COMMONWEALTH *of* VIRGINIA

Office of the

SECRETARY *of* TRANSPORTATION

Interstate 95 Corridor Improvement Plan

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VIRGINIA DEPARTMENT OF AVIATION

DRPT
Virginia Department of Rail and Public Transportation

MVDB
Motor Vehicle Dealer Board
COMMONWEALTH OF VIRGINIA

VIRGINIA PORT AUTHORITY
Jamestown Landing 1607
1952

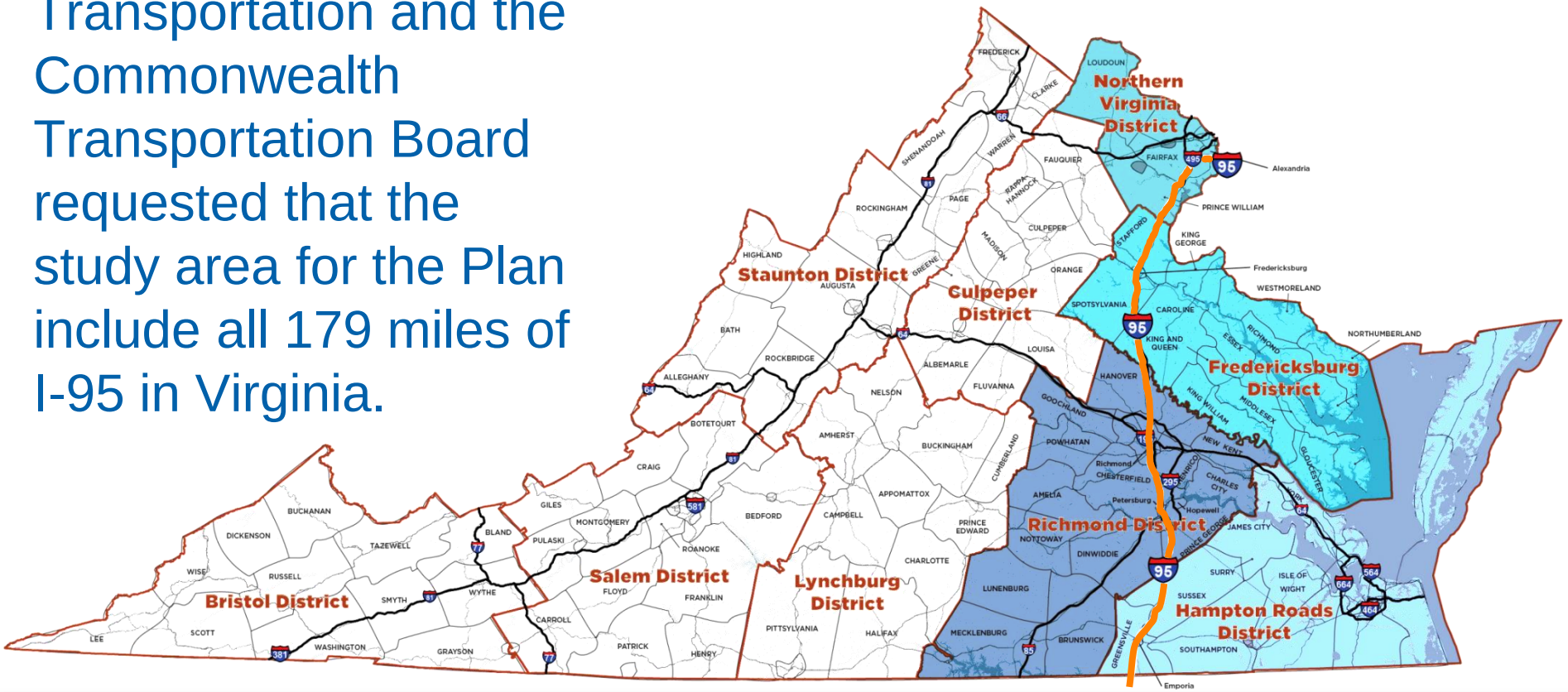
VDOT
Virginia Department of Transportation

I-95 Corridor Improvement Plan- Progress to Date

- Problem identification
- Identification of potential solutions for each problem area and operations plan
- Prioritization of operations strategies

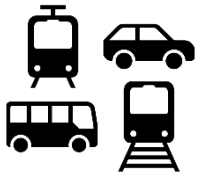
Study Area
I-95, Route 1, and Route 301 Corridors

The Secretary of Transportation and the Commonwealth Transportation Board requested that the study area for the Plan include all 179 miles of I-95 in Virginia.



Corridor Significance

Critical North-South Corridor



Multimodal Corridor

- Highway
- Metrorail
- VRE
- Vanpool
- Carpooling
- Slugging
- Commuter/Express Bus
- Park and Ride Lots
- Amtrak

9.0 Million

Trucks Per Year

> 3,700 Incidents Per Year

(With Average Clearance Times Almost 2 Hours)

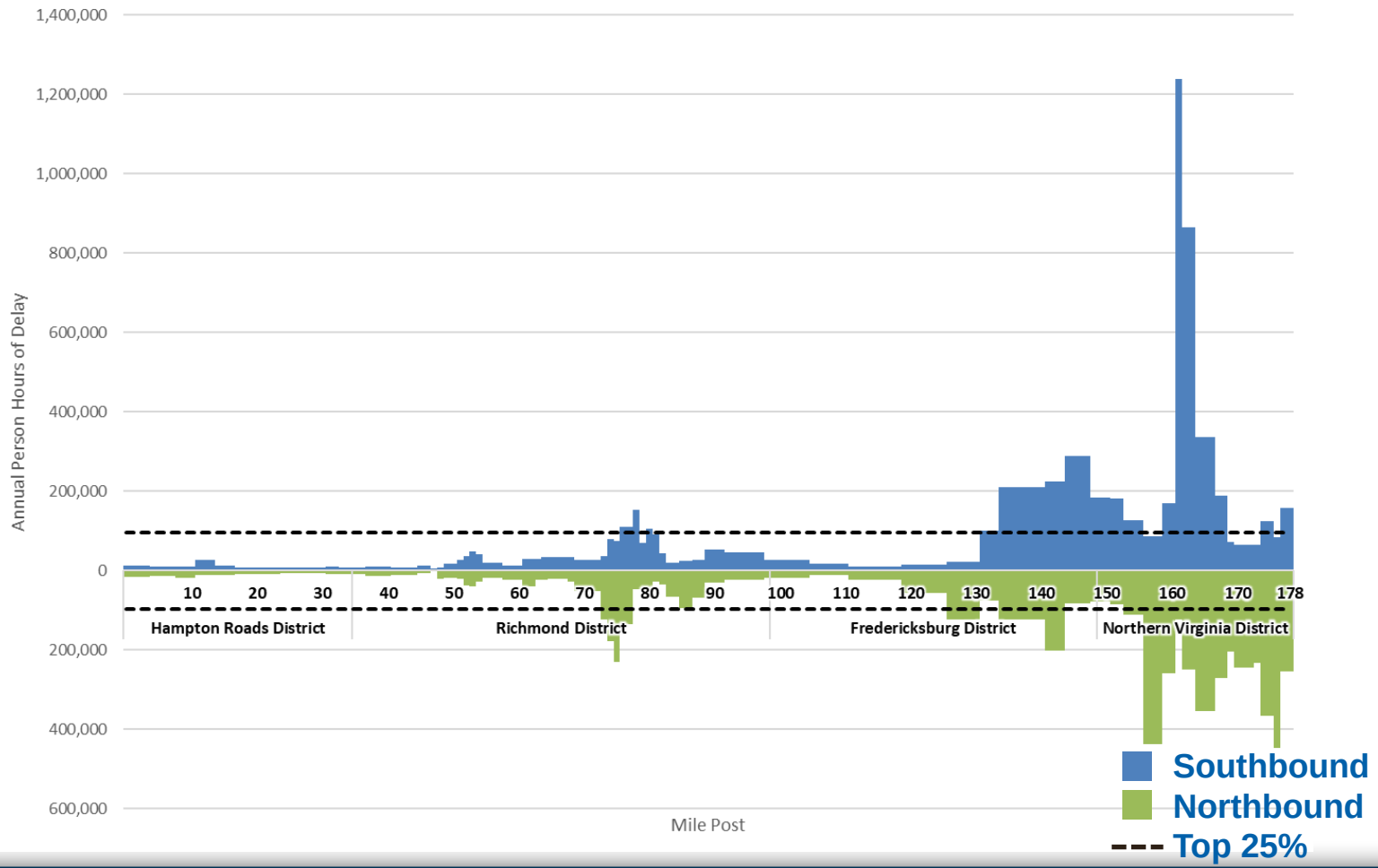
~ 21,000

Crashes Over 4 Years

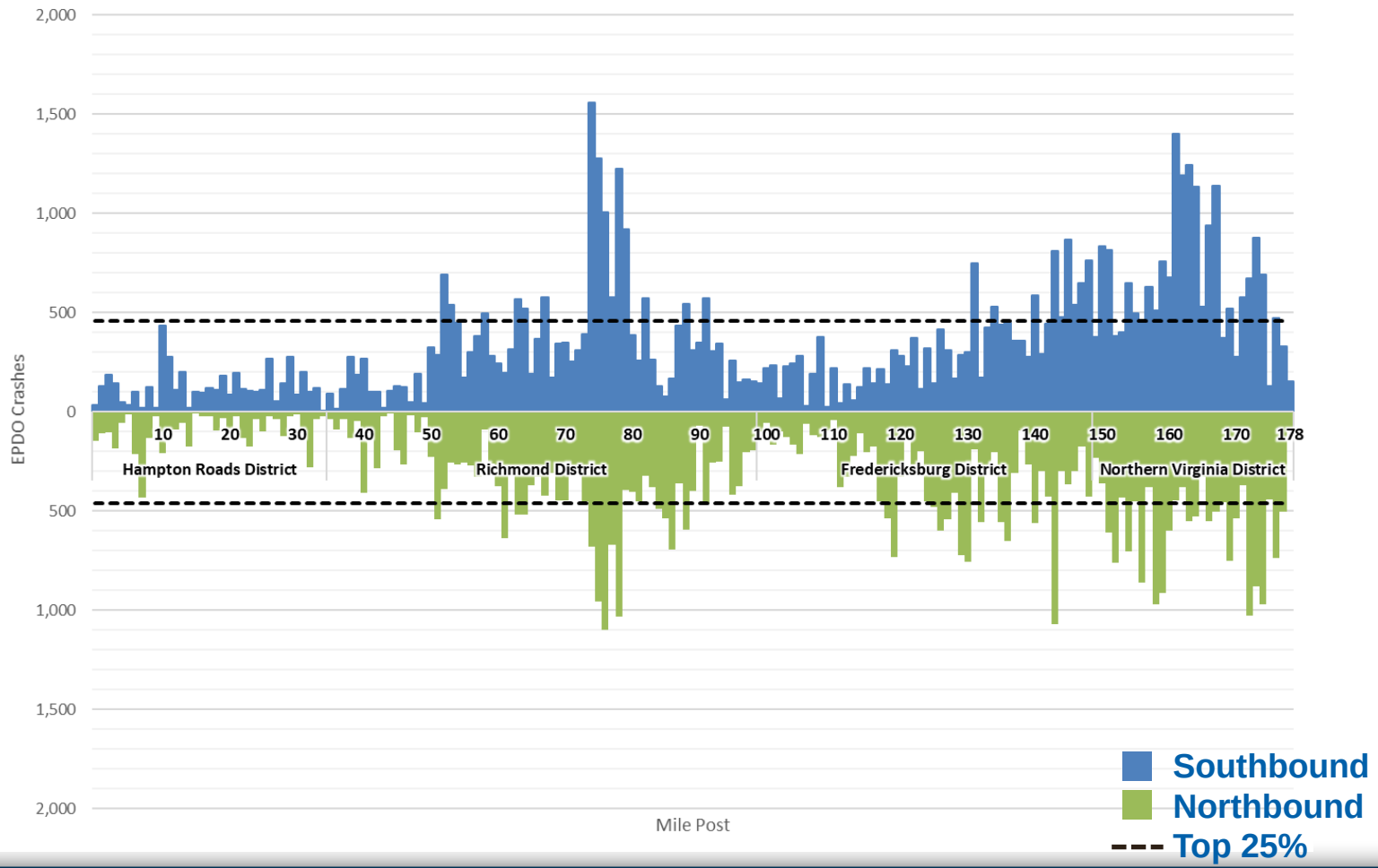
$195 Billion

in Goods Per Year

Focus Area: Occoquan
2018 Annual Delay Summary
One-Mile Segments

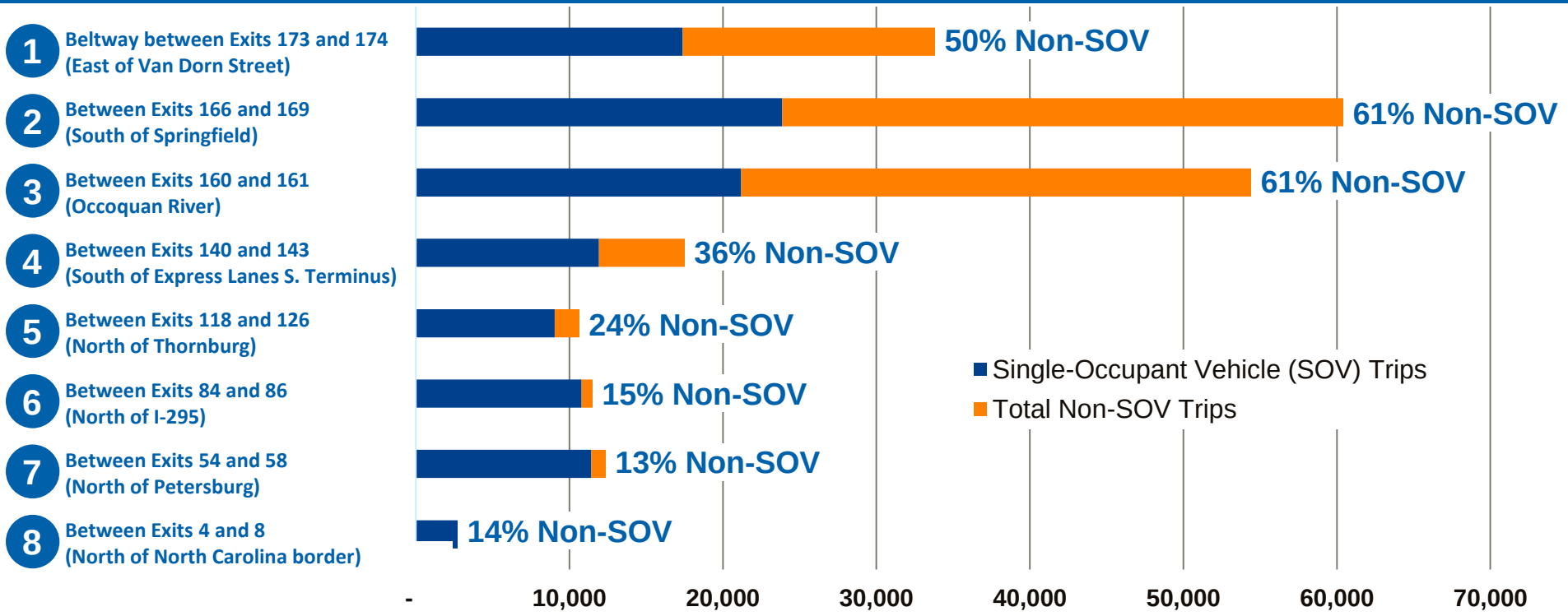


Crash Frequency and Severity Summary
One-Mile Segments



Persons Moved on Northbound I-95 in AM

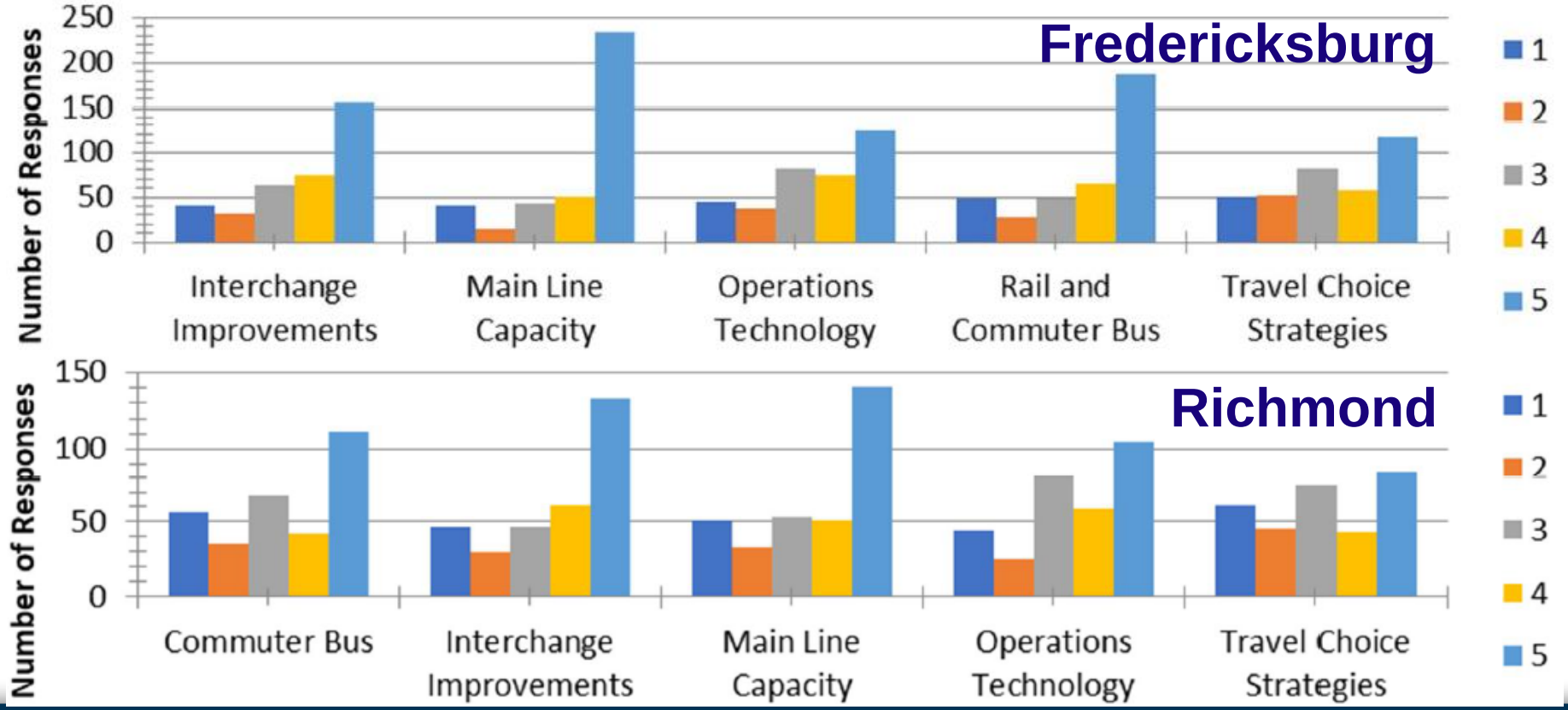
Existing



Total Persons Moved = SOV + Intercity Rail (Amtrak), Commuter Rail (VRE), Metrorail, Commuter Bus, Vanpool, Slugging and Carpool

October Meetings Public Feedback and Survey Results: Strategy Rating

Participants were asked to rate strategies on a scale of 1 to 5, with 5 being the highest



Suite of Improvements

Focus Areas

- **OPERATIONS ON I-95**
- **PARALLEL FACILITIES** (Routes 1 and 301)
- **MULTIMODAL** (rail, bus, carpool, park and ride)
- **CAPITAL PROJECTS ON I-95**

Data-driven approach incorporating performance measures

GOALS

To provide faster, safer, and more reliable travel along the I-95 corridor

Corridor-wide Improvements Planning Level Cost Estimates

Estimated FY20 Capital Cost Ranges

- Freeway operations upgrades: $48 - $53 M
- Arterial operations upgrades: $12 - $15 M
- Multimodal improvements: $215 - $260 M
- Highway capital improvements: $1.3 - 1.8 B

TOTAL: $1.6 - $2.1 B

Potential Capital Improvements

- **54 projects (highway, rail, bus, park & ride) with estimated cost between $1.5 - $2.1B**
- **35 locations requiring additional study**
- **Challenge: Needs far exceed available annual revenues**

Potential Sources of Revenue
Dedicated Interstate Funding Estimates

By FY2022 -

- **~$40M per year**: I-95 south of Northern Virginia District (CTB)
- **~$20M per year**: all Northern Virginia District interstates and supporting facilities (NVTA)
- **~$44M per year**: At the discretion of CTB for any interstate

Potential Sources of Revenue
Other Sources

- **SMART SCALE**
- **Regional funding – NVTA**
- **Regional Surface Transportation Block Grant Program (Northern Virginia, Fredericksburg, Richmond and Tri-Cities MPO regions)**
- **Innovative Transportation Technology Fund**
- **I-395 Commuter Choice**
- **Rail and transit funding programs**

Recommendations

- **Operational improvements offer highest ROI and fastest implementation**
- **$60-$68 M cost will require first 3 years of available funding**
- **Proceed with allocation of funding for operational and parallel facilities upgrades**
- **Conduct further study on items identified**
  - Bi-directional HOT Lanes, Woodrow Wilson Bridge HOT Lanes, multiple interchange improvements

Recommendations

- **Complete evaluation of I-64 corridor**
- **Identify operational improvements for other Interstate corridors**
- **Establish CTB policy on allocation of dedicated interstate revenues**
- **Evaluate all potential projects to determine best allocation of dedicated and discretionary Interstate funds**

Recommended Operational and Parallel Facilities Improvements

Recommended operational improvements

- Tied to top 25% locations for incident-related delay on I-95 mainline
- Incorporate both freeway and parallel arterial improvements

Over $200M of operations and parallel facilities improvements initially identified

- Prioritized to reflect countermeasures with greatest return on investment
- Will be prioritized on a segment level by district

Total recommended freeway and arterial operations investments: $60 - $68 M

Partial List of Operational Improvements

CCTV Cameras

Detect incidents and provide situational awareness of incidents

Changeable Message Signs

Informs drivers of conditions ahead

Safety Service Patrols

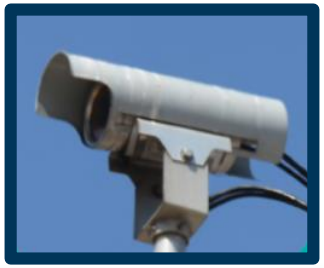
Provide incident scene support and help stranded motorists

Towing Programs

Contract towing services that are activated as incidents are detected

Variable Speed Limits

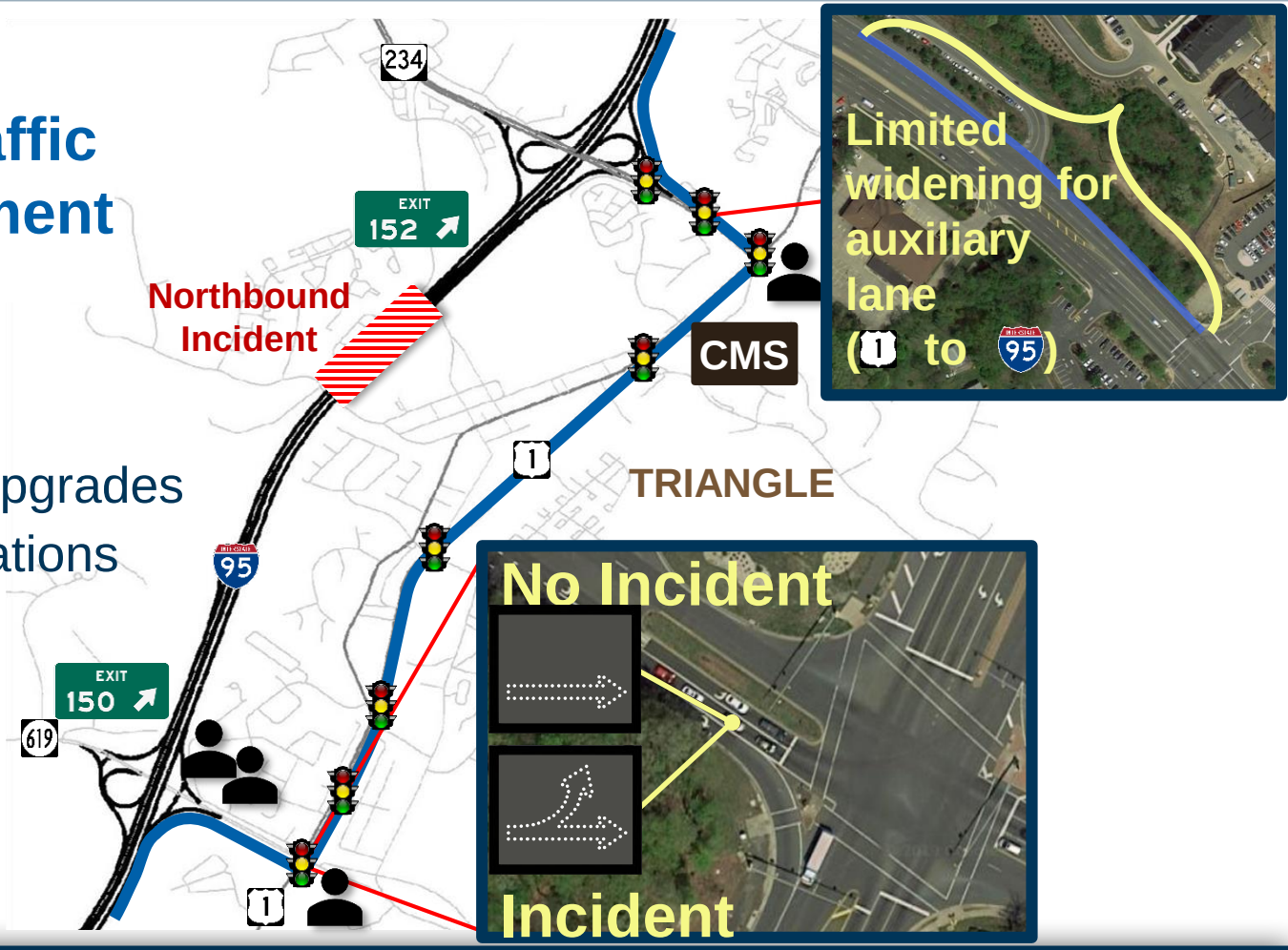
Adjustable speed limits that change to reduce traffic congestion



Parallel Facilities Improvements

Improvements considered for traffic incident management

- Message signs
- Traffic control personnel
- Communications upgrades
- Traffic signal operations
- Intersection improvements
- Sign improvements



Operational Improvements
Potential Benefits

Towing Program
Incident clearance times reduced by up to 27 minutes per incident

Safety Service Patrols
Incident duration reduced by 17% when SSP is on-site

Variable Speed Limits
Reduce crashes by 8% and increase vehicle throughput by 5%

Ramp Metering
22% reduction in travel times on I-95

Recommended Operational and Parallel Facilities Improvements

Example ROI Analysis

Safety Service Patrols (SSP)

- **Safety**
  - Average percent reduction of secondary crashes is 40%
  - 20% of crashes are secondary crashes
- **Mobility**
  - SSP reduces incident duration by 17%

Recommended Operational and Parallel Facilities Improvements

Safety Service Patrol ROI Metrics

- **Mobility**
  - Incident delay
  - % reduction in incident delay
  - Travel time savings
- **Safety**
  - PDO crashes
  - Injury crashes
  - Fatality crashes
- **Energy & Environment**
  - Travel time savings
  - Fuel consumption
  - Fuel costs
  - Emissions benefits

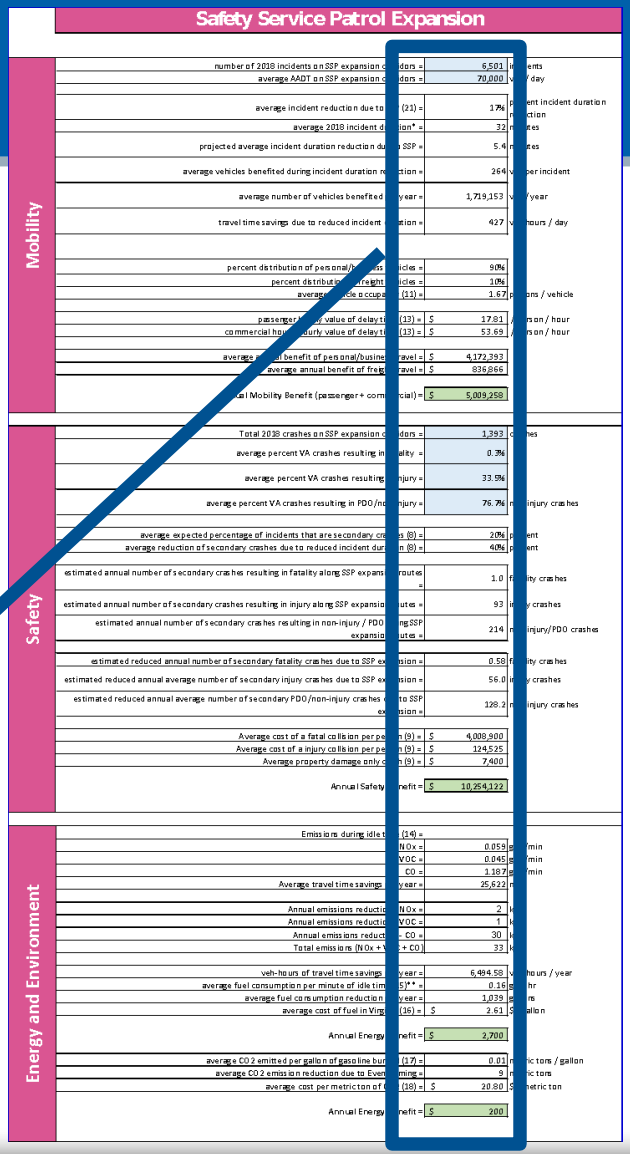
Safety Service Patrol Expansion

Mobility	number of 2018 incidents on SSP expansion corridors =	6,501	incidents
	average AADT on SSP expansion corridors =	70,000	veh / day
	average incident reduction due to SSP (21) =	17%	percent incident duration reduction
	average 2018 incident duration* =	32	minutes
	projected average incident duration reduction due to SSP =	5.4	minutes
	average vehicles benefited during incident duration reduction =	264	veh per incident
	average number of vehicles benefited per year =	1,719,153	veh / year
	travel time savings due to reduced incident duration =	427	veh hours / day
	percent distribution of personal/business vehicles =	90%	
	percent distribution of freight vehicles =	10%	
	average vehicle occupancy (11) =	1.67	persons / vehicle
	passenger hourly value of delay time (13) =	$ 17.81	/ person / hour
	commercial hourly hourly value of delay time (13) =	$ 53.69	/ person / hour
	average annual benefit of personal/business travel =	$ 4,172,393	
	average annual benefit of freight travel =	$ 836,866	
	Annual Mobility Benefit (passenger + commercial) =	$ 5,009,258	
Safety	Total 2018 crashes on SSP expansion corridors =	1,393	crashes
	average percent VA crashes resulting in fatality =	0.3%	
	average percent VA crashes resulting in injury =	33.5%	
	average percent VA crashes resulting in PDO/non-injury =	76.7%	non-injury crashes
	average expected percentage of incidents that are secondary crashes (8) =	20%	percent
	average reduction of secondary crashes due to reduced incident duration (8) =	40%	percent
	estimated annual number of secondary crashes resulting in fatality along SSP expansion routes =	1.0	fatality crashes
	estimated annual number of secondary crashes resulting in injury along SSP expansion routes =	93	injury crashes
	estimated annual number of secondary crashes resulting in non-injury / PDO along SSP expansion routes =	214	non-injury/PDO crashes
	estimated reduced annual number of secondary fatality crashes due to SSP expansion =	0.58	fatality crashes
	estimated reduced annual average number of secondary injury crashes due to SSP expansion =	56.0	injury crashes
	estimated reduced annual average number of secondary PDO/non-injury crashes due to SSP expansion =	128.2	non-injury crashes
	Average cost of a fatal collision per person (9) =	$ 4,008,900	
	Average cost of a injury collision per person (9) =	$ 124,525	
	Average property damage only crash (9) =	$ 7,400	
	Annual Safety Benefit =	$ 10,254,122	
Energy and Environment	Emissions during idle time (14) =		
	NOx =	0.059	gms/min
	VOC =	0.045	gms/min
	CO =	1.187	gms/min
	Average travel time savings per year =	25,622	min
	Annual emissions reduction - NOx =	2	kg
	Annual emissions reduction - VOC =	1	kg
	Annual emissions reduction - CO =	30	kg
	Total emissions (NOx + VOC + CO)	33	kg
	veh-hours of travel time savings per year =	6,494.58	veh-hours / year
	average fuel consumption per minute of idle time (15)** =	0.16	gal / hr
	average fuel consumption reduction per year =	1,039	gallons
	average cost of fuel in Virginia (16) =	$ 2.61	$ / gallon
	Annual Energy Benefit =	$ 2,700	
	average CO2 emitted per gallon of gasoline burned (17) =	0.01	metric tons / gallon
	average CO2 emission reduction due to Event Timing =	9	metric tons
	average cost per metric ton of CO2 (18) =	$ 20.80	$ / metric ton
	Annual Energy Benefit =	$ 200	

Recommended Operational and Parallel Facilities Improvements

Safety Service Patrol ROI

Capital Cost =	**$3.3-3.6 M**
O&M cost over 10 yrs. =	**$25 M**
Benefit over 10 yrs. =	**$80.1 M**
ROI =	**3.1**



Recommended Operational and Parallel Facilities Improvements – ROI Summary

Proposed Operational Improvement	Estimated Implementation Cost (millions $)	Estimated Annual O&M Cost (thousands $)	Benefit [10 Years] (millions $)	ROI [10 Years]
CCTV Cameras	$14.7 - 16.2	$800 - 1.0	$134.6	**4.7**
Changeable Message Signs	$3.0 - 3.3	$80 - 90	$18.7	**5.2**
Safety Service Patrols	$3.3 - 3.6	$2.5 - 2.8	$88.3	**3.1**
TRIP Towing Program	$2.1 - 2.3	$1.7 - 1.9	$84.5	**7.8**
Towing Program	$1.1 - 1.3	$1.0 - 1.1	$141.4	**12.9**
Variable Speed Limits	$13.4 - 14.8	$2.9 - 3.2	$117.5	**3.0**
Ramp Metering	$5.4 - 5.9	$410 - 510	$71.8	**8.0**
Geofenced Emergency Notifications	$0.1 - 0.2	$100 - 130	$1.4	**1.3**
Advanced Work Zone Technology	$0.9 - 1.0	$450 - 570	$19.3	**3.9**
Misc. Low-Cost Improvements	$4.1 - 4.5	$450 - 570	$98.4	**12.2**
Critical Arterial Signal Improvements	$12.1 - 15.1	$330 - 420	TBD	**TBD**

Next Steps

- Approve corridor-wide operations and arterial upgrades in January
- I-95 Report Executive Summary to CTB in January 2020
- Final Report to CTB and General Assembly in January 2020
- Prioritize remaining projects after completion of the I-64 corridor plan