BUS PRIORITY BEST PRACTICES IN THE NATIONAL CAPITAL REGION

Overview of Synthesis

Eric Randall
TPB Transportation Engineer

TPB Technical Committee
December 4, 2020

Agenda Item 9

National Capital Region
Transportation Planning Board

Contents of Synthesis

- Introduction and Purpose
- Results of TIGER Bus Priority in the NCR
- Results of Other Bus Priority in the NCR
- Bus Transformation Project (BTP) Recommendations
- Key Information from Literature on Benefits and Costs of Bus Priority
- Key Information from Peers on the Benefits and Costs of Bus Priority
- Near Term and Future Bus Priority Projects in the NCR

Nine local bus operators in the National Capital Region (NCR) provide over 164 million trips annually. Eighty-one percent of the region's population, and 94 percent of the region's transit dependent population live within a quarter-mile of transit. However, bus speeds and reliability have declined over the past decade, limiting residents' access to jobs and opportunities. Metrobus speeds, for example, have decreased by 9% or 1 mph over the past 10 years.

The *Bus Priority Best Practices Synthesis* is a resource for the National Capital Region (NCR) highlighting local examples of bus priority and includes a comprehensive list of resources for planners and policymakers.

Photo Source: Floating Bus Stop (BeyondDC/Flickr), Data Source: National Transit Database

Investing in bus priority treatments has positive impacts

- Bus priority treatments can improve bus speed, reliability and efficiency
  - Increasing the region's residents' **access to jobs and opportunities**
  - Attracting **new transit riders** and improving the experience of existing riders

16th Street NW Buses (DDOT/https://www.16thstreetnwbus.com/)

Results of Bus Priority Projects in the Region

Bus priority treatments lead to increased speeds and increases in ridership

Priority Bus Corridors/Services	Results	Bus priority infrastructure
Metroway	83% ridership increase	Partial dedicated right-of-way, consolidated bus stops
H & I Streets NW Bus Lanes	1 mph increase in bus travel speeds	Dedicated right-of-way
US 29 FLASH	54%* ridership increase	Bus-on-shoulder lanes, TSP
16th Street NW Bus Improvements	2-5 minutes in travel time savings*	Queue jump lanes, TSP, dedicated right-of-way

*Expected results based on ridership and/or travel time improvement forecasts

Sources: Ethan Goffman, "Northern Virginia's Metroway Corridor Shows How Buses and Trains Can Complement Each Other," Mobility Lab, September 30, 2019, https://mobilitylab.org/2019/09/30/northern-virginias-metroway-corridor-shows-how-buses-and-trains-can-complement-each-other/.
US29 Bus Rapid Transit Project, https://www.ridetheflash.com/wp-content/uploads/2019/09/US29FLASH-Description-March2017.pdf
DDOT, "16th Street NW Bus Lanes Project Online Open House," https://www.16thstreetnwbus.com/wp-content/uploads/2018/07/16th-St-Online-Public-Meeting-072718.pdf
Christina Moscardi, "How well do DC's red-painted bus lanes work?", February 20, 2020, http://www.christianmoscardi.com/blog/2020/02/20/dc-bus-lanes.html

Bus Priority Treatments

Dedicated Bus Lanes/Guideways	• Lanes are restricted to buses through signage or barriers • Lanes could be separate from traffic, concurrent with traffic, contraflow with traffic, or shoulder lanes
Transit Signal Priority	• Allows vehicles to communicate with traffic signals to adjust light timing • Typically either extends the green light or shortens the red
Queue Jumps	• Transit-only lanes at or before an intersection that allow buses to skip the queue of vehicles waiting a traffic light
Parking Limitations	• Reduces the ease of parking by increasing the parking fee or reducing the number of parking spaces to encourage more people to take the bus
Stop Consolidation	• Reduces the frequency of stops which increases the average speed of the buses
Off-Board Fare Payment	• Allows riders to pay in advance for their ticket, which saves time in the boarding process
All-Door Boarding	• Passengers that pay in advance can board from the rear doors, doubling the number of people that can board the bus at any given time

Bus Priority Costs and Impacts

Improvement	Improvement Description	Cost to Implement	Degree of Difficulty to Implement	Cost Savings/ Performance Improvements	Level of Anticipated Improvement
 **TSP** installed at some intersections, operated conditionally	Installed at some intersections, operated on a conditional basis	$0.3M to $9.0M per mile	Low to Moderate*	8% in travel time savings; $0.2M to $1.6M cost savings annually	Low
 **Dedicated lane** on existing road	Dedicated lane on existing road	$0.2M to $1M per mile	Low	$0.25M in savings per year; 10-14% travel time savings; up to 27% increase in reliability	Moderate
 Dense network of **TSP and queue jumps** at some intersections	Dense network of TSP and queue jumps at some intersections	$0.3M to $20M per mile	Low to Moderate*	1-10% in travel time savings; $0.3M to $1.7M cost savings annually	Low
 Dense network of **TSP, queue jumps at all intersections, dedicated lanes** on full route	Dense network of TSP, queue jumps at all intersections, dedicated lanes on the full route	$5.0M to $50M per mile	Moderate to High	18-54% in travel time savings; $0.55M to $1.95M in cost savings annually	Moderate to High
 Dense network of **TSP, exclusive bus right-of-way**	Dense network of TSP, exclusive bus right-of-way	$30M to $80M per mile	High	18-66% in travel time savings; $0.55M to $1.8M cost savings annually	High

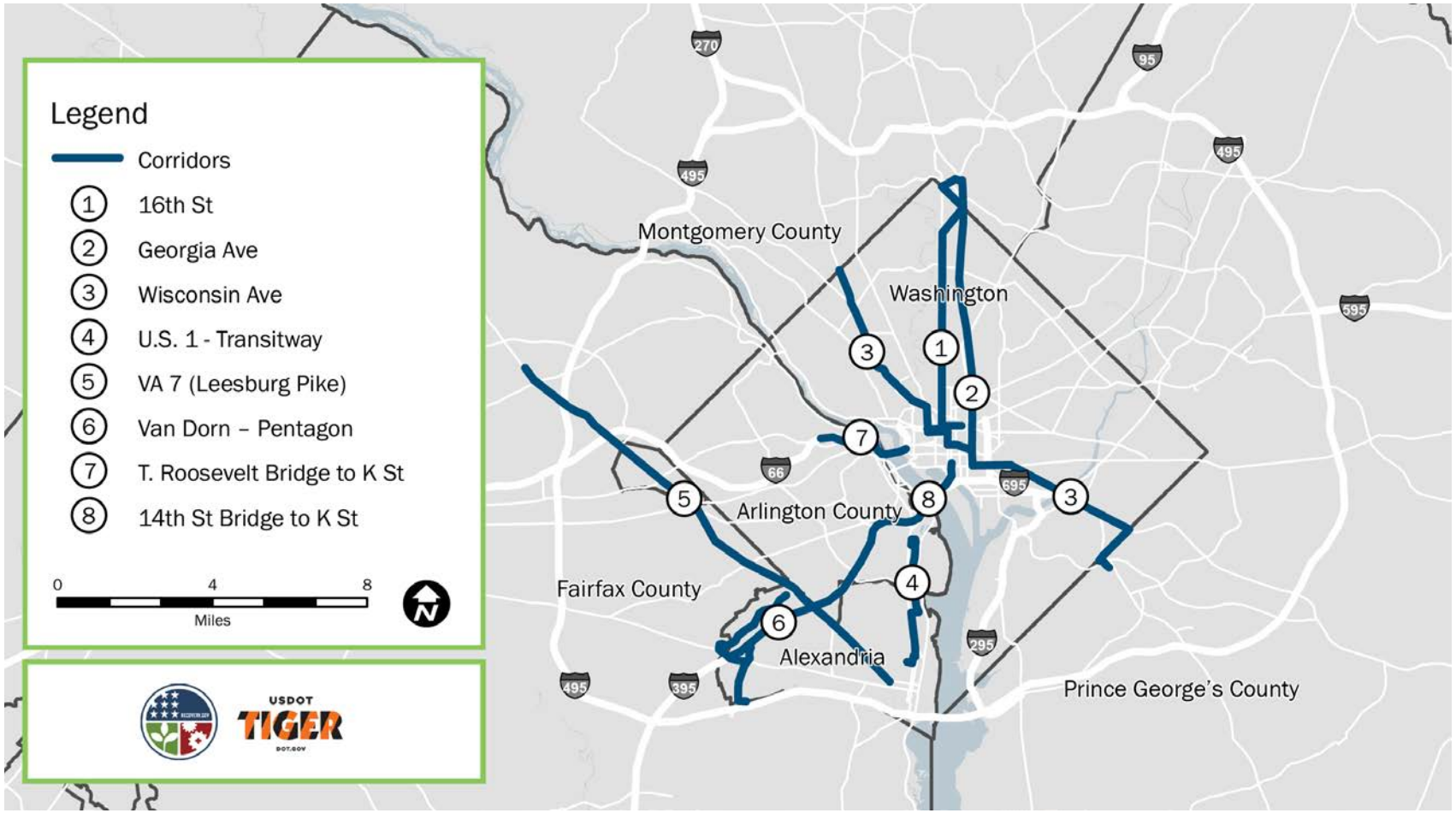
*TSP implementation can be costly and time consuming due to variations in technology and hardware
Source: Washington Area Bus Transformation Project, https://bustransformationproject.com/; King County Metro, *Transit Speed and Reliability Guidelines and Strategies,* https://kingcounty.gov/~/media/depts/transportation/metro/about/planning/speed-reliability-toolbox.pdf

TIGER Bus Priority in the NCR

The US Department of Transportation (USDOT) awarded a $58.8 million TIGER grant to the National Capital Region Transportation Planning Board (TPB) for Priority Bus Transit in the National Capital Region in 2010

Photo Source: Bus queue jump signal, 16th St DC (BeyondDC/Flickr)

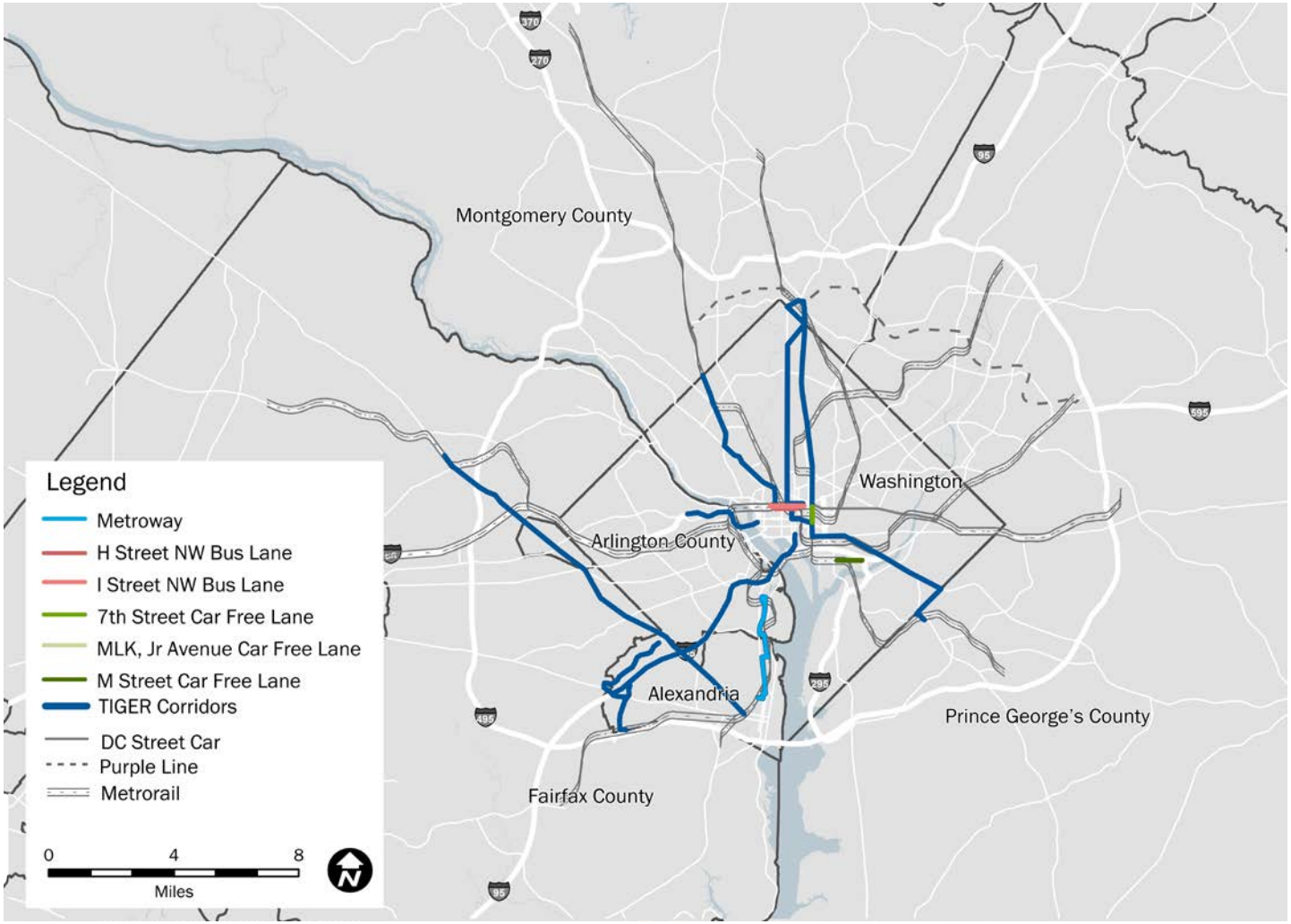
TIGER Corridors Map

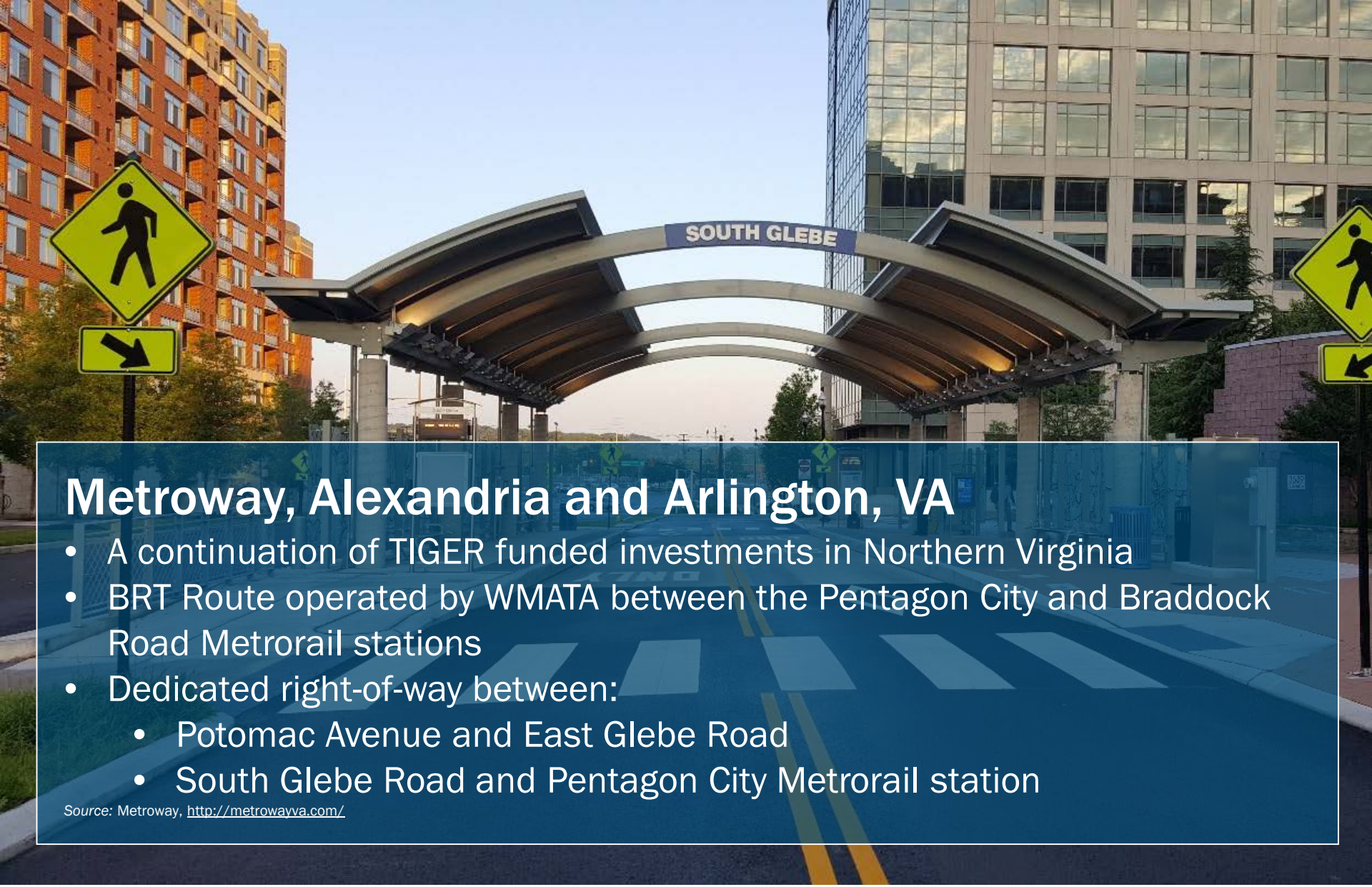


TIGER Key Takeaways

Corridor	Bus Priority Treatments	On-time Performance		Ridership
		Peak	Off-Peak	
16th Street NW, DC		↓	↑	↓
Georgia Avenue NW, DC		↓	↑	↓
Wisconsin Avenue, DC		-	↑	↑
US 1 - Transitway, VA		↑	↑	↑
VA 7 (Leesburg Pike), VA		-	-	↓
Van Dorn – Pentagon, VA		↑	↑	↓
T. Roosevelt Bridge to K St. NW, DC*		-	-	↓
14th Street Bridge to K St. NW, DC*				

Map of Existing Bus Priority Projects





Metroway, Alexandria and Arlington, VA

- A continuation of TIGER funded investments in Northern Virginia
- BRT Route operated by WMATA between the Pentagon City and Braddock Road Metrorail stations
- Dedicated right-of-way between:
  - Potomac Avenue and East Glebe Road
  - South Glebe Road and Pentagon City Metrorail station

Source: Metroway, http://metrowayva.com/

DDOT Bus Priority Plan and Program

- Development for DDOT's Bus Priority Plan began in 2020
- The plan will include:
  - Toolbox of improvements that address bus speeds and reliability
  - Identify a pipeline of bus priority projects in DC
- Numerous projects are underway through DDOT's initiative:
  - Three temporary Car Free Lanes or Streets
  - 14th Street NW Traffic Decongestion and Bus Improvements (under construction)
  - 16th Street NW Bus Lanes (under construction)
  - K Street Transitway (future project)
  - Pennsylvania Avenue SE Corridor Study (future project)

Photo Source: Bus Only Lane (BeyondDC/Flickr)

Bus Transformation Project

Developed and shaped by a broad range of stakeholders and the public from across the region, the Bus Transformation Project developed a regional Strategy and Action Plan that focus on **improving customer experience, connecting the region through better bus service, and fostering collaboration across transit and roadway agencies.**

Photo Source: https://bustransformationproject.com/wheaton-metrorail/

Benefits of Bus Priority – Faster Speeds

Bus priority treatments increase the average speed of a bus by separating it from congestion and giving it an advantage at intersections

Dedicated right-of-way saves…

2 to 3 minutes per mile

Bus lanes on arterial streets save…

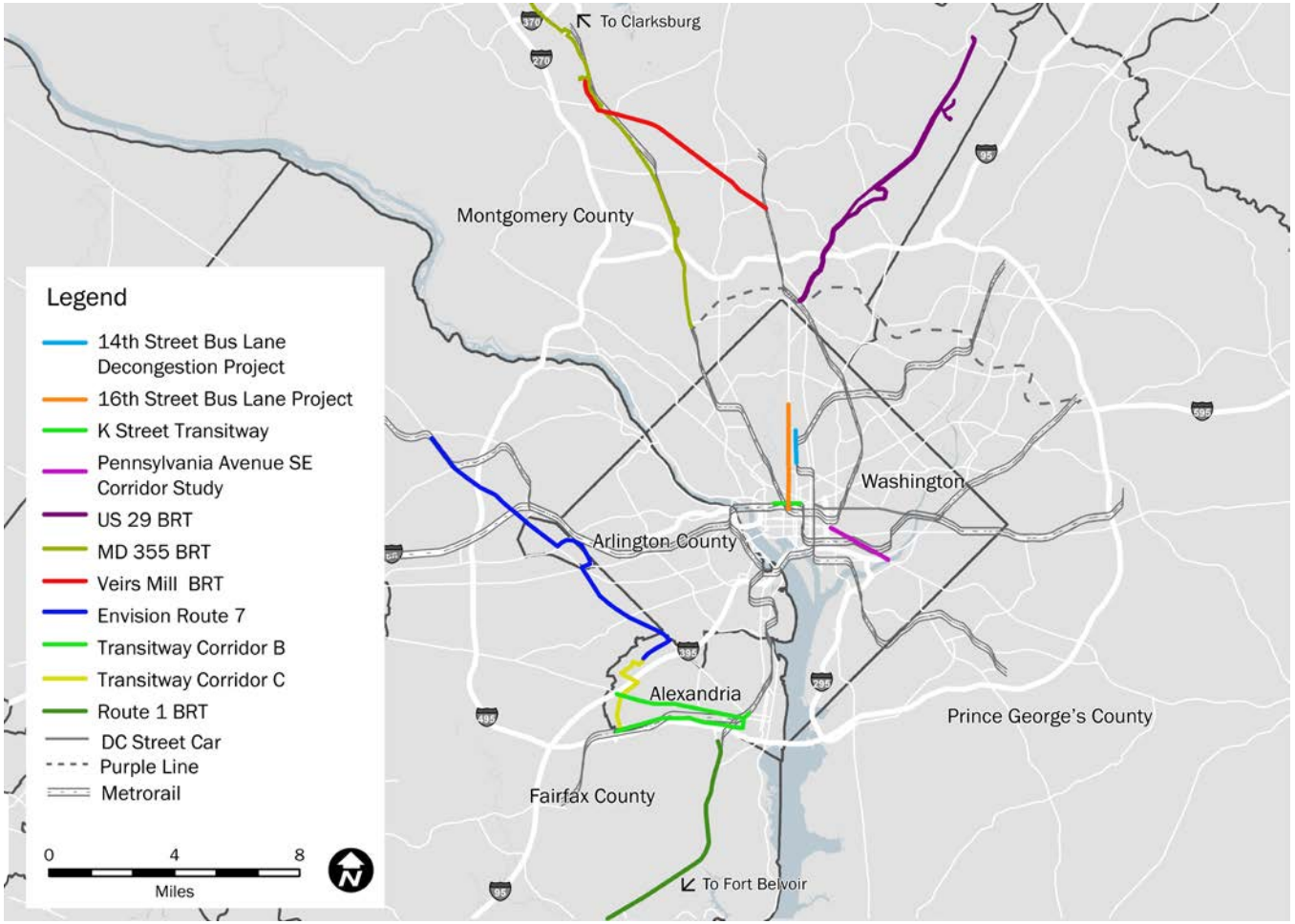
1 to 2 minutes per mile

The addition of a dedicated bus lane on a congested road can double or triple the average bus speed

Photo credit: Portland dedicated busway (J.Mause/Bikeportland.org)

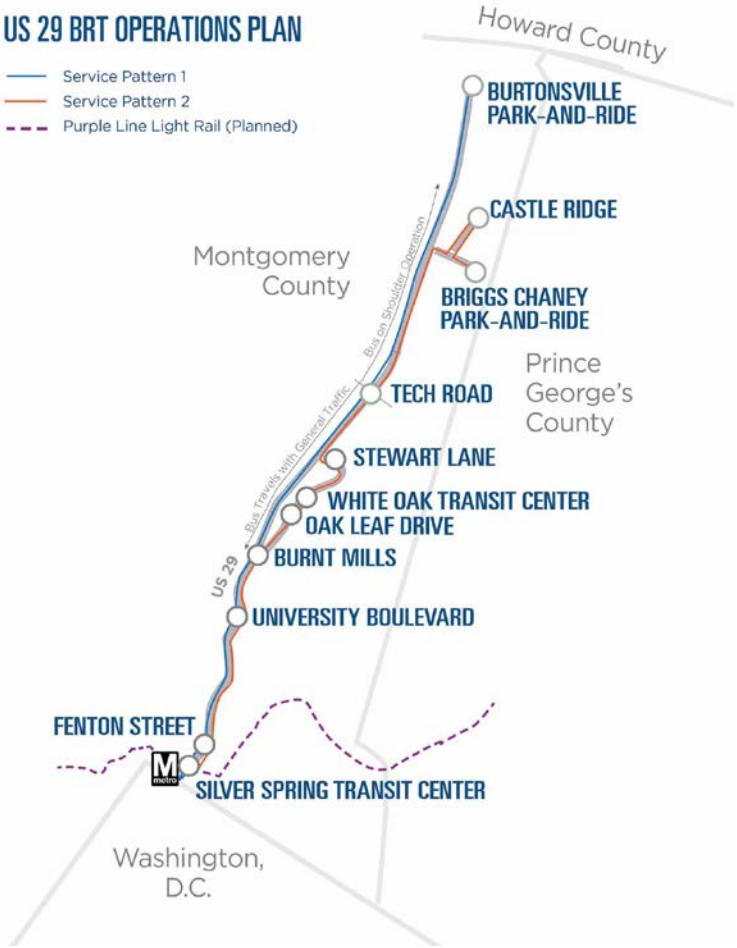
For more information, see https://www.vtpi.org/blw.pdf & https://nacto.org/wp-content/uploads/2015/04/tcrp118brt_practitioners_kittleson.pdf

Near Term and Planned Bus Priority Projects in the Region



Montgomery County Bus Rapid Transit

- US 29 FLASH opened on October 14, 2020 and features:
  - Bus-on-shoulder lanes between Burtonsville and Tech Road
  - TSP installed at 15 intersections
- US 29 FLASH is expected to reduce travel time by 22 to 35 percent on the corridor compared to existing local bus service
- US 29 FLASH is also expected to result in over $250 million of economic net benefit



Source: FLASH, https://www.ridetheflash.com/us29/.
MCDOT US 29 BRT Project Summary, https://www.ridetheflash.com/wp-content/uploads/2018/04/US_29_March2018_Open_Houses_Boards.pdf

Eric Randall

TPB Transportation Engineer
(202) 962-3254
erandall@mwcog.org

mwcog.org/tpb

Metropolitan Washington Council of Governments
777 North Capitol Street NE, Suite 300
Washington, DC 20002