

# Development of a Regional BRT System Proposal

*Crafting a package of bus-related projects for funding consideration under the American Recovery and Reinvestment Act*

Presented to the TPB Scenario Study Task Force  
March 18, 2009

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## The American Recovery and Reinvestment Act provides a **real regional opportunity**

Although almost \$50 billion in highway and transit transportation funding is mostly formula funding...

**\$1.5 billion in *competitive discretionary grants for capital projects***

What can we propose that would benefit the entire region and compete for these funds?

The bill tells us that projects will have to be:

1. **National or regional** in scope and impact
2. **Multimodal**
3. **Ready-to-go**
4. Completed **quickly** (< 3 years)
5. Relatively **low-cost**
6. **Job creation/Economic benefit**

**Current TPB and other regional initiatives point to bus rapid transit as a wide-reaching, flexible, and reasonable-cost focus for a regional project that could be implemented within a tight timeframe.**

**TPB Scenario Study Task Force charged TPB staff with assembling \$300-million grant application for a pilot phase of a regional bus rapid transit (BRT) system.**

Beginning with a series of existing regional initiatives that could fit into broad requirements:

1. WMATA Priority Corridor Network (PCN)
2. TPB Regional Bus Subcommittee Priority Bus Project List
3. TPB Scenario Study, CLRP Aspirations Scenario
4. Other state-wide and local initiatives

# Working toward a Regional BRT Network

Proposal to use stimulus funding to develop a pilot BRT project – a step towards demonstrating that BRT on a larger regional scale can really happen in the region.



# What is Bus Rapid Transit?





# Why BRT for the Washington Region?

- An implementation of true BRT can:
  - Increase bus operating speeds
  - Reduce travel time variability
- Increasing bus speeds can greatly reduce operating costs, which can provide for increase service levels.
- The perception of a “new transit system” will:
  - Raise the perceived level of service for bus passengers
  - Provide increased levels of mobility across the region

# How Does BRT Save Operating Costs?

	Before Priority Treatments		After, keeping headway the same		After, keeping buses the same	
Route Distance	5	miles	5	miles	5	miles
Headway	10	minutes	10	minutes	6.67	minutes
Avg. Speed	10	mph	15	mph	15	mph
Round Trip Time	1	hour	0.67	hour	0.67	hour
Buses Needed	6.0	buses	4.0	buses	6.0	buses

- Increasing the bus speed by **50%** results in:
  - **33%** reduction in operating costs and capital needs,
  - or
  - **33%** reduction in headway with same operating costs.



# Causes of Bus Delay

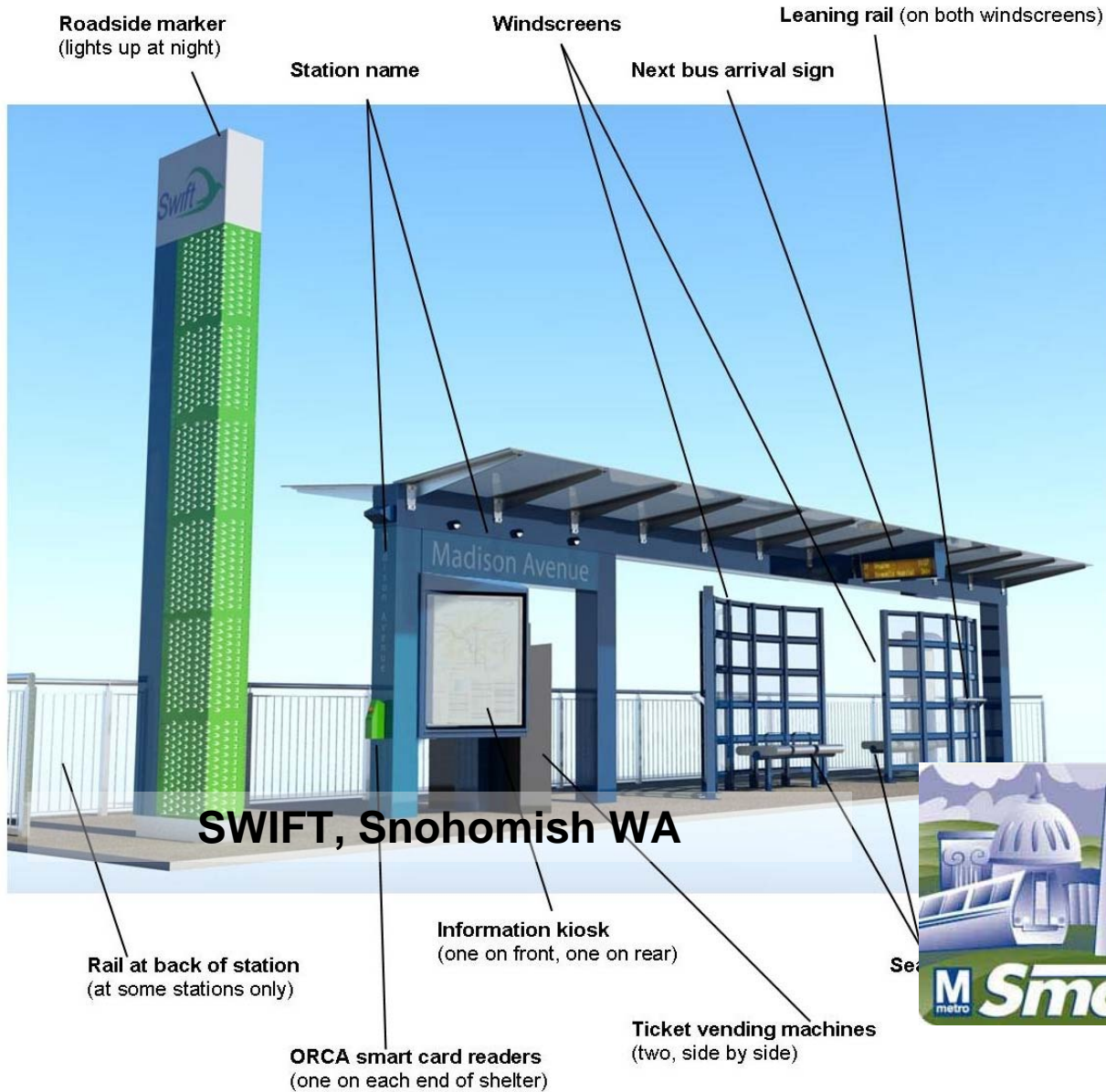
## Bus Stops

<i>Cause of Delay</i>	<i>Primary Solution</i>	<i>Low-Investment Option</i>	<i>High-Investment Option</i>
Payment	Off-board payment	SmarTrip	Full-service curbside boarding stations
Use of front door only	Multi-door boarding	SmarTrip / trust	
Wheelchair lift operation	Level boarding	Low-floor buses	

## Running-Way

<i>Cause of Delay</i>	<i>Primary Solution</i>	<i>Low-Investment Option</i>	<i>High-Investment Option</i>
Traffic Signals	Transit Priority	Active or Passive Transit Signal Priority	Graded Separated ROW
Traffic Queues	Remove Cars from Bus ROW	Bus Lanes and Queue Jumpers	
Delay caused by illegal traffic movements, parking, etc.	Education, Enforcement	Bus-mounted Enforcement Cameras	
Right turns blocked by pedestrians	Remove Cars from Bus ROW	Far-side bus stops	

# Smart Stations



# Regulation of Peak Period Curb-Lane Parking





# Bus Lanes



New York City



7<sup>th</sup> St NW, DC



Boston

# Reversible Bus Lanes

Colesville Rd, Silver Spring



Connecticut Ave, NW DC



# Enforcement



Singapore

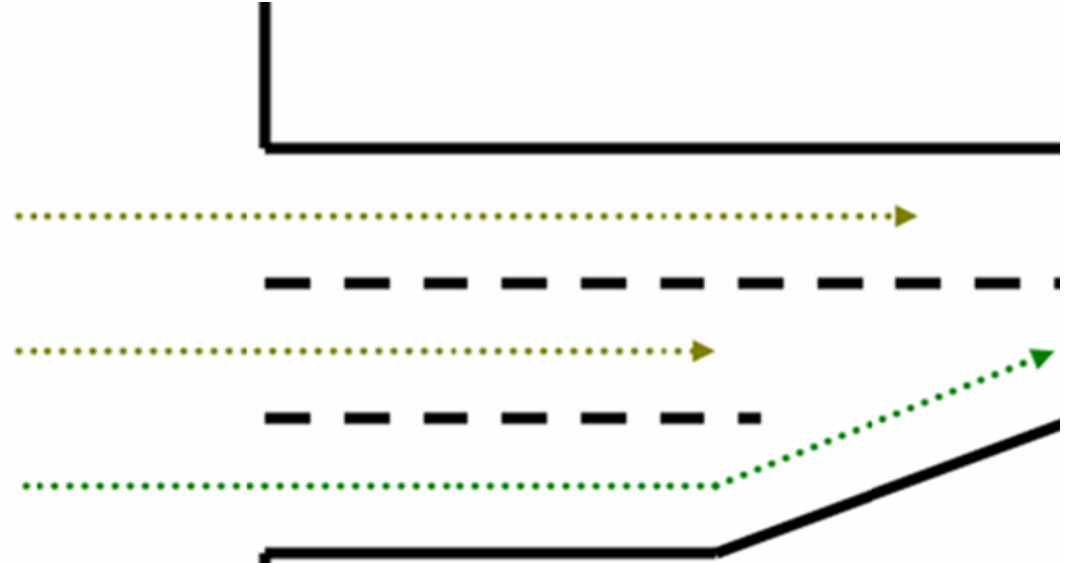
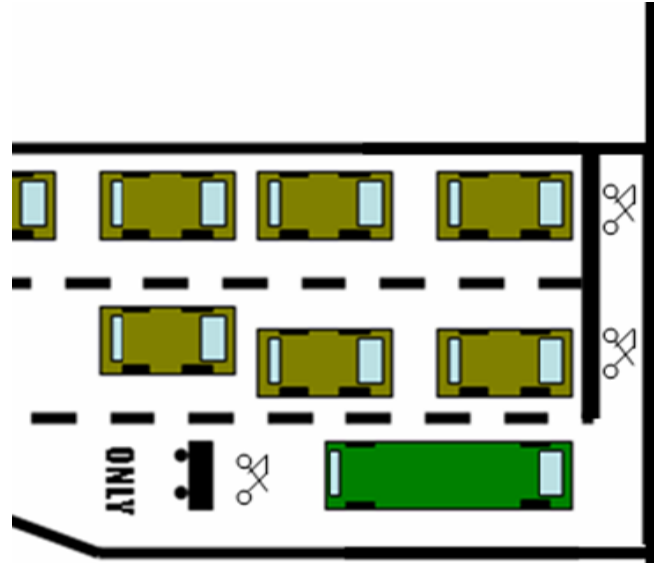


London

# Queue Jumpers



Charlotte Area Transit System (CATS)

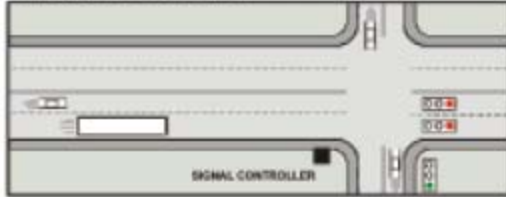




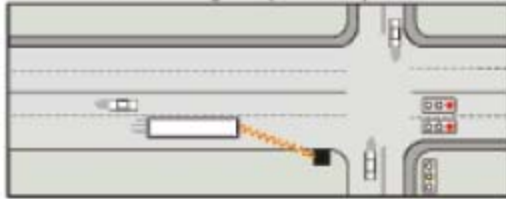
# Transit Signal Priority

## RED TRUNCATION

Bus approaches red signal



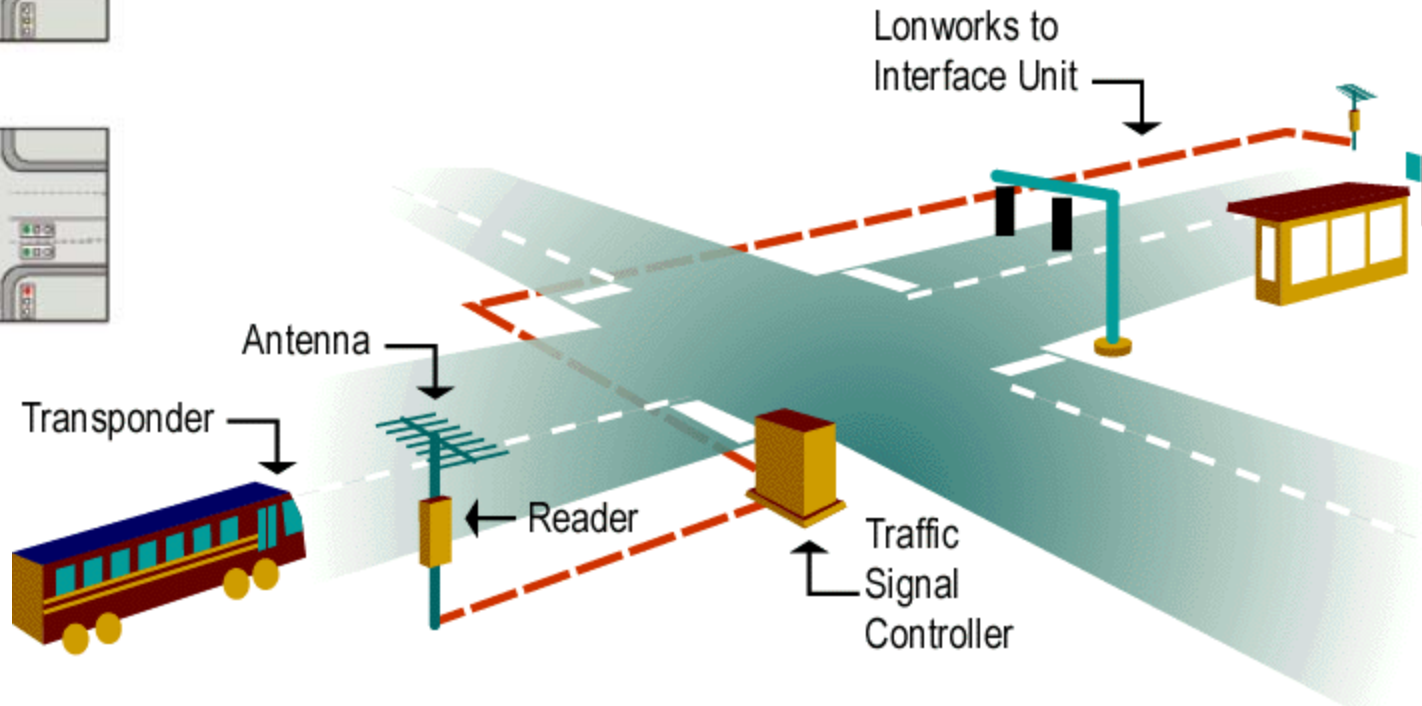
Signal controller detects bus;  
terminates side street green phase early



Bus proceeds on green signal



Viva, York ON



# Full Dedicated Right-of-Way



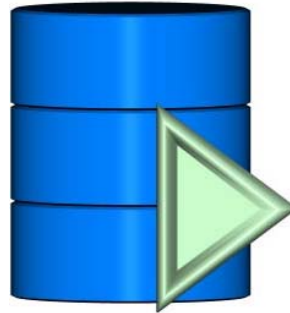
# Cost for BRT Strategies



BRT Element	Cost (1000s)		U.S. Example
<b>Priority Treatment</b>			
Active Transit Signal Priority	\$8-35	per signalized intersection	LA Metro Rapid (or 100 per mile)
Reversible Lanes			
Peak period parking regulations (use as bus lane)			
Queue Jump lanes	\$250-500	per intersection	Chula Vista, CA; Salem, OR
Exclusive Runningway	\$1,750	per (14') lane mile	EmX (Eugene, OR; shows 1056000/lane mile)
Grade Separated Right-of-way			
<b>Stations</b>			
Ticket Vending Machines (SmarTrip)	\$75-100	per station	MAX (Las Vegas)
Far side stations with next bus information, just canopies (small, urban)	\$55	per station	LA Metro Rapid
Stations with off-board fare collection and next bus information (medium)	\$250-500	per station	Albany BRT; Bottineau Boulevard (Minneapolis)
Full-service curbside boarding stations (platforms, canopies, etc) (large)	\$2,500-5,000	per station	I-35W (Minneapolis); Orange Line (LA)
<b>Vehicles</b>			
Low-floor buses (30', 25 seats)	\$413	per bus	DC Circulator (460-470 for 40' bus)
<b>Enforcement</b>			
Bus-mounted Enforcement Cameras			

## Other requirements for BRT

- Real-time arrival information
  - Includes regional real-time arrival prediction database
- Distinctive identity and branding.



## How to identify priorities for a Phase 1 BRT network?

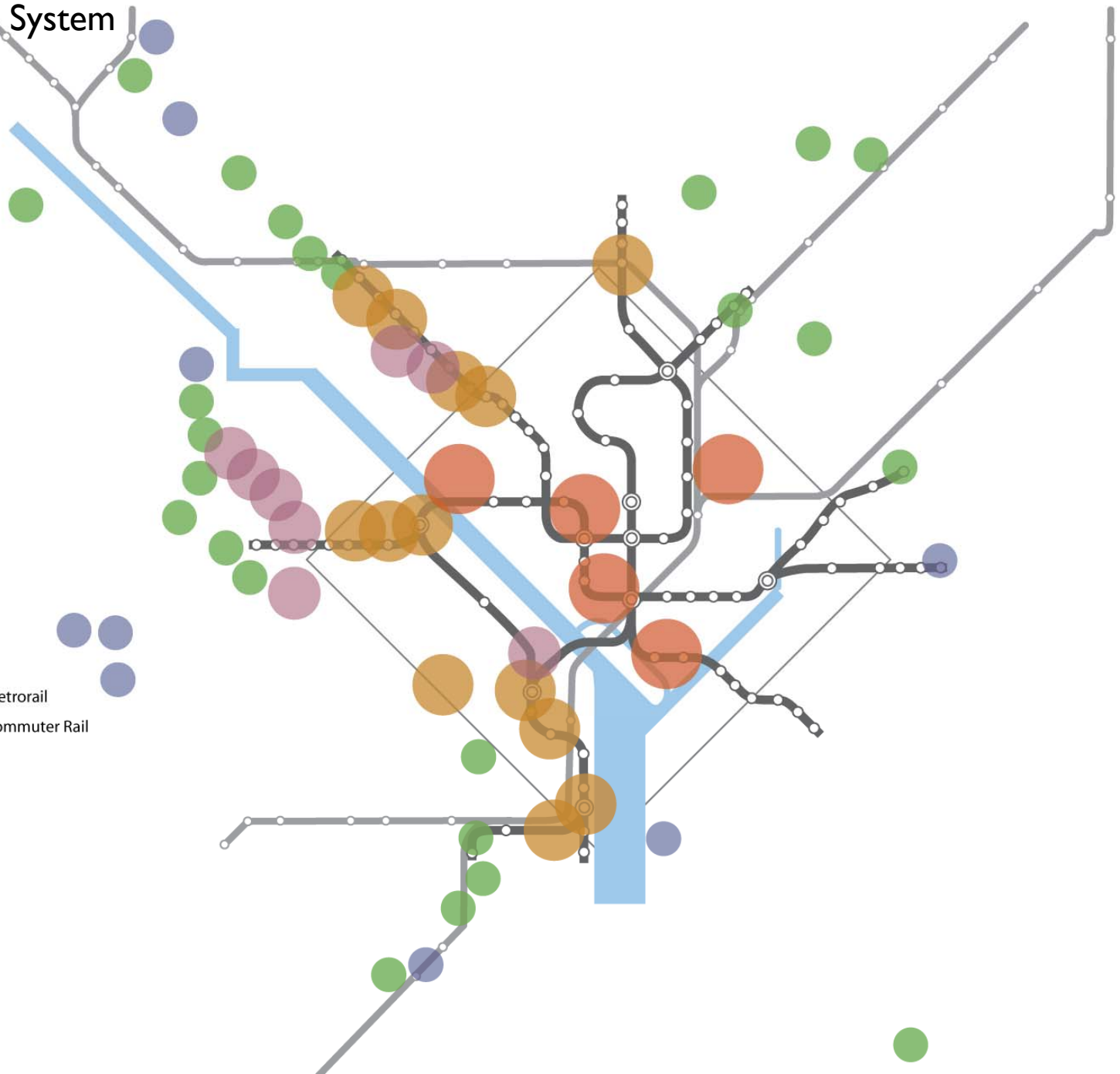
1. **Regionally Significant:** provide **benefit to multiple jurisdictions**, increase access to and between activity centers, connectivity between network elements
2. **Multimodal:** synergistic **highway and transit** benefits
3. **Ability to be completed quickly/already underway:** **TIP/State plan projects** that intersect the PCN
4. **Capital costs under \$300 million:** analysis of strategies ranging from **re-stripping, transit signal priority, queue jumpers, and reversible bus lanes, to fully dedicated bus lanes**
5. **Economic Benefit:** **operating savings** rather than costs, allowing transit agencies to expand (or at least maintain) bus transit service connecting people to jobs

**Based on these criteria, TPB staff assembled a recommended network**




# Current System

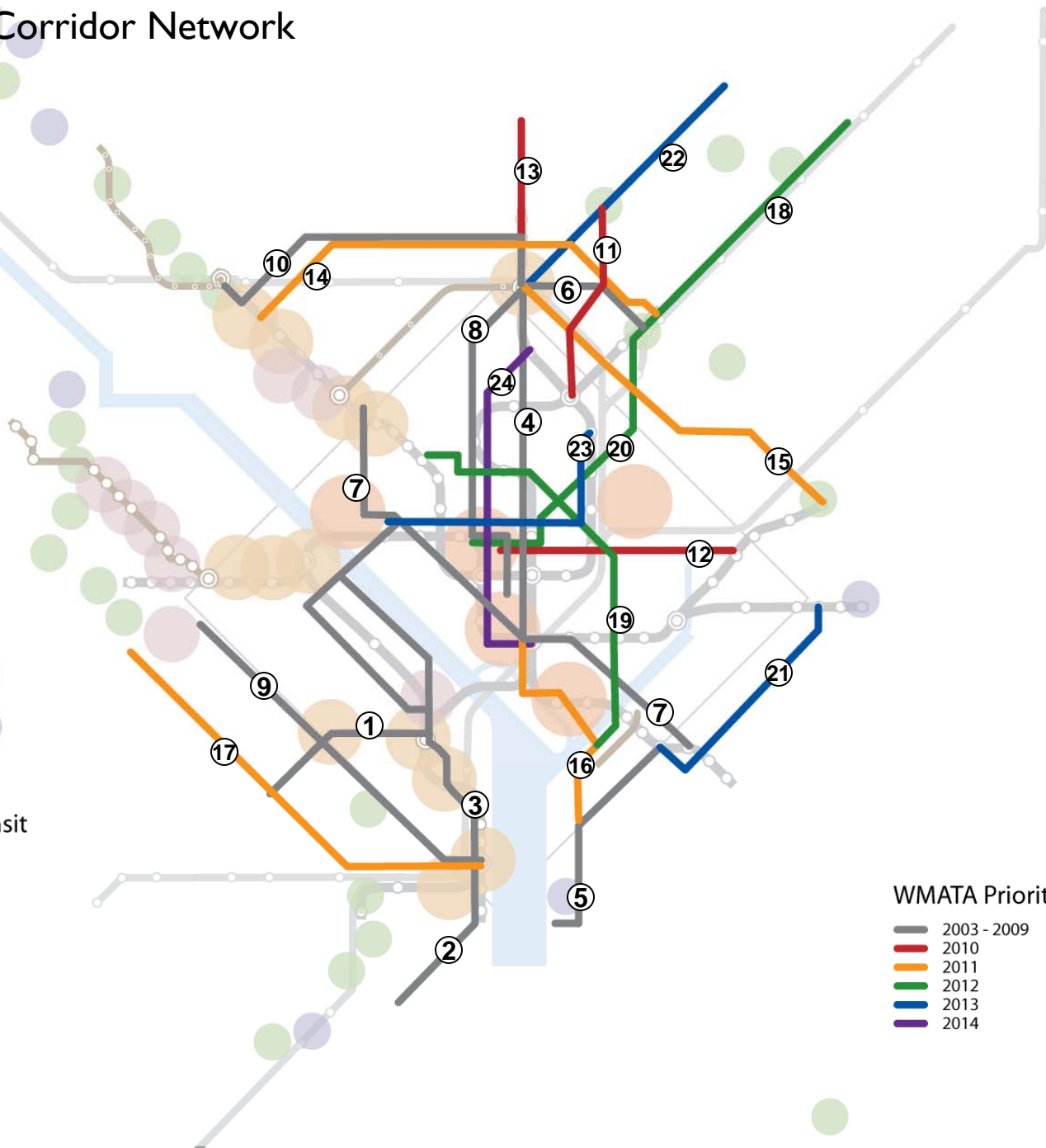
- Existing Metrorail
- Existing Commuter Rail









# WMATA Priority Corridor Network

The WMATA Priority Corridor Network (PCN) proposes to enhance bus service along the top 24 bus transit routes in the region through a combination of service enhancements and running-way improvements

-  Existing Metrorail
-  Existing Commuter Rail
- Previously Proposed Transit**
-  Major CLRP Transit Projects



## WMATA Priority Corridors

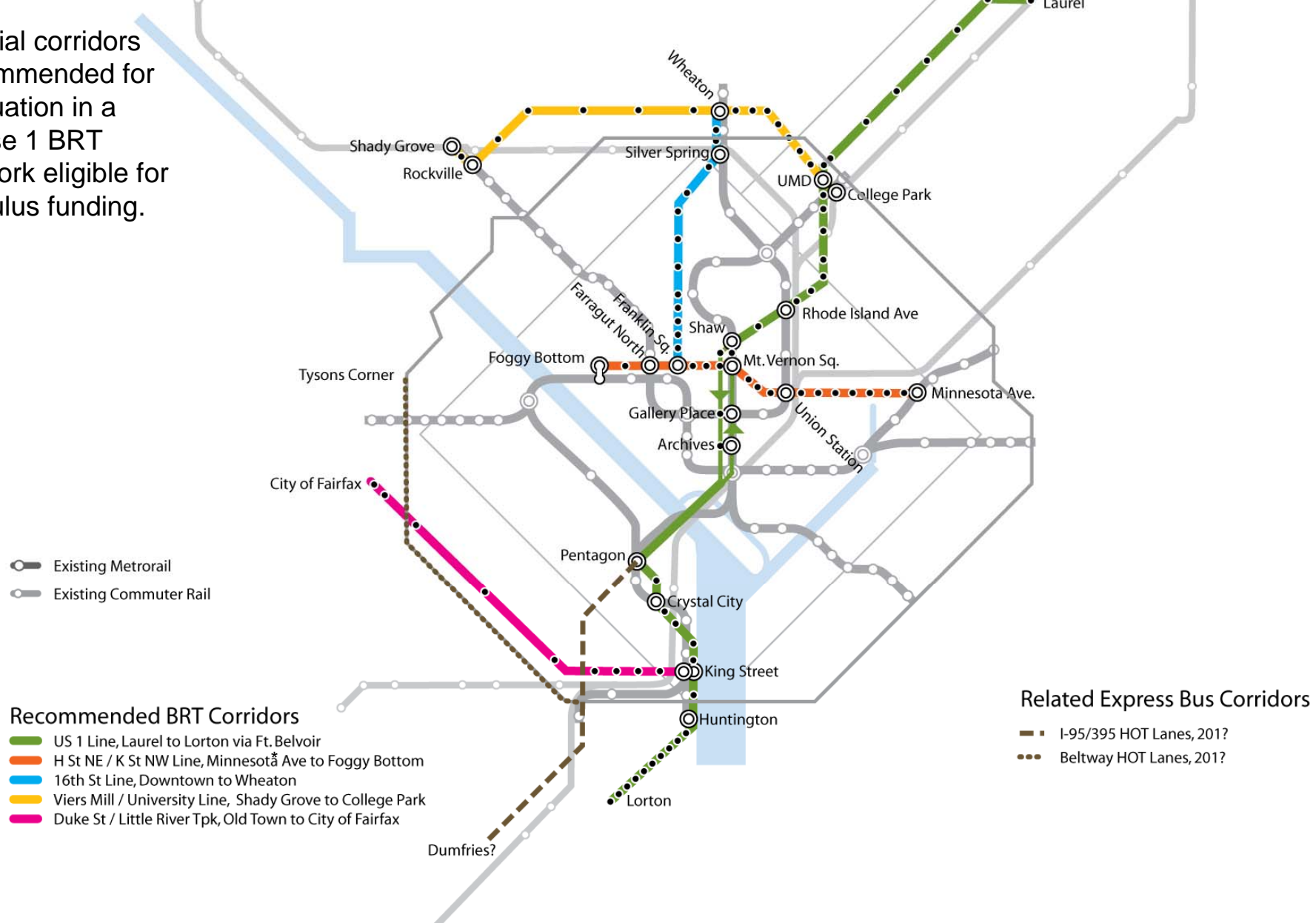
-  2003 - 2009
-  2010
-  2011
-  2012
-  2013
-  2014



# Proposed BRT Network for 2012

Draft for Discussion, March 18, 2009

Arterial corridors recommended for evaluation in a Phase 1 BRT network eligible for stimulus funding.



- Existing Metrorail
- Existing Commuter Rail

- Recommended BRT Corridors**
- US 1 Line, Laurel to Lorton via Ft. Belvoir
  - H St NE / K St NW Line, Minnesota Ave to Foggy Bottom
  - 16th St Line, Downtown to Wheaton
  - Viers Mill / University Line, Shady Grove to College Park
  - Duke St / Little River Tpk, Old Town to City of Fairfax

- Related Express Bus Corridors**
- I-95/395 HOT Lanes, 201?
  - Beltway HOT Lanes, 201?

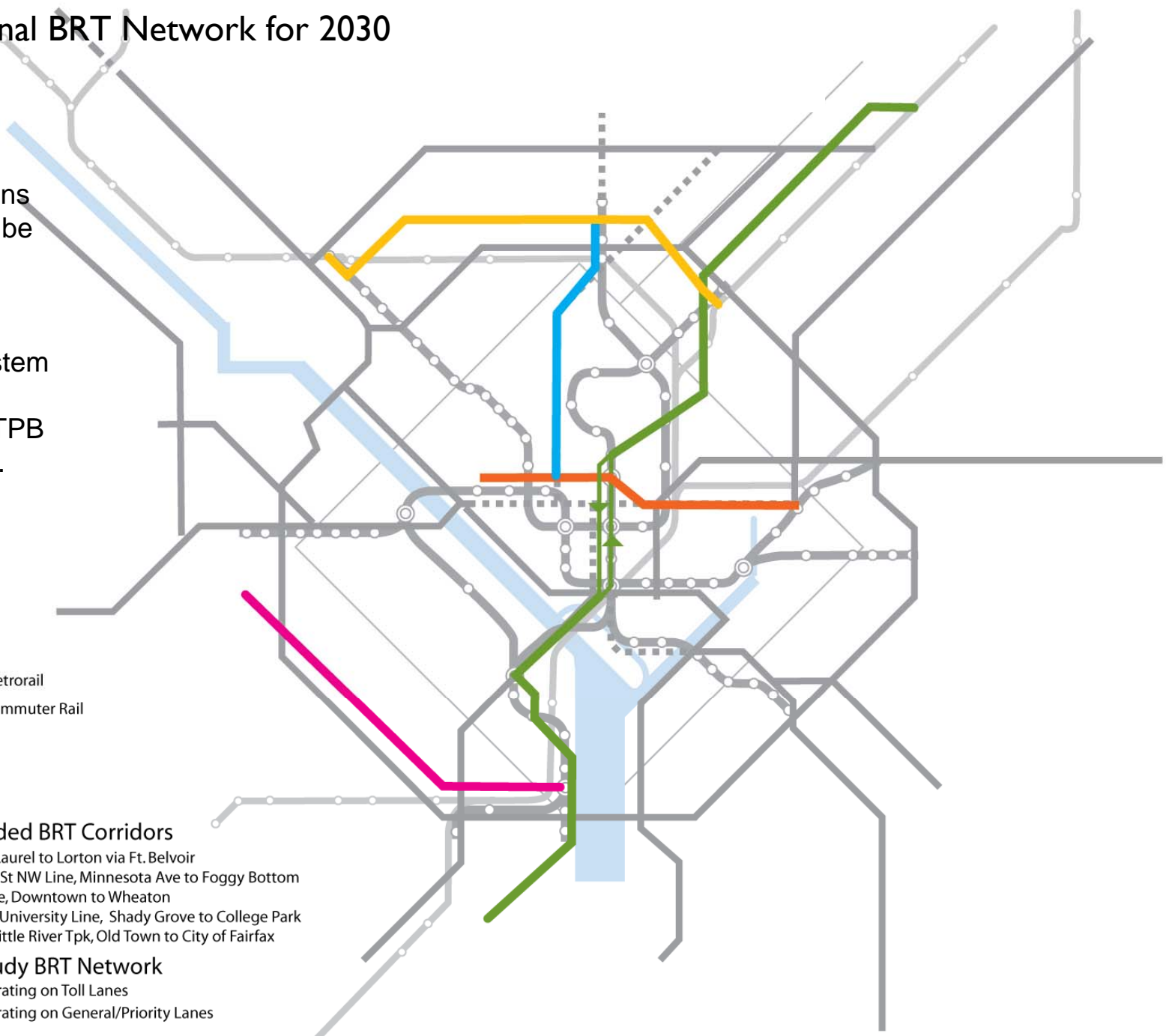
# Full Regional BRT Network for 2030

BRT recommendations made here can be the first steps towards the regional high-quality BRT system currently being studied by the TPB Scenario Study.

- Existing Metrorail
- Existing Commuter Rail

- Recommended BRT Corridors**
- US 1 Line, Laurel to Lorton via Ft. Belvoir
  - H St NE / K St NW Line, Minnesota Ave to Foggy Bottom
  - 16th St Line, Downtown to Wheaton
  - Viers Mill / University Line, Shady Grove to College Park
  - Duke St / Little River Tpk, Old Town to City of Fairfax

- Scenario Study BRT Network**
- Buses Operating on Toll Lanes
  - Buses Operating on General/Priority Lanes



## An Example of Possible, Generalized Route Costs

Line	length	Name	# of Stations	TSP	Exclusive runningway	cost (1000s)			
						Small (Urban) Stations	Medium-Investment Stations	Full Service Stations	Low-floor buses
1	18.13	Viers Mill	18	1,800	32,160	2,700	6,300	90,000	6,300
2	11.16	16th St and Georgia Ave	16	1,100	19,800	2,400	5,600	80,000	3,600
3	42.70	Route 1	41	4,270	75,740	6,150	14,350	205,000	9,000
4	15.32	Little River Turnpike	10	1,530	27,180	1,500	3,500	50,000	2,700
5	6.30	K St - H St - Benning Rd.	22	630	11,180	3,300	7,700	110,000	3,150
	75.48		107	9,360	133,900	13,350	31,150	445,000	18,450
				9,360	51,960	5,700	24,150	0	18,450

Medium Investment Example	109,630
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## Next Steps

- Continue to develop details on:
  - Priority treatments for each segment of proposed network.
  - Cost estimations of proposed lines and facilities.
- Further input provided by committees and task force in April.
- USDOT guidelines for proposals released mid May
- Project proposal due mid November

# WMATA PCN Corridors

Corridor Description	Line/Route Description	Status	Juris.	Study Year (FY)	Impl. Year (FY)	Average Weekday Ridership	Annual Platform Hours
1 Columbia Pike (Pike Ride)	16ABDEFJ 16GHKW 16L 16Y	I	VA	2002	2003	13,300	99,500
2 Richmond Highway Express (REX)	REX	I	VA	2003	2004	3,700	33,800
3 Crystal City-Potomac Yard	9A 9E 9S	I	VA	2005	2006	3,200	33,400
4 Georgia Ave./7th St. (DC)	70 71 79	I	DC	2006	2007	18,400	99,500
5 Southern Ave. Metro-National Harbor	NH-1	I	MD	2007	2008	900	New
6 University Blvd./East-West Highway	J1 J2 J3 J4	P	MD	2007	2009	7,800	68,000
7 Wisconsin Ave./Pennsylvania Ave.	30 32 34 35 36	I	DC	2008	2009	20,700	162,000
8 Sixteenth St.	S1 S2 S4	P/I	DC	2008	2009	15,000	111,900
9 Leesburg Pike	28AB 28FG 28T	P/I	VA	2009	2009	7,400	52,500
10 Veirs Mill Rd.	Q2	P	MD	2009	2010	10,500	75,400
11 New Hampshire Ave.	K6	P	MD	2010	2011	6,300	40,500
12 H St./Benning Rd.	X2	P	DC	2010	2011	13,700	65,300
13 Georgia Ave. (MD)	Y5 Y7 Y8 Y9	P	MD	2010	2011	7,600	57,600
14 Greenbelt-Twinbrook	C2 C4	P	MD	2011	2012	14,200	99,700
15 East-West Highway (Prince George's)	F4 F6	P	MD	2011	2012	8,300	52,000
16 Anacostia-Congress Heights	A2 6 7 8 42 46 48	P	DC	2011	2012	11,900	77,500
17 Little River Tpke./Duke St.	29KN 29CEGHX	P	VA	2011	2012	3,200	40,800
18 Rhode Island Ave. Metro to Laurel	81 82 83 86 87 88 89 89M	P	MD	2012	2013	6,900	57,500
19 Mass Ave./ U St./ Florida Ave./ 8th St./ MLK Ave.	90 92 93	P	DC	2012	2013	14,700	106,400
20 Rhode Island Ave.	G8	P	DC	2012	2013	3,800	34,200
21 Eastover-Addison Rd. Metro	P12	P	MD	2013	2014	5,600	44,600
22 Colesville Rd./Columbia Pike - MD US 29	Z2 Z6 Z8 Z9,29 Z11,13	P	MD	2013	2014	10,100	97,100
23 North Capitol St.	80	P	DC	2013	2014	8,600	60,800
24 Fourteenth St.	52 53 54	P	DC	2014	2015	15,000	98,200
Total Priority Corridor Network						230,800	1,668,200

# MDOT System Preservation/PCN Overlap

	Jurisdiction	ROUTE	DESCRIPTION AND IMPROVEMENT TYPE	TOTAL ESTIMATE D COST (\$000's)	CONSTRUCTION START
1	2	MD 650/193	New Hampshire Avenue/University Boulevard; MD 650 from Holton Lane to Merrimac Drive and MD 193 from 800 feet west of MD 650 to 800 feet east of MD 650 (Langley Park/Takoma Park); streetscape and safety improvements (Note: Project also shown in Montgomery County)	6,000	Under Construction
	2	MD 650	New Hampshire Avenue; Sheridan Street to Metzert Road; traffic signal systemization	1,840	FY 2010
	1	MD 193	University Boulevard; at MD 320; widen to provide right turn onto southbound MD 320	977	Under Construction
	1	MD 650	New Hampshire Ave; Oakview Drive; Extend left-turn lane on SB MD 650 (Funded for preliminary engineering only)	118	FY 2009
	1	MD 650	New Hampshire Avenue; at Adelphi Road; widening for additional lanes	1,189	FY 2009
2	2	US 1	Baltimore Avenue; at MD 410; provide second left turn lane on northbound US 1 (Funded for preliminary engineering only)	118	PE Underway
3	2	MD 410	East West Highway; at MD 500; Add new turn lane, convert thru lane to turn lane. (Funded for preliminary engineering only)	300	PE Underway
4	1	US 29	Columbia Pike; MD 193 to Prelude Drive; pedestrian safety improvements (Note: The cost shown represents SHA share of project cost)	850	Under Construction
5	1	MD 97	Georgia Avenue; Tidewater Court to Queen Elizabeth/Prince Phillip Drive; pedestrian safety improvements	551	FY 2009
6	1	MD 28	Veirs Mill Road; MD 586; Extend left-turn lanes along two approaches. (Funded for preliminary engineering only)	124	PE Underway
7*	1	MD 355	Frederick Road; at MD 118; extend southbound left turn lane.	685	FY 2009

## Staff Recommendation: Phase I BRT Corridors by 2012

#	Corridor	From	To	Rationale
1	US 1 through Arlington, Alexandria, Fairfax County	Pentagon	Ft. Belvior	BRAC, CLRP, RMAS, PCN
2	14 <sup>th</sup> St Brdige, 7 <sup>th</sup> /9 <sup>th</sup> Streets through downtown DC	Pentagon	Shaw Metro	PCN
3	Rhode Island Ave / Baltimore Ave (US 1) Corridor	Shaw Metro	Laurel	PCN, RBS Priority Corridors, TIP
4	K Street Busway	Foggy Bottom	Mt. Vernon Sq	CLRP, RPB Priorities, PCN, TIP
5	H Street Busway	Mt. Vernon Sq	Minnesota Ave	PCN
6	16 <sup>th</sup> Street BRT	K St	Silver Spring Metro	PCN, RBS Priorities
7	Georgia Ave	Silver Spring Metro	Wheaton Metro	PCN, RBS Priorities
8	Viers Mill / University Blvd	Shady Grove or Rockville	Greenbelt	PCN, RBS Priorities
9	VA 236	King Street Metro	City of Fairfax	PCN, TIP
10	Beltway HOT Lanes	Springfield	Tysons Corner	CLRP
11	Shirley Highway HOT Lanes	Potomac Mills	Pentagon	CLRP