benefits to the Economy of Improving Business Efficiencies Through Increased Mobility ($600 million scenario)

Annual Benefits of Improving Business Efficiencies	**$ 35 million**
ECONOMIC ACTIVITY	
Change in Economic Activity for the State	$ 3 million

Another benefit of improving mobility is the reduction of delay and fuel consumption. As discussed in the previous section, in the Baltimore area alone, it is estimated that commuters spend over 60 million hours annually stuck in traffic and while doing so will waste almost 40 million gallons of fuel each year. Increasing roadway capacity, however, can improve traffic speeds which, in turn, reduces commute time and fuel waste. For example, it is estimated that if an additional $206 million is spent in adding roadway capacity (again, 34.3 percent of the $600 million investment), almost 2.6 million hours of driver delay and over 1.8 million gallons of fuel statewide can be saved annually – with a combined estimated value of an estimated $29 million. These calculations, however, only cover personal travel. There are costs to businesses as well in terms of operating costs and excess fuel burn. With the improvements, an estimated $17 million in commercial fuel and operating costs could be saved. (Commercial fuel and operating costs are determined based on the percentage of commercial traffic versus private vehicle traffic. Additionally, commercial costs include labor and fuel as well as ancillary costs such as maintenance, insurance and depreciation. Current commercial costs are estimated to be $77.10 per hour).

Exhibit 3 below shows a recap of all of the costs and savings including delay costs. In sum, under the scenario whereby Maryland invests $600 million annually in transportation improvements, the total annual economic benefit is estimated to be $1.03 billion – a benefit cost ratio of approximately 1.77 to 1.

Exhibit 3: Summary of Average Annual Benefits of Increasing Transportation Spending by $600 Million per Year

Cost:	Dollars
Increased Transportation Investment	$ 600 million
Savings and Benefits:	
Economic Impact of Improvements	$ 944 million
Increased Economic Efficiencies to Business	$ 35 million
Economic Impact of Business Savings	$ 3 million
Fuel Savings	$ 4 million
Time Savings	$ 25 million
Commercial Truck Time and Fuel Savings	$ 17 million
TOTAL SAVINGS AND BENEFITS	**$ 1,030 million**
INCREASTED TRANSPORTATION INVESTMENT	**$ 600 million**
NET ANNUAL ECONOMIC BENEFIT	**$ 430 million**
Gallons of Fuel Saved	1.8 million
Hours of Delay Saved	2.6 million

Note 1: Economic Impact of Improvements includes direct impacts such as spending on labor, equipment, and materials on the construction activity; secondary impacts such as the spending by those who earn salaries from work performed directly or indirectly as a result of the construction activity; and the effects of income/spending by those who received income from the expenditures of those who were directly or indirectly associated with construction activity.
Note 2: Benefits and savings are slightly less in the early years of a 25-year planning horizon and slightly greater in later years. Consequently, a mid-point year is chosen to represent the "average" annual benefits.

Finally, not included in these calculations are the environmental benefits associated with improved roadway system performance. Reducing the frequency of stop-and-start congestion and well as driving at more optimal speeds has positive environmental impacts in terms of emission levels. Also, because of the limitations of the modeling process at this level of analysis, the full feedback effects of user benefits and environmental effects on the economy are not considered. As a result, if anything, the results presented here are conservative estimates. Also not considered are safety related impacts and quality-of-life effects (from emission level changes, fewer hours spent commuting resulting in more discretionary time, etc.) stemming from capacity investments since there is no simple way of addressing these impacts with the data available for this analysis.

What Is the Impact of Increasing Transportation Spending $400 Million Annually?

Exhibits 4 through 6 examine another "what if" scenario. What if Maryland invested an additional $400 million per year in its transportation system instead of $600 million?

With Exhibits 4 through 6 are in the same format as in the preceding scenario, Exhibit 4 shows that the total economic benefit of investing an additional $400 million per year in

transportation improvement, including $137 million in roadway improvements ($400 million x 34.3 percent) is estimated to be $629 million annually, including the creation of an estimated 5,300 jobs.

Exhibit 4: New Jobs, Annual Income Increase and Total Economic Impact from $400 Million in New Annual Transportation Expenditures

New Annual Expenditures on Transportation:	**$400 million**
NEW JOBS	
Direct:	3,138
Indirect and Induced:	2,221
Total Direct, Indirect and Induced Jobs:	5,359
ECONOMIC ACTIVITY	
Increase in Economic Activity Economy-Wide	$ 629 million

Using the same methodology as the preceding example, the value of improved business efficiencies is estimated to be $24 million annually plus an additional $2 million annually in economic benefit (Exhibit 5).

Exhibit 5: Benefits to the Economy of Improving Business Efficiencies Through Increased Mobility ($400 million scenario)

Benefits Over 25 Years of Improving Business Efficiencies	**$ 24 million**
ECONOMIC ACTIVITY	
Change in Economic Activity for the State	$ 2 million

Exhibit 6 summarizes the economic savings and benefits. In total, a $400 million annual investment in transportation improvements yields an estimated annual economic benefit of $687 million. In addition, approximately 1.2 million gallons of gasoline and 1.7 million hours of delay would be saved annually. (Assuming again that 34.3 percent [$137 million] of the total $400 million investment went into roadways.)

Exhibit 6: Summary of Average Annual Benefits of Increasing Transportation Spending by $400 Million per Year

Cost:	Dollars
Increased Transportation Investment	$ 400 million
Savings and Benefits:	
Economic Impact of Improvements	$ 629 million
Increased Economic Efficiencies to Business	$ 24 million
Economic Impact of Business Savings	$ 2 million
Fuel Savings	$ 3 million
Time Savings	$ 20 million
Commercial Truck Time and Fuel Savings	$ 9 million
TOTAL SAVINGS AND BENEFITS	**$ 687 million**
INCREASED TRANSPORTATION INVESTMENT	**$ 400 million**
NET ANNUAL ECONOMIC BENEFIT	**$ 287 million**
Gallons of Fuel Saved	1.2 million
Hours of Delay Saved	1.7 million

Note 1: Economic Impact of Improvements includes direct impacts such as spending on labor, equipment, and materials on the construction activity; secondary impacts such as the spending by those who earn salaries from work performed directly or indirectly as a result of the construction activity; and the effects of income/spending by those who received income from the expenditures of those who were directly or indirectly associated with construction activity.
Note 2: Benefits and savings are slightly less in the early years of a 25-year planning horizon and slightly greater in later years. Consequently, a mid-point year is chosen to represent the "average" annual benefits.

So far, we've examined the economic benefits of increasing transportation investment by $600 and $400 million per year. Exhibits 7 through 12 isolate the economic impact of new roadway construction alone under the two alternative scenarios.

What If We Increase Roadway Spending by $206 Million Annually ($600 million scenario)?

In this scenario, if transportation expenditures were increased by $600 million annually, based on the current distribution of expenditures between ports, airports, transit and roadways, the level of roadway expenditures would increase by an estimated $206 million annually. If that were to occur, it is estimated the employment impact would be an increase of approximately 2,900 jobs with an economy-wide economic impact of approximately $349 million annually from roadway expenditures alone. Furthermore, almost 3,000 jobs would be created as a result of the investment. (Exhibit 7)

Exhibit 7: New Jobs, Annual Income Increase and Total Economic Impact from $206 Million in New Annual Roadway Construction Expenditures

New Annual Expenditures on Transportation:	**$206 million**
NEW JOBS	
Direct:	1,763
Indirect and Induced:	1,176
Total Direct, Indirect and Induced Jobs:	2,939
ECONOMIC ACTIVITY	
Increase in Economic Activity Economy-Wide	$ 349 million

Under this scenario, it is estimated that business efficiencies would increase approximately $12 million per year with those savings having an additional economic impact of approximately $1 million year. (Exhibit 8)

Exhibit 8: Benefits to the Economy of Improving Business Efficiencies Through Increased Mobility ($206 million scenario)

Annual Benefits of Improving Business Efficiencies	**$ 12 million**
ECONOMIC ACTIVITY	
Change in Economic Activity for the State	$ 1 million

Exhibit 9 provides a summary of the benefits and savings associated with increasing roadway investment by $206 million annually. The total economic impact is $413 annually including an estimated 1.8 million gallons of fuel savings and 2.6 million hours of delay savings each year. (Note: The fuel and delay savings referenced here at the same fuel and delay savings included in the $600 million annual transportation investment scenario. That is the case because the $600 million scenario presumes a $206 million annual investment in roadway capacity expenditures.)

Exhibit 9: Summary of Average Annual Benefits of Increasing Roadway Spending by $206 Million per Year (assumes $600 million annual increase in transportation funding of which $206 million is allocated to roadways)

Cost:	Dollars
Increased Transportation Investment	$ 206 million
Savings and Benefits:	
Economic Impact of Improvements	$ 349 million
Increased Economic Efficiencies to Business	$ 12 million
Economic Impact of Business Savings	$ 1 million
Fuel Savings	$ 4 million
Time Savings	$ 30 million
Commercial Truck Time and Fuel Savings	$ 17 million
TOTAL SAVINGS AND BENEFITS	**$ 413 million**
INCREASED TRANSPORTATION INVESTMENT	**$ 206 million**
NET ANNUAL ECONOMIC BENEFIT	**$ 207 million**
Gallons of Fuel Saved	1.8 million
Hours of Delay Saved	2.6 million

Note 1: Economic Impact of Improvements includes direct impacts such as spending on labor, equipment, and materials on the construction activity; secondary impacts such as the spending by those who earn salaries from work performed directly or indirectly as a result of the construction activity; and the effects of income/spending by those who received income from the expenditures of those who were directly or indirectly associated with construction activity.
Note 2: Benefits and savings are slightly less in the early years of a 25-year planning horizon and slightly greater in later years. Consequently, a mid-point year is chosen to represent the "average" annual benefits.

What If We Increase Roadway Spending by $137 Million Annually ($400 million scenario)?

Finally, Exhibits 10 through 12 show the economic impact roadway expenditures only if transportation expenditures were increase by $400 million per year. (Again, this assumes the current distribution of transportation expenditures such that 34.3 percent, or $137 million per year, of the $400 million per year increase in transportation investment is allocated to roadway expansion.)

Exhibit 10 shows that an estimated 2,000 jobs would likely be created with an economic impact of approximately $233 million annually. Business efficiencies, as seen in Exhibit 11, would increase an estimated $8 million per year while the economic impact of those increased efficiencies would be an estimated $0.6 million per year. In total, the economic impact of increasing roadway expenditures by $137 million per year is estimated to be $274 million annually including 1.2 million gallons of fuel and 1.7 million hours of delay saved annually. (Exhibit 12)

Exhibit 10: New Jobs, Annual Income Increase and Total Economic Impact from $137 Million in New Annual Roadway Construction Expenditures

New Annual Expenditures on Transportation:	**$137 million**
NEW JOBS	
Direct:	1,173
Indirect and Induced:	782
Total Direct, Indirect and Induced Jobs:	1,955
ECONOMIC ACTIVITY	
Increase in Economic Activity Economy-Wide	$ 233 million

Exhibit 11: Benefits to the Economy of Improving Business Efficiencies Through Increased Mobility ($137 million scenario)

Annual Benefits of Improving Business Efficiencies	**$ 8 million**
ECONOMIC ACTIVITY	
Change in Economic Activity for the State	$ 1 million

Exhibit 12: Summary of Average Annual Benefits of Increasing Roadway Spending by $137 Million per Year (Assumes $400 million annual increase in transportation funding of which $137 million is allocated to roadways.)

Cost:	**Dollars**
Increased Transportation Investment	$ 137 million
Savings and Benefits:	
Economic Impact of Improvements	$ 233 million
Increased Economic Efficiencies to Business	$ 8 million
Economic Impact of Business Savings	$ 1 million
Fuel Savings	$ 3 million
Time Savings	$ 20 million
Commercial Truck Time and Fuel Savings	$ 9 million
TOTAL SAVINGS AND BENEFITS	**$ 274 million**
INCREASED TRANSPORTATION INVESTMENT	**$ 137 million**
NET ANNUAL ECONOMIC BENEFIT	**$ 138 million**
Gallons of Fuel Saved	1.2 million
Hours of Delay Saved	1.7 million

Note 1: Economic Impact of Improvements includes direct impacts such as spending on labor, equipment, and materials on the construction activity; secondary impacts such as the spending by those who earn salaries from work performed directly or indirectly as a result of the construction activity; and the effects of income/spending by those who received income from the expenditures of those who were directly or indirectly associated with construction activity.
Note 2: Benefits and savings are slightly less in the early years of a 25-year planning horizon and slightly greater in later years. Consequently, a mid-point year is chosen to represent the "average" annual benefits.

The Last Alternative: The Consequences of Doing Nothing on the Economy and Quality of Life

To this point, the "What If" discussion has been centered around the assumption that the most desirable option is to do *something*. But, there is another option – doing nothing. Or more reasonably, doing nothing more than is being done now. In other words, what are the consequences of continuing the present trend of transportation investment? How will doing nothing more than the current trend affect quality of life and the economy?

Doing nothing has several consequences as shown in Exhibit 13. First, and most obvious, congestion will get worse. Over the next 25 years it is estimated that the citizens of Maryland will burn an extra 45 million gallons of fuel and spend an extra 65 million hours in traffic than what would be the case if the $600 million per year transportation investment strategy is pursued. But there are economic consequences as well. In total, if current trends continue, almost $11 billion in economic opportunity (**after** deducting the cost of the investment) will be lost.

Put another way, if the citizens of Maryland invest $600 million per year in transportation improvements, and specifically investment $206 million annually in roadway capacity improvements, over 25 years 45 million gallons of fuel and 65 million hours of delay will be saved and $10.8 billion in net economic gain will be realized. (As noted in Exhibit 13.)

Also, as can be seen in the exhibit below, the estimated savings in fuel, time and the increased economic opportunity are significantly less should the $400 million transportation investment scenario be chosen.

Exhibit 13: The Consequences of Doing Nothing on the Economy and Quality of Life Over 25 Years

Investment Alternative	Savings in Wasted Fuel (in millions of gallons)	Savings in Hours Spent Stuck in Traffic (in million of hours)	Net Increased Economic Opportunity (in billions of dollars)
Current Trend	-	-	-
$600 Million per Year	45.5	65.1	$10.8
$400 Million per Year	30.3	42.5	$7.2

NOTE: "Increased Economic Opportunity" shown here reflects the total economic benefits and savings over 25 years less the cost of improvements over 25 years. All values are expressed in 2005 dollars.

The scenarios discussed here are just a few of any number of alternatives available. Whatever alternative is ultimately chosen, it is clear that investment in transportation infrastructure has a significant benefit to the general economy. In the alternative, it is also clear there are significant costs associated with falling further behind in infrastructure investment.

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