

# Boston Street Multi-Modal Corridor Study

Final Draft



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# Corridor History



**Traffic issues in the Boston Street corridor linking downtown with I-95 to the east through Fells Point and Canton along the waterfront have long been a concern. Major developments in the Harbor East, Harbor Point and Canton communities have been and will continue to be the driving force of traffic growth.**

Plans for an east-west interstate highway for the corridor to connect I-83 to I-95 were canceled in the early 1980s. In it's place, Boston Street was reconstructed into a four-lane boulevard between Conkling Street and Fleet Street. In the mid 1990's and early 2000s, continued major redevelopment projects such as Harbor East, Canton Crossing and Brewers Hill intensified concerns about traffic congestion. This lead City agencies to create a transportation strategy for Southeast Baltimore focused on improving operations on existing roads and increasing transportation choices along the corridor. Concurrently, in concert with that effort, advanced project planning and engineering design was undertaken by the State for a new light rail line, known as the Red Line, to connect from the downtown area, through Fells Point and Canton along Boston Street and east to Bayview. In 2015, this project was canceled, resulting in the need for a fresh look at multi-modal transportation needs and solutions in the corridor.

This study documents current traffic conditions and develops a menu of multi-modal mobility and traffic management solutions.

### Pre-1970's

Industry and Working Waterfront



### 1970's

Freeway plans for I-83 to I-95 connection (elevated viaduct)



### Mid-1980's

First wave of waterfront redevelopment begins with condominiums on south side of Boston Street



### Mid 1990's

American Can Company redevelopment



### Late 1990's

Boston Street reconstructed as four-lane boulevard



### Early 2000's

Harbor East Redevelopment Begins



### 2011-2013

Brewers Hill and Canton Crossing Redevelopment



### 2015

Red Line Canceled



### 2016

Harbor Point Redevelopment Begins



Pre 70's

2011-2013

2015



# Transportation Context

Boston Street serves as both a neighborhood main street and a regional connector; the street also serves many transportation functions.



Bus routes for  
MTA Link Gold Route



Designated Evacuation and  
Snow Emergency Route



Designated Commercial and  
Industrial Truck Route



Designated Bike Route



On-Street Parking for  
Commercial Business



Waterfront Promenade / Parks  
and Retail Pedestrian Access



**The corridor experiences heavy commuter traffic flows inbound towards downtown in the morning and outbound toward I-95 in the evening. Key issues identified in this study include.**



Lack of direct and frequent transit service through the corridor to key regional destinations.



Illegal on-street parking and loading during peak hours that reduces the available capacity of Boston Street. Lack of available on-street parking also creates traffic congestion, forcing drivers to circle the block in search of open spaces.



Rush hour traffic congestion results in rolling queues stretching several blocks long. Several intersections have high volumes of turning traffic, making it challenging to provide signal timing plans that serve local and through traffic.



Active industrial land uses are located in the eastern portion of the corridor, served by several railroad lines that cross Boston Street, resulting in blockages to through vehicle traffic.



# Study Area

The study area includes the neighborhoods of Canton, Highlandtown, Brewer’s Hill, Greektown, Butchers Hill, Fells Point and Medford. The study corridor encompasses Boston Street between Fleet Street and O’Donnell Street.



The Grey area show a quarter mile buffer around the study corridor.



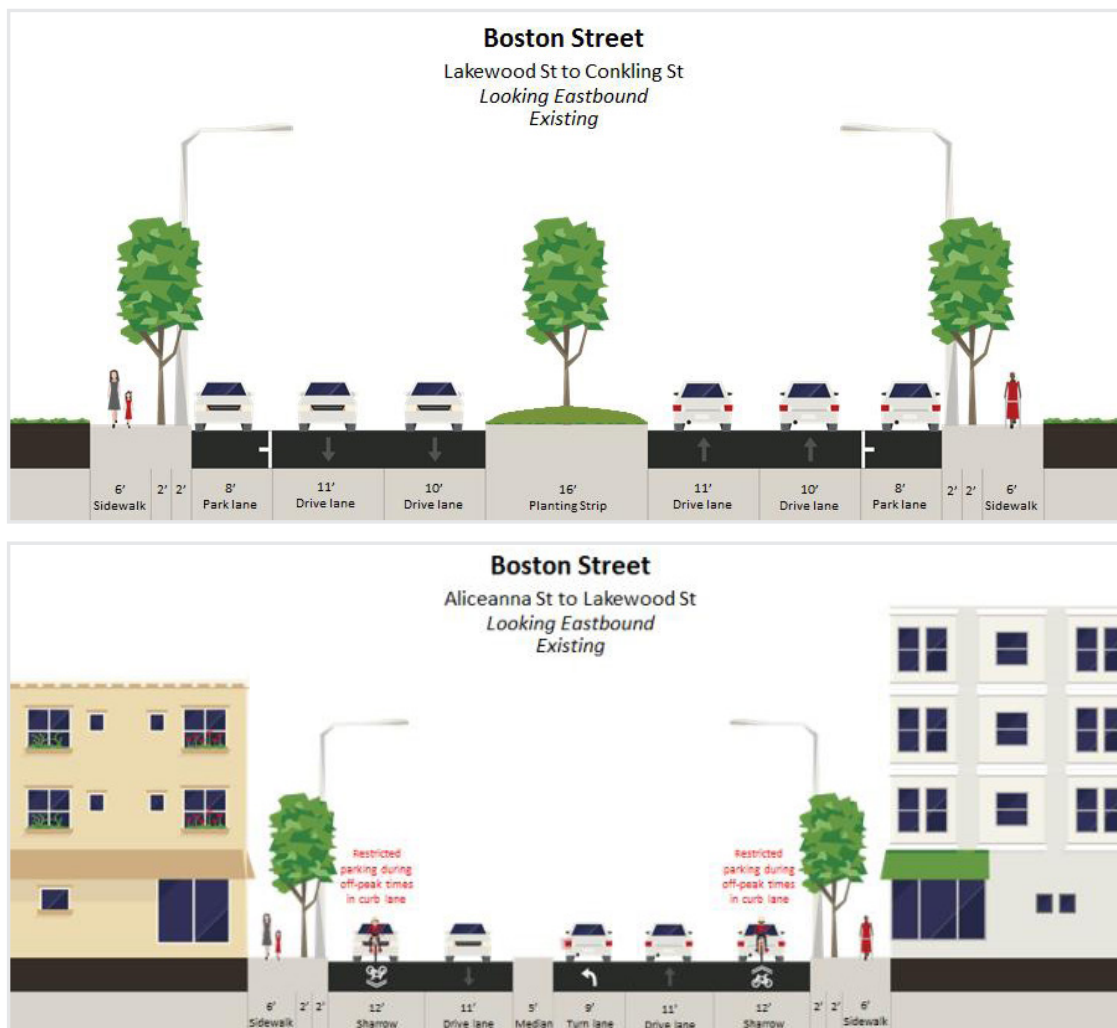
# Existing Conditions

Residential density in the western segment of the corridor is 25 homes per acre, 15 homes per acre in the Canton area, and 10 homes per acre in the eastern segment between Kenwood and Robinson.

Average employment density of the study area is less than 10 jobs per acre.

Significant job centers of fifty to one hundred jobs per acre are located just outside of the study area including the downtown Central Business District, John Hopkins Hospital, Harbor East, Harbor Point and Johns Hopkins Bayview Campus.

**The residential and employment density in this corridor can support a higher level of transit service. If that service is frequent, on time and direct.**



## Typical Right-of-way Cross Section

Total right-of-way varies from 80' to 94' and includes sidewalks, a center median, dedicated left-turn lanes, travel lanes, curbside parking, sidewalks, a planting strip and in some segments share the road.

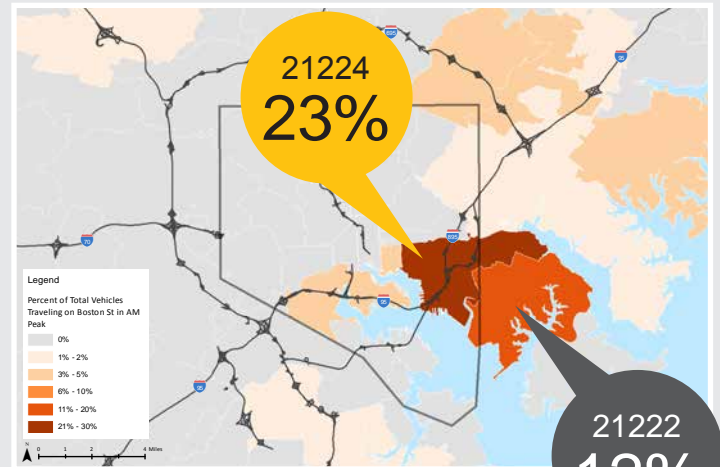


# Commuting Shed Profile

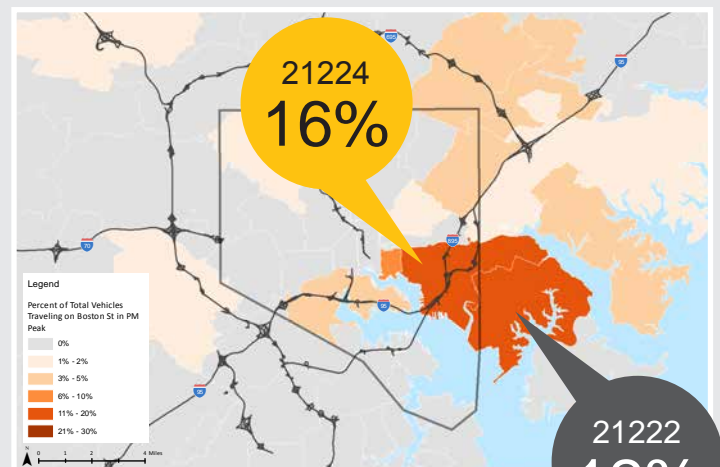
A travel survey for automobiles using the Boston Street corridor was performed on a typical weekday. The license plate numbers of all private automobiles traveling in the peak direction during the AM and PM peak periods were recorded and delivered to the Maryland Motor Vehicle Administration (MVA). MVA returned the data set with the zip code of registration for each vehicle submitted. This data provides a reliable picture of the localities from which the majority of commuters are traveling to the Boston Street Corridor or to downtown locations beyond.

Of the vehicles recorded on Boston Street, only one third or less (35% in AM Peak, 28% in PM Peak) originated from just two zip codes, 21224, which includes areas in southeast Baltimore City and the northern portion of Dundalk, and 21222, which encompasses the remainder of Dundalk. **The remaining two-thirds of vehicle traffic is regional in nature without an origin in the study area.**

While no other single zip code, (except for 21224 and 21222), represents greater than five percent of the total in either the AM or PM peaks, a handful of areas stand out as a second tier of traveler origins, collectively representing roughly another quarter of the vehicles recorded. For the AM period, the zip codes in that grouping are clustered to the north and east of the City (White Marsh, Bel Air, Perry Hall, etc.) as do trips coming from 21117 (Owings Mills) and 21230 (South Baltimore & Federal Hill).



Morning Commute Shed



Evening Commute Shed



2006-2017

# Transportation Investments in the Boston Street Corridor/ Southeast Area

Many previous transportation studies have been performed in the corridor and study area by the city, state, non-profit and federal agencies including the Southeast Strategic Transportation Vision, The Red Line and it's Environmental Impact Statement, and strategic planning documents including the Bike Master Plan, Water Transit Strategic Plan, Waterfront Partnership Transportation Task Force Strategy, Southeast Baltimore Complete Streets Plan, Citywide Truck Route Study as well as dozens of traffic impact studies for individual development projects. Nearly 80 specific capital projects, operational improvements, public policy options and service options were identified across all modes of transportation. While not all of these recommendations were accepted or adopted by BCDOT, more than 30 actions have been taken to improve the quality and reliability of travel in Southeast Baltimore. Since 2006, the following transportation improvements have been designed, constructed, implemented or are moving forward by BCDOT:

1. Upgrade of S. Central Avenue to four lanes from E. Fayette Street to Aliceanna Street including a new bridge to Harbor Point (construction underway expected completion by 2020).
2. Intersection widening improvements completed in 2015 at:
  - a. Boston Street at S Clinton Street
  - b. Boston Street at Ponca Street
  - c. S Conkling Street at O'Donnell Street
  - d. O'Donnell Street at Interstate Avenue
  - e. O'Donnell Street at Ponca Street
  - f. Boston Street at S Haven Street
3. Traffic signal installation at Boston Street and S. Haven Street (completed in 2014).
4. Harbor Connector Water Taxi system (200,000 trips per year in 2014) with stops at the Canton Waterfront Park and Fells Point Maritime Park (implemented in 2010).
5. Implementation in 2010 of Green and Orange Charm City Circulator routes (Ridership in 2012: Orange 1,477,00, Green 740,500).
6. Implementation of 21 lane miles signed and marked bicycle routes through Harbor East, Fells Point, Canton, and Greektown.

Central Avenue Bridge Connecting to Harbor Point



New Harbor Connector Water Taxi





# Transportation Investments in the Boston Street Corridor/ Southeast Area

7. Installation of over 100 new public bicycle racks for parking throughout the Southeast Zone (completed between 2010-2016).
8. Installation of five bike share stations and docks at the Shot Tower Metro Station, Harbor East, Harbor Point, Fells Point, and the Can Company.
9. Zipcar availability (2010) throughout the corridor.
10. Upgrade of select bus stops with new shelters and benches.
11. Bus service enhancements by the Maryland Transit Administration launched in June 2017 as BaltimoreLINK:
  - a. No. 26 Line: The new service originates downtown at E. Fayette and N. Charles Streets and travels to Dundalk Marine Terminal with a stop at the Amazon Distribution Center on Broening Highway, which employs more than 1,000 people.
  - b. No. 31 Line: The new service originates from State Center Metro to the Community College of Baltimore County (CCBC) and Dundalk with a stop at the Shops at Canton Crossing
  - c. CityLINK Gold Line connects Boston Street to Johns Hopkins Hospital and continues to North Avenue.

Additionally, private companies are operating in southeast Baltimore, providing alternatives to car ownership, including:

- Johns Hopkins University Hospital Shuttle
- University of Maryland Private Shuttle
- Amazon Shuttle
- Zipcar
- Uber and Lyft

On-Street Bike Lane



Can Company Bike Share Station



Charm City Circulator







# Traffic Congestion & Safety

Existing traffic volumes exceed existing roadway/ intersection capacity in several locations. Two intersections currently operate a failing level of service (**level of service E or F**) during either or both peak hours:

- Boston and Ponca Street
- Boston and Aliceanna Street

Two others operate at capacity (**level of service D**) during the P.M. peak hours:

- Boston and Fleet Street
- Boston and Conkling Street

## Anticipated Economic Development Activity 2017-2027

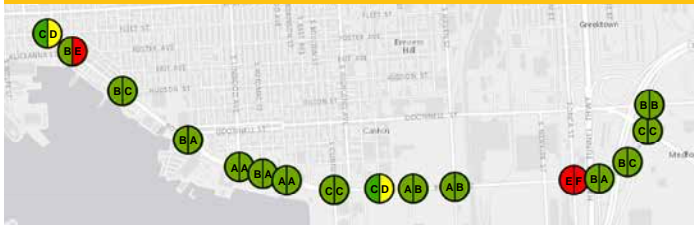
Land Use Type	Total Study Area	Along Boston Street	Unit
Office	2,433,849	400,000	Square Foot
Industrial	1,783,848	114,848	Square Foot
Retail	786,395	432,000	Square Foot
Residential	4,263	1,000	Dwelling Units
Hotel	512	-	Rooms

126 vehicle crashes occurred along the corridor between 2012 and 2014, **including seven involving pedestrians or bicycles.**

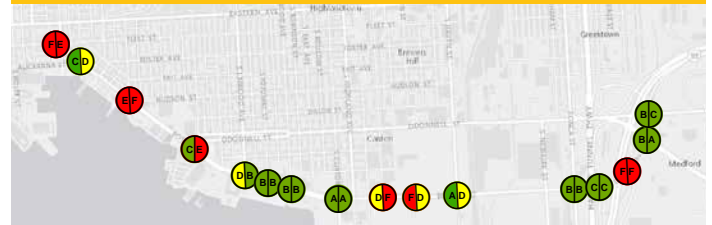
Continued growth and redevelopment in the corridor and beyond will lead to a projected increase in traffic volumes over the next 5 years:

- **11,000 additional cars per day**
- **1,600 additional cars during each rush hour**
- **Several thousand new walking, biking and transit trips will be added to the corridor**

### Existing AM and PM Peak Hour Intersection Level of Service



### Future AM and PM Peak Hour Level of Service without Any Improvements



Illegal parking and loading along Boston Street during rush hours reduces the capacity of Boston Street. Signal timing plans are pre-timed based on estimated traffic volumes for pre-set times of day and may not effectively accommodate the unique vehicle and pedestrian travel patterns of the corridor. Lastly, minimal signage exists to provide primary and secondary safe route guidance to motorists, which may result in regional traffic using Boston Street.

**Without any roadway improvements, changes in travel patterns, use of alternative modes, and continued economic development; 6 intersections will operate at a failing level of service within 5 years, resulting in longer travel times and more traffic congestion.**



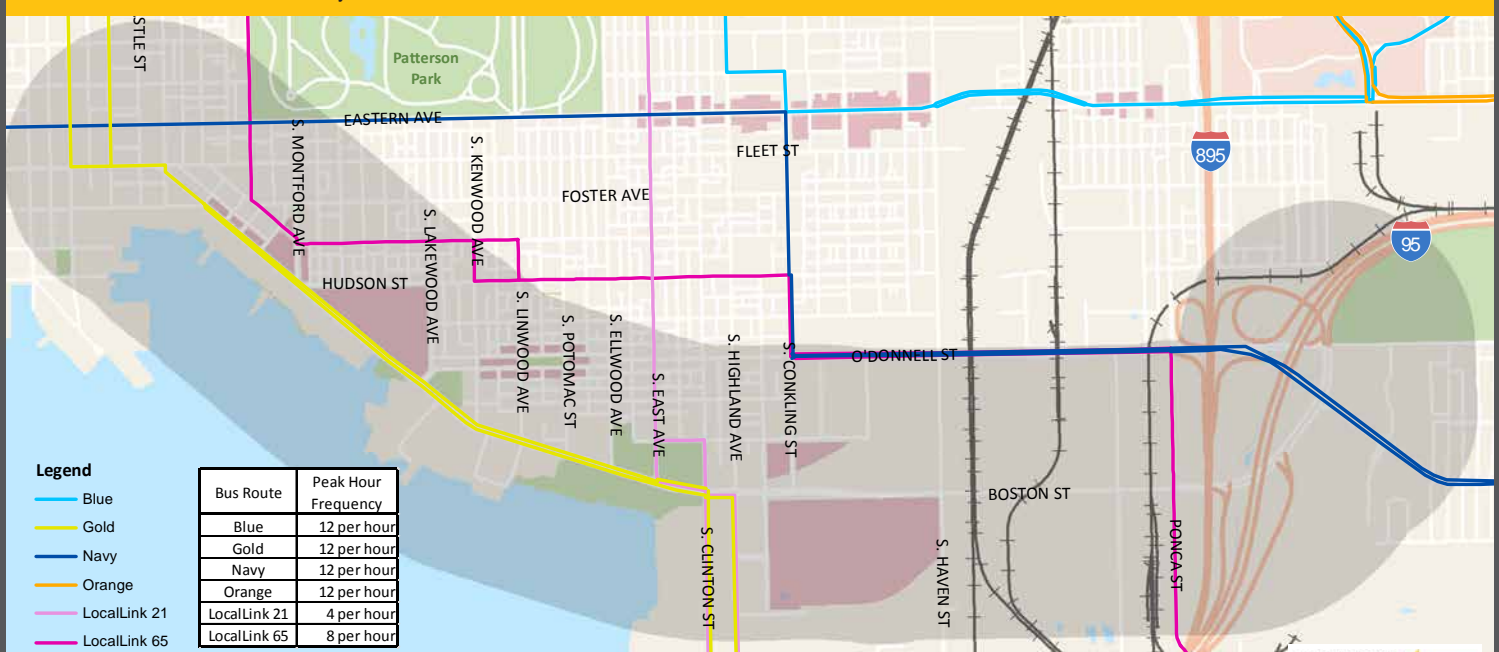
# Lack of Direct and Frequent Transit Service

The Boston Street corridor is served **by bus transit** provided by the Maryland Transit Administration (MTA) and the University of Maryland white **water transit** is provided by the Baltimore Water Taxi and Harbor Connector. The Harbor Connector operated by the Charm City Circulator provides year round water shuttle service during weekday, mornings and afternoons in an effort to provide alternative travel options to Downtown. On June 18, 2017, MTA's BaltimoreLink bus transit plan took effect, reconfiguring bus service city-wide. The BaltimoreLink plan is focused on providing better overall service quality by eliminating duplicative and long bus routes, establishing a grid of high-frequency routes, and re-branding the busiest routes with color-based names (e.g. Gold Line, Blue Line, Red Line, etc.) that are easy for riders to memorize. In the study area, the coverage of MTA service remains roughly the same, while

the frequency of service on some streets has changed. The level of service on Boston Street proper is the same in aggregate, although the two former routes that ran on Boston Street (the 13 and 31) are replaced by a single trunk route, the Gold Line. Bus frequencies on Eastern Avenue are evened out, and the O'Donnell Street corridor now boasts frequent service to areas east of the City which does not directly serve downtown.

Rank	Stop	# of Boardings		
		All Day	AM	PM
1	Eastern Ave at Ponca St WB	175	44	39
2	Eastern Ave at Eaton St EB	173	23	52
3	Highland Ave at Baltimore St NB	165	55	36
4	Eastern Ave at Eaton St WB	156	31	47
5	Bayview Blvd at Hopkins Bayview Cir NB	145	14	54
6	Eastern Ave at Macon St WB	139	51	26
7	Canton Waterfront Park	200	30	50
8	Eastern Ave at Ponca St EB	114	23	24
9	Eastern Ave at Conkling St WB	110	16	29
10	Highland Ave at Baltimore St SB	108	31	25

Bus Route Structure in the Study Area under the BaltimoreLink Plan





# Lack of Direct and Frequent Transit Service

The busiest transit stops are outside the study area primarily along the Eastern Avenue corridor, as well as the intersection of Highland and Baltimore, and the Harbor Connector/Water Taxi stop at Canton Waterfront Park. The majority of stops along Boston Street are not heavily used, with fewer than 30 daily boardings. This is owed to the lack of service frequency and direct connection to Downtown, Harbor East and Harbor Point through bus as well as water transit service.

A lack of intermodal connections to transit, such as bicycle infrastructure near popular transit stops or park and ride facilities near the corridor is noted a deficiency in the transit network. There are four park and rides in Baltimore County within six to twelve miles from the study area (White Marsh, Martin State, Essex and Mace Mini). All commuter bus service from the I-95 north corridor serves downtown via the Fort McHenry Tunnel to I-395. However, none of these lots have direct express bus service to Harbor Point or Harbor East through the Boston Street corridor.

Transit may be a more attractive choice to provide service to concentrated areas of employers such as the Inner Harbor, Harbor Point, Harbor East, etc. where the cost of parking may be high. The greatest barrier to inducing commuters to use available transit services is often the lack of a “last-mile” connection when transit services are not quite close enough to be accessed on foot (at either end of the trip).

While the corridor has good access to transit, the frequency of service, typically running at 20-minute headways throughout the day with the exception for those who work at the Johns Hopkins Medical Center, is not reflective of a growing urban neighborhood. The lack of frequent transit service may contribute to lower ridership levels, and the high occupancy rate of on-street parking in the area.



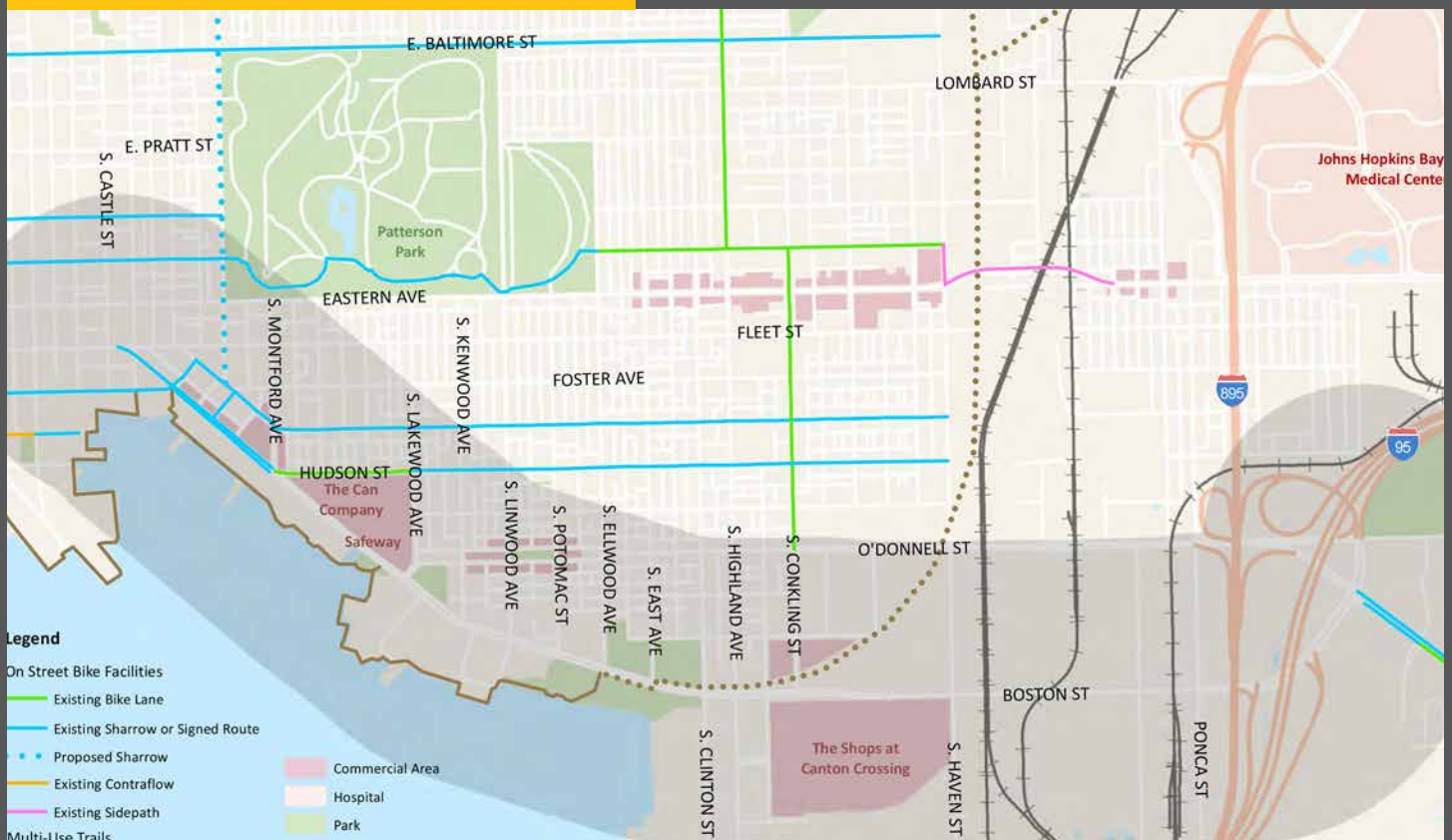


# Bicycle Network Needs Improvement

Within the study area, shared lanes/signed routes account for approximately 18 miles of bicycle facilities; less than three miles are dedicated and/or protected lanes. In addition the promenade is a seven mile, mostly contiguous paved path adjacent to Baltimore's waterfront, there are a few gaps in access to the Promenade that fall within the study area at Aliceanna, Hudson and Clinton Streets.

Only a short segment of Boston Street between Aliceanna Street and Hudson Street have bike facilities. Field observations showed this is to be an unappealing route as bicyclists were observed riding on the sidewalks and there is minimal space for bicyclists between the traveling vehicles and the parked cars. Two other parallel east-west routes serve as bike routes as they are designated as share-the-road or signed bike routes across the study area connecting the eastern edge to center area of the City. While east-west routes have shared bike facilities, a few north-south streets have pockets of dedicated bike lanes that connect Boston Street to the other parallel east-west routes. The Baltimore Bike Share program includes an existing station at the Can Company and a proposed station at the O'Donnell square Park.

## Existing and Planned Bicycle Network





# Bicycle Network Needs Improvement

The gaps and barriers in the bicycle network include:

- Missing connections: The Conkling Street bike lane does not currently extend south of Dillon Street to reach Boston Street. Potomac Street is the only north-south link that extends as far north as Eastern Avenue.
- Lack of connections to the Waterfront Promenade.
- Need for other low-stress east-west bike routes.
- Minimal bike share stations; especially at locations to serve inter-modal transfers as well as the eastern section of the study corridor and the Canton neighborhood

In 2013, the Baltimore City Department of Transportation (BCDOT) conducted a study in conjunction with the Waterfront Partnership to evaluate the feasibility of allowing bicycling on the Waterfront Promenade. The evaluation determined that with improvements, bicyclists could access and use the Waterfront Promenade safely. BCDOT coordinated with Waterfront Partnership, the Community, the Inner Harbor Bicycle Police Unit, and the Mayor's Bicycle Advisor Commission to develop a one-year pilot project focused on implementing safety-enhancing strategies for bicycling along the Waterfront Promenade. Currently, bicycling is permitted as the one-year pilot project began on September 27, 2016 and will be evaluated over the following 12 months. The pilot project will remove existing restriction signage and install consistent permissive signage.

Bicyclists riding in shared lane along Boston Street between parked cars and moving traffic



Example of a protected bike lane on Roland Avenue



Waterfront Promenade





# Pedestrian Network and Safe Intersection Crossings

With its continuous street grid and the Waterfront Promenade, the Boston Street corridor and adjacent neighborhoods generally have a complete pedestrian network. Street lighting is continuous along the study corridor, but pedestrian-level lighting is not provided. Most intersections have pedestrian ramps, signals and crosswalks. There are, however, sections of the eastern half of the corridor where sidewalks are missing from one or the other side of Boston Street. While this area is currently industrial and experiences a low volume of pedestrians, continued development will increase pedestrian activity.

Additionally, there are several locations throughout the corridor where the existing infrastructure could be improved to increase pedestrian safety and make the corridor more inviting. Throughout the corridor, there are crosswalks and curb ramps in need of rehabilitation to current standards. Pedestrian refuge islands could improve the safety and comfort of pedestrians crossing Boston Street, especially at marked but unsignalized locations

and locations that have a pedestrian crash history such as at the intersection of Lakewood. The Waterfront Promenade, a pedestrian connection that augments the sidewalk network, ends abruptly at the Canton Waterfront Park and has a gap near the intersection of Boston Street and Aliceanna Street.

Six intersections in the evening peak hour have pedestrian crossings greater than 100 persons per hour. These include in order from highest to lowest Fleet, Montford/Hudson, Aliceanna, Linwood, Clinton, and Conkling.

The gaps and barriers in the pedestrian network include:

- Lack of midblock crossings
- Gaps in sidewalk network
- Worn crosswalk markings
- Curb ramps that are not ADA compliant
- Lack of median refuge areas
- Lack of Pedestrian signals with countdown indications

Pedestrian crossing at Lakewood Avenue. The intersection has faded crosswalks, no refuge area in the median, and non-compliant ADA ramps, on each corner.

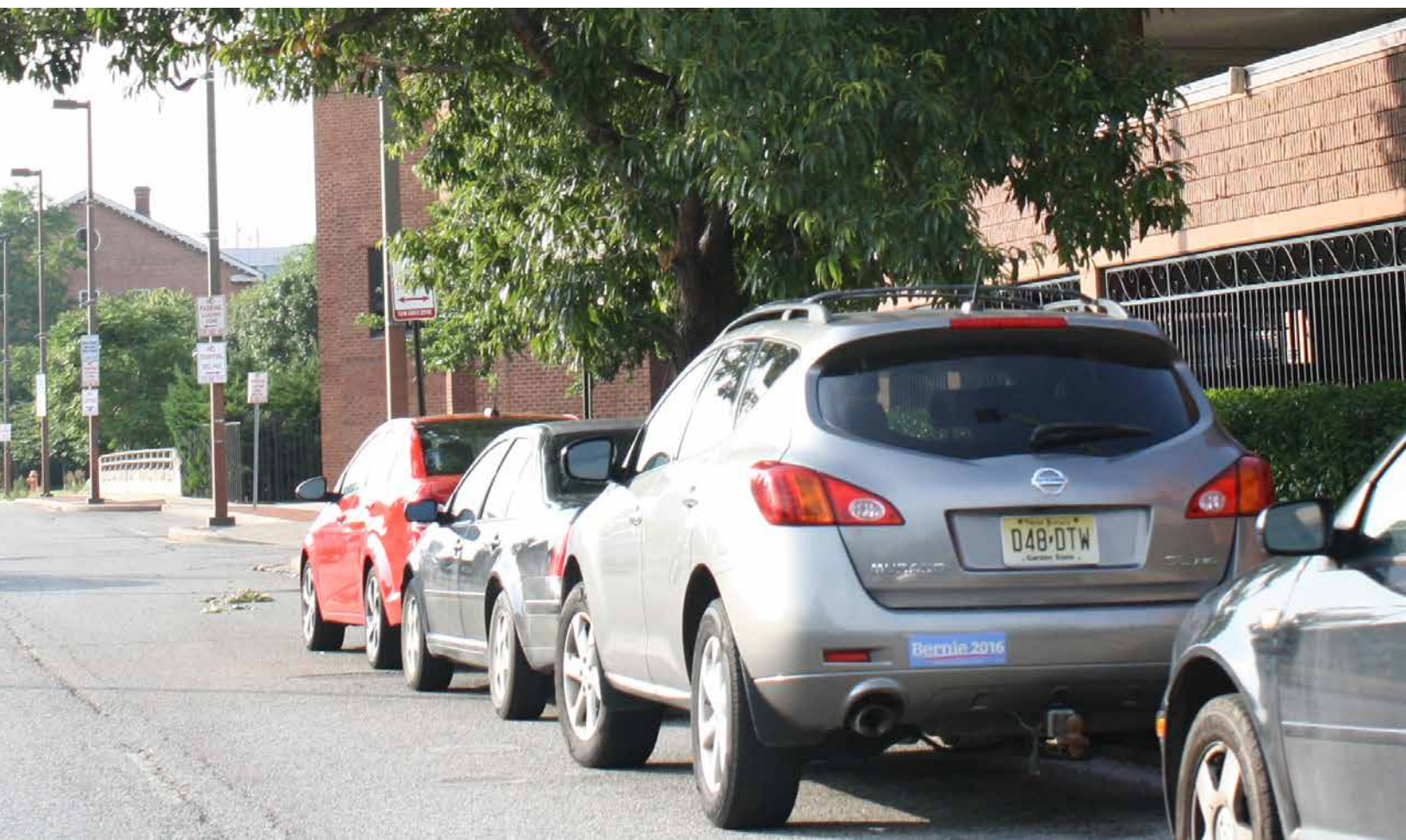




# Curbside Parking

There are approximately 2,000 on-street parking spaces along Boston Street and on immediately adjacent streets within two blocks of Boston Street. The majority of parking is unrestricted (88%) and is located in the blocks adjacent to Boston Street. The western half of Boston Street, between Fleet Street and O'Donnell Street is primarily metered or time restricted parking, while the remaining eastern segment is primarily unrestricted. The time restricted parking is confined in the westbound direction during the morning peak period (7A.M. - 9A.M.) and in the eastbound direction in the afternoon peak period (4P.M. - 7P.M.). Curbside parking ends along Boston Street east of Conkling Street.

Parking Category	# of Spaces
Commercial Loading Zone	20
Disabled	16
Meters or Pay-to-Park	7
Passenger Loading Zone	6
Restricted	176
Special Permit	4
Under Construction	5
Unrestricted	1,764
<b>Total</b>	<b>1,998</b>





## Curbside Parking (continued)

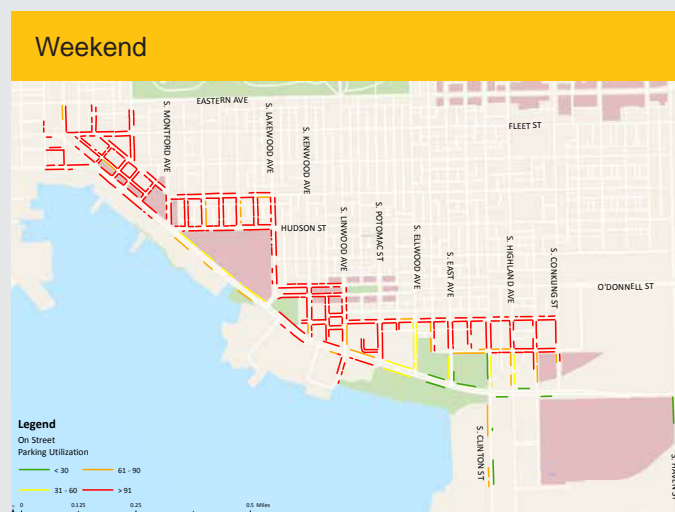
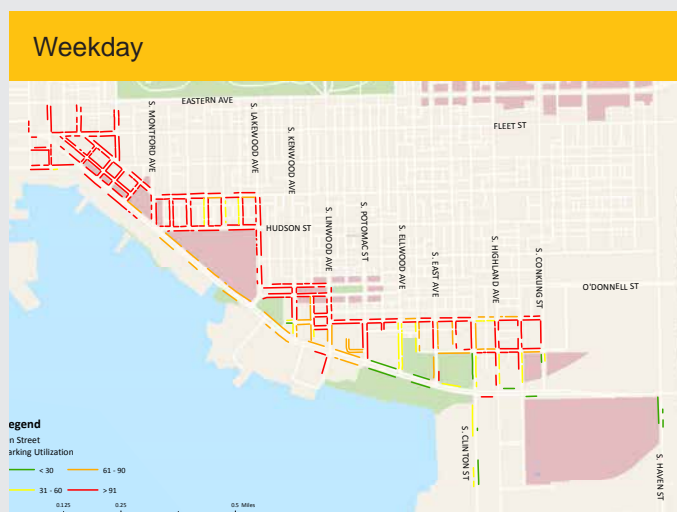
Evidence from field observations as well as comments received during all three public meetings indicates that the on-street parking from Fleet Street to Lakewood Avenue can be a contributing factor in traffic backups in the corridor. The parking in these sections is allowed outside of the peak hour/peak traffic direction, and during peak periods the parking lanes provide a second travel lane for rush-hour traffic. Cars parked overnight or during mid-day are frequently not moved in time to clear this second travel lane unfortunately, resulting in a sudden merge pattern that disrupts traffic flow and results in extensive queues.

A survey of curbside parking utilization at various time periods revealed that a majority of on-street spaces are occupied at all times, and that in the evenings and on weekends there are very few spaces available at all, with occupancy rates exceeding 90%. Retail businesses depend on nearby available parking to provide access for customers, but the vast majority of the on-street parking in the Boston Street corridor is unregulated, and as a result is full almost all of the time.

Within and immediately adjacent to the corridor are several commercial properties with large parking lots that have significant unused capacity during the weekday daytime such as the Safeway grocery store, Canton Crossing and Amazon Fulfillment center. Opportunities exist to use the underutilized spaces as park and ride locations for both transit service and carpooling.

The lack of available on-street spaces likely contributes to congestion, as drivers spend additional amount of time searching for a space. In addition, the lack of curbside parking regulations (e.g. permit restrictions), parking cost (e.g. free parking) and significant inventory of off-street parking at larger retail centers was found to contribute to parking spillover from retail and entertainment uses, higher automobile use and mode share imbalance in the corridor.

Curbside parking utilization for evening weekday and weekend time periods.







# Freight Accessibility

**Truck Routes** - The segment of Boston Street between Fleet Street and Clinton Street is a restricted truck route for local truck trips only, while the segment of the study area between Clinton Street and O'Donnell Street is a through truck route. Within the larger study area, Eastern Avenue is the designated east-west truck route between the interstates and Downtown.

**Loading Zones** - There are four commercial loading zones along Boston Street:

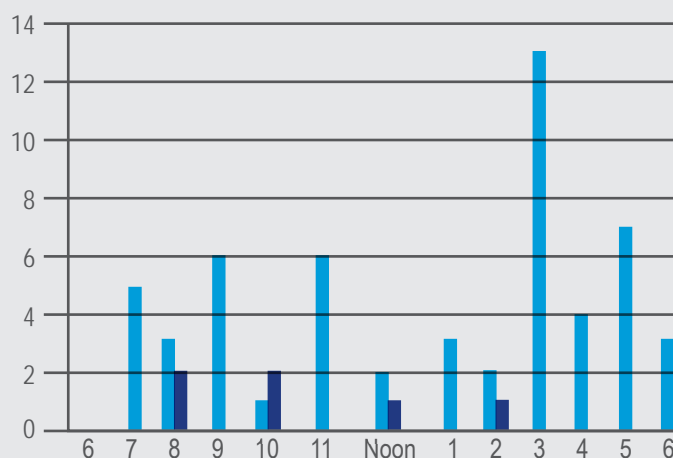
1. Eastbound in front of the Anchorage Tower Condominium building
2. Eastbound in front of the Captain James Restaurant (weekday restrictions only)
3. Westbound at Patterson Park Avenue in front of the Barcoding building (weekday restrictions only)
4. Eastbound at Linwood in front of the Canton Cove Condominium building

**Rail Crossing** - Active at-grade rail crossings east of Haven Street contribute to traffic congestion in the corridor. There are two Class 1 railroads (Norfolk Southern and CSX) as well as a short line railroad (Canton Railroad) that operate in this area. When trains are active in the roadway crossing, vehicles are required to stop and wait for the trains to clear. Train activity was observed throughout the weekday at each crossing as shown in the bar chart to the right.

Two small flashing beacons and warning signs for railroad crossing blockages exist along Boston Street east of Clinton Street to alert motorists to advised detour routes utilizing Conkling, O'Donnell and Ponca Streets or Haven Street and Eastern Avenue. This detour is not readily apparent to non-residents and frequent travelers of Boston Street. Existing wayfinding signage is not highly visible.



Frequency of Railroad Crossings ( blockages per hour )





# Public Opinion Survey

To gain an understanding of travel patterns along Boston Street, an online public opinion questionnaire was developed. The questionnaire, administered via the online survey service SurveyMonkey®, was open between the fall of 2016 through the spring of 2017 and advertised on the BCDOT Planning Division's webpage, at public meetings with community associations, and through a paper newsletter mailed to study area residents and businesses. The opinions of commuters, residents or business/property owners in the area, regarding their travel patterns and decisions on how and when they travel in Southeast Baltimore, specifically along the Boston Street corridor in Canton, Fells Point, and Harbor East, is an important factor in the study and recommendation development. Over the 180 day open collection period, 497 responses were received. All responses received as of May 1, 2017 are included in the analysis.

## Survey Questions

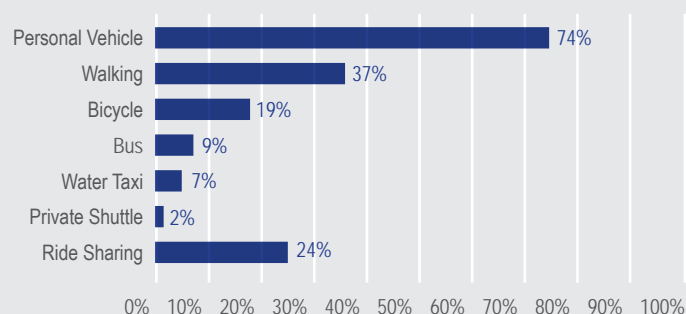
The survey consisted of 16 questions, plus an open short answer comment box, and included questions on trip purpose, trip frequency and mode of travel; satisfaction with traffic flow, on-street parking, transit service, bicycle network, pedestrian conditions; use of park and ride facilities; support for dedicated bus and bike lanes, transit service improvements, and new park and rides; opinions on the prioritizing of each mode of travel within the corridor; and demographic data such as car ownership, home neighborhood / zip code, and age.

## Key Findings

Several notable findings drawn from the survey are:

- **74%** of respondents drive for work trips at least once per week, while 91% drive for non-work trips. The next highest mode of travel is walking. Less than 10% use public transportation (bus or water taxi) or private shuttles.
- **24%** of respondents use ride sharing (e.g. Uber / Lyft) for work trips at least once per week.
- **39%** of respondents carpool at an informal location daily.
- Respondents prioritize personal vehicle and walking as modes of transportation on Boston St., followed by public transit and bicycles.
- **77%** are unsatisfied or highly unsatisfied with traffic flow during rush hours.
- **50%** are unsatisfied or highly unsatisfied with frequency/duration of stopping/blockages at the railroad tracks, while 38% are indifferent.
- **48%** of respondents would not support the conversion of an existing travel lane to a bus/bike only lane.

Percent of respondents who use the listed modes of travel at least once per week.





# Process for Developing Recommendations

**An inclusive and iterative process was employed to identify and refine recommended actions for improving multimodal travel along Boston Street for all Modes.**

Conduct field investigation, observations and measurements of current roadway and traffic conditions. Correlate deficiencies in roadway design, traffic operations, safety and multimodal mobility with crash experience, capacity analysis and mode share. Refine previous recommendations accordingly and develop new actions.

Review previous studies and plans.  
Determine previous recommendations that meet the current study goals and objectives and are still viable for carrying forward.

Engage and convene a Community Advisory Panel comprised of residents, business owners, community organizations and public agency stakeholders.

Solicit input from the public through opinion surveys, community meetings and project website.



Public Meeting - 3.16.17



Public Meeting - 6.6.17



## Recommended Actions

### Extend Eaton Street from Toone Street to Boston Street

Extend Eaton Street from Toone Street to Boston Street to complete the street grid in Brewer's Hill and allow for better local traffic distribution. This concept also includes the widening of Boston Street to 4 lanes between Haven and Conkling Streets.



### Implement New Technology for Real-Time Traffic Signal Timing

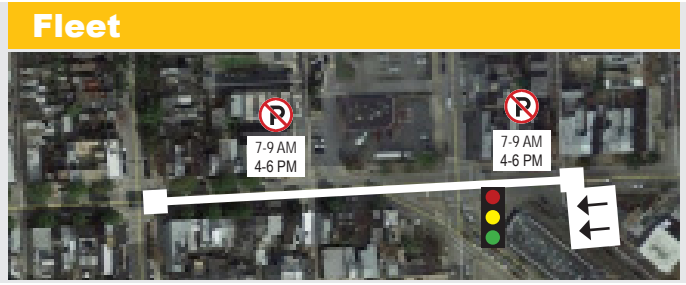
Poor traffic signal timing contributes to traffic congestion, delay, and traffic flow. Adaptive signal control technology adjusts the timing of red, yellow and green lights to accommodate changing traffic patterns and ease traffic congestion. Traffic sensors collect and monitor traffic volumes in real-time, and develop up-to-the minute adjustments in signal timing plans to meet traffic demands and then downloads the new timing plans to each signal controller within the coordinated system. Adaptive signal technologies can improve travel times in a corridor by between 10 to 30%.



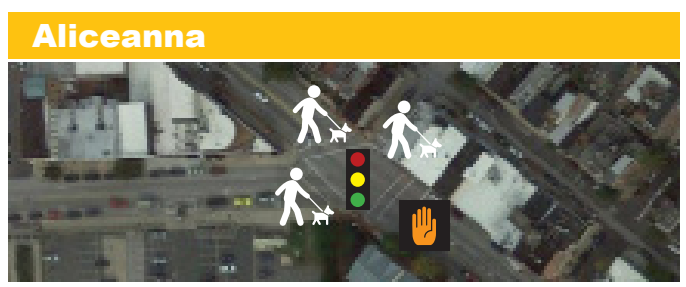
# Recommended Actions

The following intersection improvements are recommended to meet the City's intersection operational standards:

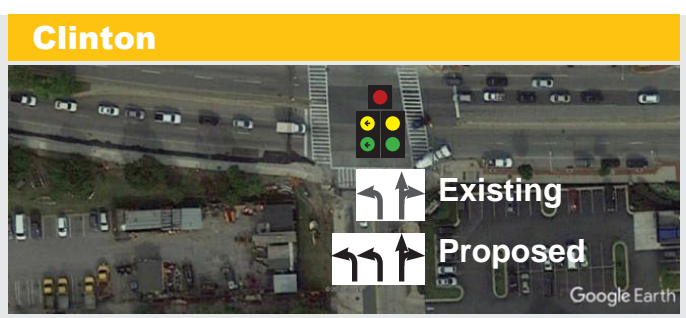
**Boston Street & Fleet Street:** Implement peak period parking restrictions (7-9AM and 4-6PM) along Fleet Street between Duncan and Washington in the westbound direction to provide a second through lane.



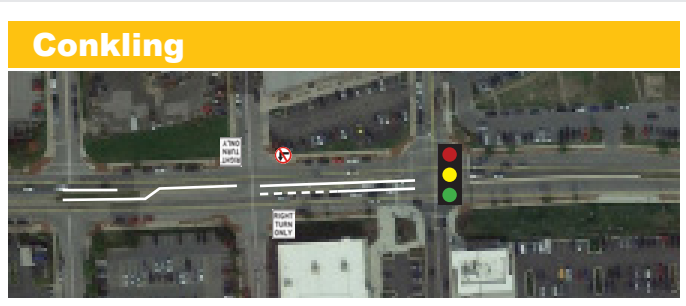
**Boston Street & Aliceanna Street:** Remove the crosswalk and pedestrian signals on the east leg of Boston Street to reduce the number of required signal phases and reduce vehicle & pedestrian delays. Pedestrian crosswalks and signals will remain on the west, north and south legs.



**Boston Street & Clinton Street:** Revise the lane assignment on the northbound approach from a dedicated left lane and a shared through-right lane to provide double left turn lanes, and a shared through-right lane; and provide for a new northbound left turn signal indication.



**Boston Street & Conking Street:** Provide for additional eastbound left turn vehicle storage by extending the left turn lane to Highland Avenue. This will require restriction of movements at Baylis only allowing northbound right turns, eastbound left turns, and east-west through movements.



**Boston Street & Ponca Street:** Construct an additional northbound right turn lane and widen the receiving lanes for southbound traffic from one to two lanes; provide for a new northbound left-turn signal. On the southbound leg, remove the southbound left turn phase; revise the lane assignment to a shared through-right and shared through-left.





# Recommended Actions

## Improve Interstate Trailblazing Signage

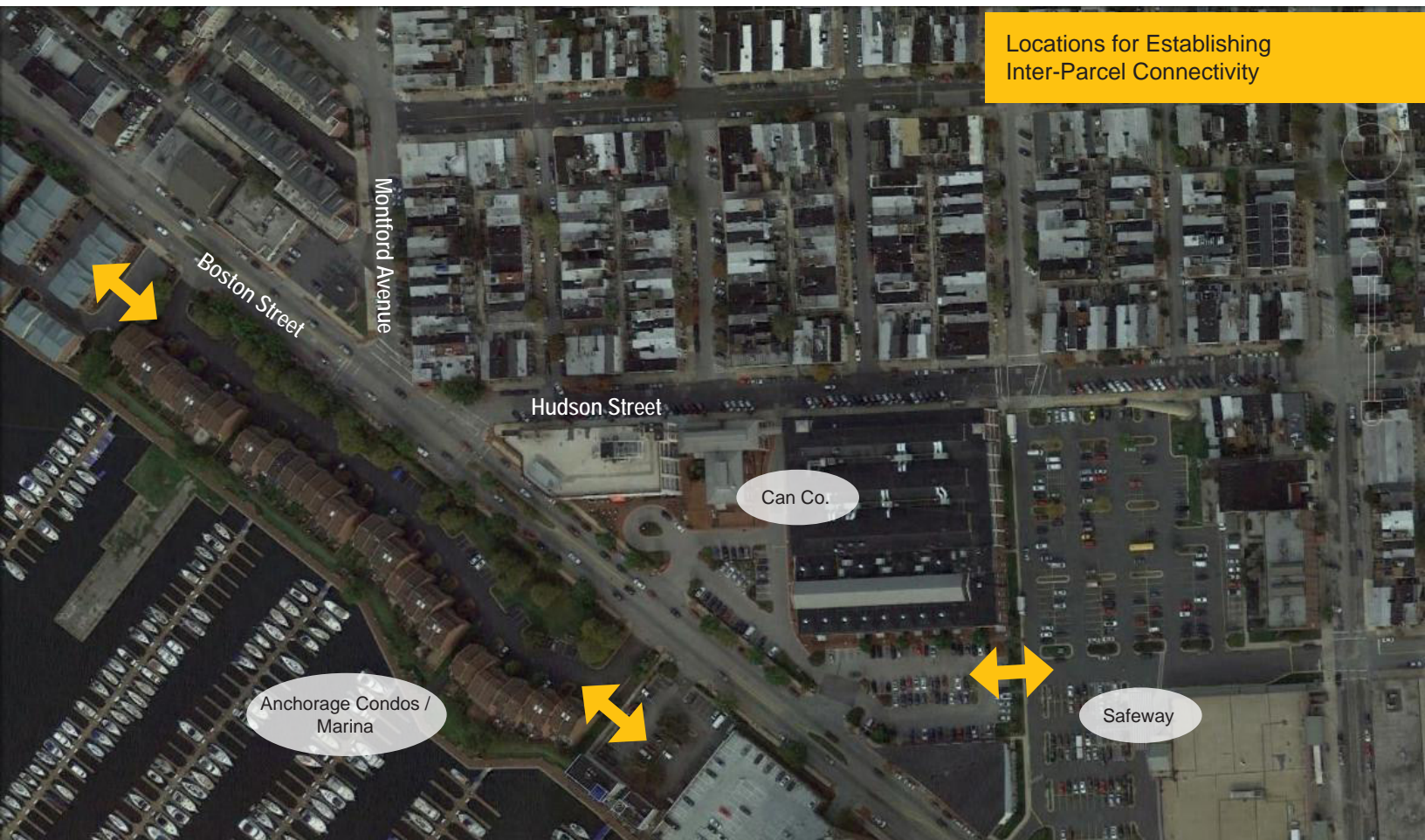
Implement a comprehensive trailblazing signage plan to direct travel into and out of Baltimore City through the Southeast area and Boston Street corridor for interstate connections, evacuation routes and truck destinations.

## Enhance Rail Crossing Warning and Detour Signage

Upgrade warning signage to include variable message features that can advise motorists to use the recommended detour routes. Enhance wayfinding signage along designated detour routes to direct motorists.

## Work with Private Property Owners to Establish Inter-Parcel Connectivity at Key Locations

Provide connections between key parcels to create a secondary street network allowing local drivers the option not to use Boston Street to travel between neighborhood developments. Specific locations include: between the Can Company and Safeway parking lots, and between the Anchorage residential building/ marina and adjacent townhomes.



Locations for Establishing Inter-Parcel Connectivity



## Recommended Actions

### Install Median Pedestrian Refuge Islands along the Corridor

Install six feet wide pedestrian refuge islands to promote pedestrian comfort, safety and reduce the pedestrian exposure time. The selected, recommended locations have an existing, wide median and only requires retro-fitting to accommodate a pedestrian refuge. The recommended locations include:

- Boston Street at Hudson Street
- Boston Street at Lakewood Avenue
- Boston Street at Potomac Street (both sides of intersection)
- Boston Street at Ellwood Avenue

Pedestrian Refuge Example



### Upgrade Pedestrian Infrastructure

Upgrade pedestrian infrastructure where it is discontinuous, worn, and sub-standard. This includes: install ADA compliant curb ramps where they do not currently exist, restripe all existing crosswalks across each intersection leg, and replace existing pedestrian signals with countdown pedestrian signals where they do not exist.

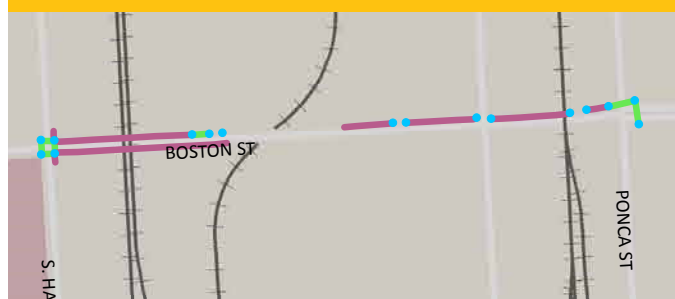
Existing Pedestrian Intersection Infrastructure



### Provide for Continuous Sidewalks

Ensure the sidewalks aligning each side of Boston Street are consistent and continuous throughout the study corridor. This is a key step in increasing trips by non-vehicle modes.

Existing Sidewalk Gaps





# Recommended Actions

## Construct Bicycle Boulevards along Foster Avenue and Hudson Street

To provide a more attractive east-west connection across the Canton area, retro-fit Foster Avenue and Hudson Street into bike boulevards. The City's 2015 Bike Master Plan, assigns Foster Avenue as a neighborhood route with Fait Avenue serving as its opposite pair as Foster is one-way traffic flow in the eastbound direction, and proposes infrastructure such as a bike boulevard; establishing bike facilities on Hudson would be an addition to the planned bike network.



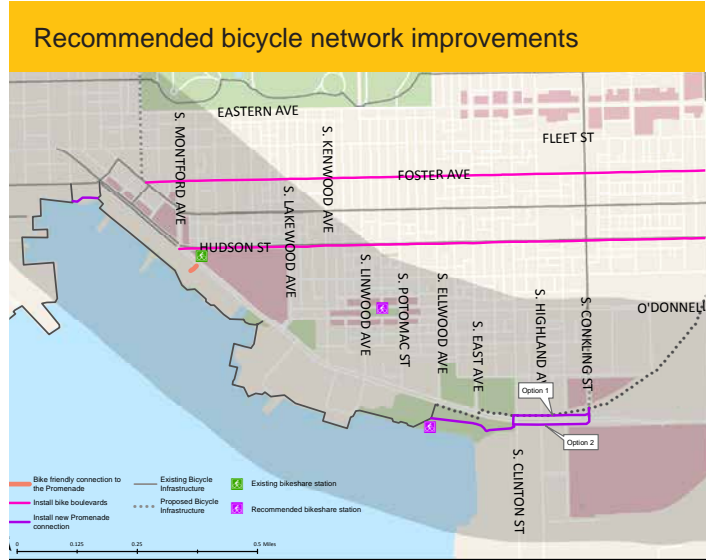
**Bicycle boulevards are low-speed, low-traffic streets that can be designed to more comfortably accommodate bikes within the vehicle travel lanes.**

## Install Additional Bike Share Stations in the Canton Area

In addition to the stations proposed by Baltimore Bike Share, install stations at the Canton Waterfront Park and at Brewers Hill near the intersection of O'Donnell and Conkling Streets. Installing a bike station at the Canton Waterfront Park creates an intermodal connection with the Harbor Connector stop and a potential future park-and-ride lot, and a station near the new Brewers Hill development serves the terminus of the proposed new bike boulevards.

Summary of Pedestrian Recommendations

Improvement	Estimated Quantity
Countdown signal	1 Intersection
Install New Sidewalk	2,000 Linear Feet
Pedestrian Refuge Island	5 Locations
Renew Crosswalk	57 Crossings
Renew Curb Ramp	97 Corners







# Recommended Actions

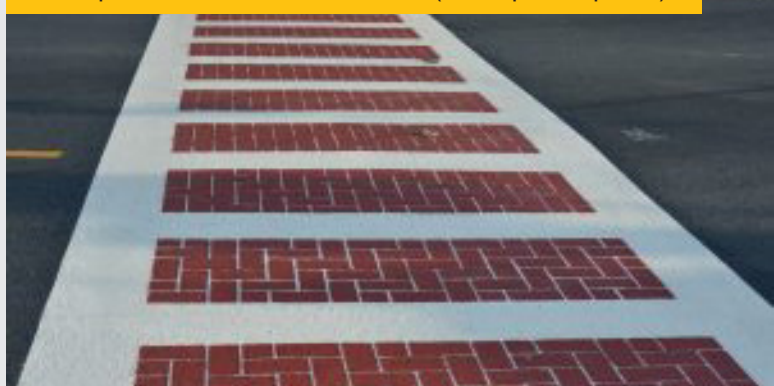
## Improve Connections to the Baltimore Waterfront Promenade

Fill in the gaps in Baltimore’s Promenade that fall within the study corridor and provide direct, explicit connections to Boston Street to encourage its use. This includes:

### Aliceanna Street Connection

To increase use by bicyclists, and to reduce potential vehicle conflicts, construct the decorative treatment of the Promenade through the section traversing the parking lot at Captain James Crabhouse.

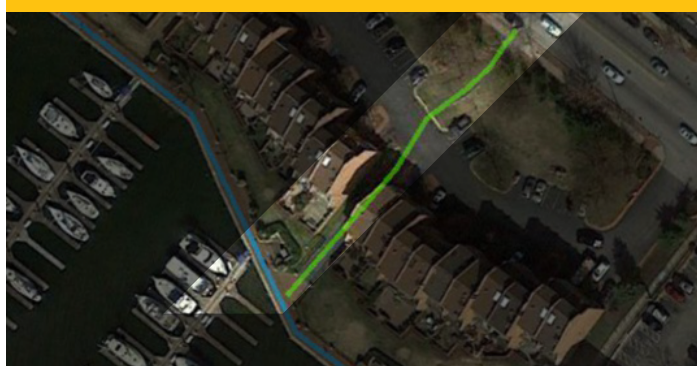
Example of Decorative Treatment ( Stamped Asphalt )



### Hudson Street Connection

Widen the existing path to the standard ten feet for a shared use path that connects the Promenade and Boston Street and bisects the residential communities aligning the waterfront; install signage directing bikers between the bike share station at the Can Company and the Promenade.

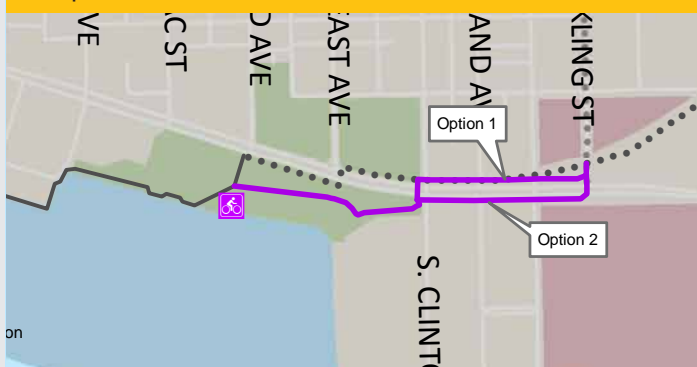
Hudson Street Promenade Connector



### Clinton Street and Waterfront Park Connection

Revise the proposed Promenade extension alignment depicted in the City’s Bicycle Master Plan to connect along Boston Street on the north or south side east to Conkling Street.

Proposed Promenade Extension





# Recommended Actions

## Expand the Restricted Parking Time Periods

Change the morning peak period parking restriction start time from 7:00AM to 6:30AM, and change the evening peak period parking restriction start time from 4:00PM to 3:30PM to provide for additional capacity for moving traffic.

## Increase Targeted Parking Enforcement

Provide for a highly visible and publicized enforcement effort during the transition to the peak period parking restrictions. This may include stationing tow trucks at the beginning of each rush hour to immediately remove any vehicles in violation of the restriction.

## Increase Metered Parking Near Businesses

Install additional metered parking on block faces adjacent to retail businesses. Candidate streets for additional metered parking installation include:

- Boston Street between Fleet Street and Potomac Street
- The south side of Hudson Street between Boston Street and Lakewood and the west side of Lakewood Avenue between Hudson Street and Boston Street on the back side of The Can Company and Safeway
- O'Donnell Street between Linwood Avenue and Potomac

The parking meters should use the latest technology available to the City, and parking rates should set to change throughout the day as demand fluctuates in order to meet the a desired occupancy of 85 to 90%.





# Recommended Actions

## **Additional parking benefits can be achieved through a community-sponsored Residential Parking Permit Program**

Participants at public meetings indicated that they regularly need to park several blocks from their homes, and that having visitors is difficult due to the lack of parking. The parking utilization study showed a high quantity of unrestricted parking and consistently high on-street parking utilization. Re-instating and expanding an RPP implementation within the Canton neighborhood would preserve some of the spaces for local residents by establishing parking restrictions that local parking zone permit holders are exempted from. RPP adoption per City code is implemented on a block face-by-block face basis, and requires the initial written support of 60% of the residents of each block face requesting it, and strong continued support. It should be noted that RPP could not be established in the Canton area before December, 2017, as per City Code Article 31 sub title 10, a five-year moratorium on RPP in the area expires at that time. Any RPP program should be designed at a proper scale to avoid impacts to small business with limited off-street parking.





# Recommended Actions

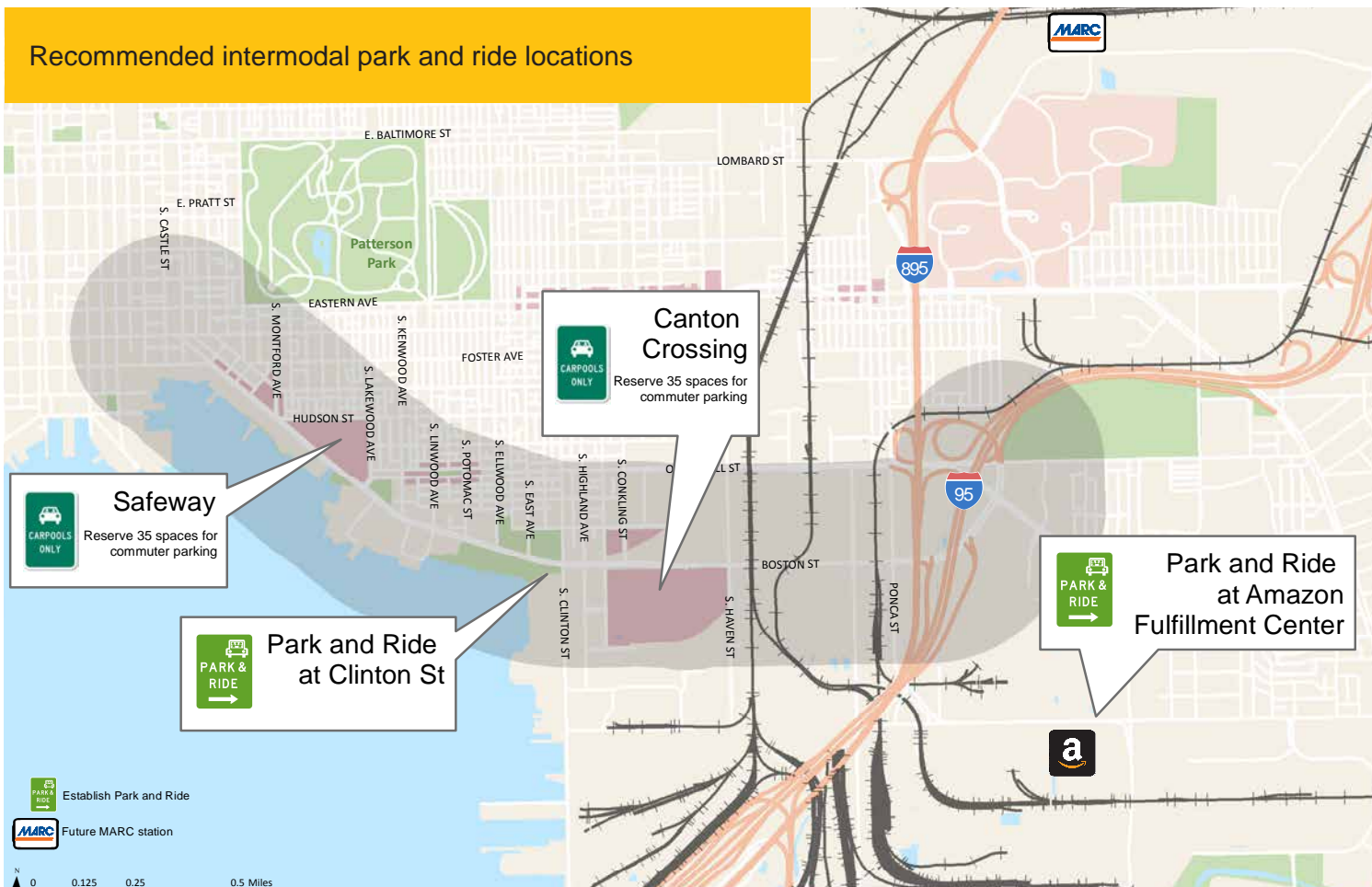
## Improve Intermodal Connections

### Park and Ride / Park and Bike at Boston and Clinton Street

The Baltimore Water Transit Strategic Plan calls for a new parking facility east of the Canton Waterfront Park to improve access to the Harbor Connector from I-95. In advance of that permanent facility coming to fruition, encourage commuter parking at the Canton Waterfront Park public parking lot by clearly designating and promoting the availability of commuter parking.

### Dedication of Commuter Parking Zones at Existing Shopping Centers along the Study Corridor

Work with property owners to establish formal park-and-ride facilities at underutilized surface parking lots. Establish the facilities through designating portions of surface lots for commuter and carpool use through signage and advertising. Recommended locations include Safeway grocery Store, Canton Crossing and the Amazon Fulfillment Center.





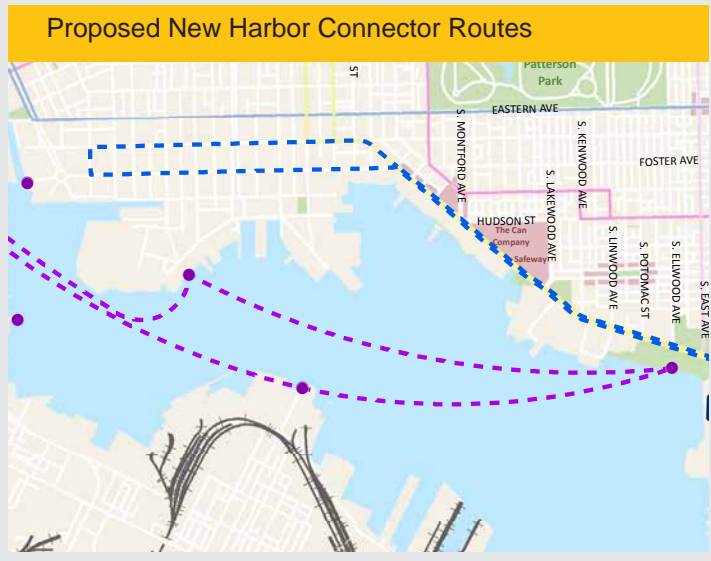
# Recommended Actions

## Improve Harbor Connector Stops

Improve water transit passenger amenities including installing waiting shelters, benches, lighting, and real-time next boat information; this is carrying forward a recommendations from the City's 2015 Water Transit Strategic Plan.

## Explore New Harbor Connector Routes from Canton Waterfront Park to Maritime Park & Harborplace

Provide new commuter service route between the Canton Waterfront Park and Harborplace in the Inner Harbor, as well as establish a direct route to Maritime Park as the development in Harbor Point is complete. This recommendation carries forward recommendations from the City's 2015 Water Transit Strategic Plan, and benefits the study corridor through providing additional, commuter-focused water transit routes that expands the modal options and reduces congestion along Boston Street and Downtown.



## Re-Route MTA Express Route from White Marsh

Revise MTA's Express route number 120, which originates at the White Marsh Park and Ride, to utilize Boston Street instead of I-395 to better serve the large employers in Harbor East and Harbor Point and increased transit ridership in the corridor.

MTA Express Route Commuter Bus





## Recommended Actions

**Provide Last-Mile Transit Alternatives through public-private partnerships**  
**To facilitate trips to commuter destinations that are not currently accessible by transit, such as the Inner Harbor, Harbor Point, Harbor East, etc, it is recommended to implement several additional transit services including subscription van pool services, micro-transit routes and employer-operated shuttles to fill in the remaining gaps in transit coverage and frequency. As parking costs in these areas are high, more localized and frequent transit service may fill gaps and increase ridership service.**

**Further incentivize existing commuter van pool system** to fill in the gaps where bus transit does not serve, and cater incentives towards employers near the study corridor. Traditionally, vanpool systems are run by a private organization, but public institutions offer incentives to employers or participants in a van pool. Common public sponsored incentives are tax credits to either the participants or employers who encourage commuter rideshare, vouchers to participants that meet established qualifications, awarding grants to support the initial capital investments of a vanpool system such as for purchasing the vehicles, or running the clearinghouse that matches commuters with rideshares. Creating a van pool service for residents of suburban locations may be a worthwhile precursor to re-routing commuter bus service.

**Incentivize micro-transit routes along Boston** to provide direct service from the proposed park and ride facilities to the employment centers of Harbor East and Harbor Point. To serve local residents, incentivize micro-transit that provides direct and efficient services to retail and restaurant establishments in the Canton neighborhood during peak times such as weekday and weekend evenings; this may reduce parking demand on Boston as well.

An additional option is to **establish demand-responsive transit routes** that operate on a flexible route and schedule using smaller or medium sized vehicles operating in a shared-ride mode between pick-up and drop-off locations according to passenger needs. Common examples include Jitneys and mobility on demand services.

**Incentivize employer sponsored shuttles** that provide the last-mile connection from existing public transit services. Such shuttle service works well for warehouse or manufacturing sites whose employees may not have access to a personal vehicle, and can concentrate shuttle service during shift change.



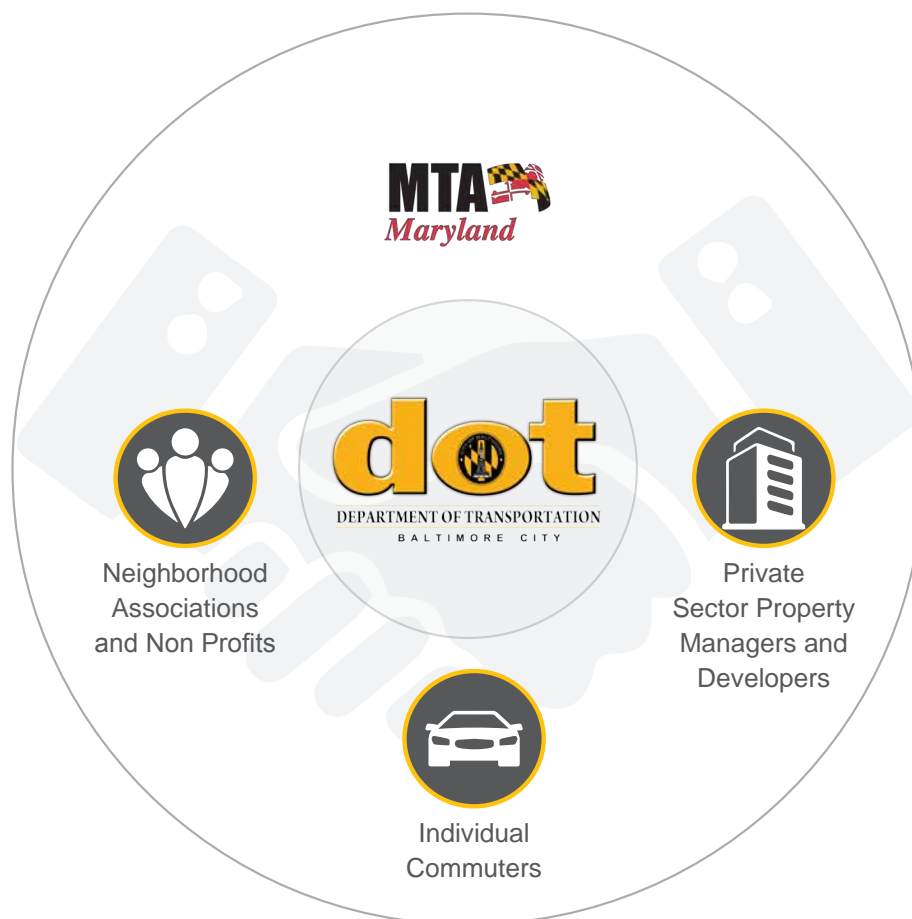
Atlantic City, NJ Jitney Vehicle



# Creating a partnership for improved mobility

The Boston Street corridor is a vital corridor within the City. Recent and future economic development activity has brought new mobility challenges for residents and commuters alike. The recommended actions identified in this report aim to improve the Boston Street corridor by expanding the multi-modal transportation options, improving the safety of corridor users, and identifying innovative approaches to travel choices along the corridor.

The implementation of these recommended actions will require a collaborative partnership between the City and our public and private partners.



## Next Steps



Identify funding sources



Submit recommendations to the Director for final decision



# Cost Estimates for Recommendations

Recommendation	Cost
Eaton Street Extension and Boston Street Widening	\$2,000,000
Install Adaptive Signal Control at all Intersections along the Study Corridor	\$1,500,000
Improve Trailblazing Signage on Boston Street	\$50,000
Upgrade Existing Advanced Warning Signage for At-Grade Railroad Crossings	\$100,000
Inter-Parcel Street Connections.	Property Owner Costs
Intersection and Traffic Signal Improvements	<ul style="list-style-type: none"> <li>• Boston &amp; Fleet \$10,000</li> <li>• Boston &amp; Aliceanna \$10,000</li> <li>• Boston &amp; Clinton \$15,000</li> <li>• Boston &amp; Conkling \$500,000</li> <li>• Boston &amp; Ponca \$500,000</li> </ul>
Install Pedestrian Refuge Islands throughout the Corridor	\$200,000
Improve Pedestrian Infrastructure at Intersections	\$500,000
Provide for Continuous Sidewalks throughout the Study Corridor	\$550,000
Construct Bicycle Boulevards along Foster Avenue and/or Hudson Street	<ul style="list-style-type: none"> <li>• Foster Avenue \$250,000</li> <li>• Hudson Street \$250,000</li> </ul>
Install Additional Bikeshare Stations in the Canton Area	\$160,000
Increase Connections to the Baltimore Waterfront Promenade (Public-Private Partnerships)	<ul style="list-style-type: none"> <li>• Connection at Captain James Crabhouse \$100,000</li> <li>• Connection at Hudson Street \$50,000</li> <li>• Extension to Conkling Street \$300,000</li> </ul>
Remove On-Street Parking from Hudson to Lakewood	\$5,000
Expand the Restricted Parking Periods	\$5,000
Targeted Parking Enforcement	\$50,000
Increase Metered Parking Near Businesses	\$18,000 per block face
Park & Ride at Boston and Clinton Street	\$1,400,000
Park and Ride at Amazon Fulfillment Center	\$50,000
Dedication of Commuter Parking Zones at Businesses	Property Owner Costs
Improve Harbor Connector Stops	\$110,000
Explore New Harbor Connector Routes from Canton Waterfront Park to Maritime Park & Harborplace	<ul style="list-style-type: none"> <li>• Capital Cost \$700,00 per vessel</li> <li>• Annual Operating Cost \$531,000 per route</li> </ul>
Re-Route of MTA Express Route from White Marsh to Boston Street	MTA Costs
Last-Mile Transit Alternatives ( Public Private Partnerships )	\$100,000 to \$1,000,000



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