



Feasibility Plan for Maximum Truck to Rail Diversion in Virginia's I-81 Corridor

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Agenda

- 1. Study Overview**
- 2. I-81 Corridor Activities**
- 3. Study Findings and Recommendations**
- 4. Public Comment Summary**
- 5. Next Steps**

About the Study

- **Primary objectives**
 - **Comply with the requirements of Virginia’s 2007 Appropriations Act, Item 442, which calls for “development of a feasibility plan to define the conditions that would be necessary to divert the maximum amount feasible of the long-haul, through-truck freight traffic to intermodal rail in the Interstate Route 81 Corridor.”**
 - **Address issues raised in CTB Resolution of Oct. 11, 2006 and Virginia Acts of Assembly Chapter 934 (H 1581)**
 - **Address all potentially feasible rail strategies, not limited to Crescent Corridor or other opportunities currently before the Commonwealth**
- **Process**
 - **Led by Commonwealth’s Multimodal Office and conducted by Cambridge Systematics, with DRPT and VDOT, in cooperation with Secretary of Transportation’s Office**
 - **Norfolk Southern and Woodside Associates provided operations modeling, market estimates, improvement plans for Crescent Corridor**
 - **Commonwealth provided current data and prior studies**
 - **Cambridge Systematics developed independent analysis and documentation**

About the Study

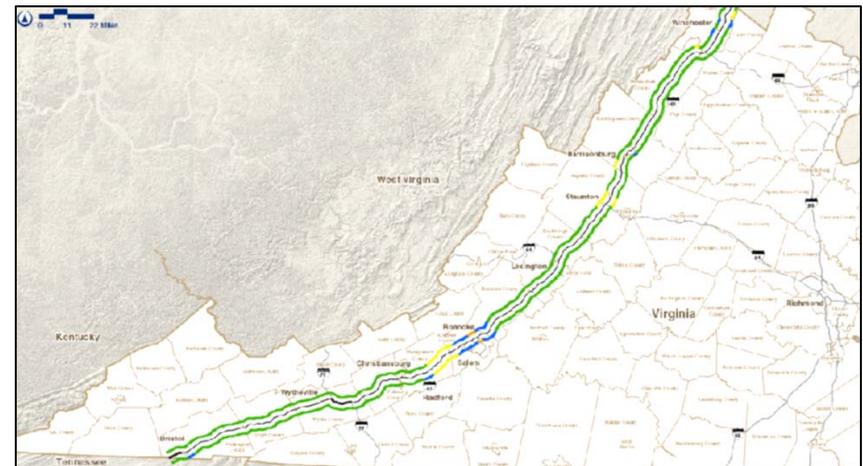
- **Draft findings prepared**
- **Presentation of draft findings to Commonwealth Transportation Board (9/17/08)**
- **Revised Draft Report prepared (12/09)**
- **Public Comment (2/10)**
- **All analyses have been updated from 2005/07 base years to 2008**
- **Planning for Crescent Corridor has advanced and stabilized**
- **Analysis methodology focused around strategic alternatives and programs**
 - **Previous analysis ‘filtered out’ difficult-to-divert traffic at an early stage revised methodology leaves as much diversion potential ‘on the table’ as possible**
 - **Strategy approach allows for expanded treatment of conventional speed open technology, high speed open technology, and very-high speed open technology**

I-81 Corridor Activities

I-81 Vehicle Activity and Performance

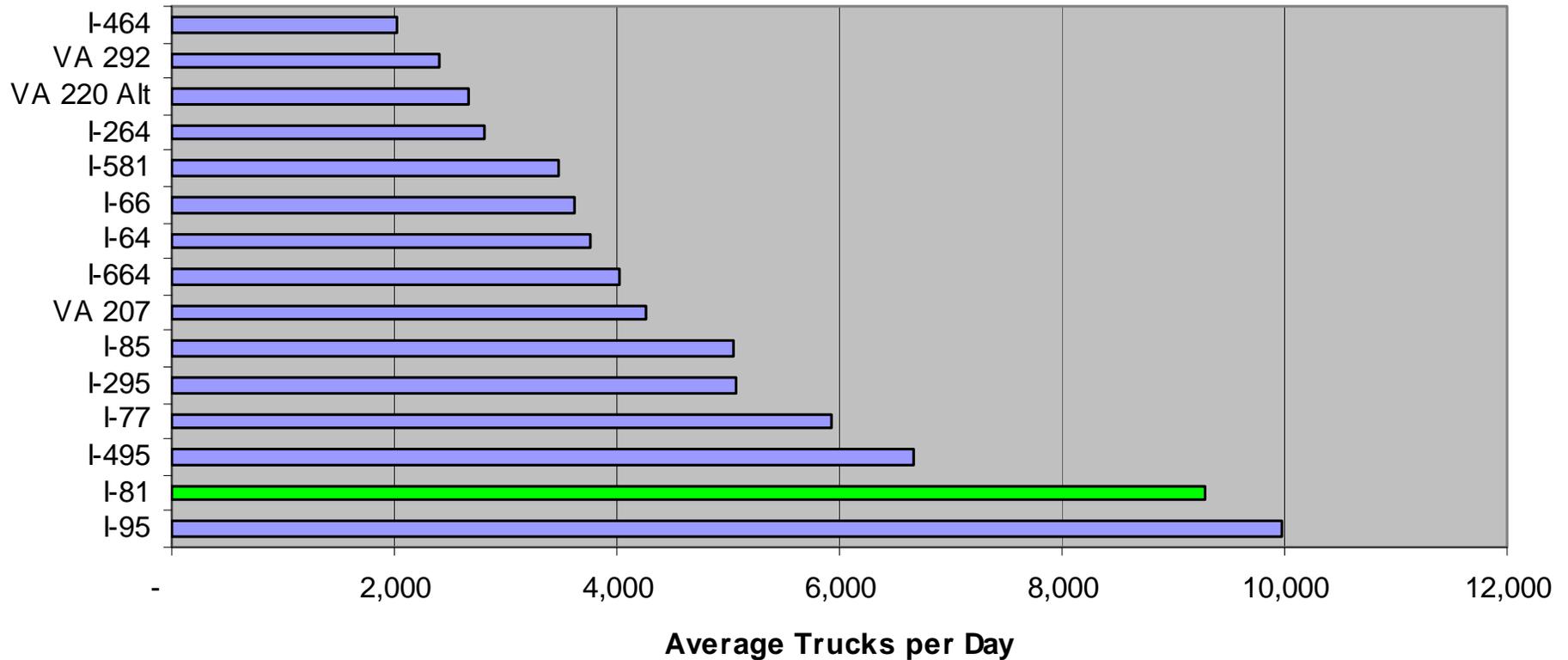


- **Extent**
 - 855 miles through six states, 325 miles in Virginia
- **Current performance in Virginia**
 - 7% of I-81 mileage is below LOS standards in the peak period
 - Two-thirds of mileage, exits have geometric deficiencies
 - Ten locations with slow travel speeds



I-81 Corridor Activities

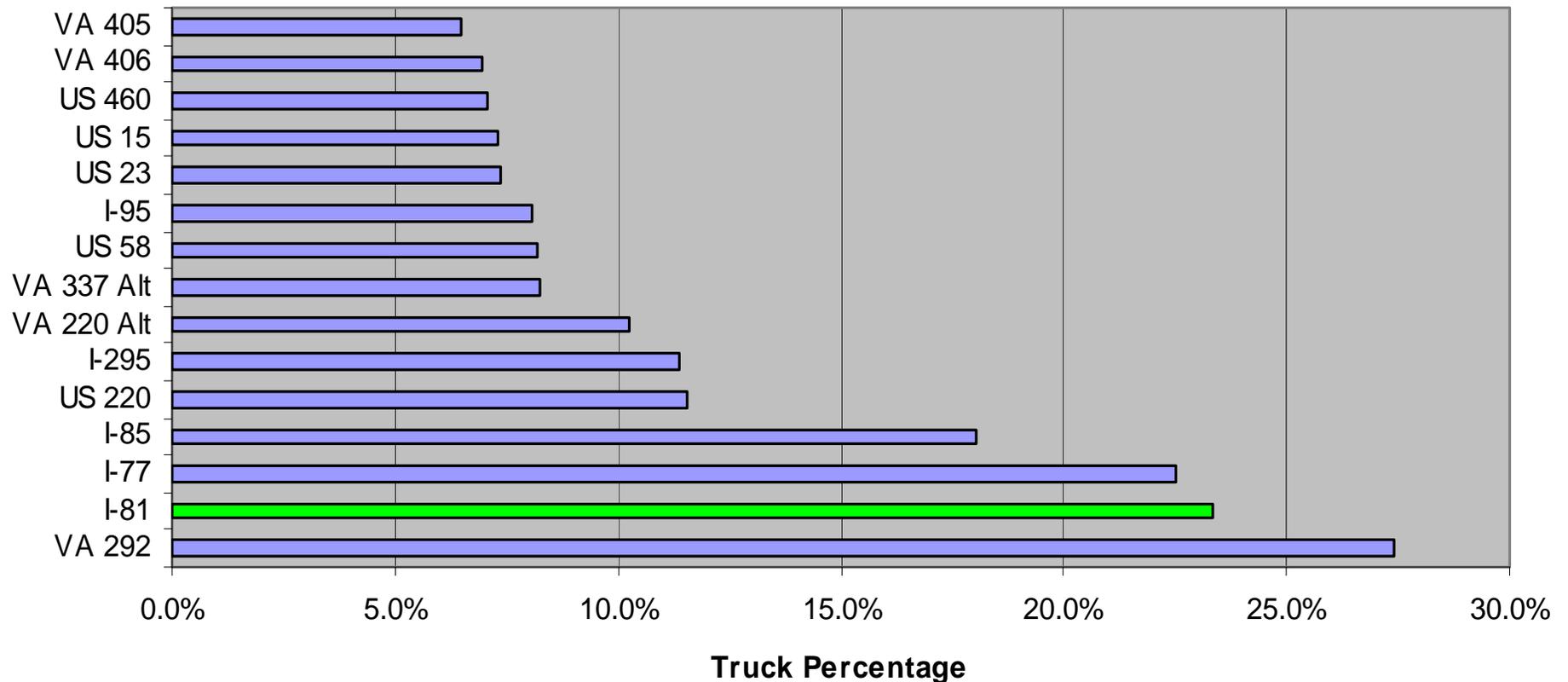
Truck Counts on Commonwealth Highways
I-81 Averages 9,284 Trucks per Day



Source: CS analysis of VDOT Traffic Counts for year 2008.

I-81 Corridor Activities

Truck Percentages on Commonwealth Highways
I-81 Averages More Than 23% Trucks

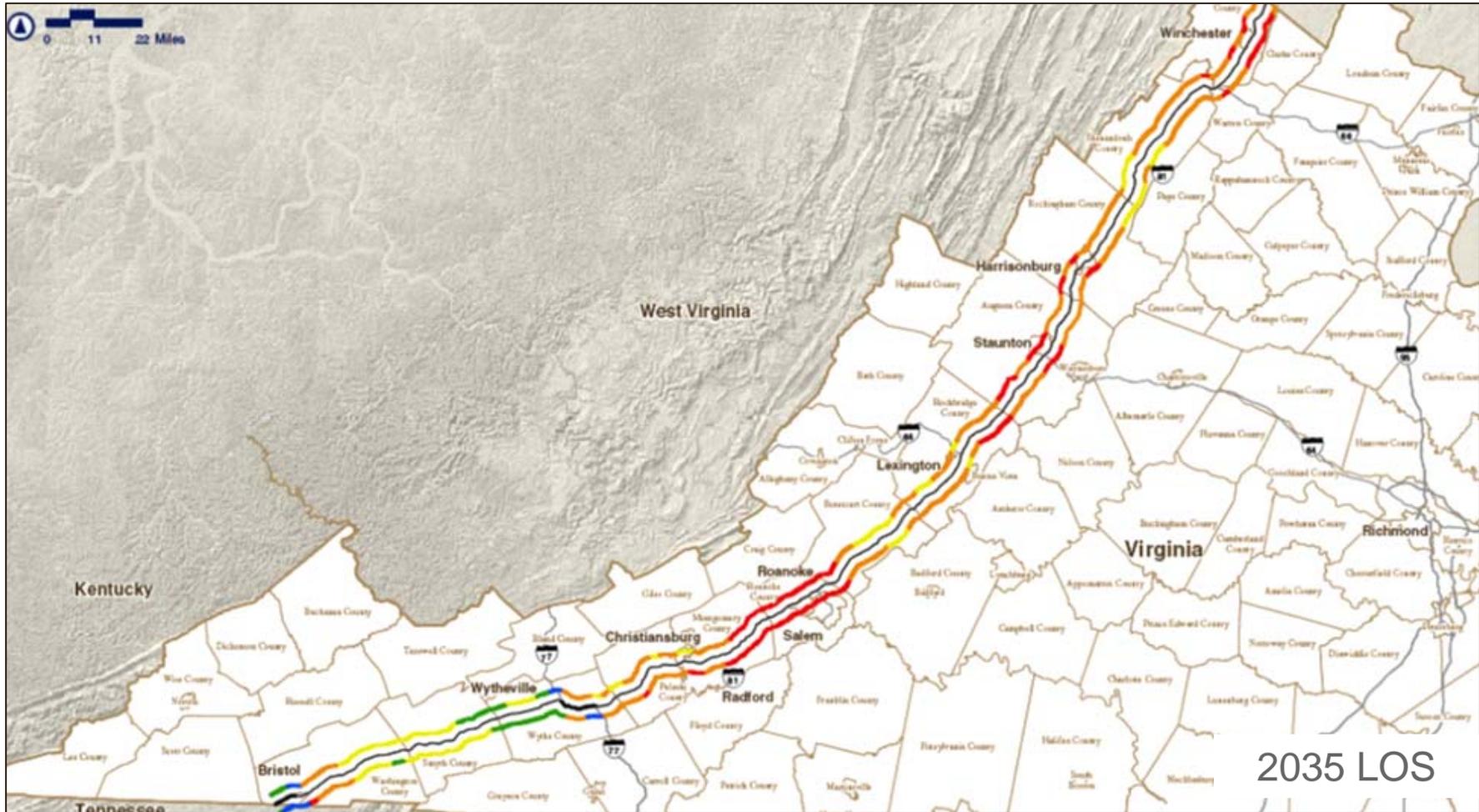


Source: CS analysis of VDOT Traffic Counts for year 2008.

I-81 Corridor Activities

Future I-81 Performance Without Improvements

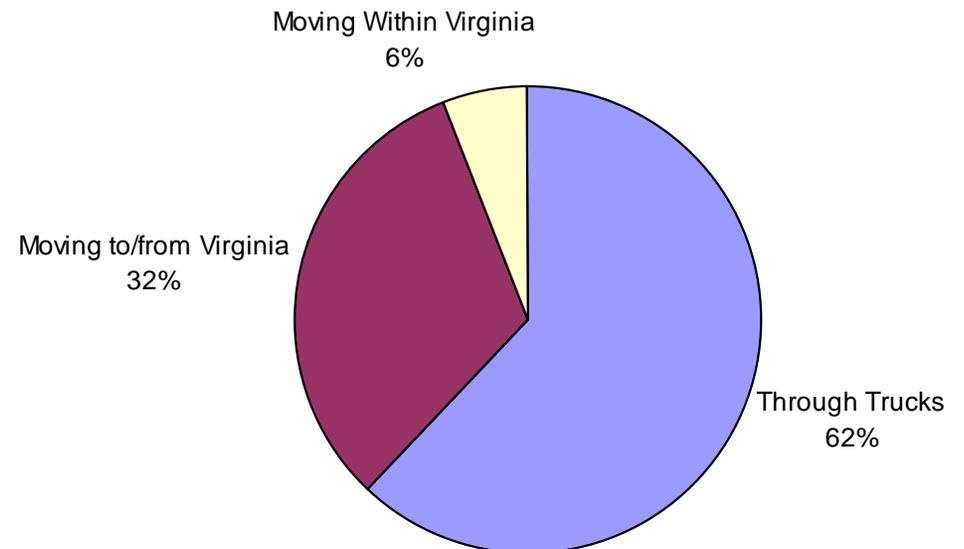
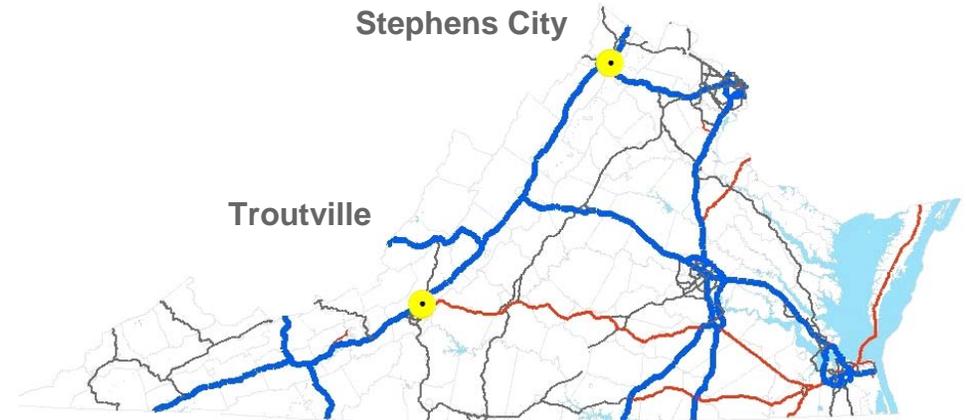
AADT to Grow at 1.7 to 2.1%; Trucks to Grow at 2.8% per year



I-81 Corridor Activities

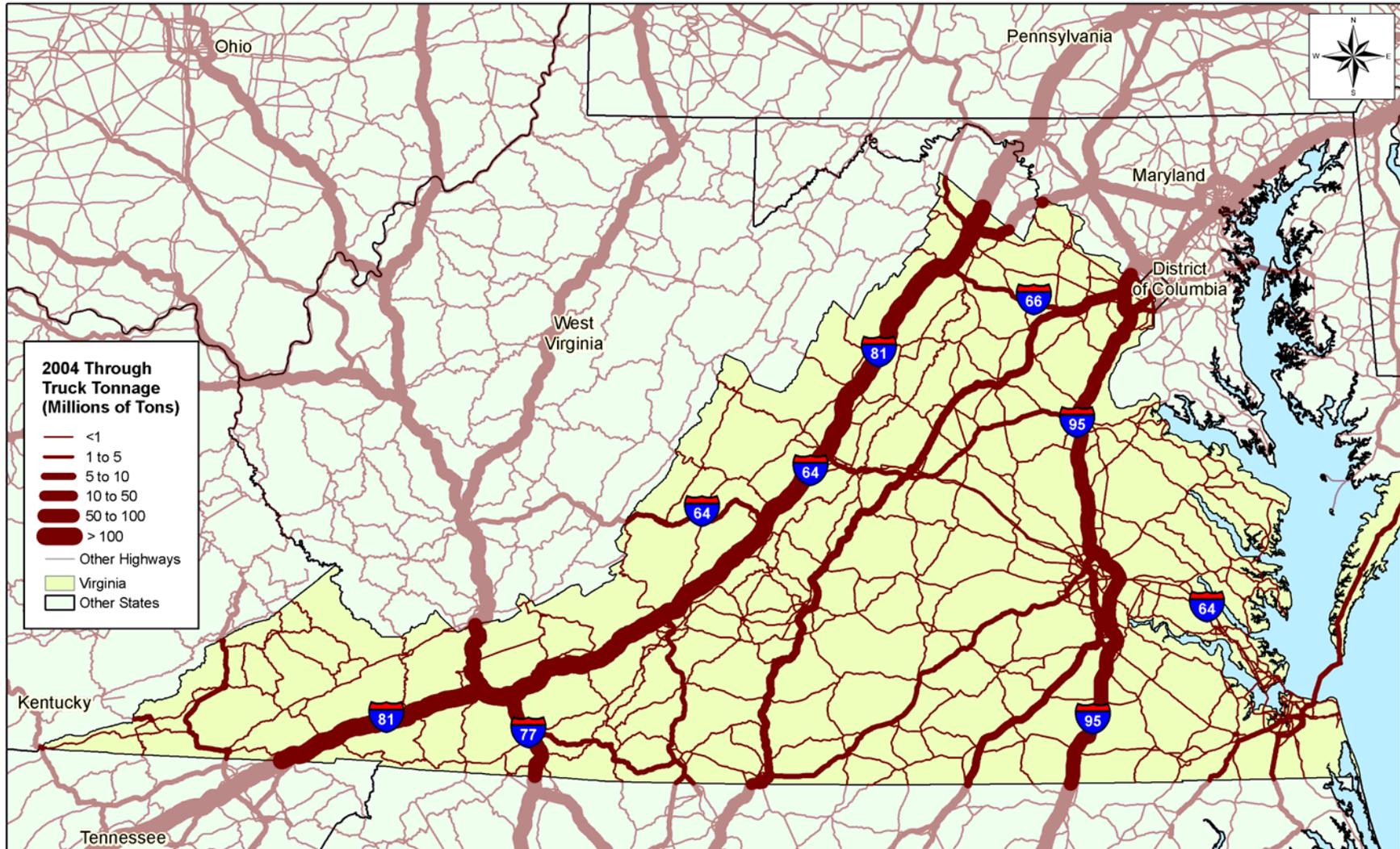
How Trucks Use I-81

- **24-hour survey, June 19-20, 2007**
 - Two weigh stations on VA I-81
 - Trucks pulled out of scale lanes and interviewed
 - Surveyor recorded observable information
 - Roughly 10% of counted trucks were surveyed
- **Results**
 - Good quality information for origin-destination states, the most critical data
 - Results varied depending on weigh station and direction
 - Overall averages were: 62% through trucks, 32% moving to and from Virginia, 6% moving within Virginia



I-81 Corridor Activities

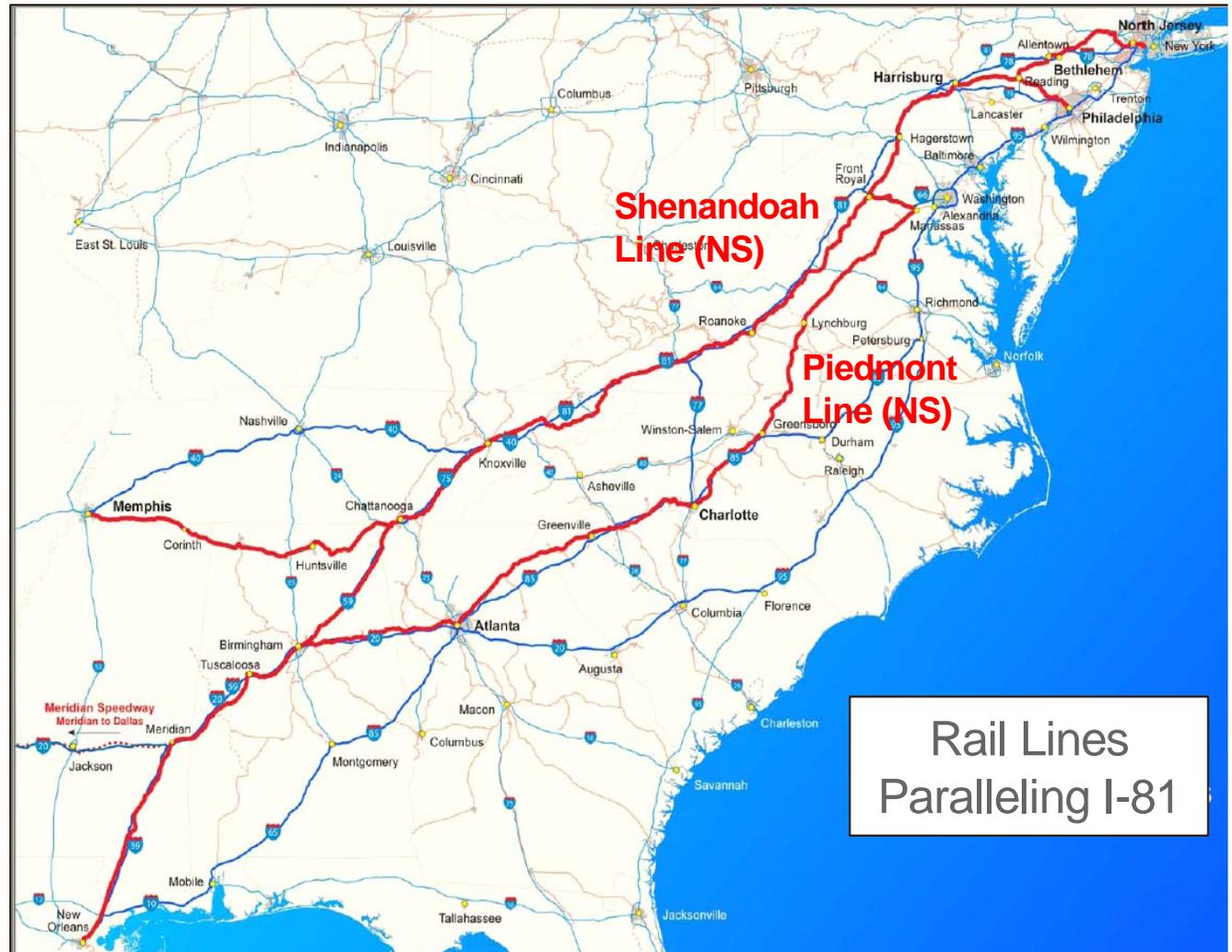
Through-Truck Tonnage on Virginia Highways
2004 Most recent Estimate from Transearch Data



I-81 Corridor Activities

Rail Lines Paralleling I-81

- **Shenandoah Line runs northeast from the TN line to the WV line**
- **Piedmont Line runs northeast from the NC line, reaches Manassas, then heads west to join the Shenandoah Line at Riverton Jct near Front Royal**
- **Both lines owned and operated by Norfolk Southern**
- **Both routes mostly single-track, with additional tracks in various locations for opposing trains pass**



Rail Lines
Paralleling I-81

I-81 Corridor Activities

Performance of Rail Lines Paralleling I-81

	Shenandoah Line	Piedmont Line
Average Freight Train Service Speeds	Up to 30 mph average	
Intermodal Units, 2006	500,000	
Intermodal Units, 2035	1,100,000	
Intermodal Trains per Week, 2006	60	81
Intermodal Trains per Week, 2020	82	121
Non-Intermodal Trains per Week, 2006	154	338
Non-Intermodal Trains per Week, 2020	153	340
Mileage	352	282

Study Findings and Recommendations

Potentially Divertible Trucks

Trucks per day on I-81 in year 2008 (average of segments in counties where weigh stations are located)	9,284 / day
Less origin-destination patterns not well served by rail corridors paralleling I-81 (running cross-wise to the I-81 Corridor, or entirely within Virginia)	$9,284 - 1,051 = 8,233 / \text{day}$
Less commodity types not amendable to handling by rail (15.0% of all I-81 trucks)	$8,999 - 1,235 = 6,998 / \text{day}$ Approximately 2.5 million trucks annually

Study Findings and Recommendations

Potentially Divertible Truck Types -- Today

With Conventional Lift-on/Lift-off Intermodal Technology, containers and truck chassis are lifted on to and off of rail cars using overhead cranes, “top picks” and/or fork lifts

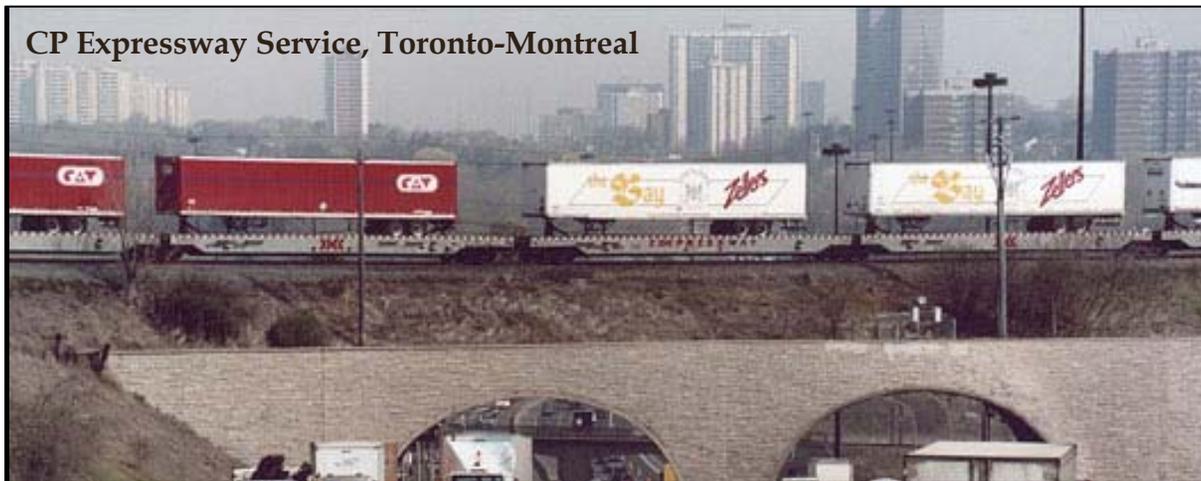
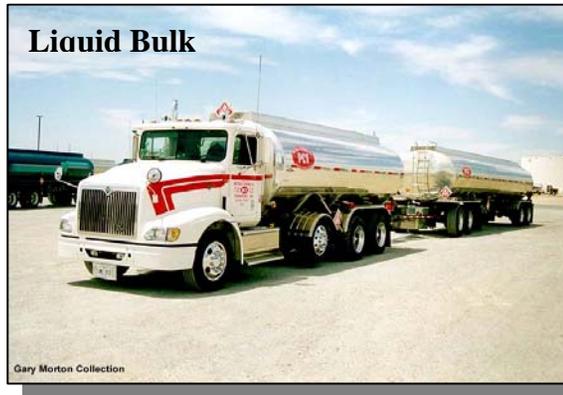
Service is limited to containers, containers on truck chassis, and “dry van” chassis and trucks



Study Findings and Recommendations

Potentially Divertible Truck Types -- Tomorrow

h “Open
chnology,” truck
assis are not lifted
to and off of rail
s – they are rolled
to and off of rail
s using ramps
s allows truck
assis of any kind --
any kind –
ntainer, dry van,
uid bulk, dry bulk,
bed, etc. – to be
ried on rail cars,
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king the trip



Study Findings and Recommendations

Potentially Divertible Trucks According to Trip Type, Distance, and Technology Needed

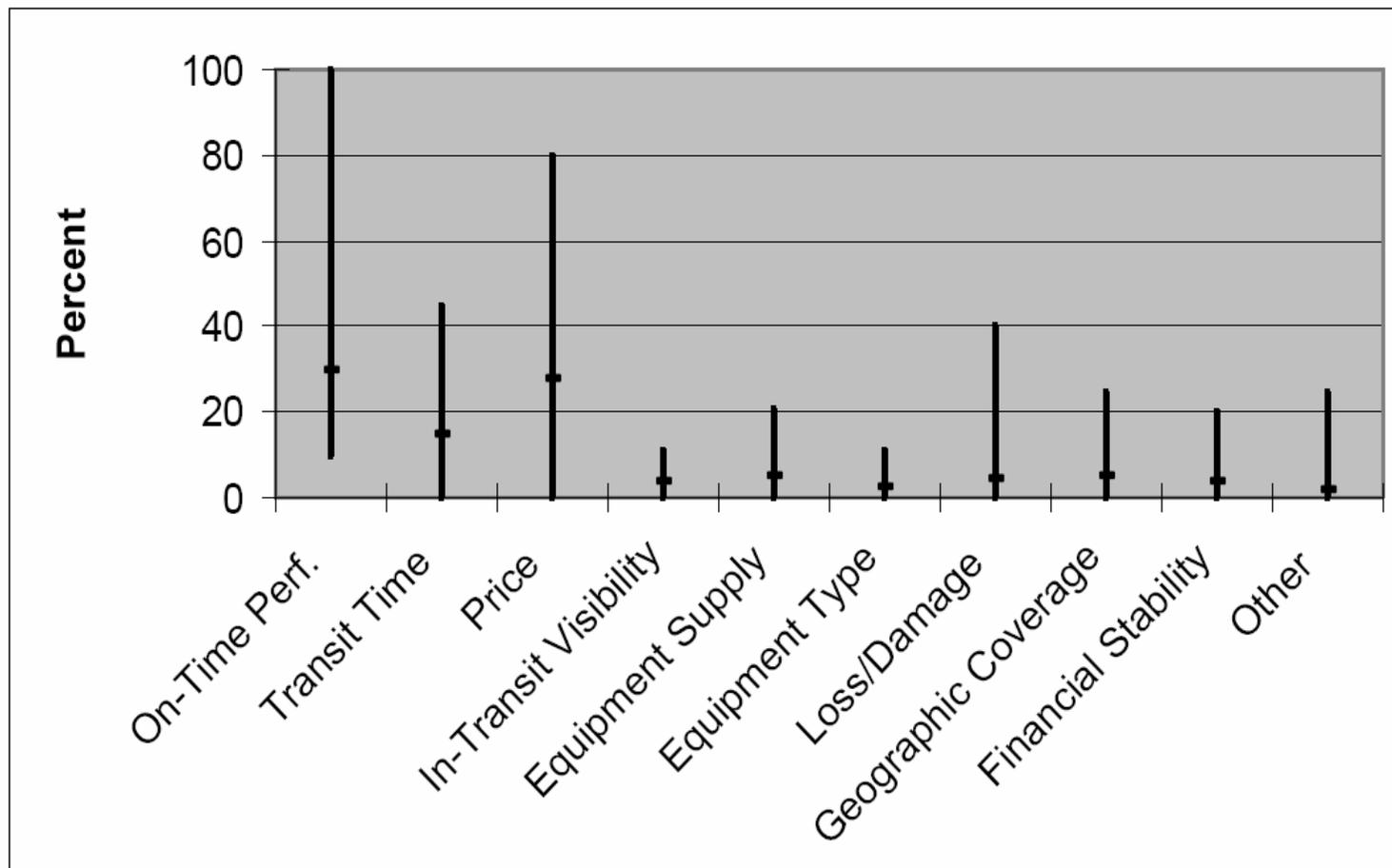
	Trucks Per Day With Divertible Routing and Divertible Commodity	Potentially Divertible With Conventional Technology		Potentially Divertible With Open Technology	
		<i>Over 500 Miles</i>	<i>Under 500 Miles</i>	<i>Over 500 Miles</i>	<i>Under 500 Miles</i>
through Virginia	3,190	2,127	-	1,063	-
and other routes through Virginia	1,652	1,082	19	541	10
to and from Virginia	2,156	310	1,128	155	564
entirely within Virginia	-	-	-	-	-
	6,998	3,519	1,147	1,759	573

Study Findings and Recommendations

Freight Transportation is a Purchased Service

Rail Won't Capture 100% of All Potentially Divertible Trucks, but Can Capture Many of Them by Competing on Cost, Reliability

(Vertical Bars Represent Range, Horizontal Dashes Represent Average Response)



Study Findings and Recommendations

Fuel Price is an Important Factor

It is reasonable to expect that over time, both trucking and rail costs will tend to increase, but rail costs should increase more slowly

- Rail is more fuel efficient than trucking
- Rail pays less per gallon than “at the pump” prices
- End to end rail service often depends on trucks for first-mile/last-mile connections, so the service price is affected by both rail and truck costs

Fuel price changes matter, but the effects may not be “game changing”

- With current price points the estimated rail diversion opportunity based solely on rail’s price advantage is 14 percent of all I-81 trucks.
- Increasing at-the-pump fuel prices from \$3 to \$6 per gallon would increase the diversion potential to between 17 and 18 percent.
- Increasing at-the-pump fuel prices from \$3 to \$9 per gallon would increase the diversion potential to between 20 and 21 percent.



Study Findings and Recommendations

FINDING: Strategy #1 (improve conventional intermodal rail) is the most feasible, and there is an active proposal (the Crescent Corridor) to accomplish the targeted diversion. It is the lowest-risk strategy and one of the least expensive on a per unit diverted basis.

RECOMMENDATION: Advance the Crescent Corridor. The Commonwealth should proceed with further investigations of potential participation in the Crescent Corridor project. These should include: evaluation of the Commonwealth's financial participation; structures to ensure successful investments by other states and the private sector; necessary environmental studies; and agreements to ensure that the expected diversion benefits are actually delivered.



Study Findings and Recommendations

FINDING: Strategies #2 (develop multistate open technology network) and #3 (develop and enhance Virginia terminals) are considered potentially feasible. From a technical and engineering standpoint the required improvements are achievable, but as service strategies they are by no means proven, and there are no active plans to implement them. They are inexpensive on a per unit diverted basis.

RECOMMENDATION #2: Investigate other potentially feasible truck to rail diversion strategies. NS should proceed with further development of strategies to improve upon the diversion achieved by the Crescent Corridor, particularly from: a) conventional speed open technology service to divert long-haul bulk trucks; and b) potential private investments in Virginia terminals to divert Virginia origin-destination traffic.

Study Findings and Recommendations

FINDING: Strategy #4 (higher-speed open technology service) and Strategy #5 (very high-speed truck intercept/truck shuttle service) would further increase the truck to rail diversion potential. However, the feasibility of these strategies from a technical, market, and financial standpoint is currently unknown, and would require extensive and potentially costly follow-on studies to determine with specificity. Additionally, the anticipated capital cost in Virginia per diverted unit is quite high -- \$175 per unit for Strategy #4 and \$288 per unit for Strategy #5 -- compared to less than \$27 per unit for Strategies #1, #2, and #3.

NO RECOMMENDATION. Further investigation of these concepts may be warranted, but should be a lower priority than advancement of the more proven and cost-effective strategies identified in this report.



Study Findings and Recommendations

FINDING: The I-81 Tier I EIS estimated a maximum diversion of 1,224,500 units in 2035; this study finds that it is feasible divert 965,496 annual units in 2035, and potentially feasible to divert up to 1,627,881 units. The difference between the diversion estimate in this report and the diversion estimate in the EIS represents slightly more than two years of normal growth in the total number of I-81 trucks, which is not considered significant.

RECOMMENDATION #3: Continue to advance improvements identified in the I-81 Tier I EIS.

Study Findings and Recommendations

Diversification Strategies Must be Targeted According to Trip Type, Distance, and Technology Needed

Diversification Strategy	Potential Diversification
Upgrade existing intermodal network with terminal and capacity upgrades, operating at conventional speeds, capturing long-haul intermodal trucks passing through VA	3,209 / day
Develop multistate open technology network plus (1), operating at conventional speeds, capturing long-haul bulk trucks passing through VA	1,604 / day
Upgrade Virginia terminals plus (1) and (2), capturing long-haul trucks with Virginia origins and destinations	465 / day
Introduce higher-speed open technology network between Knoxville and Harrisburg, plus (1) and (2) and (3), capturing shorter-haul trucks and Knoxville-Harrisburg truck moves	4,910 / day
Develop very high speed “truck intercept / truck shuttle” service between Knoxville and Harrisburg, capturing long-haul intermodal and non-intermodal through trucks using I-81 end to end	3,190/day

Note: some of these strategies are aimed at the same market opportunities, so they sum to more than the total diversification potential of 6,998 trucks per day

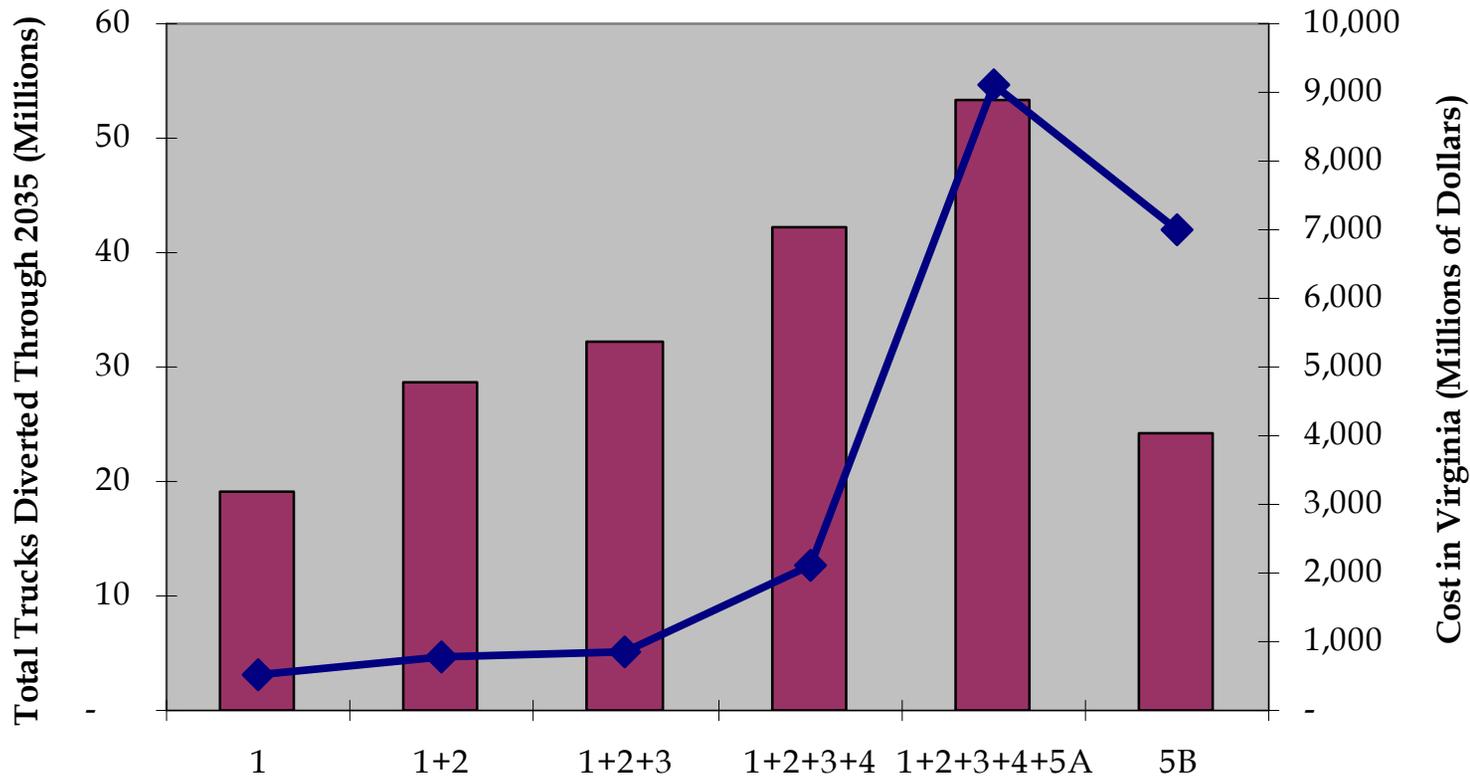
Study Findings and Recommendations

Performance and Feasibility of Each Strategy

	1 Only	1+2	1+2+3	1+2+3+4	1+2+3+4 +5A	5B Only
Potentially Divertible Trucks	3,209	4,813	5,278	6,998	6,998	3,190
Long-Haul through Trucks Diverted	1,255	1,883	1,883	2,368	3,097	1,595
Other Trucks Diverted	-	-	233	405	405	-
Total Trucks Diverted	1,255	1,883	2,116	2,773	3,502	1,595
Long-Haul through Trucks on I-81	5,711	5,711	5,711	5,711	5,711	5,711
Total Trucks on I-81	9,284	9,284	9,284	9,284	9,284	9,284
Total AADT on I-81	39,730	39,730	39,730	39,730	39,730	39,730
Percentage of Potentially Divertible Trucks Diverted	39.1%	39.1%	40.1%	39.6%	50.0%	50.0%
Percentage of Long-Haul Through Trucks Diverted	22.0%	33.0%	33.0%	41.5%	54.2%	27.9%
Percentage of Total Trucks Diverted	13.5%	20.3%	22.8%	29.9%	37.7%	17.2%
Percentage of Total AADT Diverted	3.2%	4.7%	5.3%	7.0%	8.8%	4.0%
Total Annual Units Diverted, 2008	458,075	687,295	772,340	1,012,319	1,278,117	582,175
Total Annual Units Diverted, 2035	965,496	1,448,629	1,627,881	2,133,690	2,693,920	1,227,065
Total Annual Units Diverted, 2008-2035 (Millions)	19.1	28.6	32.2	42.2	53.3	24.3
Estimated Cost Total (\$ Millions)	2,100	2,675	2,775	4,275	13,275	9,000
Estimated Cost in Virginia (\$ Millions)	512	762	862	2,112	9,112	7,000
Estimated Cost in Virginia per Unit Diverted (\$)	26.82	26.61	26.78	50.07	171.09	288.55
Assessment of Feasibility	Feasible	Potentially Feasible	Feasibility Unknown			

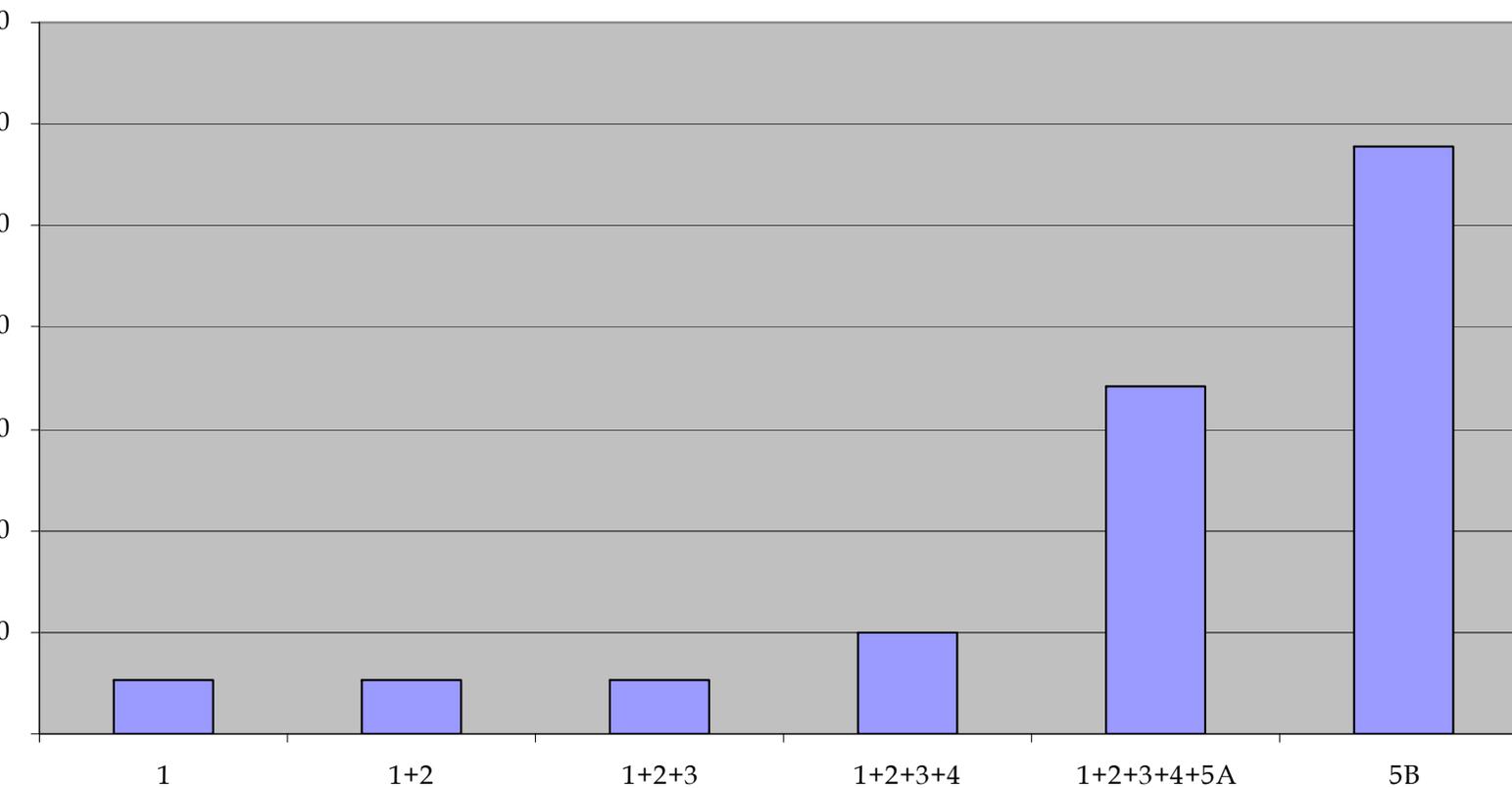
Study Findings and Recommendations

Comparison of Diverted Units Through 2035 and Capital Costs Within Virginia



Study Findings and Recommendations

Cost in Virginia per Diverted Unit Through 2035



Public Comment Summary

A total of 51 comments during the official public comment period.

- The majority, 72.5% of respondents criticized the study as being incomplete and failing to follow the language of HB-1581
- 23.5% support a shift from truck to rail
- 4% note that any rail project in the I-81 corridor should include a trail component

A primary objective of the study was to comply with the requirements of Virginia's 2007 Appropriations Act, Item 442, which calls for "development of a feasibility plan to define the conditions that would be necessary to divert the maximum amount feasible of the long-haul, through-truck freight traffic to intermodal rail in the I-81 Corridor."



Next Steps for the Corridor

Continue work on I-81 corridor projects

- Manassas to Front Royal improvements complete summer 2010**

Use study recommendations as blueprint for state investments in the corridor

- Approximately \$20 million in Rail Enhancement Funds will be recommended in the FY11-16 Six-Year Improvement Program**

As additional funding becomes available, DRPT is prepared to act quickly to execute strategies identified in the study

Coordinate multi-state investment strategies to realize full potential of recommendations along corridor