

BALTIMORE



# Developing Shared Bus/Bike Lanes in downtown Baltimore

TPB Regional Public Transportation Subcommittee

November 20, 2017



# Overview

- Charm City Circulator & Pratt/Lombard v.1 (2009)
- Peer Review and BaltimoreLink (2015)
- Screening, Design, & Pratt/Lombard v.2 (2016)
- Implementation of New Corridors & Before/After Study (2017)
- Enforcement
- Bicycle Utilization
- Education of Bus Operators, Cyclists, and Drivers





# Charm City Circulator & Pratt/Lombard

- Dedicated Bus Lanes were added to Pratt & Lombard Streets from Greene Street to Market Place in December 2009
- Developed to support the new free Charm City Circulator bus



CITY OF BALTIMORE  
Sheila Dixon, Mayor

DEPARTMENT OF TRANSPORTATION  
Alfred H. Foxx, Director



## Press Release



FOR IMMEDIATE RELEASE  
Thursday, December 03, 2009

Contact: Adrienne Barnes  
(410) 361-9296  
Kathy Chopper  
(443) 984-2182

### City of Baltimore Begins Installation of Dedicated Bus Lanes

The Baltimore City Department of Transportation today announced that the installation of dedicated bus lanes has begun in downtown Baltimore. In order to improve transit services for the citizens of Baltimore, dedicated bus lanes will be installed along Lombard and Pratt Streets from Martin



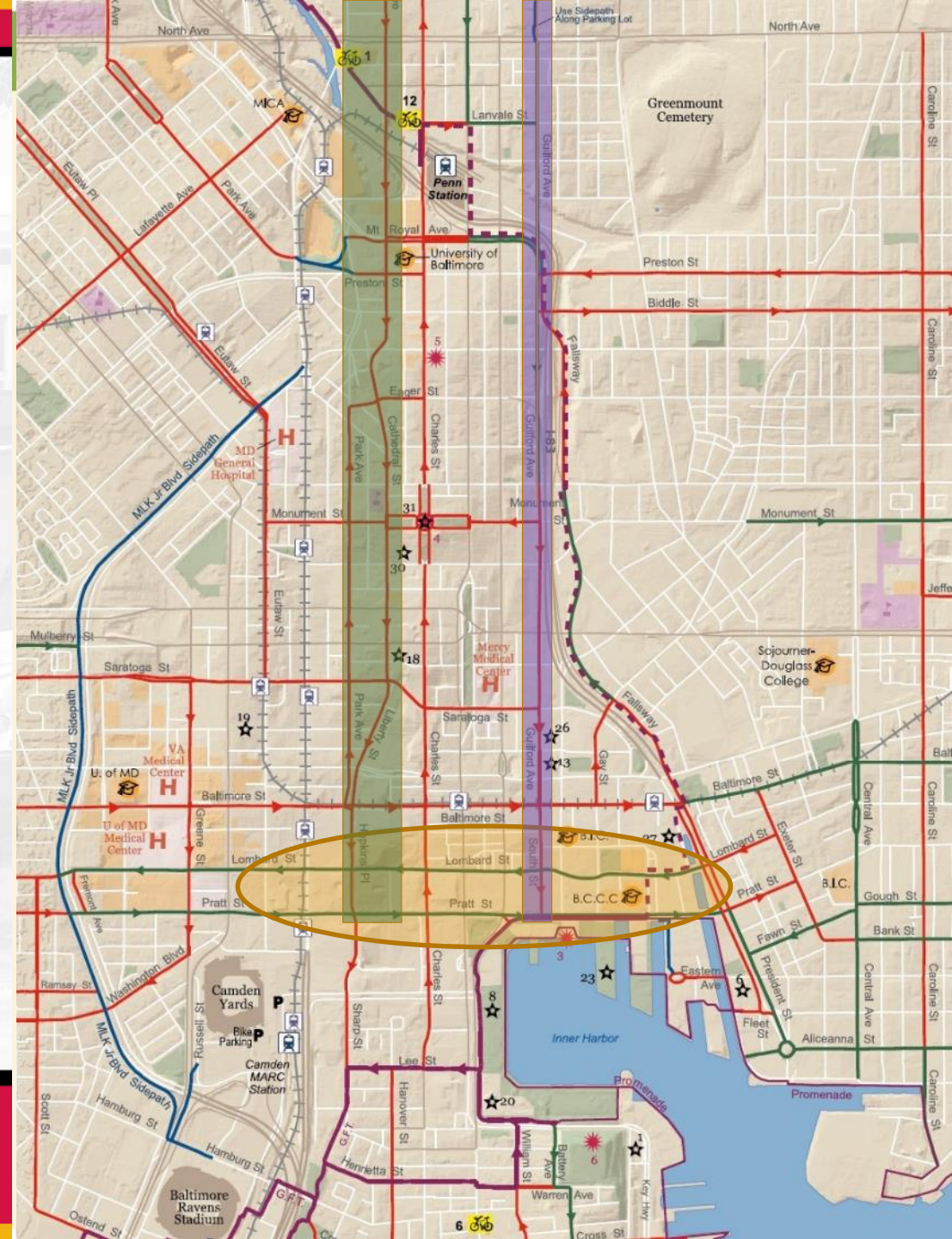
**MDOT**  
MARYLAND DEPARTMENT  
OF TRANSPORTATION  
MARYLAND TRANSIT  
ADMINISTRATION

BALTIMORE  
**LINK**



# Baltimore City Downtown Bike Facilities

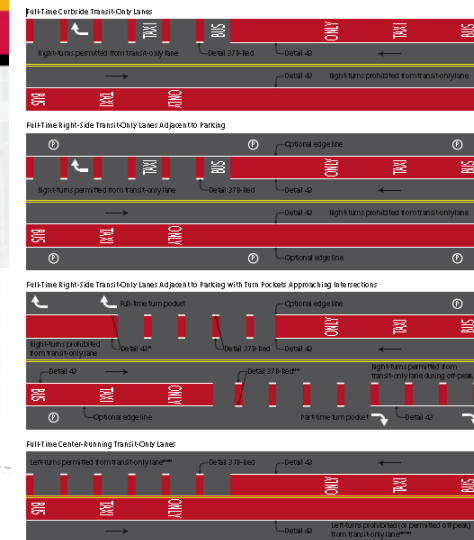
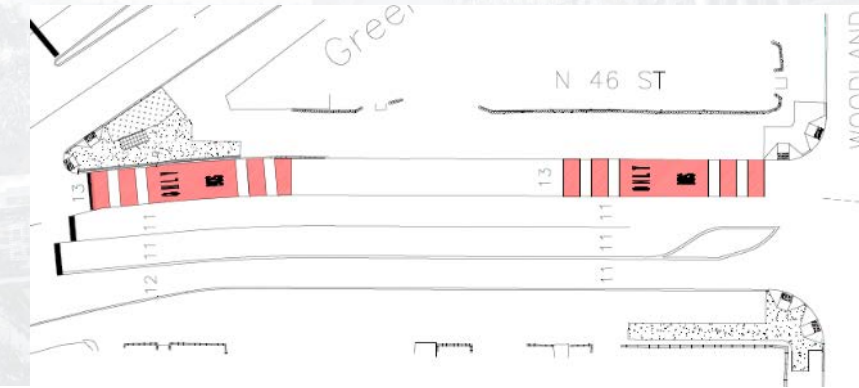
- Historically downtown Baltimore has had more viable north/south bike options than east/west due to street connectivity and width
- Jones Falls Trail/Guilford Bike Blvd. (2004, 2011, & 2013) and Maryland Avenue Cycle Track (2016) provided quality facilities on what had already been well utilized streets





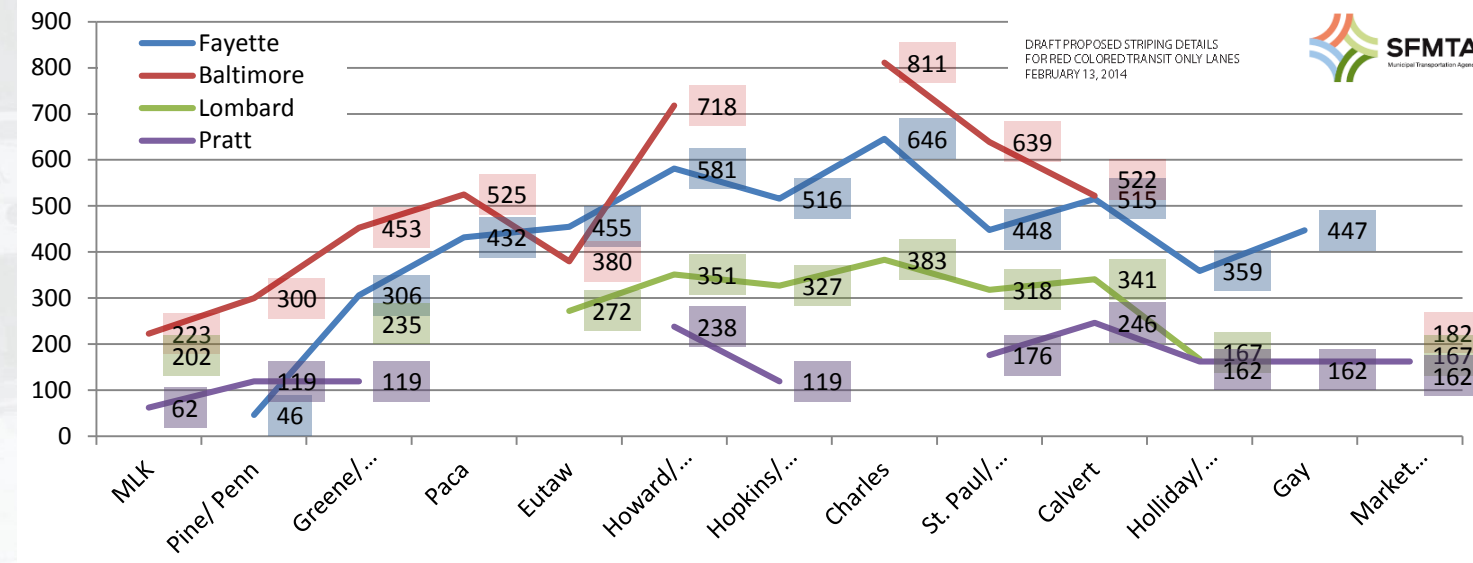
# Peer Review – Design & Thresholds

- In 2015 Baltimore City DOT expressed interest in revisiting Dedicated Bus Lanes
- Contacted NYC, Chicago, San Francisco, & Seattle to learn about their efforts
  - Chicago & San Francisco using “dashed” treatment in locations where turning vehicles are allowed
  - NYC found that intermittent use seemed to encourage stopping in the bus lane
  - Seattle using “ladder” design to minimize materials costs
- Average & maximum volume of weekday MTA buses



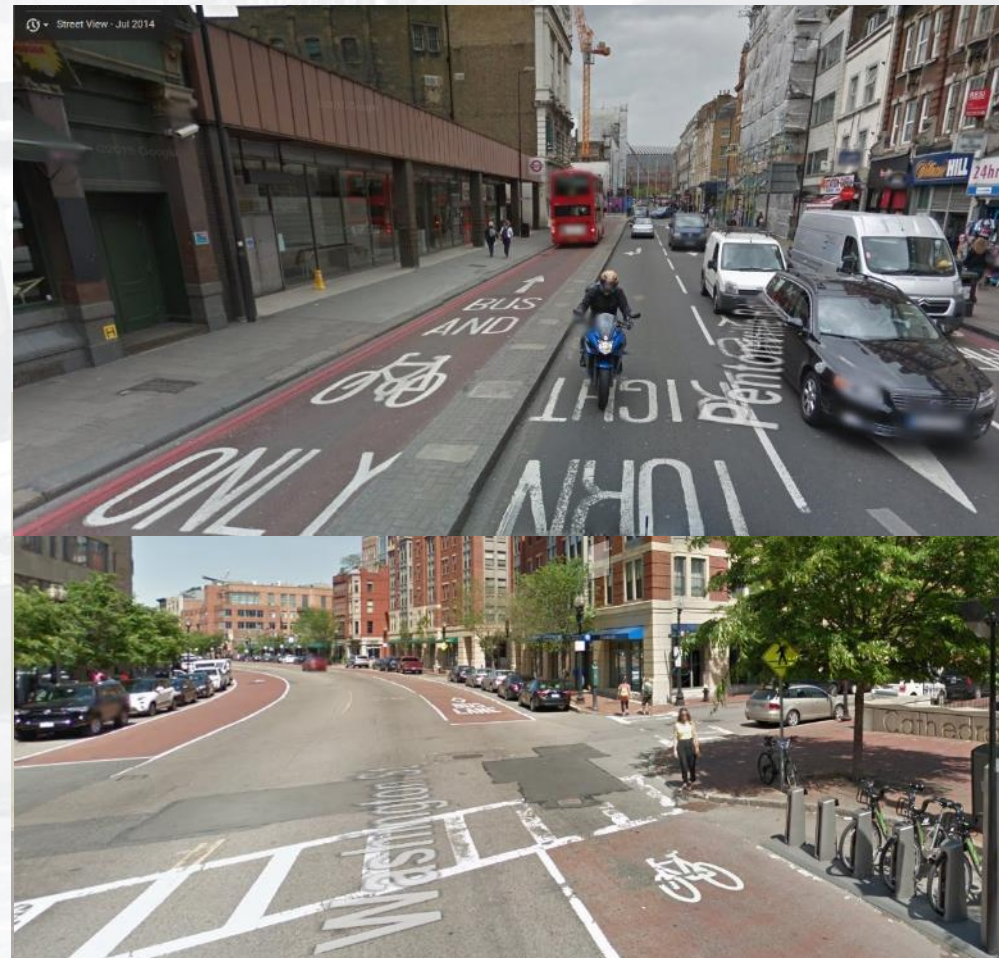
NOTES:  
 Detail 40 is 6" solid white line.  
 Detail 278-Red is 6" broken white line with 4" dashes and 12 gaps; provides at least 100' in advance of intersection or major driveway.  
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 Detail 278-Red is 6" broken white line with 4" dashes and 12 gaps; provides at least 100' in advance of intersection or major driveway.  
 \*Mod pavement markings approaching intersection if space permits; provide at least 100' of dashed transition area.  
 \*\*Provides at least 100' of dashed transition area in advance of parallel turn pocket.  
 \*\*\*Detail 278 recommended where left-turns are permitted at all times.  
 \*\*\*\*Detail 40 recommended where left-turns are prohibited or only permitted during off-peak hours.

DRAFT PROPOSED STRIPING DETAILS FOR RED COLORED TRANSIT ONLY LANES  
 FEBRUARY 13, 2014



# Peer Review – Bike Compatibility

- Most US cities not sharing red bus lanes with bicycles but London and some other UK cities do
- The Silver Line BRT on Washington Street in Boston allowed bicycles on their red bus lanes
- Many agencies recommended parallel facilities as preferable





# Peer Review



Boston – Washington Street



NYC – 1<sup>st</sup> Avenue



Seattle – Wall Street



Washington, D.C. – Georgia Ave. NW



San Francisco – O'Farrell Street

Christof Spieler



Chicago – Clinton Street

Sam Israel





# BaltimoreLink Includes Transitways

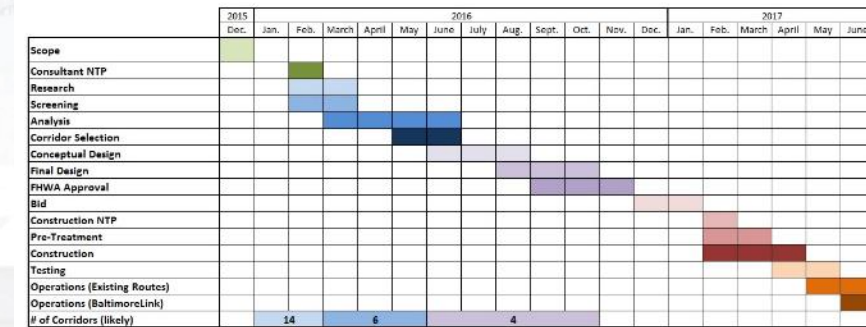
- BaltimoreLink was launched in October 2015 with Governor Hogan standing in front of a 20' by 20' sign showing Baltimore Street as a transit-only street similar to 16<sup>th</sup> Street Mall in Denver, CO
- Project included \$6M for Dedicated Bus Lanes as one component of the \$135M budget





# Project Schedule

- Corridor Evaluation – Nov. 2015 to May 2016
- Conceptual Design – June & July 2016
- Public Meetings – July & Nov. 2016
- Pratt & Lombard Implementation – July/August 2016
- Final Design – Aug. 2016 to Jan. 2017
- MTA Contracting Process – Feb. & March 2017
- Construction – May through Sept. 2017
- Before & After Evaluation





# Analysis of Potential Dedicated Lanes

- Bus Frequency
  - At least 18 buses/hour in peak periods
- Person Through-Put
  - Number of people traveling in dedicated bus lane must be greater than the number of people traveling in the adjacent lane



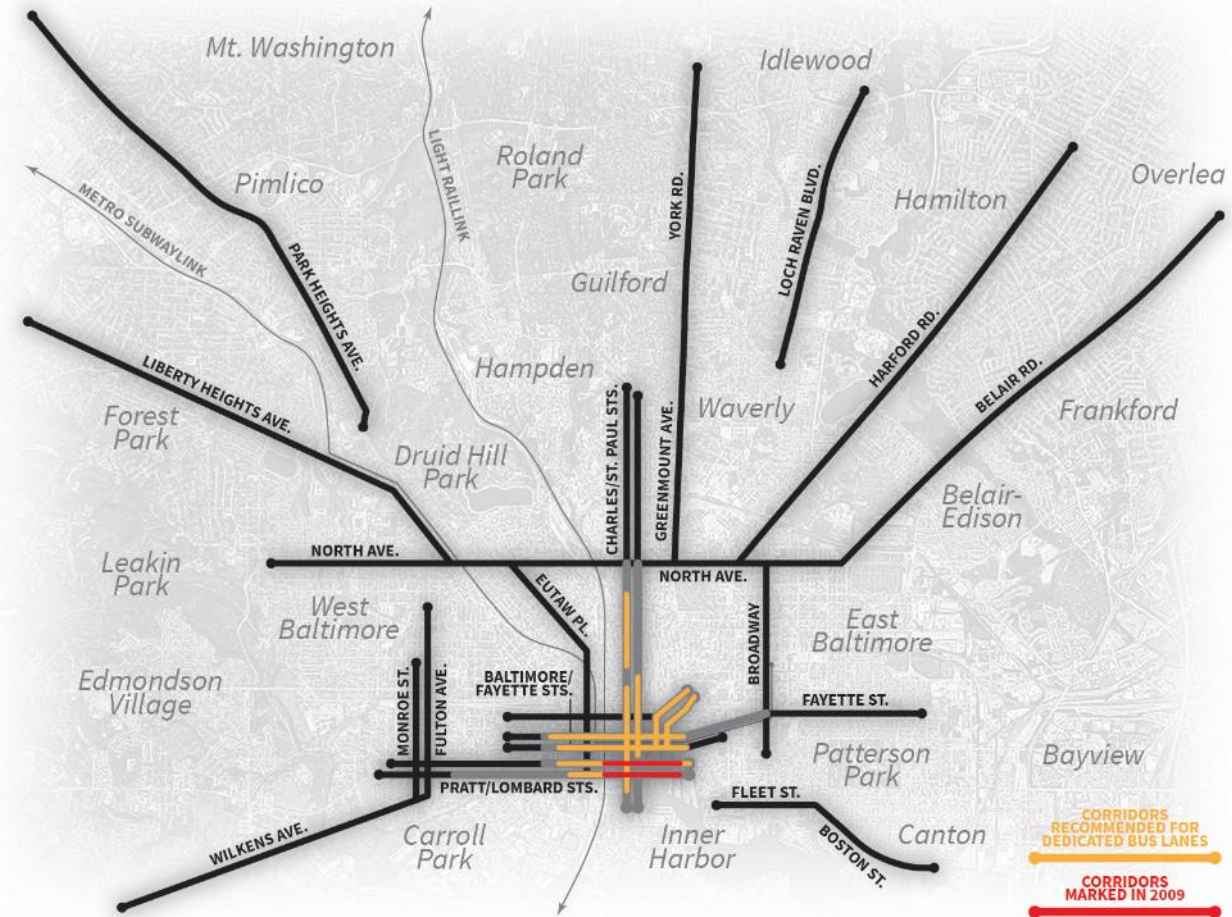
Goal	Performance Measure	Bus-Only Lane Thresholds and Guidance	
		Auto	Bus
Mobility	Person Throughput	Bus lane should carry approximately 80-120% of the adjacent auto lane. The flexibility/range allows for consideration of exclusive bus lanes, business access and transit (BAT) lanes, peak period bus lanes, and use of consecutive turn lanes and on-street parking conversion.	
	Person Delay	Change in person delay (passengers/riders/operators of autos and buses) with conversion to bus lane	
	Volume (peak hour)/ Frequency	Peak Hour: >1,000 vphs requires more than 1 auto lane; Daily: >10,000 vphs requires more than 1 auto lane	Curb lane: ≥24 buses (1 bus every 2.5 minutes); Offset Lane (i.e., adjacent to parking): ≥18 buses (1 bus every 3.3 minutes)
	Passengers per Hour	N/A (1.15 passengers per vehicle assumed systemwide per BMC)	Curb lane (CBD): 2,000-3,000; Curb (normal flow): 1,200-1,600; Offset Lane (i.e., adjacent to parking): >800 (all expressed as peak hour)
	Travel Time	Projected impacts to be assessed on case-by-case basis, balancing need to move the greatest number of people.	
	Average Speed	>10 mph below speed limit: bus lane detrimental to corridor mobility; 0-10 mph below speed limit: bus lane may have limited mobility impacts; additional case-by-case consideration given to intersection impacts	<8 mph: substantial benefits to bus lane; 8-12 mph: potential benefits to bus lane; >12 mph: limited benefits to bus lane; additional case-by-case consideration given to intersection impacts and potential for transit preferential treatments (e.g., transit signal priority, queue jumps, etc.)
Access	LOS/Delay and v/c	Expected change in LOS/delay and v/c (LOS/delay may be appropriate at LOS E if benefits to bus travel are substantial; v/c < 1.0)	Expected change in delay
	Parking and Loading/ Unloading Impacts	Case-by-case basis to determine potential impacts; likely only applicable for curbside bus lanes, but consideration will also be given to any potential parking and loading/unloading impacts	
	Population near routes	N/A	% population accessed within 5-min walk of corridor and/or bus routes on corridor
	Transit Dependent Population near routes	N/A	% transit-dependent population accessed within 5-min walk of corridor and/or bus routes on corridor
	Access to Jobs	N/A	# of jobs accessed by bus routes on corridor
	Connectivity/Transfers	N/A	# of direct connections/transfers to high-capacity transit (i.e., Metro, light rail, CityLink)
Design Adequacy	Emergency Routes	Yes/No	
	Freight Routes	Yes/No	
	Lane Width	10-12 feet: bus lane appropriate; 12-14 feet: consider painted buffer or consider bus/bike lane; >=14 feet: consider separate adjacent bike (green) and bus (red) lane	
Network Performance	Right Turns at Intersections	<100 right turns per hour: motorists can use bus lane; >100 right turns per hour: exclusive alternative should be considered (i.e., bus bypass lane, queue jump)	N/A
	On-time Performance	N/A	<80%: substantial benefits to bus lane; 80-90%: potential benefits to bus lane; >90%: limited benefits to bus lane
	Traffic Diversion	Expected diversion due to bus lane	N/A





# Analysis of Potential Dedicated Lanes

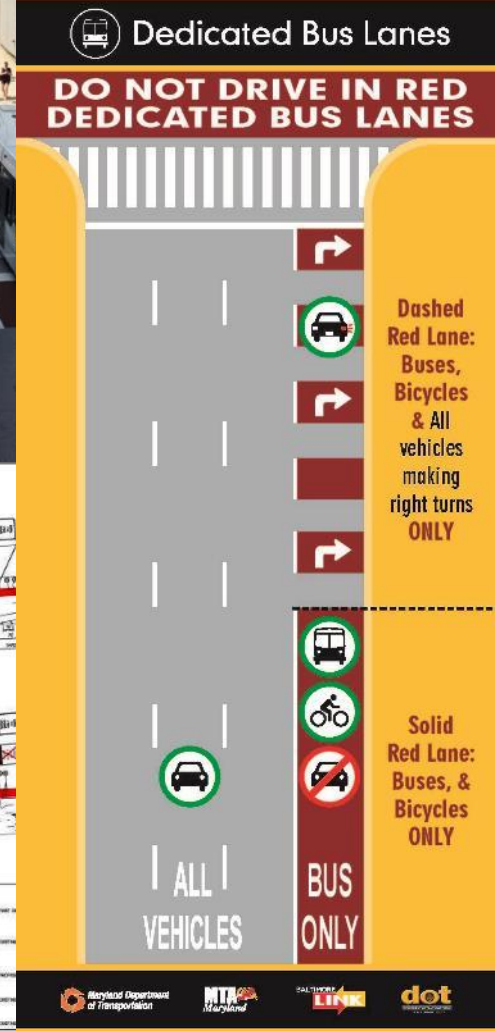
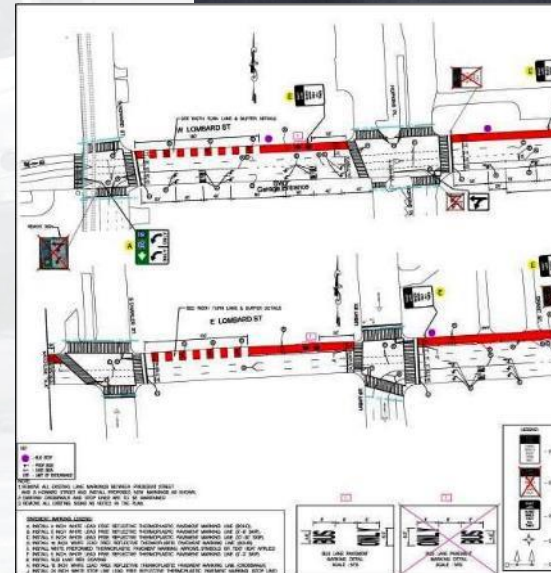
- Initially studied 17 corridors (25 streets)
- Further traffic analysis of five corridors
- TIGER Proposal for North Avenue
- Recommended segments of four corridors
- Moved into conceptual design and public meetings on these segments





# Reinstallation on Pratt & Lombard

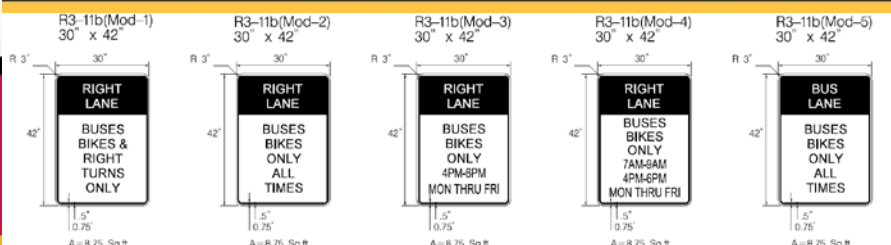
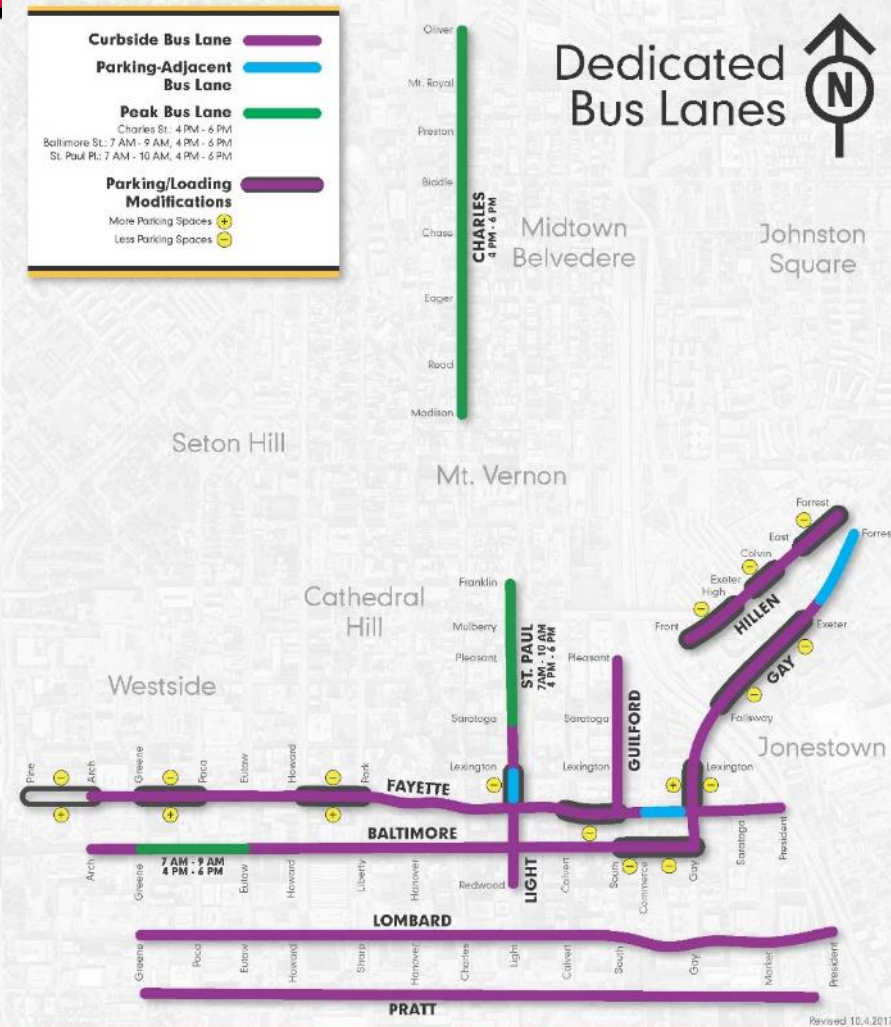
- Baltimore City DOT installed 1 1/3 miles of red Dedicated Bus Lanes in July/August 2016
  - Pratt (Howard to Constellation)
  - Lombard (Howard to Market)
  - Intermittent striping 100' in advance of right turn intersections
- Used methyl methacrylate (MMA) product
- Installation work largely done at night
- Four step installation:
  - Removed existing lane markings
  - Cleaned roadway to remove oil & grit
  - Brushed on red methyl methacrylate
  - Installed thermoplastic pavement markings





# Final Design & Construction

- Held six public meetings (3 in July 2016, 3 in Nov. 2016)
- Consultant walked length of design corridors and handed out flyers and spoke with merchants
- Coordinated closely with Baltimore City DOT and Parking Authority of Baltimore City (PABC) throughout
- Got final approval from the Mayor's Office in February 2017
- Implementation done through MTA's Construction Management on-call contract
- Construction started in June 2017 and wrapped up in October 2017 except a segment on St. Paul





# How Are The Lanes Enforced?

- Red paint helped with self enforcement vs. previous conditions on Pratt & Lombard
- Education effort with Variable Message Sign, flyers, and press
- Initial targeted enforcement with Baltimore Police Department, TEOs, and MTA Police
  - Requires significant coordination
  - MTA Police gave out 133 tickets in early 2017
- Photo enforcement would require a change in state legislation





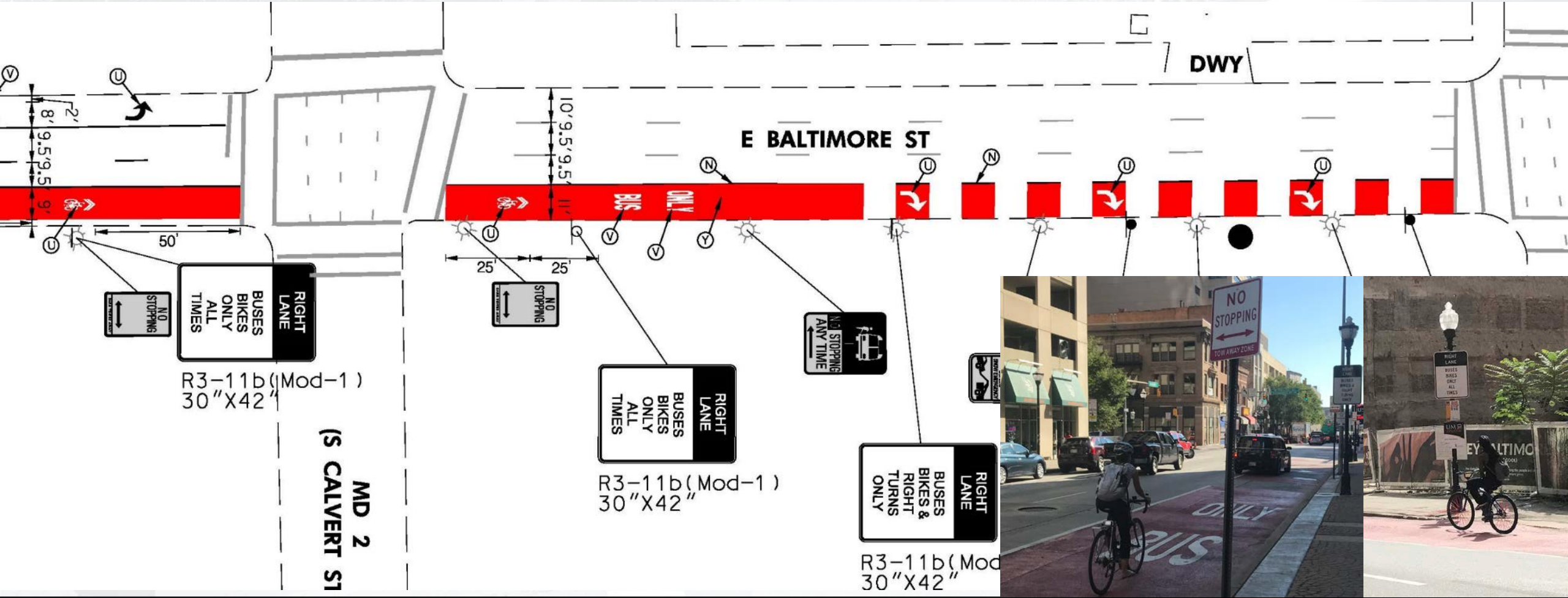
# Before & After Study

Key Performance Indicator	Unit of Measure	Data Source	Comments
Bus On-time Performance	Percentage of buses on time as defined in MTA service standards	MTA APC reports	
Bus travel time	Average miles per hour	MTA APC reports	
General purpose travel time	Average miles per hour	RK&K	RK&K will time trips along each corridor during peak periods
Ridership	Total daily passenger boardings at selected stops	MTA APC reports	Select stops with reasonably similar LOS before and after BaltimoreLINK route changes
Illegal motor vehicle travel within dedicated bus lanes	Total number of private vehicles issued notices for violating lane restrictions during reporting period	Baltimore Police Department and MTA Police reports	Only after data Obtain from select locations, one or two blocks along each corridor
Crashes	Total number of crashes of all types occurring in dedicated lane during reporting period	Baltimore City Police reports	Side swipes, rear ends, etc.
Traffic volumes	Vehicles per hour	RK&K	Traffic counts by video at select mid-block locations, one or two blocks along each corridor.  This provides necessary count data but also allows for video review of a corridor so that enforcement, lane usage, etc. can be observed.
Illegal parking	Total number of parking infractions in select locations during reporting period	Baltimore City Department of Transportation	Only after data Obtain from select locations, one or two blocks along each corridor



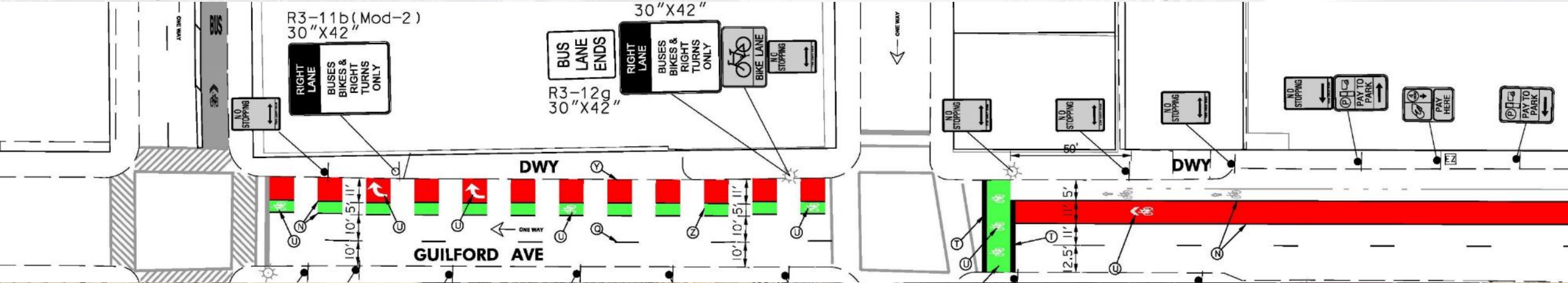


# Bicycle Utilization: Baltimore Street





# Bicycle Utilization: Guilford Avenue & Fayette Street









# Education of Bus Operators, Bicycle Riders, & Drivers



Chicago Bus/Bike Interaction educational video (12:35 min.)

<https://www.youtube.com/watch?v=SqmBgjS5klo>



Pittsburgh Bus/Bike Interaction PSA (2:30 min.)

<https://www.youtube.com/watch?v=IllzJRERQu8>



Baltimore City/MTA Maryland Dedicated Bus Lane PSA (30 sec.)

[https://www.facebook.com/mta\\_maryland/videos/1577021288987398/](https://www.facebook.com/mta_maryland/videos/1577021288987398/)



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