DEDICATED TRUCK LANES FEASIBILITY STUDY

PHASE I REPORT

FINAL REPORT

Phase 1: The Business Case for Dedicated Truck Lanes

PREPARED **JUNE 2010** FOR:

MISSOURI DEPARTMENT OF TRANSPORTATION

ILLINOIS DEPARTMENT OF TRANSPORTATION

INDIANA DEPARTMENT OF TRANSPORTATION

OHIO DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

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Phase 1: The Business Case for Dedicated Truck Lanes

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PHASE 1 FINAL REPORT:
THE BUSINESS CASE FOR DEDICATED TRUCK LANES

1. INTRODUCTION

The I-70 Dedicated Truck Lanes Feasibility Study is conducted as part of the United States Department of Transportation (U.S. DOT) 2007 Corridors of the Future Program. Through this program, FHWA provided matching funding for a Coalition of four states (Indiana, Missouri, Ohio and Illinois) to conduct a two-phase feasibility study to determine the need, cost, risk, financing options and practicality to develop dedicated truck lanes (DTLs) on the Corridor. The study corridor is an 800-mile stretch of Interstate 70 (I-70), starting at the Ohio/West Virginia state line, extending west across Ohio, Indiana, Illinois and Missouri, ending just west of Kansas City, Missouri.

Phase 1 is to provide an initial assessment of the business case for DTLs, in sufficient detail for the Corridor Coalition to make an informed decision on whether to continue to advance the concept on the Corridor. Phase 2 is intended to provide more detailed analyses of the concept, cost, risks, potential opportunities, financing options, practicality and strategy for the Coalition to continue to jointly study, develop, finance, construct, operate and maintain the I-70 Corridor as a unified facility.

1.1 THE PHASE 1 STUDY APPROACH AND PROCESS

Phase 1 developed and tested the business case for a dedicated truck lanes corridor in the I-70 study area. For this study, the business case is defined as a proposal that:

- Identifies a problem or need;
- Defines a solution;
- Quantifies how much it will cost to implement the solution;
- Estimates the return on investment (ROI) or cost avoidance (CA), i.e., reduced current or future costs that will be realized if the solution is implemented; and
- Assesses the financial feasibility of the solution.

THE BUSINESS CASE FOR DEDICATED TRUCK LANES ON THE I-70 CORRIDOR

The business case evaluation formula used for this phase of the feasibility study is shown in Exhibit 1.

EXHIBIT 1. I-70 BUSINESS CASE

$$(CC + CO + CM) \leq (ROI + CA)$$

(cost to construct + cost to operate + cost to maintain) is less than or equal to (return on investment [public and business benefits] + cost avoidance)

It is important to note that a public sector or government ROI is not limited to generating dollars to cover the costs (CC+CO+CM) of improvements. For state departments of transportation, a successful return on investment:

- Provides improvement to existing roadway and regional conditions, including:
  - Safety;
  - Access;
  - Mobility;
  - Time reliability on the facility and operational efficiency resulting in expanded productivity to businesses that use the facility and ultimately, higher profits and potential tax revenues;
  - New businesses and jobs attracted to the region;
  - Intermodal connectivity that will enhance the entire transportation system; and
  - Environmental improvement such as lower emissions.

Similarly, cost avoidance (CA) - or reducing current or future costs - from a government or public sector perspective can include savings and cost avoidances such as:

- Fewer crashes resulting in:
  - Reduction in loss of lives;
  - Less property damage; and
  - Lower insurance premiums for corridor users.
- Reduction in maintenance costs, including future pavement replacement projects.
- Reduction in the need to construct additional general purpose lanes to increase capacity.

The application of this business case model for I-70 DTLs includes objectively analyzing and evaluating the likelihood that DTLs could improve safety, reduce congestion, and enhance mobility and freight productivity. These outcomes were examined according to their ability to (1) meet the vision and goals of the I-70 Corridor Coalition and (2) provide a combination of return on investment and cost avoidance equal to or greater than the cost to construct, operate and maintain the facility in its current configuration.

1.2 Feasibility Study Analytical Approach

The study approach is shown in Exhibit 2 and described below. A set of twelve technical appendices document the analysis and findings conducted for the Phase 1 Study. Each appendix evaluates specific components of the business case for a DTL concept and identifies, analyzes and evaluates one or more conditions necessary to demonstrate that there is a business case for advancing the concept of dedicated truck lanes on I-70 from the eastern Ohio state line to Kansas City, Missouri.

Develop Vision and Goals: Phase 1 began during the I-70 Corridor Coalition workshop and study kick-off meeting held in Indianapolis, Indiana on June 25- 26, 2009. At that meeting, the I-70 Corridor Coalition described their vision and goals for the I-70 Corridor and the study, as well as coming to consensus on the potential needs of private sector shippers and carriers for an efficient corridor, focused on enhancing the economies of the Coalition member states.

Exhibit 2. Phase 1 Analytical Approach - I-70 Dedicated Truck Lanes Feasibility Study

Gather Information

Stakeholder Interviews: Public and private sector stakeholders and corridor users, including motor carriers and private shippers who use the corridor, were interviewed to determine if they agree with the vision and goals. They were also asked to describe what design, operational features and performance measures (such as time reliability) they would expect for them to use the corridor with DTLs.

Corridor Conditions: Simultaneous to the interview process, the team conducted a corridor conditions analysis to define and evaluate existing and future challenges, needs and opportunities.

Define Performance Measures: Using Coalition and stakeholder perspectives, an understanding of corridor conditions, and the definition of the business case, a set of performance measures and evaluation criteria were defined and validated. This created a baseline for evaluating initial engineering concepts, operational features and conditions needed to attract and meet the needs of users and regional businesses.

Develop Conceptual Scenarios: Based on the previous steps, several DTL scenarios were developed, focusing on fulfilling the business case requirements as identified by potential corridor users and a solution to corridor problems.

Test the concepts: The various corridor scenario concepts were then tested by evaluating them against the performance measures and goals.

Refine the concepts and model options: After testing, the conceptual scenarios were refined and quantitatively evaluated using travel demand, toll revenue and economic impact modeling. Conceptual cost estimates were prepared and a planning level financial feasibility analysis was conducted.

Conduct the financial analysis: The financial team conducted an initial financial feasibility analysis, based on the proposed scenario, estimated costs and potential revenue that could be generated, if the facility is tolled

Conduct a business case analysis: Based on the findings, outcomes and recommendations detailed in each appendix, the business case was evaluated.

Make recommendation: The final step in Phase 1 was to make a recommendation for the scenario concept that (1) best meets the Coalition's goals and vision for the Corridor and (2) has also been validated through a business case analysis.

Phase 1 analysis and findings are documented in twelve linked technical appendices that detail the research, analysis and findings for specific components of the business case for DTLs.

1.3 Overview and Organization of this Final Report

This report presents a summary of the findings and conclusions from the twelve technical appendices prepared for Phase 1. Each appendix provides part of the reasoning and analysis used to evaluate the business case. This report is organized as follows, based on the business case analysis process:

What is the Need?

Section 2 presents the Coalition's vision and goals for DTLs as discussed and adopted in their kickoff meeting and webinars, and as presented in Technical Appendix 6.

Section 3 presents findings from public and private sector stakeholder outreach as detailed in Technical Appendices 3, 4, and 5.

Section 4 describes the existing and future roadway conditions on the Corridor and conclusions from Technical Appendix 1.

Section 5 presents conclusions from Technical Appendix 2, the Corridor commodity analysis.

Section 6 discusses the Corridor performance measures as in Technical appendix 6.

What are the Potential Solutions?

Section 7 outlines the DTL scenarios and options identified and evaluated by the study and described in Technical Appendix 6.

Section 8 presents changes in safety considerations, economic impacts, reductions in congestion and environmental impacts of each scenario. This includes findings from Technical Appendices 6, 7, 8, and 10.

Section 9 presents multimodal conditions and opportunities as discussed in Technical Appendix 8 and technology opportunities as discussed in Technical appendix 9.

What Will Dedicated Truck Lanes Cost? Can They Be Financed?

Section 10 discusses the Corridor's cost, funding options and estimated financial capacity as analyzed in Technical Appendices 11 and 12.

What is the Business Case?

Section 11 describes the business case conclusion based on Phase 1 findings.

What is the Recommendation?

Section 12 presents the Phase 1 recommendations including potential I-70 Corridor enhancements as discussed in Technical Appendices 6 and 9.

1.4 Conclusion from Phase 1

Phase 1 findings demonstrate that there is a business case for constructing, operating and maintaining dedicated truck lanes (DTLs) (i.e. highway lanes for the exclusive use of trucks) along the approximate 800 miles of I-70 stretching from the eastern border of Ohio west to Kansas City, Missouri. This conclusion is based on the analysis provided in the twelve technical appendices prepared for this study and summarized in this Final Report.

Based on the research and analysis conducted for this study as presented in the 12 Technical Appendices, it can be demonstrated that a business case exists for dedicated truck lanes on this section of the I-70 Corridor.

What is the Need?

2. Corridor Coalition's Vision and Goals for Dedicated Truck Lanes

The vision and goals for DTLs on the I-70 Corridor were developed initially by the I-70 Corridor Coalition at the I-70 kickoff meeting and workshop held in Indianapolis, Indiana on June 25-26, 2009.

This vision and goals are based on the experiences and knowledge of the I-70 Corridor Coalition, as well as input from the Federal Highway Administration, shippers and modal carriers participating in the workshop. During the stakeholder engagement process, the vision and goals were tested and confirmed with businesses, freight companies, shippers and community leaders.

Exhibit 3. I-70 Vision and Goals

Vision:

Dedicated Truck Lanes on the I-70 corridor will reduce congestion, improve safety, and increase productivity of freight motor carriers and businesses, providing the Midwest region with an opportunity to prosper and grow economically.

Goals:

1. Serve intercity freight needs and demands within the corridor.
2. Provide connections for freight movements across the U.S.
3. Incorporate roadway design and operational incentives to improve productivity for businesses and motor carriers using the corridor, e.g. as high productivity vehicles (HPV)/long combination vehicles (LCV).
4. Incorporate roadway design and operational features that would:
   a. Reduce roadway congestion;
   b. Relieve urban area bottlenecks;
   c. Improve safety through separation;
   d. Provide relief to parallel routes; and
   e. Increase private sector productivity through improved supply chain efficiencies.
5. Improve connections to intermodal terminals and existing businesses.
6. Attract shippers and carriers to move their goods from other corridors to the I-70 corridor.
7. Allow existing businesses to become more profitable and potentially expand.
8. Retain and attract manufacturing, warehouse and distribution industries.
9. Be financially feasible to construct, maintain and operate.
10. Improve the overall environmental quality in the Corridor area.
11. Provide a test-bed for new highway technology that could further improve freight operations and safety.

3. Stakeholder Perspectives

Three independent groups of stakeholders were presented with a high-level vision for DTLs. These included (1) public sector leaders, (2) motor carriers and (3) shippers who frequently use I-70. Each was asked to describe the conditions and criteria needed for them to be willing to support the concept of DTLs, use the lanes and potentially help pay for an improved I-70 that includes DTLs.

Appendices 3, 4 and 5 present the detailed findings from this stakeholder outreach. The majority of stakeholders indicated they liked the DTL concept, particularly the opportunity to increase safety, and would use the lanes. Nearly all voiced concerns with how the facility would be financed. The potential use of tolls as a financing option was regarded as an undesirable option by many. However, tolling was supported by about half of the motor carriers and shippers surveyed – ***if*** the new facility could be shown to improve travel speeds, provide more reliable travel times and improve safety.

3.1 Motor Carriers

Based on interviews and surveys conducted by the American Transportation Research Institute (ATRI) of motor carriers who frequently use the I-70 Corridor:

- Nearly 70 percent of carriers interviewed support the concept of DTLs, believing it will provide improved safety, faster and more reliable travel times and reduce congestion.

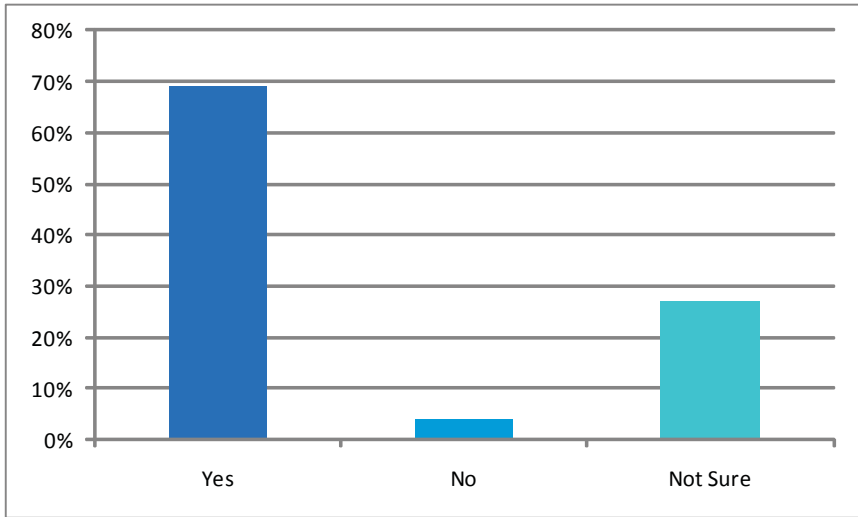
- Those not sure questioned cost, adequacy of alternate routes and had concerns about design and implementations.
- 84 percent stated that their drivers would use an I-70 DTL corridor the same amount or more than the existing I-70.
- None believed that drivers would decrease use of I-70 if DTLs were constructed.
- Survey respondents indicated that motor carrier drivers would "likely prefer" travel on DTLs.

When asked about design preferences and needs, motor carriers responded the following features were most important:

- Access (sufficient on/off ramps);
- Lane separation;
- A minimum two lanes (to allow passing); and
- Access to parking and truck facilities.

Motor carriers also felt that if tolling is used to finance DTLs, passenger vehicles should also be tolled, since they would also receive benefits from the new facility design and operations. Details from the motor carrier interviews are presented in Technical Appendix 4.

EXHIBIT 4. MOTOR CARRIERS INDICATION OF SUPPORT FOR DTL CONCEPT



Source: ATRI Survey for I-70 Study, Appendix 4

3.2 Shippers

Appendix 5 presents a summary of outreach activities and findings with shippers using the I-70 Corridor. Most shippers supported the concept of DTLs based on potential gains in productivity and safety.

Exhibit 5. Shipper Support of Dedicated Truck Lanes

Reason for Support	Percentage
Productivity	74.2%
Safety	74.2%
Reduced Cost	61.3%
Service	54.8%
Intermodal	9.7%
Driver Interest	6.5%

Source: Shipper Interviews for I-70 Feasibility Study, Appendix 5

3.3 Public Sector

Key public sector leaders, business organizations and community leaders in each of the I-70 Corridor Coalition states were contacted and interviewed for this study. Details of comments from the public sector are included in Appendix 3. Overall it was found that there is general public support for DTLs if they improve:

- Safety;
- Mobility; and
- Efficiency.

Concerns included funding, especially relative to competing local or regional needs and priorities, as well as management of DTLs and truck traffic in urban areas.

4. Existing and Future Roadway Conditions and Conclusions

The most fundamental issue to address in evaluating the business case for I-70 is to determine if conditions actually warrant public investments for improvements. Technical Appendix 1 presents a detailed analysis evaluating the current and future problems and needs on the 800-mile I-70 Corridor under study. Analysis demonstrates that sections are congested, crashes are higher than national averages on interstates, pavement is in need of improvement, some sections of the roadway have design features that are obsolete, average truck speeds are below posted limits and in key locations, there is a higher percentage of trucks than other similar sections of interstate corridors. These conditions indicate that the I-70 Corridor warrants investment and improvements.

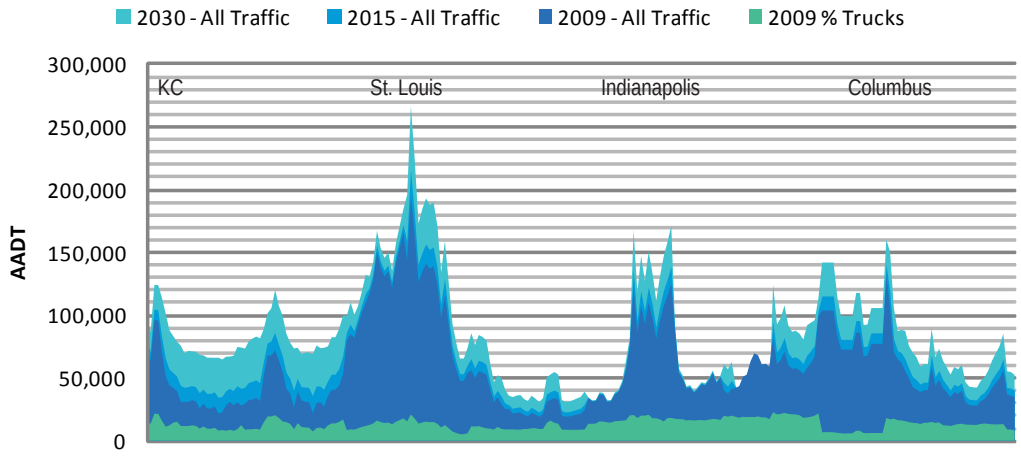
Appendix 1 indicates that challenges on the corridor include:

- Safety;
- Congestion;
- Capacity;
- Bottlenecks; and

- Travel time reliability.

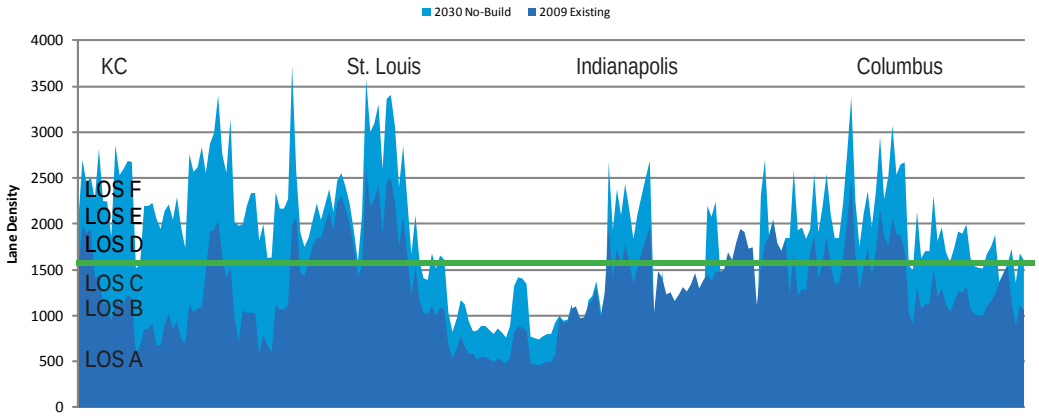
Exhibit 6 illustrates that the current Average Annual Daily Traffic (AADT) on key sections of the I-70 Corridor range from 20,000 to 200,000 vehicles. Traffic in 2030 is projected to increase by 10,000 to 66,000 vehicles a day on those same sections of I-70. Currently, truck traffic makes up between 6.5 percent and 51 percent of I-70's traffic, depending heavily on the influx of cars and other traffic in urban areas. Generally, urban areas have the highest Average Annual Daily Traffic (AADT) and rural areas the highest percentages of truck traffic, as shown in Exhibit 6.

EXHIBIT 6. EXISTING AND TRUCK (2009) AND PROJECTED (2015 AND 2030) TRAFFIC ON I-70 STUDY SECTION



As shown on Exhibit 7, congestion along the I-70 Corridor is also growing. In 2009, approximately 184 miles had moderate to heavy congestion (shown as a green line). By 2030, approximately 325 miles are projected to have moderate to heavy congestion.

EXHIBIT 7. EXISTING (2009) AND PROJECTED (2030) CONGESTION ON I-70 STUDY SECTION



Safety on the study section of I-70 is also a concern. Data analysis demonstrates a direct correlation between Level-of-Service (LOS) and safety. LOS is rated on an A (best) to F (worst) scale. The worse the LOS, the greater the crash rates. In areas operating at LOS F, the total truck crashes are more than two and a half times the total crash rate for all vehicles. Also, in truck/car crashes, 98 percent of the fatalities are car occupants.

> These conditions warrant investment and improvements.

5. Commodity Flow Analysis

The proposed solution for improving I-70 – as presented in the Corridors of the Future Program application – recommends reconstructing I-70 with DTLs, including innovative physical and operational features. An important part of the evaluation process rests on whether truck movements are a major reason for the problems and needs on the corridor, or if truck movements are the principle commodity movements that support the region's economic base.

Technical Appendix 2 evaluates and documents whether the I-70 Corridor's problems and needs can best be addressed by a truck focused solution. The appendix includes an in-depth analysis of the commodity movements along the I-70 Corridor and the regional economic base it supports. It also presents detailed freight flow analyses of major urban areas in the four Coalition states. Key findings include:

- Sixty percent of all motor carrier drivers on the I-70 Corridor travel less than 350 miles.
- Only 4.1 percent of truck trips are more than 1,000 miles.
- 35.5 percent of truck trips originate and terminate completely within the four-state corridor.
- 15.1 percent of truck trips originate and terminate completely outside the four-state corridor.
- Intra-corridor movements:
  - Account for much of the goods traffic in the corridor; and
  - Ohio and Illinois are significant origin and destination points for trucks on I-70.
- Motor vehicles, machinery and mixed freight account for much of the value of the goods moving in the corridor.

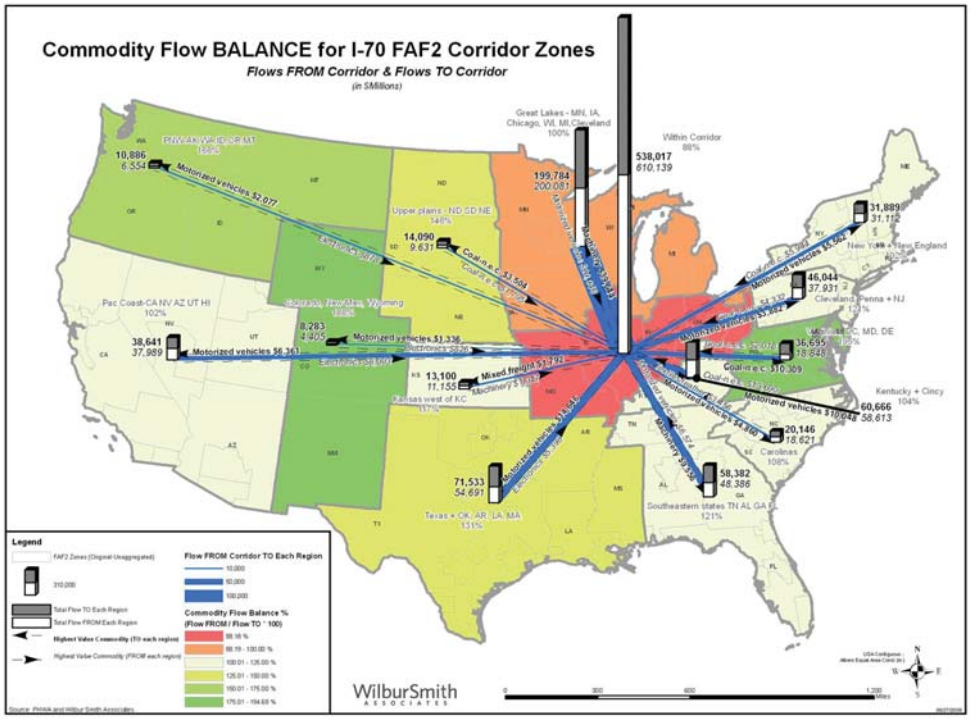
The analysis indicated that the majority of commodity movements in the study area take place within the I-70 Corridor, or use the I-70 Corridor for a portion of their north/south movements. Most (but not all) commodities moving by rail require a movement of at least 500 miles to be cost efficient (and profitable) for Class 1 railroads. Barge movements demand even longer distances to be cost competitive. Therefore, the short and medium distance commodity movements on the I-70 Corridor are typically most efficiently moved by trucks.

Exhibit 8 presents a summary of trip purpose and length for commercial vehicles using the corridor. Exhibit 9 presents a visual representation of the origins and destinations of commodities moving from and to the Indianapolis metropolitan area. Similar maps for all major urban areas along the corridor can be found in Appendix 2.

EXHIBIT 8. TRAVEL DISTANCES ON I-70					
	Trip Count				
Centroid to Centroid Miles	Total	Percent	Centroid to Centroid Miles	Total	Percent
<350	454	58.8%	751-1000	20	2.6%
351-500	103	13.3%	>1000	32	4.1%
501-750	163	21.1%	Totals	772	100.0%

Source: I-70 Feasibility Study, Appendix 2

EXHIBIT 9. EXAMPLE URBAN AREA COMMODITY FLOW ANALYSIS I-70 STUDY



6. PERFORMANCE MEASURES

Performance measures are used to monitor changes in response to a project and to evaluate progress toward desired goals or objectives. Identifying and applying a performance measures analysis to the I-70 Corridor allows a comparison between the No-Build and Build scenarios in a way that focuses on the study goals and the business case.

Performance measures and evaluation criteria were defined for the feasibility study using the Corridor Coalition's goals and vision, stakeholder perspectives, established corridor needs and components of the business case. The measures were used to compare the cost for implementation, including the cost to construct, operate and maintain the corridor, with and without DTLs.

Exhibit 10 presents the performance measures and criteria used in the Phase 1 analysis. Appendix 6 presents a detailed discussion of how the performance measures were identified, ranked and evaluated. It is anticipated that these measures will be refined and reduced in number during Phase 2. The evaluation creates a baseline for the initial conceptual design, operational features and conditions needed for DTLs on the I-70 Corridor to meet the needs of users and regional businesses.

Exhibit 10. Business Case Evaluation Criteria/Measures

Rank*	Criteria in order of Importance to stakeholders	Approach to Comparisons Between Scenarios	Metric **	Business Case Measures / Value	Tech App.
1	Safety	• Projected differences in # of crashes (fatalities, injury, property damage) based on design features.	ROI	$ Savings based on cost per incident	1

2	Freight Movement Productivity/ Enhanced Mobility and Congestion Reduction	• Changes in traffic congestion.
		• Productivity and efficiency improvements based on travel time reliability.
		• Productivity improvements provided through incentives:
		  • High performance vehicles;
		  • ITS integrated into the Corridor technology;
		  • Regulatory consistency; and/or
		  • Redundancy to provide rerouting of traffic for lane closures due to incidents or other factors.
			ROI	LOS/VC
				Travel time reliability
				Ability to include incentives
					4
					5
					6

3	Cost and Financial Feasibility	• Each Scenario will be compared based on its estimated cost to:
		  • Construct;
		  • Operate; and
		  • Maintain.
		• As compared to its:
		  • Toll revenue generated; and/or
		  • Ability to be financed and funded.
			Cost	$
				Financing capacity and public investment
					6
					11
					12

4	Economic Benefit	• Potential economic impacts (change in employment) in the Corridor region as calculated based on difference in travel efficiencies and expenditures related to the transportation improvements (DTL).	ROI	Change in the # Jobs in the Corridor	10

5	Stakeholder Acceptance	• Based on comments through stakeholder outreach, stakeholder acceptance;
		  • Stakeholder (local officials, elected officials, Coalition partners);
		  • Shippers; and
		  • Motor carriers.
			ROI	% Willing to use
				%Willing to pay
					3
					4
					5

6	Technology Integration/Security	• Potential to integrate future ITS technologies including incident management technologies. • Ability to separate HAZMAT.	ROI	Level of magnitude	9

7	Pavement Life Cycle	• Comparison based on separation:
		  • Lanes specifically designed for trucks may last longer; and/or
		  • Separation of trucks may increase life of GPLs.
			CA	Years/timing for resurfacing and reconstruction	1

8	Other Incentives and Amenities	• Ability to integrate other improvements, for example additional truck parking, special truck service plazas using green technology, etc. • Overall enhancements to the Interstate system.	ROI	Level of magnitude	6
9	Environmental Impact	• Changes in “carbon footprint” as measured by air, water, and noise quality impacts; fuel efficiency; social, cultural and environmental justice impacts; other impacts on public health.***	ROI CA	Level of magnitude only	7
10	Political/Legislative	• Number of regulations and laws that must be changed to implement DTLs and tolling. • Feasibility/reality for political acceptance.***		#	11
11	Intermodal Connectivity	• Opportunities for improved access to other modes. • Connectivity to other modes on or near the Corridor (air, rail, water ports).	ROI	# New Interchanges needed	8

** Rank based on importance as defined by stakeholder outreach*
*** Type of measure: ROI = Return on Investment; CA = Cost Avoidance*
**** To be evaluated in Phase 2*

What are the Potential Solutions?

7. Possible Dedicated Truck Lane Scenarios

Based on the previous steps, several DTL scenarios were developed to provide a solution to the challenges on the I-70 Corridor. Appendix 6 presents a detailed discussion of the many DTL scenarios and options identified, discussed, considered, eliminated and refined into the selected scenarios.

The options were narrowed to three scenarios: Two Build and a No-build. Revenue evaluations were based on sketch level traffic and toll revenue analysis, as was a high-level financial capacity analysis. The economic benefits model and a high level financial capacity analyses were based on the same cost and revenue estimates. The scenarios initially recommended and analyzed through Phase 1 include:

No-Build Scenario

Each state will:

- Continue to support the existing I-70 roadway and its current design at the levels in their current program;
- Complete projects identified in their State Transportation Improvement Programs and Long Range Plans;
- Continue current maintenance, rehabilitation and preservation programs and maintain current operational conditions;
- Reconstruct sections or add capacity as general purpose lanes as needed or as warranted in their current design configuration; and
- Continue to work independently for improvements on I-70.

Scenario 1

Develop two dedicated truck lanes in each direction within the existing I-70 corridor alignment and its adjacent beltways. (In urban areas DTLs could follow existing north or south belt-line routes around the metropolitan areas.)

- Provide 70 truck access points;
- 21 urban interchanges (separated truck and passenger vehicles);
- 49 slip-ramps at rural interchanges;
- Physically separate the DTLs from general purpose lanes with barriers and/or medians; and
- Evaluate alternative tolling approaches including tolling of both passenger vehicles and trucks.

Scenario 2

Develop two dedicated truck lanes in each direction within the existing I-70 corridor alignment and its adjacent beltways. (In urban areas DTLs could follow existing north or south belt-line routes around the metropolitan areas.)

- Provide 43 truck access points through separate truck/passenger vehicle interchanges;
- 18 urban interchanges;
- 25 rural interchanges;

- Physically separate the DTL lanes from general purpose lanes with barriers and/or medians; and
- Evaluate alternative tolling approaches including tolling of both passenger vehicles and trucks.

Exhibit 11. Scenario Concepts for Cost and Sketch Traffic and Toll Analysis

Concept	Scenario 1	Scenario 2	No-Build Scenario
Truck lanes inside the existing I-70 alignment and adjacent beltways	x	x	
Add capacity to general purpose lanes as planned/needed			x
Physically separate the lanes with barriers and medians	x	x	
Separated truck and car interchanges (urban)	21	18	
Separated truck and car interchanges (rural)		25	
Slip Ramps (rural)	49		
Design different configurations in urban vs. rural areas	x	x	
Design corridor to follow I-70 through urban area			x
Design the corridor to follow either north or south belt-line routes in major urban areas	x	x	
Do not toll the facility	x	x	x
Toll the facility	x	x	
Operate as a single facility in all states	x	x	
Each state works independently			x

8. Evaluating the DTL Scenarios

Testing the business case for DTLs entails comparing the costs, public sector return on investments (ROI), cost avoidance (CA) and financial feasibly of the two DTL Build Scenarios and the No-Build Scenario to the business case criteria and the established performance measures and goals. Quantitative analyses were conducted wherever possible.

8.1 Safety Analysis

Appendices 1 and 6 present a safety analysis comparing DTLs to the No-Build Scenario. Findings indicated the following safety benefits over:

15 years

- 100 to 150 fewer fatalities;
- 4,000 to 5,000 fewer injuries;
- 8,000 to 10,000 fewer property damage accidents; and
- $1 billion in savings.

40 years

- 130 to 180 fewer fatalities;
- 9,000 to 10,000 fewer injuries;
- 18,000 to 20,000 fewer property damage accidents; and
- $2 to $2.5 billion in savings.

Exhibit 12. DOT Estimates of Costs per Crash by Type			
Crash Type	Ohio DOT	Indiana DOT	CalTrans
Fatal	$3,753,200	$3,763,400	$4,600,000
Injury	138,100	82,400	64,600
Property Damage Only	3,900	4,300	9.400

Source: ODOT, INDOT, Caltrans - the base year dollars and sources for the crash costs are as follows: ODOT – Year 2000 $; User Benefit Analysis for Highways, AASHTO, 2003; INDOT – Year 2000 $; adjusted from Ted Miller et al., The Cost of Highway Crashes, The Urban Institute, 1991; Caltrans – Year 2007 $; California Life-Cycle Benefit/Cost Analysis Model (Cal-B/C), version 4.0, California Department of Transportation, 2009

Exhibit 13. No-Build Scenario Annual Crashes				
Year	Total	Property Damage Only	Injury	Fatality
2009	10,562	8,330	2,276	165
2015	12,752	9,937	2,871	197
2030	18,351	14,183	4,241	242

Exhibit 14. Estimated Safety Benefits for Dedicated Truck Lane Scenarios				
	Total Vehicle Crash Reduction			
	Total	Property Damage Only	Injury	Fatality
15 Years	-12,668	-8,228	-4,328	-113
40 Years	-28,318	-18,603	-9,578	-138

8.2 Economic Analysis

Technical Appendix 10 and Exhibit 16 present the results of an economic benefit analysis for the corridor. The analysis was based on the TREDIS© model and used to calculate approximately 20 years of regional economic benefits to the counties adjacent to the I-70 corridor study assuming DTLs are constructed by 2015. The total regional economic output benefit through 2030 is approximately $36 billion in additional regional output and an additional 258,000 job years.

Exhibit 15. Aggregate Total Impacts for Select Years						
Impact Type	2011	2015	2020	2025	2030	2011-2030
Economic Output (Millions/2010 Dollars)						
DTL Tolling	$ -	$(240)	$(320)	$(400)	$(480)	$(5,740)
Construction and O&M	8,310	(430)	(150)	(150)	(150)	29,430
Travel Efficiencies	-	650	710	780	680	12,010
Total	$8,310	$(20)	$240	$230	$230	$35,690
Employment (Job-Years)						
DTL Tolling	-	(1,230)	(1,660)	(2,090)	(2,520)	(29,970)
Construction and O&M	59,770	(3,130)	(1,100)	(1,100)	(1,100)	211,310
Travel Efficiencies	-	4,120	4,450	5,000	5,500	76,490
Total	59,770	(240)	1,780	1,810	1,810	257,830
Source: Wilbur Smith Associates' application of the TREDIS® model						
*Note: economic output is presented in millions of 2010 dollars;economic output is rounded to the nearest $10M, and employment is sounded to the nearest 10; Analysis assumes total construction by 2015.						

8.3 Reduction in Congestion

Technical Appendix 1 evaluated the potential reduction in congestion comparing additional general purpose lanes to DTLs. The comparison showed significant improvements in I-70's operation with DTLs. This measure assumes that 80 percent of the trucks in the corridor will use the DTLs and 20 percent will continue using the general purpose lanes.

Exhibit 16. Projected Congestion Reduction on I-70 Study Section (2009 Existing vs 2030 No-Build Congestion)

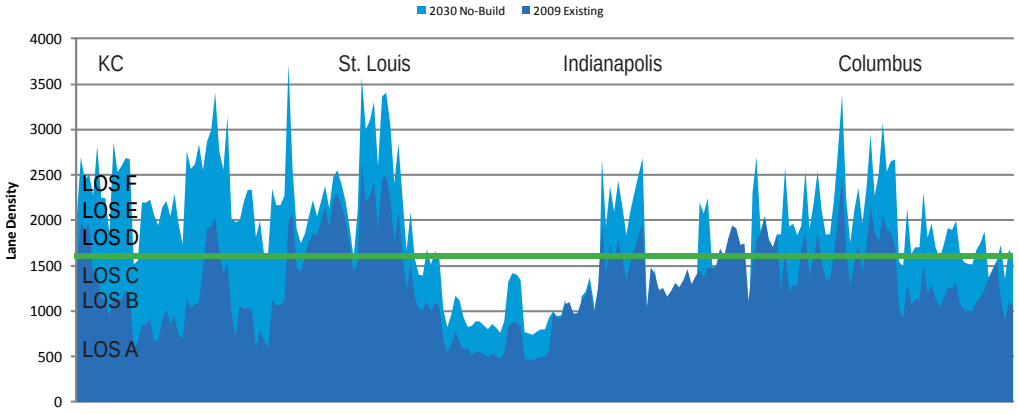
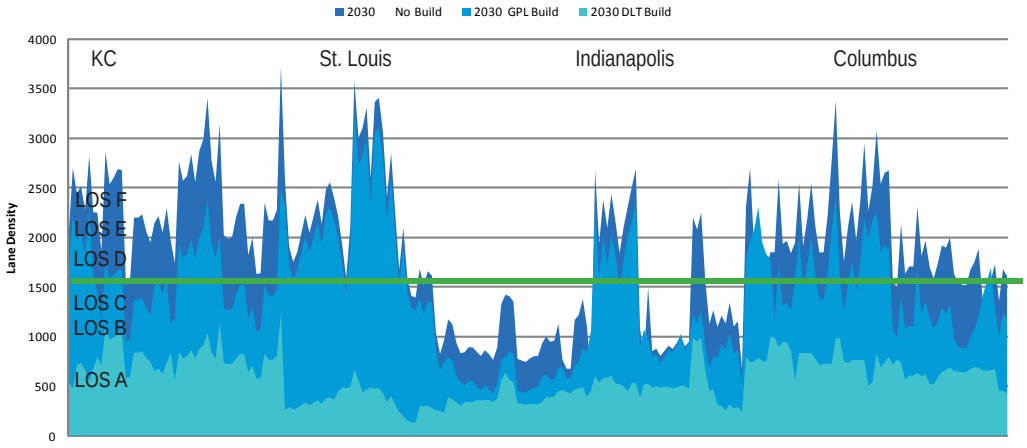


Exhibit 17. 2030 Congestion (2030 No Build compared to 2030 Build Dedicated Truck Lanes and 2030 Build General Purpose Lanes)



8.4 Environmental Analysis

The team also conducted a high-level environmental overview of the study section of I-70. Its findings are presented in Technical Appendix 7.

- No fatal flaws (flaws that cannot be avoided or mitigated) were identified.
- Five major pinch points were identified along the I-70 corridor.
- Corridor-wide conditions including, but not limited to, noise, air quality, environmental justice, carbon emissions/footprint, secondary and cumulative impacts could each be affected by DTLs. However, any potential impacts need to be verified in detail as a part of future analyses performed in accordance with the National Environmental Policy Act (NEPA).
- There is a potential for reduction in carbon footprint for the corridor based on reduction in CO2 and particulate matter, but detailed NEPA studies are needed to verify any air-quality impacts.

It is not the intent of this Feasibility Study (Phase 1 or Phase 2) to conduct any detailed NEPA analysis until a determination has been made to advance the project. In terms of the business case, no quantitative environmental ROI or CA is claimed based on this initial environmental overview. Phase 2 will continue to analyze and describe the potential environment impacts to the corridor and the larger region, including potential benefits based on congestion reduction that will improve traffic flow and thereby reduce emissions.

9. Multimodal, Technology and Other Issues, Opportunities and Considerations

A number of other issues were identified and evaluated through the research conducted in the Technical Appendices.

Technical Appendix 8 looked at intermodal and multimodal issues and opportunities and concluded that improvements to I-70 could help enhance those freight movements. For example, air cargo providers are increasingly shifting to using trucks to move goods on shorter distance routes. Technical Appendix 8 also discussed major new intermodal facilities at Rickenbacker south of Columbus, Ohio and outside Kansas City that could benefit from improved truck connectivity.

Technical Appendix 9 discussed the potential use of a DTL corridor to serve as a testing ground for advanced technology, including opportunities to develop a corridor where alternative fuels could consistently be available. It also could provide opportunities for consistent use of technologies, including electronic manifests, weight in motion facilities, etc. that could eliminate the need for DOTs to construct and operate weight stations, potentially generating significant savings for state DOTs. Further, construction of separated lanes could insure that all hazardous cargos could be moved to the DTLs. Dedicated truck lanes would also provide a redundant roadway so that, in case of an emergency closing one or more lanes, traffic could travel together on one facility rather than waiting for lanes to reopen, reducing delays for both passengers and motor carriers.

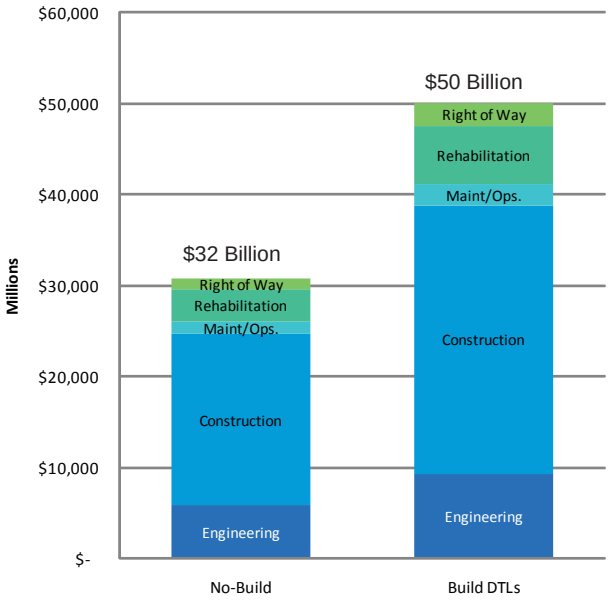
Technical Appendices 1 and 6 discussed how DTLs could provide an overall enhancement to the regional and national interstate system. They also discuss the fact that moving trucks out of general purpose lanes would reduce the wear and tear in these lanes resulting in longer pavement life and reduced maintenance costs. Technical Appendix 6 also presented an analysis explaining the potential fuel savings and productivity gains of allowing higher productivity vehicles (HPVs).

What Will Dedicated Truck Lanes Cost? Can They Be financed?

10. Cost Analysis

As presented in Appendix 6, initial planning level cost estimates show the cost to construct, operate and maintain DTLs for 40 years at approximately $50 billion. This is in comparison to $32 billion to reconstruct, operate and maintain the I-70 Corridor in its existing configuration for the same 40 year period. Initial planning level cost estimates indicate that Scenarios 1 and 2 have almost identical costs. Overall, the difference in costs between the No-Build and DTLs over 40 years is approximately $18 billion. In Phase 2 of this feasibility study, the planning level cost estimates for the scenarios will be refined.

Exhibit 18. DTLs vs No-Build Costs Over 40 years (Assuming Initial Build-out in 2015)



10.1 Financial Capacity Analysis

Potential funding and financing options for the proposed scenario described in Appendix 11 included a review of funding options, including bonds and special tax districts, as well as non-tax revenue sources, and equity funding. These will be evaluated in more detail during the Phase 2 study.

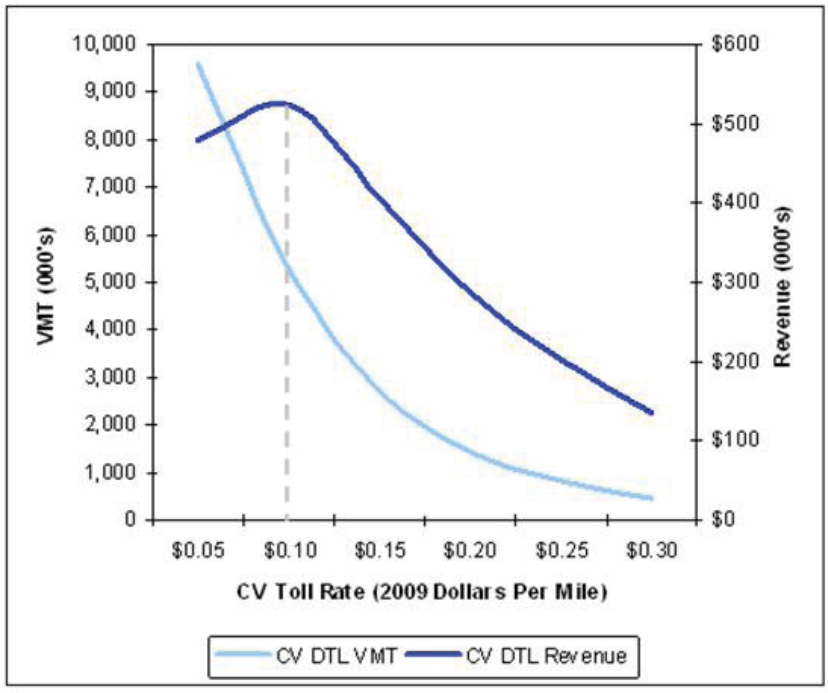
The ability to finance the project is critical to determining that a business case exists. Appendix 12 provided an initial, planning-level financial capacity analysis if tolls were used by the state DOTs to cover the costs to construct, maintain and operate dedicated truck lanes.

Based on the initial analysis, there is a gap can between the monies that can be generated if the corridor is tolled and the amount available through existing resources (assuming continuing current funding levels). This financing capacity gap could vary from $6 to $14 billion depending on how the facility is financed (publicly or privately).

10.2 Potential to Generate Toll Revenue

Attachment A to Appendix 6 presents a sketch level traffic and toll revenue analysis conducted for the two build scenarios. Eight options were tested with toll rates ranging from $0.05 to $0.30 per mile in five cent increments. Tolling all vehicles (commercial and passenger vehicles) at a $0.10 per mile rate on all lanes provided the optimal revenue compared to the level of traffic that is diverted. An estimated $10.6 billion (in 2009 dollars) in tolls can be generated over 40 years, covering approximately 75 percent of the $18 billion cost differential for DTLs. Note that in both Missouri and Ohio, there are statutory limitations that will need to be addressed before tolls on I-70 could be implemented as outlined.

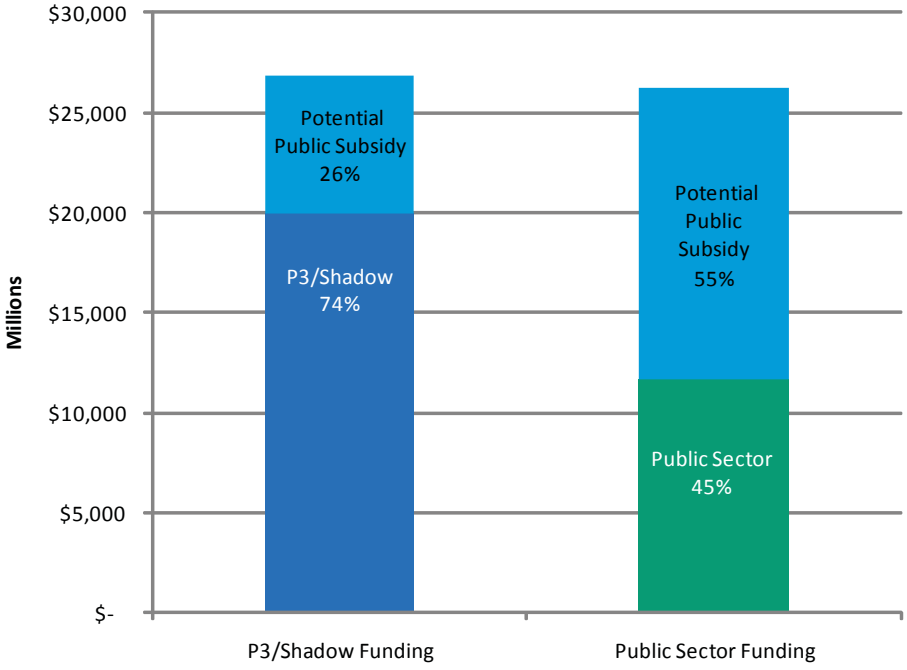
Exhibit 19. Commercial Vehicle Toll Rate Compared to Revenue



Tolling is estimated as being able to support approximately:

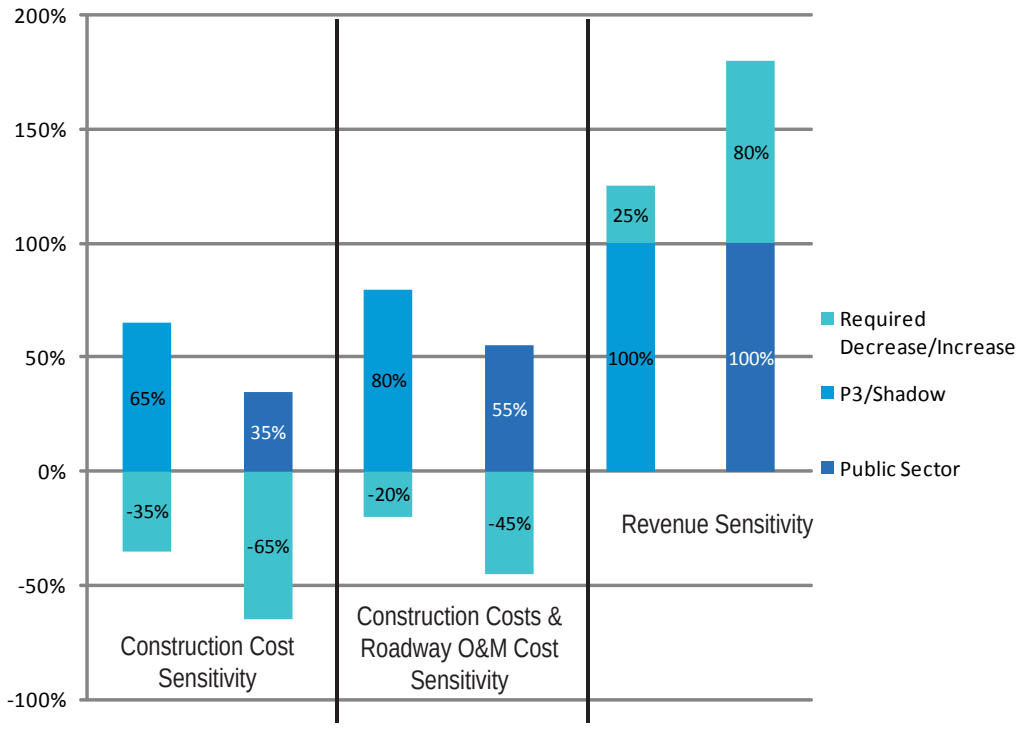
- 74 percent of project costs (Public-Private Partnership [P3] Funding Model), or
- 45 percent of project costs (Public Sector Funding Model).

Exhibit 20. Potential Costs Supported by Tolls



As with any financial estimate, changes to costs and revenue calculations could significantly affect the conclusions. Exhibit 21 presents a sensitivity analysis of the findings. For example, if costs were reduced by 20 percent, under the shadow bid (P3) scenario, tolling could cover a greater percentage of the overall project.

Exhibit 21. Break Even Sensitivity Analysis



WHAT IS THE BUSINESS CASE FOR DEDICATED TRUCK LANES?

11. THE BUSINESS CASE

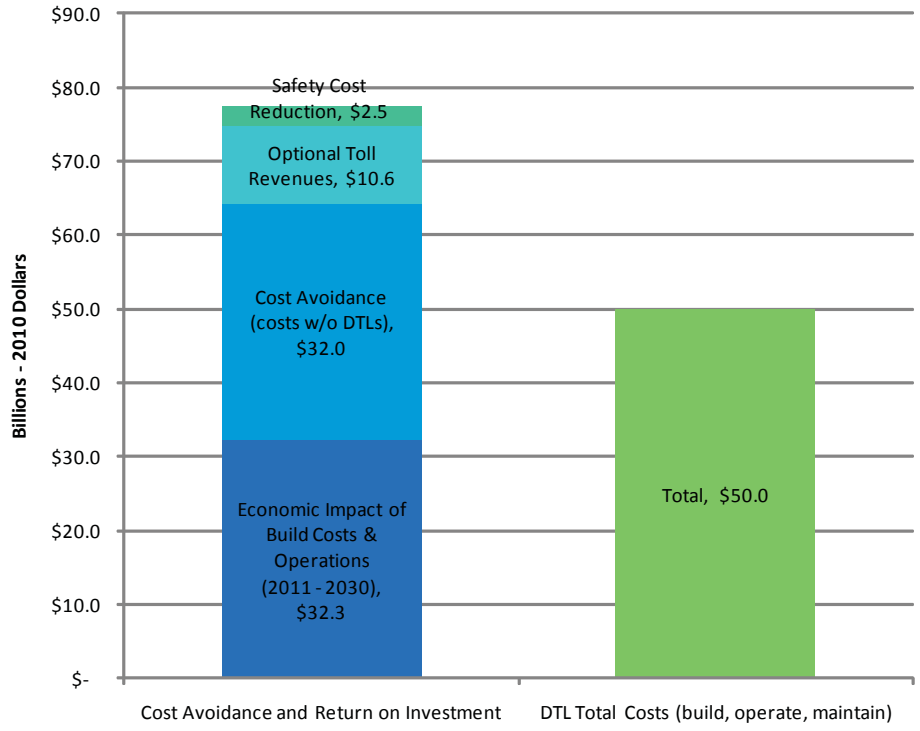
Demonstrating the business case for DTLs requires comparing the costs to build, operate and maintain DTLs and the potential public sector ROI and CA to the No-Build scenario.

$(CC + CO + CM) \leq (ROI + CA)$

As shown in Exhibit 22, based on the findings and conclusions as presented in the twelve technical appendices, there is a business case for DTLs on the I-70 Corridor as compared to the No-Build scenario. The cost differential for constructing DTLs versus continuing to maintain and operate the I-70 Corridor as a general purpose facility is estimated at approximately $18 billion. (i.e., $50 billion to build and operate DTLs vs. $32 billion to maintain and operate the I-70 Corridor in its current configuration as the No-Build Scenario.)

The ROI from DTLs in quantifiable benefits generated by DTLs includes an additional $32.3 billion in increased regional economic output (including 258,000 job years); $2.5 million in safety benefits (lives saved and injuries and property damage avoided); and potentially $10.6 billion in toll revenues. Also included as a cost avoidance is the $32 billion that would need to be expended to continue to maintain and operate I-70 as planned in its current condition. As the analysis becomes more detailed, other benefits such as reduction in the region's carbon footprint, opportunities for technology enhancements leading to operational savings and system enhancements may also be attributed to DTLs. These benefits will be explored in greater detail in Phase 2 of this study.

EXHIBIT 22. BUSINESS CASE FOR DTLS ON I-70



What is the Recommendation?

12. The Recommendation

The final step in the Phase 1 approach is to recommend a scenario that (1) meets the Coalition's goals and vision for the I-70 Corridor and (2) is supported by the business case evaluation.

12.1 Recommended Corridor Scenario

Based on the analysis as presented, the design and operations scenario concepts that best fulfill the business case for the I-70 Corridor include:

- Fully separated DTLs inside the passenger lanes;
- DTLs follow beltways in urban areas;
- Truck access provided through either:
  - 43 fully separated interchanges, or
  - 70 access points with a combination of fully separated interchanges and slip ramps;
- Electronic tolling of all vehicles using the I-70 Corridor;
- Opportunities for HPVs to operate on the I-70 Corridor;
- Uniform regulations and operating approaches across the entire I-70 Corridor; and
- Design features to allow integration of technologies, alternative fuels and operating scenarios that may realistically be available in the future.
- These options would provide the best design features to:
  - Improve safety and reduce congestion;
  - Improve freight productivity;
  - Produce the best operating scenario to provide a financial return on investment; and
  - Result in the best cost avoidance or lowest costs for long-term pavement maintenance.

Phase 2 will also explore the schedule and approach to construct and operate DTLs and which of the two build scenarios (43 separated interchanges or 70 access points) would work best.

12.2 Strengthening the Business Case

Several incentives and enhancements to the Build Scenario proposed for DTLs were discussed in Technical Appendix 9 and by private sector stakeholders that use this section of I-70. These incentives could improve freight productivity and increase their use of the Corridor. The enhancements could also provide opportunities for Corridor innovation, strengthening the business case for DTLs. These incentives were not quantitatively evaluated in Phase 1 and are proposed for further analysis in Phase 2. They include:

- Evaluating future, higher productivity vehicles (HPVs) e.g. higher weight limits, multiple trailers, wider loads, increased speeds, special load types;
- Further evaluation of uniform regulations, speeds, and enforcement practices across the entire corridor;

- Incorporating Intelligent Transportation Systems (ITS) technologies into tolling and operational features of the DTLs; and
- Incorporating Travel Demand Management (TDM) and Transportation System Management (TSM) options (such as allowing busses to use DTLs, adjusting tolls, restrictions on use of lane, incentives, etc., based on time of day or congestion such as is done with high-occupancy vehicle lanes).

An initial simple evaluation of the HPV option presented in Technical Appendix 6 calculated that by converting a five-axle semitrailer to a HPV, it would increase vehicle weight and cubic feet of available trailer space.

- Of 1,000 truck trips, a 40 percent conversion to HPVs would:
  - Reduce number to trips to 832;
  - Reduce total VMT by 18 percent;
  - Decrease fuel consumption by 13 percent; and
  - Reduce emissions (CO2, NOx, PM) by 13 percent.

Illinois Department of Transportation

Federal Highway Administration

MoDOT

INDIANA DEPARTMENT OF TRANSPORTATION

STATE OF OHIO DEPARTMENT OF TRANSPORTATION