

SOUTHEAST STRATEGIC TRANSPORTATION VISION BALTIMORE CITY, MD



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I. Executive Summary

Under the current Transportation Impact Study legislation (11-529), the Baltimore City Department of Transportation (DOT) requires the development of a strategic plan for each of the identified mitigation zones to guide investment of development fees over the next five years (2015-2020). This study focuses on the Southeast Zone. The purpose of this report is to:

1. Summarize previous studies in the Southeast Zone.
2. Summarize improvements to the transportation network.
3. Identify economic development activity through expected land use changes, including new and redevelopment, development programs, densities, mix of uses and timelines.
4. Document existing transportation network conditions, specifically intersection vehicle level of service.
5. Project new multi-modal travel demands generated by land use changes, including vehicle trips, as well as walking, bicycle and transit trips.
6. Develop holistic and integrated recommendations to improve all modes of travel, and identify specific corridors for selecting final alternatives and implementation.

Since the first Southeast Transportation Plan in 2007, the City has invested over \$15 million and completed over a dozen transportation improvements to alleviate projected worsened congestion throughout the study area.

While the 2008-2012 economic downturn slowed some of the market absorption of the 2007 report development projections, the current development forecasts remain robust in the Southeast Zone. The City's Econ View¹ identifies over 35 individual development projects in various planning, permitting, construction or occupancy stages, identifying 12.5 million square feet of new development, and potentially yielding over 20,000 new vehicles to roadways in the Southeast Zone during rush hour.

Several corridors in the study area are currently experiencing severe traffic congestion during rush hour (e.g. multiple failing intersections), including: S. and N. President Street, Eastern Avenue, Boston Street, S. and N. Central Avenue, E. Fayette Street, Fleet Street, S. and N. Washington Street, Broening Highway, Holabird Avenue and Aliceanna Street.

The existing roadway network as currently configured will not be able to fully accommodate future development-generated vehicle traffic volumes. Although the Southeast Zone provides an extensive walking, biking and transit network, including bus, rail, and water transit more improvements are needed to fully leverage non-single occupancy vehicle modes.

The study initially included an assumption for the completion of the Red Line Light Rail project, and developed a set of recommendations focusing on station area access improvements for all modes of

¹ Econ View is Baltimore City's interactive mapping tool, developed to display real estate development and public investment across the city.

travel in order to maximize the City and State investment in the Red Line. The Red Line would have provided high quality transit connectivity for residents and employees in the Southeast Zone to city and regional destinations. The study was distributed to the public for review the day prior to the announcement cancelling the MTA Red Line project in June 2015. The study was revised to remove the Red Line project benefits, and related station area access improvement recommendations, replacing the Light Rail project with a holistic set of transit priority corridor alignments and priority operational and physical treatments to maximize City, State and private transit service reliability. The final report acknowledges the recent announcement of the MTA's BaltimoreLink local bus improvement plan that may have impacts to the current local bus service operating in the Southeast Zone. Because the MTA BaltimoreLinks plan does not provide specific route and service plans for the southeast until full implementation in June 2017, the Southeast Strategic Transportation Vision Report is being released without analysis of MTA BaltimoreLink. Baltimore City Department of Transportation is committed to coordinating with MTA BaltimoreLink, and will advocate for transit routing and service levels to meet the transportation goals and needs of the residents and employers in southeast Baltimore. DOT does not support transit routing on Baltimore Street and N. Milton Street.

Recommendations developed in this report include: targeted capacity enhancements for walking, biking, transit, passenger vehicles and freight; traffic operations strategies to better manage traffic flow; improved inter-modal connections and policy initiatives to increase the existing and future travel share by modes other than private passenger vehicle. By investing in these strategies, the City will be able to better manage traffic in the Southeast Mitigation Zone, while attracting new residents, visitors and workers, and provide seamless and reliable travel options that do not depend on owning a car.

These high level strategies to include:

- Improving street network connectivity through new links including the S. Central Avenue bridge extension, Brewer's Hill north-south connector (Boh-Donnell) and Boston Street-Broening Highway Connector (S. Eaton Street Extension)
- Employing traffic management strategies including curbside management, signal timing, and deployment of Traffic Enforcement Officers
- Establishing short, circulating transit routes with State partners (MTA) and private partners
- Establishing Bus Transit Priority Corridors through transit signal timing priority, queue jumps, limited stop service, and off-board fare payment along key corridors
- Expanding the bicycle network through protected lane treatments, and other infrastructure treatments
- Establishing transportation hubs in Harbor East, Highlandtown and Canton where improved bus, water transit, bicycle and park and ride connections could be established
- Establishing one or more formal Transportation Management Association(s) to facilitate employer/ employee programs and incentives, including ride shares, bike shares, subsidized transit passes, park and ride shuttles, and guaranteed ride home
- Deploying ITS technologies to improve communication response time and incident management

II. Study Area

The Southeast Zone in Baltimore City is geographically defined through the Traffic Mitigation Legislation and is bounded by Orleans Street/Pulaski Highway/E. Lombard Street to the north, S. and N. President Street/I-83 to the west, Broening Highway/I-95 to the east, and Keith Avenue to the south. The study area is shown in **Figure 1** and the City legislative Districts are shown in **Figure 2**. Council District 1 is primarily represented in this study area, along with portions of Council Districts 2, 12 and 13. There are also numerous state legislative wards in the study area, which are represented by 5 State legislators.

The Southeast Zone is a broad area lying directly east of Baltimore's downtown and Inner Harbor that houses a mix of commercial, residential, institutional, and industrial development. The area closest to the Inner Harbor, commonly referred to as Harbor East, has experienced a boom in new development in recent years. Commercial uses – office, hotel and retail – dominate the landscape in this area. Dense residential development is also prevalent further east and north of the waterfront, including the neighborhoods of Little Italy, Fells Point, Canton, Butchers Hill, Brewers Hill, and Greektown. The northeastern end of the study area is comprised mostly of the Johns Hopkins Bayview Medical Center, and commercial and industrial uses. The southeastern end of the study area is primarily industrial and warehousing, as the Port of Baltimore is located immediately outside the study area.

Figure 1. Study Area

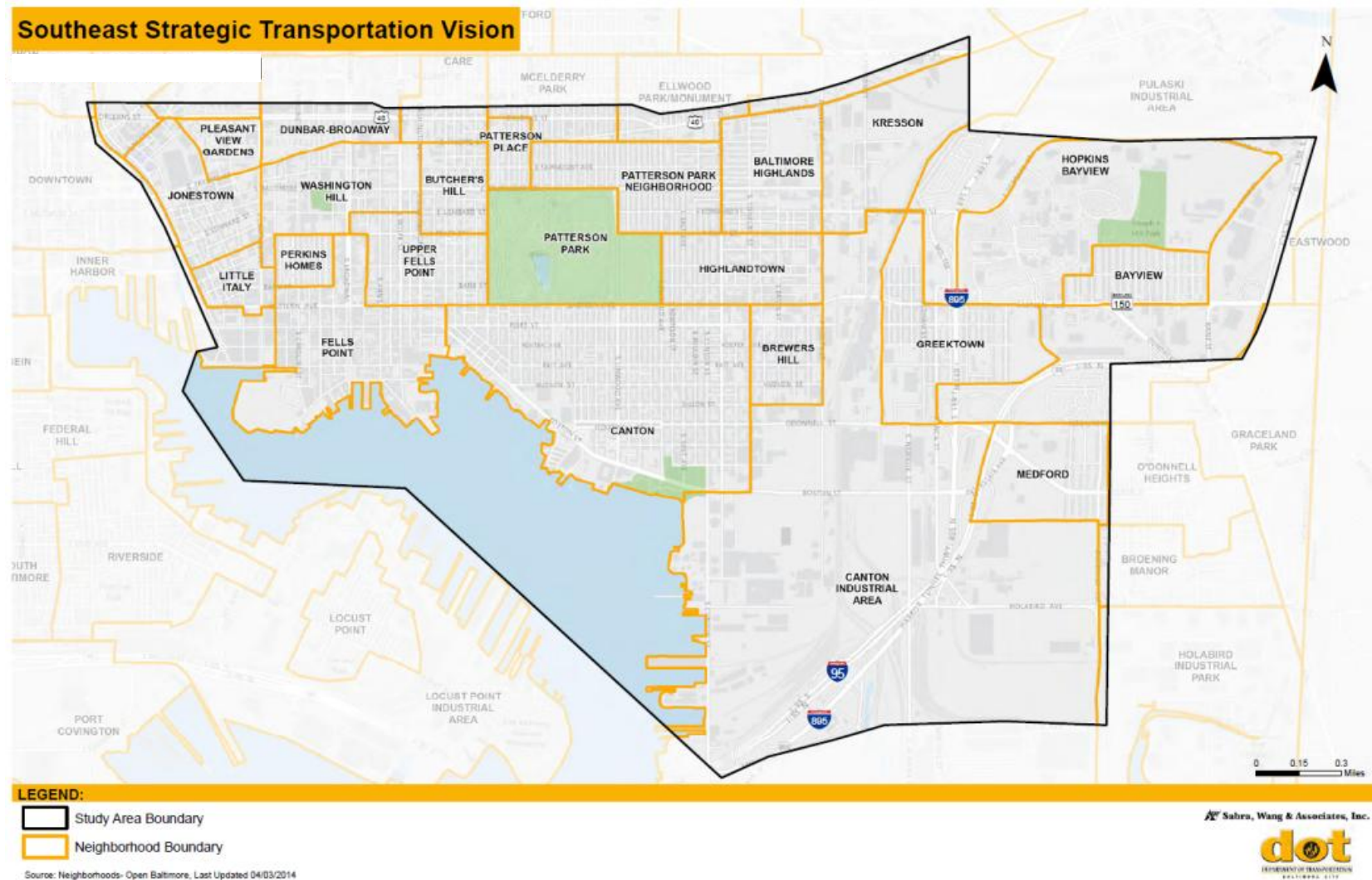
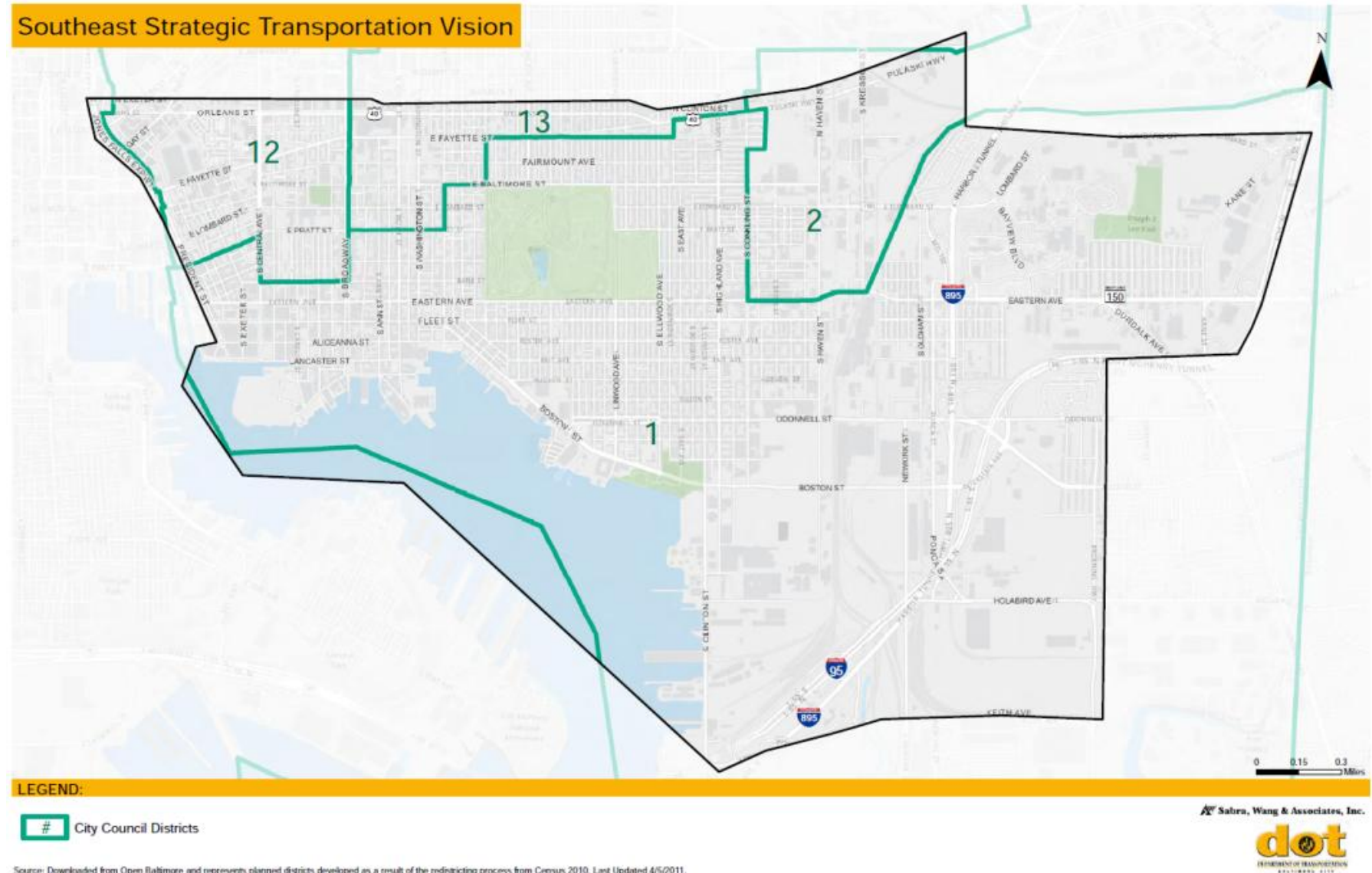


Figure 2. City Legislative Districts



III. Previous Studies and Improvements

Over the past nine years, numerous transportation studies have been completed by DOT in the Southeast Zone. These include the following:

- 1) Southeast Transportation Study, 2007: This study evaluated projected development in Southeast, existing traffic conditions, future projected vehicle trips and an assessment of the ability of the roadway network to accommodate new development. The study also identified multi-modal transportation improvements to enhance capacity and provide improved mobility.
- 2) Brewers Hill PUD Traffic Impact Study, 2008: This Traffic Impact Study included existing conditions, future conditions with project build out, and recommendations for mitigating site traffic.
- 3) Harbor Point Traffic Impact Study, 2008: This Traffic Impact Study included existing conditions, future conditions with project build out, and recommendations for mitigating site traffic.
- 4) UnionWharf Traffic Impact Analysis, 2010: included existing conditions, future conditions with project build out, and recommendations for mitigating site traffic.
- 5) Southeast Complete Streets Plan, 2012: Description of, and implementation for, integrating high-quality pedestrian, cycling and transit infrastructure into the roadway network throughout the Southeast Zone neighborhoods.
- 6) Harbor Point Traffic Study, 2013: This Traffic Study focused on the proposed internal public street infrastructure, and connections to the existing City street network, included existing conditions, future conditions with project build out, and recommendations for mitigating site traffic.
- 7) Whole Foods Relocation to Central Ave Traffic Operations Study, 2014: Evaluation of site access and circulation, between Lancaster Street and Aliceanna Street, and impacts to S. and N. Central Avenue and S. and N. Caroline Streets.
- 8) BJ's Wholesale Traffic Study, 2015: Evaluation of site access and circulation included existing conditions, future conditions and recommendations for mitigating site traffic.
- 9) Water Transit Strategic Plan 2015: Recommends policy for the Water Transit Program Management, including the Water Taxi (WT), Harbor Connector (HC) and Dockmaster programs.

IV. 2007-2015 Infrastructure Investments

Since 2007, the following transportation improvements shown below have been designed, funded, implemented or are moving toward advertisement for construction by the Baltimore City Department of Transportation:

- 1) Upgrade of S. Central Avenue to four lanes from E. Fayette Street to Aliceanna Street (*expected to begin construction in 2016*)
- 2) Intersection widening improvements at (*completed in 2015*):
 - 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 (Boston Street and S Haven Street, *completed in 2014*)
- 4) Implementation in 2010 of Harbor Connector Water Taxi system (200,000 trips per year in 2014)
- 5) Implementation in 2010 of Green and Orange Charm City Circulator routes (80,000 trips per year in 2014)
- 6) Implementation as of Fiscal Year 2015 of 20.5 lane miles signed and marked bicycle routes through Harbor East, Fells Point, Canton, and Greektown
- 7) Installation of over 100 new public bicycle racks for parking throughout the Southeast Zone (*completed between 2010-2016*)
- 8) Provision of Zipcar parking throughout the Southeast Zone (*completed between 2014-2016*)
- 9) Upgrade of select bus stops with new shelters and benches (*completed between 2010-2016 in partnership with Maryland Transit Administration*)
- 10) New bus service enhancements by the Maryland Transit Administration (*completed in 2014*):
 - a. No. 26 Line: The new service will originate downtown at E. Fayette and N. Charles Streets and travel to Dundalk Marine Terminal with a stop at the Amazon Distribution Center on Broening Highway, which will employ more than 1,000 people.
 - b. No. 31 Line: The new service will originate from State Center Metro to the Community College of Baltimore County (CCBC), Dundalk with a stop at the Shops at Canton Crossing

Additionally, private companies are operating in the Southeast Zone, providing alternatives to car ownership, including:

- Johns Hopkins University Hospital Private Shuttle
- University of Maryland will be implementing a Private Shuttle
- Amazon Private Shuttle
- Zipcar
- Uber/Lyft
- Bicycle Racks and storage on both private property and in the public right-of-way

V. Economic Development Activity/ Land Use Forecasts (2015-2020)

Future economic development is expected throughout the study area, and this growth will result in increased demand for travel across all modes. **Table 1** lists the identified developments expected to be completed, or recently completed and expected to be fully occupied for the next five years. The list was compiled using the City's Econ View database, and supplemented through conversations with the Department of Planning, the Downtown Partnership, Waterfront Partnership, Baltimore Development Corporation and Council Members. Over 35 unique projects were identified totaling over 12,500,000 square feet in new and redevelopment. The total development includes over 6,500 new residential dwelling units, 1,000 hotel rooms, 2,300,000 square feet of office, 1,000,000 square feet of retail and 1,500,000 square feet of industrial space. The table includes the location, type, and size of the developments. **Figure 3** illustrates the distribution of planned developments by land use type, and **Figure 4** illustrates the Forecasted Economic Development Activity Locations.

Figure 3: Distribution of Planned Developments

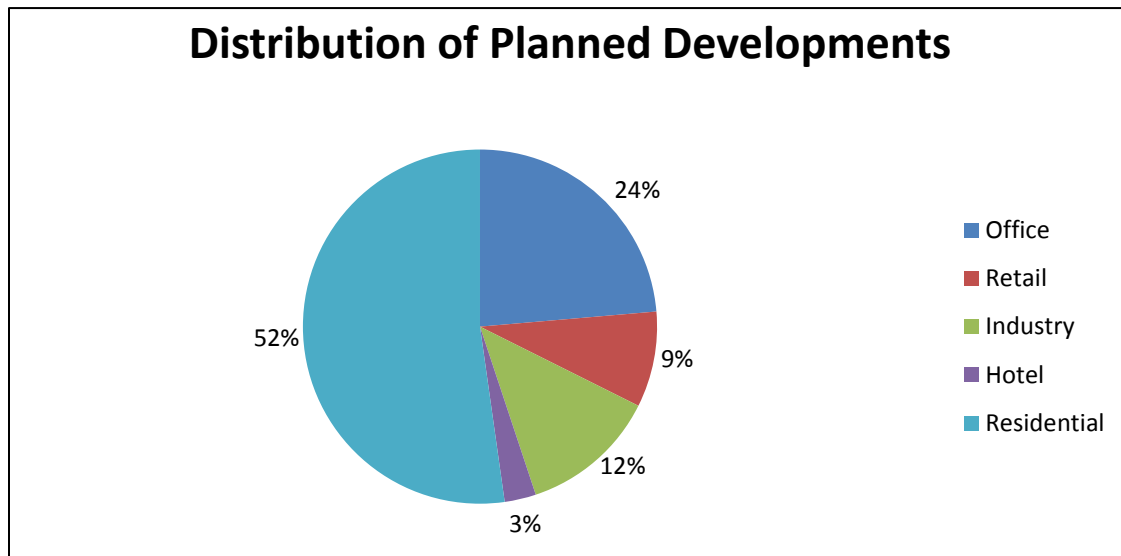
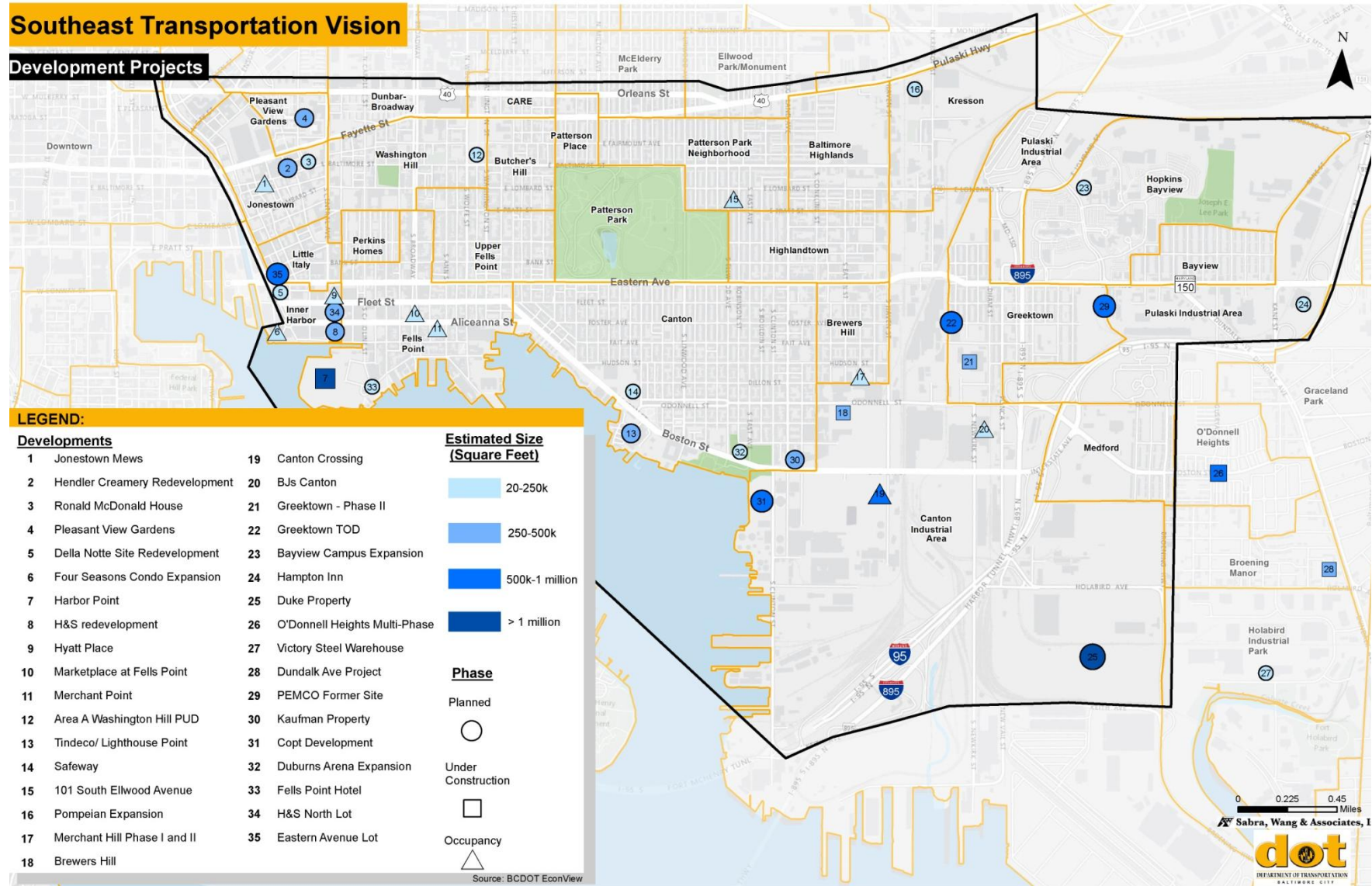


Table 1. Current Summary of Development Activity in the Southeast Zone

Council District	Project Name	Address	Project Type	Description	Phase	Residential Units	Rooms Hotel	Office (Sq Ft)	Retail (Sq Ft)	Industry (Sq Ft)	SubZone	Neighborhood
1	Hyatt Place	511 South Central Ave	Hotel	Hotel - 8 story mixed-use building - retail, hotel, parking	Occupancy	0	280	0	14,200	0	A	INNER HARBOR
12	Jonestown Mews	921-923 E. Baltimore Street	Residential	Conversion of historic building for market rate apartments.	Occupancy	21	0	0	0	0	A	JONESTOWN
1	Bjs Canton	5 Newkirk St/ Boston O'donnell St/ Ponca St	Mixed-Use	3000 SF Taco Bell, 89,000 Bjs wholesale club, 12 gas pumps	Occupancy	0	0	0	92,000	0	C	CANTON INDUSTRIAL AREA
1	Four Seasons Condo Expansion	100 International Drive	Residential	Addition of up to eight additional floors to the existing Four Seasons Hotel to include luxury condominium units	Occupancy	80	0	0	0	0	A	INNER HARBOR
1	Canton Crossing	Boston Street / S Clinton Street	Mixed-Use	Approximately 250,000 sf. of retail including several anchor tenants, junior box stores , restaurants and specialty shops, plus 250K office	Occupancy	0	0	250,000	250,000	0	C	CANTON
1	Merchant Point	700-26 S Ann St	Residential	Phase I - New construction of 8 townhouses. (Aliceanne) Phase II - Rehabilitation of the Four Bay House into 1 Townhouse. (Aliceanne) Phase III - New construction of 3 townhouses (Aliceanne)	Occupancy	19	0	0	0	0	B	FELLS POINT
1	Merchant Hill Phase I and II	3800 Dillon St	Residential	Luxury newly constructed townhomes.	Occupancy	46	0	0	0	0	B	BREWERS HILL
1	Marketplace at Felts Point	South Broadway/Fleet Street	Mixed-Use	The Dolben Company, Inc. and Klein Enterprises have partnered together to co-develop 159 new apartments in Baltimore and 28,000 square feet of retail space. The historic public comfort station has been rehabilitated to house non-profit office space.	Occupancy	159	0	0	28,000	0	B	FELLS POINT
12	Hendler Creamery Redevelopment	1100 E Baltimore Street	Mixed-Use	Historic redevelopment of the former Hendler Creamery building and adjacent properties into a 276 unit residential development with ground floor retail.	Planned	276	0	0	15,000	0	A	JONESTOWN
12	Ronald McDonald House	1200 East Baltimore Street Baltimore, MD 21202	Institutional	The Ronald McDonald House is planning to construct a new house in the historic Jonestown Neighborhood that will provide visiting families to Johns Hopkins Hospital, University of Maryland Medical Center, and other area hospitals. The house will include 55 new rooms, over a 50% increase over their current location.	Planned	55	0	0	0	0	A	JONESTOWN
12	Pleasant View Gardens	201 N Aisquith Street Baltimore Maryland 21202	Residential	Rehabilitation of family public housing	Planned	311	0	0	0	0	A	PLEASANT VIEW GARDENS
1	Della Notte Site Redevelopment	801 Eastern Ave, Baltimore, MD 21202	Mixed-Use	Proposed 16-story apartment tower with ground floor retail on the site of the former Della Notte Restaurant in Little Italy	Planned	150	0	0	5,000	0	A	INNER HARBOR
1	H&S redevelopment	711 S. Central Avenue	Mixed-Use	30,000 SF Whole Foods, 250 condos, 50,000 SF Office	Planned	250	0	50,000	30,000	0	B	INNER HARBOR
13	Area A Washington Hill PUD	1 North Wolfe Street	Residential	New Construction of 210 apts at Gateway within the Washington Hill PUD	Planned	210	0	0	0	0	B	WASHINGTON HILL
1	Tinoco/ Lighthouse Point	Boston Street/ Lakewood Avenue	Mixed-Use	250 condos	Planned	250	0	0	0	0	B	CANTON
1	Safeway	Boston Street/ Lakewood Avenue	Mixed-Use	redevelopment 150 apartments, 50,000 SF office	Planned	150	0	50,000	0	0	C	CANTON
1	101 South Ellwood Avenue	101 South Ellwood	Residential	175 apartments	Planned	175	0	0	0	0	C	PATTERSON PARK NEIGHBORHOOD
2	Pompeian Expansion	4201 Pulaski Highway Baltimore, MD 21224	Industrial	Expansion of Pompeian's existing facility at 4201 Pulaski Highway to include a 40,000-square foot warehouse expansion to the rear.	Planned	0	0	0	0	40,000	C	KRESSON
1	Greektown TOD	Foster Ave	Mixed-Use	200K office, 100K retail, 100 room hotel, 300 apartments	Planned	300	100	200,000	100,000	0	C	GREEKTOWN
1	Bayview Campus Expansion	E. Lombard Street / Bayview Boulevard	Office	100,000 SF research and development	Planned	0	0	100,000	0	0	D	HOPKINS BAYVIEW
1	Hampton Inn	6571 Eastern Ave	Hotel	Construct 112 Room Hampton inn and Suites hotel	Planned	0	112	0	0	0	D	PULASKI INDUSTRIAL AREA
1	Victory Steel Warehouse	6320 Beckley Street	Warehouse	1 Story, 22,800 SF warehouse building	Planned	0	0	0	0	22,800	D	HOLABIRD INDUSTRIAL PARK
1	Dundalk Avenue Project	Holabird/ Dundalk	Residential	250 Apartments	Planned	250	0	0	0	0	D	BROENING MANOR
1	PEMCO Former Site	5601 Eastern Ave	Mixed-Use	60K grocery, 150K retail, 100 room hotel, 250 apartments, 250K office	Planned	250	100	250,000	210,000	0	D	GREEKTOWN
1	Kaufman Property	Boston/ Highland/ Bayliss	Mixed-Use	250 apartments, 50K office	Planned	250	0	50,000	0	0	C	CANTON
1	Copt Development	Clinton South of Boston	Mixed-Use	500 Dwelling units, 100K retail, 250K office	Planned	500	0	250,000	100,000	0	D	CANTON INDUSTRIAL AREA
1	Duburns Arena Expansion	Boston/ Ellwood	Event	5,000 additional seats	Planned	0	0	0	0	0	C	CANTON
1	Fells Point Hotel	Thames/ Lancaster	Hotel	150 room hotel	Planned	0	150	0	0	0	B	FELLS POINT
1	H&S North Lot	Aliceanne/ Fleet Central /Eden	Mixed-Use	300 apartments, 50K retail, 100K office	Planned	300	0	100,000	50,000	0	B	INNER HARBOR
1	Eastern Avenue Lot	Eastern/ President/ Fawn	Residential	500 apartments	Planned	500	0	0	0	0	A	LITTLE ITALY
1	Duke Property (Amazon)	Holabird Avenue / Broening Highway	Warehouse	remaining buildout of 1,500,000 SF warehouse	Under Construction	0	0	0	0	1,500,000	D	HOLABIRD INDUSTRIAL PARK
1	O'Donnell Heights Multi-Phase Redevelopment	Boston Street/ O'Donnell Street Dundalk/ Gusryan	Residential	925 Townhomes	Under Construction	925	0	0	0	0	D	O'DONNELL HEIGHTS
1	Harbor Point	1100 Wills Street	Mixed-Use	master planned unit development (1,400,000 SF office, 914 dwelling units, 250 hotel rooms, 196,000 SF retail)	Under Construction	914	250	1,400,000	196,000	0	B	FELLS POINT
1	Brewers Hill	O'donnell Street / S Conkling Street	Mixed-Use	remaining buildout of 250K office	Under Construction	0	0	250,000	0	0	C	BREWERS HILL
1	Greektown - Phase II	820 Oldham Street	Residential	Demolish existing structures and construct single-family townhomes within the Greektown PUD.	Under Construction	177	0	0	0	0	C	GREEKTOWN
Total						6,518	992	2,950,000	1,090,200	1,562,800		

Figure 4. Forecasted Economic Development Activity Locations



VI. Existing Transportation Network

The study area is an urban setting that is served by a multimodal transportation network including roadways, pedestrian routes, bicycle routes, and transit services.

a. Walking Network

Southeast Baltimore has a fully developed network of sidewalks providing pedestrian connectivity throughout the study area. Baltimore City DOT has begun an Americans with Disabilities Act (ADA) self-assessment project according to Federal Highway Administration (FHWA) guidelines. The self-assessment will be completed over the next 4 fiscal years (2016-2020). DOT has also developed an ADA Transition plan to address prioritization and procedure for implementation of accessible transportation facilities in the right-of-way (ROW). Upgrading sidewalks to ADA and to desired widths often requires partnership between DOT and private property owners. Developers contribute to upgrading sidewalks and curb ramps as part of the Developer Agreement process as applicable.

b. Biking Network

Several designated bicycle routes traverse the Southeast Zone totaling over 20 lane miles of signed routes, designated on-road bike lanes and multi-use paths. Several north-south routes exist that provide dedicated bike lanes. While several signed and marked east-west routes exist, none offer dedicated or protected bike lanes. The area's existing bicycle network is illustrated in **Figure 5**. In 2015 DOT published the Bicycle Master Plan, which identified priority bicycle infrastructure needs in the Southeast study area.

c. Transit Network

Several operators are involved in the Southeast transit system. The City operates two Charm City Circulator bus routes in the area (Orange and Green routes). Two water-based transit services exist; a privately operated water taxi (fee service) for visitors and residents, as well as the City-operated Harbor Connector (free commuter service). **Figure 6** illustrates the current network of City operated transit in the area.

The Maryland Transit Administration (MTA) operates the Metro Subway which serves the Southeast Zone at the Shot Tower station. The Metro serves 2,000 daily riders at this station. The MTA also operates local bus routes, including the lines number 7 (Mondawmin to Canton), 10 (Catonsville to Dundalk), 13 (Walbrook Junction to Canton) 21 (Mondawmin to Fells Point), 22 (Mondawmin to Bayview), 23 / 40 (Rolling Road to Essex local and express), 26 (Downtown to Dundalk), 31 (State Center to Dundalk) that traverse the Southeast along major roadways including Orleans Street, E. Fayette Street, Eastern Avenue, Boston Street, Wolfe Street, S. and N. Washington Street, S. and N. East Avenue, and Ponca Street – as illustrated in **Figure 7**. These routes carry a combined 65,600 passengers per day, with a significant percentage of trips originating from or destined to one of the 330 bus stops in the Southeast Zone. At the time of final report release, the MTA has begun the planning and public comment period for the MTA BaltimoreLINKS program and details of the program and effects on the southeast are not known. Baltimore City DOT will work with MTA to forward the needs of the residents of Baltimore City within this study area.

In addition, several private transit operators, such as Johns Hopkins University and Johns Hopkins Hospital serve the study area to provide travel options for their employees, students and patients.

Figure 5. Southeast Baltimore Bicycle Network (2015)

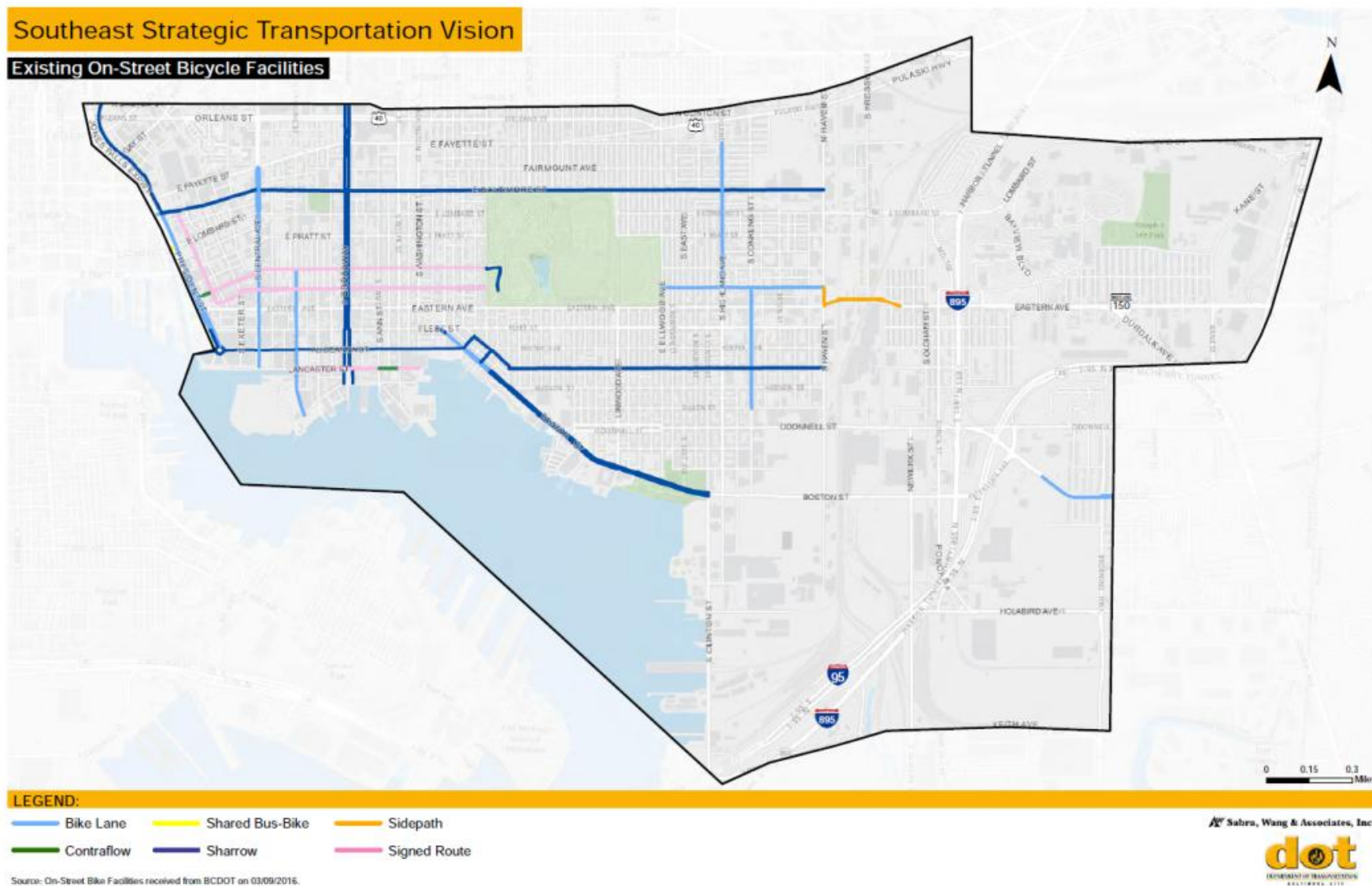


Figure 6. City Operated Transit Services (2016)

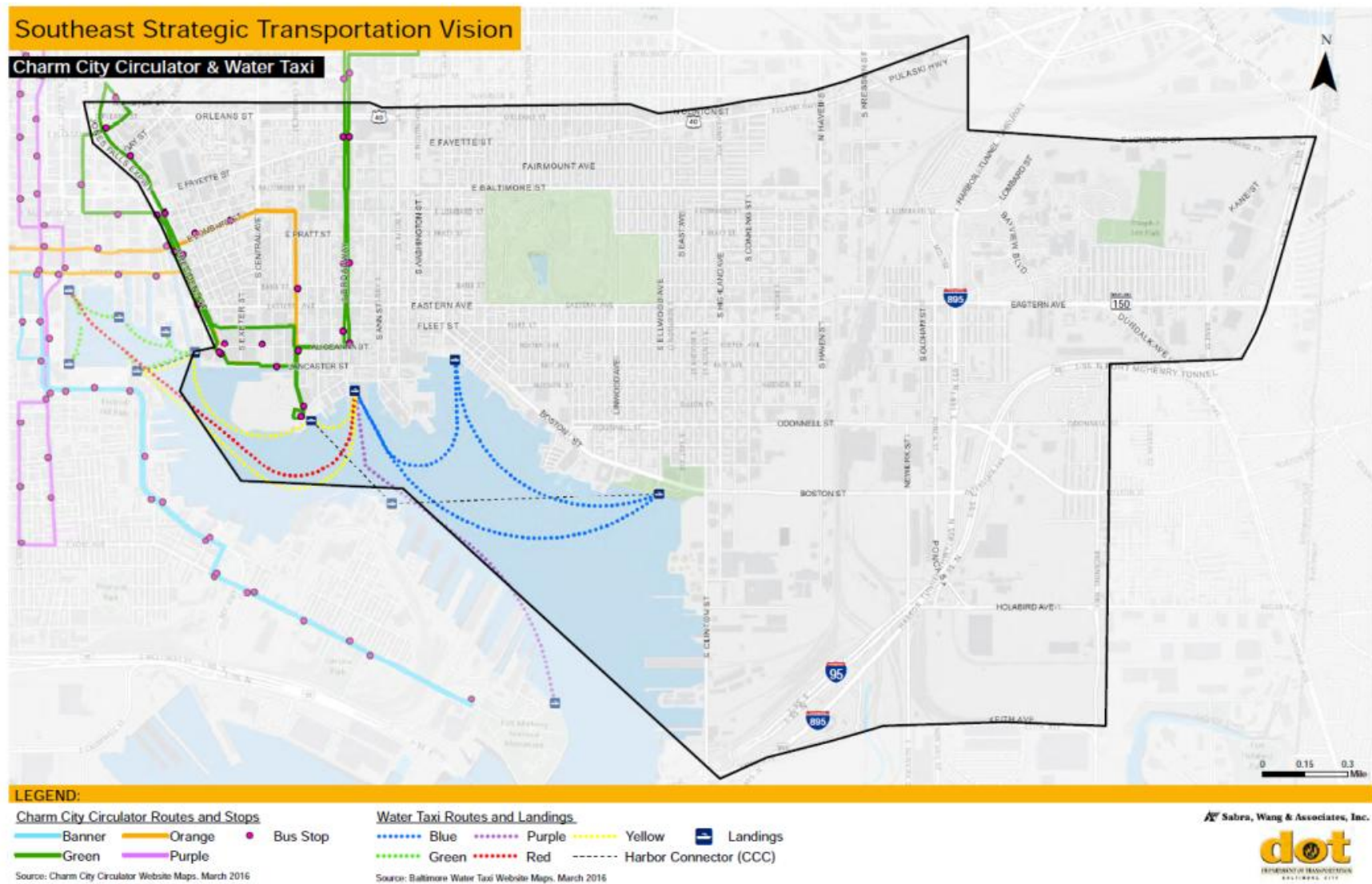
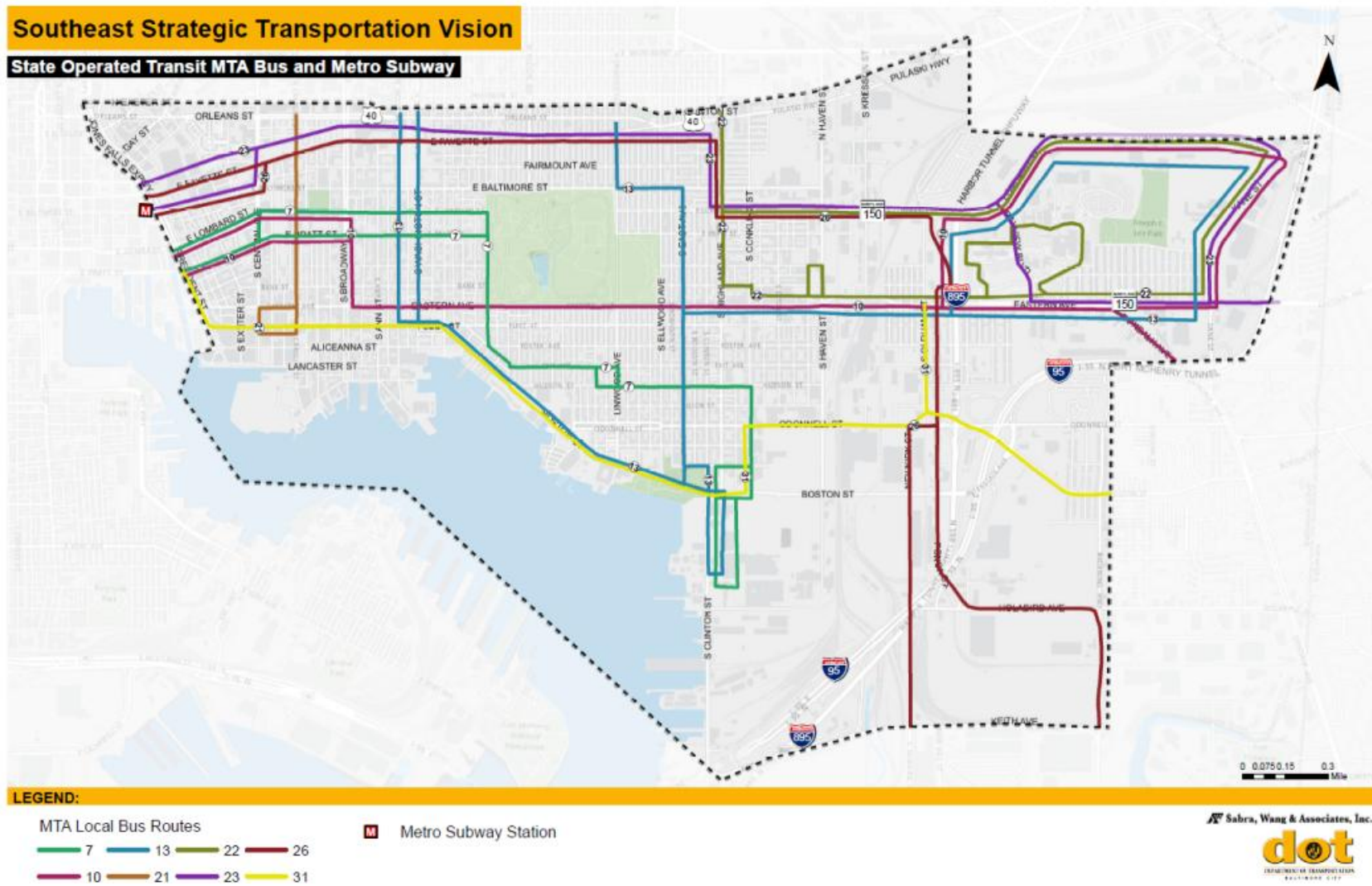


Figure 7. State Operated (MTA) Transit Services - Bus and Metro (2016)



D. Roadway Network (Passenger Cars and Trucks)

A traditional grid street network exists throughout the study area. Freeways provide connectivity to the local street network along both the eastern and western boundaries of the study area. I-83 connects the western portion of the study area to points north while I-95 and I-895 run north-south along the eastern border of the study area with a few access points within the Southeast. The major roadways evaluated in this study are the east-west arterials of E. Baltimore Street, Boston Street, Fleet Street, Aliceanna Street, Eastern Avenue, E. Fayette Street, O'Donnell Street, E. Lombard Street, E. Fayette Street and Orleans Street as well as the north-south arterials of S. and N. President Street, S. and N. Central Avenue, Broadway, Wolfe Street, S. and N. Washington Street, Conkling Street, Ponca Street, and Broening Highway. Study intersections are illustrated in **Figure 8**. In 2012, Baltimore City DOT approved the designated through truck routes which serve the commercial and industrial uses in the Southeast, as shown in **Figure 9**. The truck map shows which truck routes are for local traffic, through traffic and which routes are restricted to truck traffic from 7 PM to 7 AM. Outside of the industrial area, designated streets include Fleet, Boston, S. and N. Central, Broadway, E. Fayette, and Eastern Avenue. Boston and Fleet Streets in Fells Point are restricted from truck traffic. Broening Highway is the primary freight corridor connecting the Port of Baltimore operations to City destinations and the interstate system.

i. Roadway Capacity Analysis

A capacity analysis is summarized for the existing conditions using the Highway Capacity Manual (HCM) methodology for all of the study intersections, based on the most-recently available traffic counts and/or studies. Level of service (LOS) is defined by the HCM as a “qualitative measure describing operational conditions within a traffic stream.” LOS ranges from A to F where A represents optimal conditions and F represents failing conditions. Baltimore City’s standards define LOS D or better as acceptable.

The existing traffic volumes, along with existing roadway geometry, lane configurations and signal timing, were inputted to code a baseline traffic model for the study network using Synchro software. Synchro Software is a deterministic and macroscopic signal analysis program that implements the Highway Capacity Manual methodology. The results of the capacity analysis are summarized in **Figure 10 and Table 2**.

ii. Volume-to-Capacity Ratio

An additional planning metric, volume-to-capacity ratio was also employed to assess the ability of future development-generated vehicle traffic volume to be served by the available intersection capacity based on the existing roadway geometry and signal timing. The volume-to-capacity ratio compares roadway demand (vehicle volumes) with roadway supply (carrying capacity); a value over 75% indicates limited ability to handle additional vehicles. In a connected street network like in the Southeast, the effects of even one failing intersection is not isolated and can result in several blocks of queued vehicles in all directions, significantly increasing travel times and delays.

iii. Summary

Based on this performance measure, 18 of the 34 critical intersections are operating at over 75% of capacity (e.g. LOS D, E or F) during at least one peak hour, indicating that any significant additional vehicle demand will exceed the remaining intersection capacity, and result in failing operations, excessive queuing, increased motorist delays and travel times.

Figure 8. Study Intersections



Figure 9. Designated Truck Routes

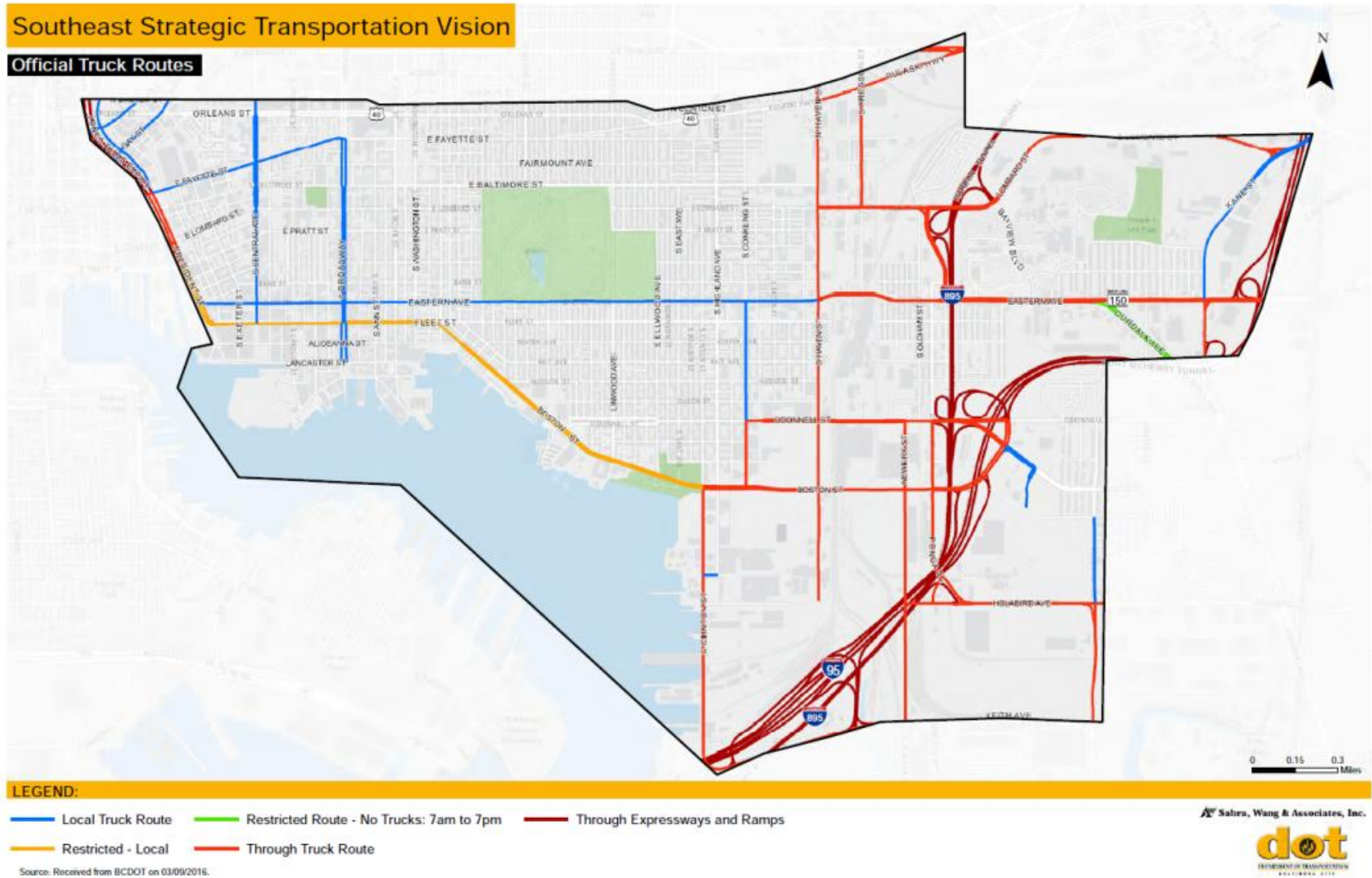


Figure 10. Existing AM and PM Peak Hour Intersection Level of Service

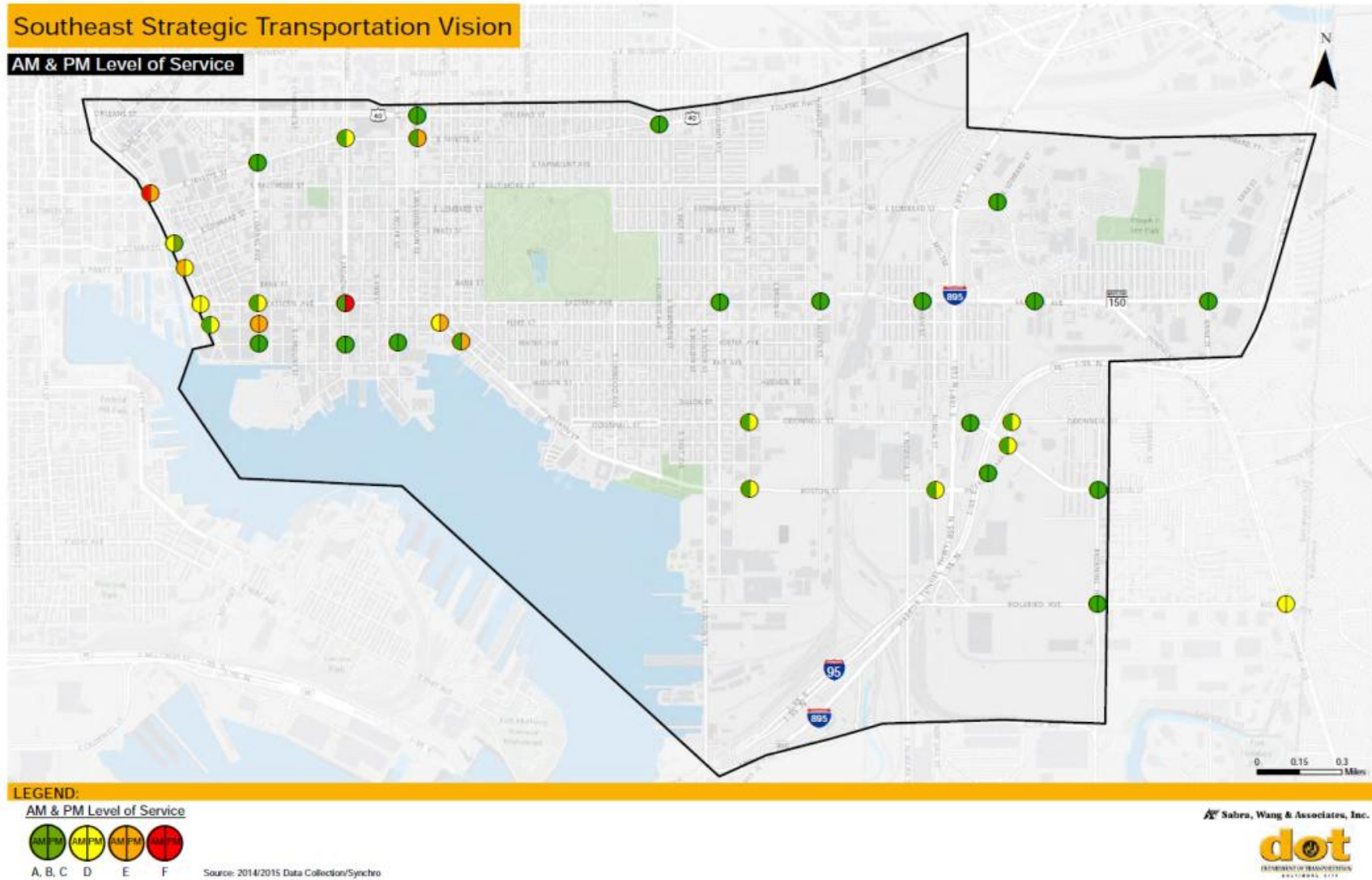


Table 2. Summary of Existing Intersection Capacity Analysis²

ID	Intersection	Level of Service AM (PM)	Volume-to-Capacity Ratio	Total Entering Volume – PM
1	President St @ Fayette St	F (E)	100.9%	5228
2	President St @ Baltimore St	D (D)	90.1%	5000
3	President St @ Lombard St	D (C)	84.3%	4496
4	President St @ Pratt St	E (D)	84.3%	4856
5	President at Eastern Ave	D (D)	97.1%	3,532
6	President at Fleet Street	C (D)	55.1%	2,329
7	Central Ave @ Aliceanna St	B (B)	76.6%	1281
8	Central Ave @ Fleet St	E (E)	75.1%	1755
9	Central Ave @ Eastern Ave	C (D)	72.1%	1465
10	Central Ave @ Fayette St	C (C)	72.5%	3067
11	Boston St @ Aliceanna St	B (E)	77.5%	2244
12	Boston St @ Fleet St	D (E)	79.8%	2364
13	O'Donnell @ Conkling St	C (D)	89.9%	1976
14	Pulaski Hwy @ Ellwood Ave	B (B)	71.9%	2458
15	Lombard St @ Bayview Rd	C (C)	59.6%	2211
16	Kane St @ Eastern Ave	C (C)	74.6%	3130
17	Boston St @ Ponca St	C (D)	82.2%	2087
18	O'Donnell @ O'Donnell Cutoff	C (C)	46.0%	1883
19	O'Donnell @ Interstate Ave	C (D)	80.7%	2265
20	O'Donnell St Cutoff @ Interstate Ave	C (D)	60.2%	1820
21	Boston St @ Broening Hwy	C (C)	46.7%	958
22	Broening Hwy @ Holabird Ave	C (C)	53.9%	1686
23	Interstate Ave @ Ramp from I-95 NB	C (C)	43.2%	1433
24	Fayette Street @ Washington St	C (E)	93.6%	2199
25	Orleans Street @ Washington St	A (A)	62.2%	2104
26	Aliceanna Street @ Broadway	B (C)	53.5%	1471
27	Eastern Avenue @ Broadway	C (F)	141.1%	3830
28	Eastern Avenue @ Haven Street	C (C)	82.2%	2198
29	Eastern Avenue @ Highland Street	B (C)	81.8%	1453
30	Fayette Street @ Broadway	C (D)	85.5%	2847
31	Dundalk Ave @ Holabird Avenue	D (D)	76.9%	2537
32	Eastern Avenue @ Bayview Blvd	B (B)	48.3%	2403
33	Eastern Avenue @ Oldham St	A (B)	65.3%	1569
34	Boston St @ Conkling St	C (D)	76.6%	2499
35	Aliceanna St @ Wolfe St	C (B)	80.90%	1330

Red indicates intersection at or above capacity

VII. Future Traffic Forecasts

The methodology for projecting future traffic, specifically development-generated traffic, includes estimating new trips generated by each new land use, and then adjusting to account for alternative travel choices such as walking, biking and transit.

A. Trip Generation

Trip generation is the most critical aspect of assessing traffic impact. The objective of a trip generation analysis is to forecast the number of new trips that will begin or end at a proposed land use. A primary source for the data on vehicular trip generation is the *Trip Generation Handbook, 9th Edition* published by the Institute of Transportation Engineers (ITE). The *Handbook* compiles data from numerous studies of trip rates at hundreds of specific types of land uses (e.g. retail, schools, and apartments) throughout the country. The data is sorted by various time periods and plotted against independent variables (e.g. square feet of commercial space, number of employees, and number of dwelling units). The data is presented in charts with weighted averages and fitted curve linear regression equations (when enough data is available).

The compilation of trip generation rates is largely suburban in nature, derived from single use sites in areas without strong walking, biking and transit options. As such, several site-specific factors can reduce the number of estimated personal vehicular trips generated by a new development or land use. These include:

- The availability of alternative modes of transportation – sidewalks, bicycling networks, and transit services
- The effect of pass-by traffic – passenger vehicles already on the road making a new “stop” at a proposed land use
- The effect of internally captured trips – composed of traffic originating and destined for different land uses within the same development that do not travel on the public street, such as a hotel guest eating lunch at a restaurant in the same building or complex.

The effect of pass-by traffic is also quantified from data available in the *Trip Generation Handbook*.

b. Mode Choice

In accounting for alternative travel modes, influencing factors include travel time, travel cost, time of day, comfort, etc. In this study, mode choice was determined using the Baltimore Metropolitan Council’s (BMC) regional travel demand model, which incorporates local neighborhood-level census data including car ownership and journey to work surveys. This tool takes neighborhood-specific characteristics – proximity to transit, land use – into account to determine the share of trips that will be taken by bike, light rail, Metro, commuter rail, bus, and on foot. The Southeast Zone is divided into four different sub-zones with distinct characteristics allowing for the application of local data – making the tool a valuable resource for forecasting mode split. The denser neighborhoods of the western end of the study area provide better access for transit, walking, and biking than do the more suburban and industrial neighborhoods along the eastern end.

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The baseline mode share is as follows, and varies within the ranges based on trip type such as commute, shopping, etc., and specific location/ proximity to bus and rail lines within the Southeast Zone:

- Bus Transit – 3.5% to 14%
- Metro Subway – 5.5% to 11%
- Walking/ Biking – 4% to 37%

Given the rates from the *Trip Generation Handbook* and the mode choice discussed in this section, forecasts were made for each of the planned developments listed in Section IV.

After adjusting for applicable discounts related to walking, biking and transit trips, the new land uses³ will add approximately 9,400 AM and 10,200 PM new peak hour vehicle trips to the existing street network as shown in the table below. The travel forecasts also estimate approximately 2,700 new walking, biking and transit trips in the AM peak hour and 3,800 new walking, biking and transit trips in the evening peak hour.

	AM Peak Hour		PM Peak Hour		Daily Trips	
	Entry	Exit	Entry	Exit	Entry	Exit
Raw New Site Trips	7475	5351	8124	10114	84575	84579
Less Non-Auto (Ped, Bike, and Transit)	1307	1400	1932	1950	17609	17616
Less Internally Captured Trips	295	295	885	885	9175	9175
Less Pass-by Trips	39	38	852	852	9551	9369
Total Net New Vehicle Trips	5834	3618	4455	6427	48241	48420

“Entry” and “Exit” in the table above refers to the sum total of new vehicles entering and leaving new developments, respectively. Detailed forecasted AM, PM peak hour trips are summarized in **Table 3**, for each identified development in the planning, construction or occupancy stage.

Figure 11 shows, spatially, where the relative impact of the projected developments are expected in the study area over the next five years. The figure shows that Harbor East and Canton Industrial Area are expected to see the highest number of newly generated vehicle trips.

³ As described on page 2, Econ View, which display real estate development and public investment across the city, was used to determine expected new land uses.

Figure 11: 3-D visualization of Trip Generation across Southeast Plan Study

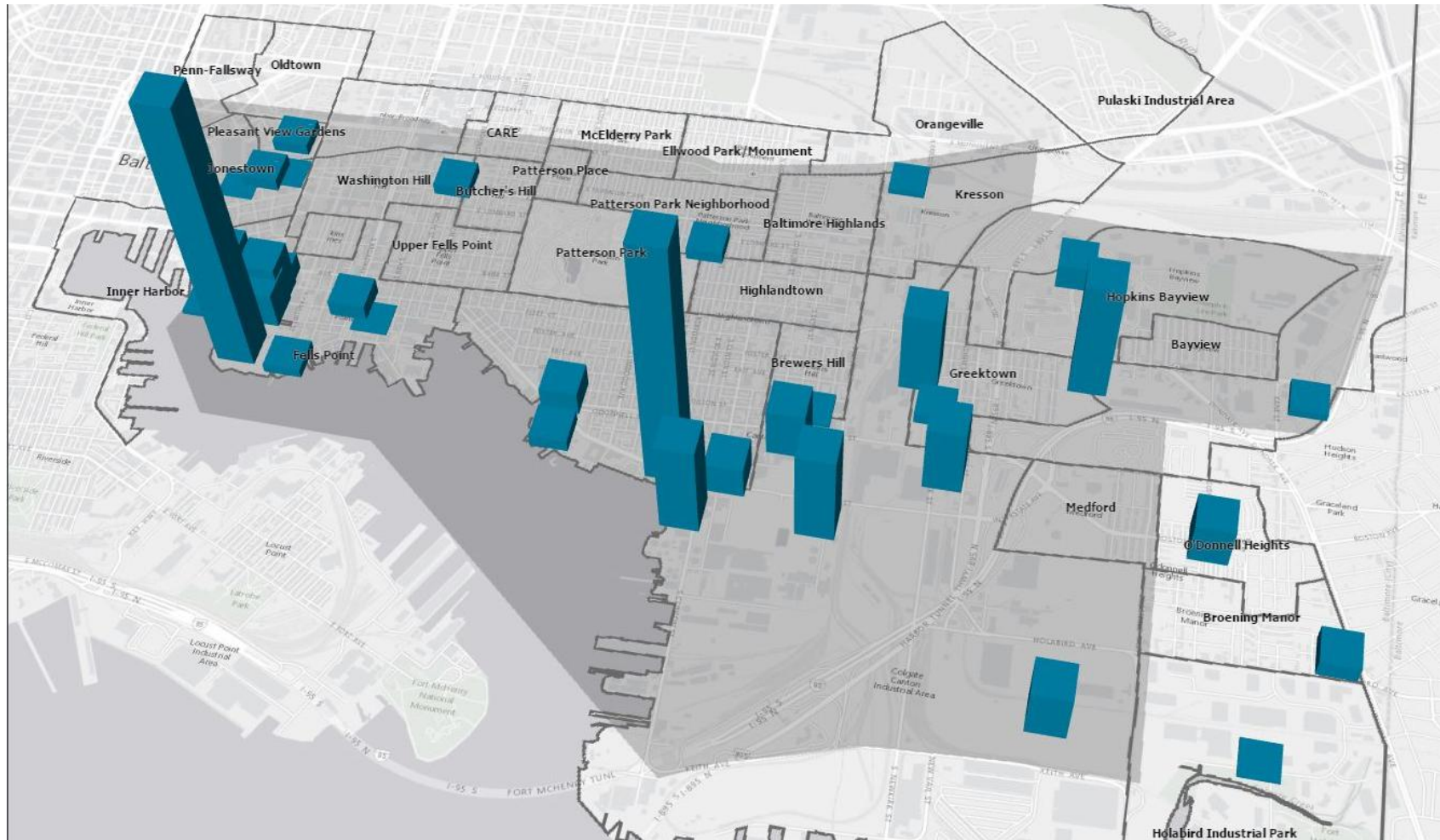


Table 3: Forecast of Trips Generated by Currently Planned and Under Construction/ Occupancy Developments

ID #	Development	Proposed Use	AM Peak Entry Trips	AM Peak Exit Trips	PM Peak Entry Trips	PM Peak Exit Trips	Total Peak Trips
1	Jonestown Mews	Apartment	1	3	3	2	9
		Subtotal	1	3	3	2	
2	Hendler Creamery Redevelopment	Retail	22	14	17	15	162
		Apartment	11	42	25	16	
		Subtotal	33	56	42	31	
3	Ronald McDonald House	Assisted Living	2	1	2	3	8
		Subtotal	2	1	2	3	
4	Pleasant View Gardens	Apartment	13	54	53	28	148
		Subtotal	13	54	53	28	
5	Della Notte Site Redevelopment	Retail	2	2	2	1	72
		Apartment	6	27	20	12	
		Subtotal	8	29	22	13	
6	Four Seasons Condo Expansion	Condos	5	17	14	8	44
		Subtotal	5	17	14	8	
7	Harbor Point	Retail	62	43	172	161	3779
		Office	1157	132	232	1154	
		Hotel	54	5	40	44	
		Apartment	61	242	135	85	
		Subtotal	1334	422	579	1444	
8	H&S redevelopment	Condos	12	59	30	17	485
		Office	80	8	17	86	
		Supersmarket	40	24	60	52	
		Subtotal	132	91	107	155	
9	Hyatt Place	Retail	18	12	16	16	240
		Hotel	50	34	47	47	
		Subtotal	68	46	63	63	
10	Marketplace at Fells Point	Retail	31	19	33	32	214
		Apartment	11	46	25	17	
		Subtotal	42	65	58	49	
11	Merchant Point	Townhomes	1	5	5	2	13
		Subtotal	1	5	5	2	
12	Area A Washington Hill PUD	Apartment	13	54	54	30	151
		Subtotal	13	54	54	30	
13	Tindeco/ Lighthouse Point	Condos	12	61	59	29	161
		Subtotal	12	61	59	29	
14	Safeway Development	Apartment	10	42	43	23	326
		Office	83	11	19	95	
		Subtotal	93	53	62	118	
15	101 South Ellwood Avenue	Apartment	15	58	60	32	165
		Subtotal	15	58	60	32	
16	Pompeian Expansion	Warehouse	40	10	8	25	83
		Subtotal	40	10	8	25	
17	Merchant Hill Phase I and II	Townhomes	5	16	13	7	41
		Subtotal	5	16	13	7	
18	Brewers Hill remaining buildout	Office	315	43	55	267	680
		Subtotal	315	43	55	267	
19	Canton Crossing	Retail	110	63	246	285	1299
		Office	293	30	45	227	
		Subtotal	403	93	291	512	
20	BJ's Canton	Gas	28	27	43	44	970
		Restaurant	60	41	26	20	
		Retail	111	74	246	250	
		Subtotal	199	142	315	314	

20	BJ's Canton	Gas	28	27	43	44	970
		Restaurant	60	41	26	20	
		Retail	111	74	246	250	
		Subtotal	199	142	315	314	
21	Greektown PUD townhomes	Townhomes	12	56	53	27	148
		Subtotal	12	56	53	27	
22	Greektown TOD	Apartment	25	98	49	27	1160
		Hotel	26	7	20	20	
		Office	243	26	38	201	
		Retail	73	41	129	137	
		Subtotal	367	172	236	385	
23	Bayview Campus Expansion	Office	151	21	29	142	343
		Subtotal	151	21	29	142	
24	Hampton Inn	Hotel	29	20	28	27	104
		Subtotal	29	20	28	27	
25	Duke Property	Warehouse	289	77	84	253	703
		Subtotal	289	77	84	253	
26	O'Donnell Heights redevelopment	Townhomes	43	211	208	102	564
		Subtotal	43	211	208	102	
27	Victory Steel Warehouse	Warehouse	6	1	6	17	30
		Subtotal	6	1	6	17	
28	Dundalke Avenue Project	Apartment	21	84	84	45	234
		Subtotal	21	84	84	45	
29	PEMCO Former Site	Retail	96	55	188	207	1675
		Office	278	19	41	217	
		Hotel	26	3	17	16	
		Apartment	21	80	3	4	
		Supermarket	97	57	129	121	
		Subtotal	518	214	378	565	
30	Kaufman Property	Office	85	12	19	98	442
		Apartment	21	82	82	43	
		Subtotal	106	94	101	141	
31	Copt Development	Retail	73	39	129	123	1318
		Office	299	31	46	241	
		Apartment	41	160	80	56	
		Subtotal	413	230	255	420	
32	Duburns Arena Expansion	Arena	894	894	894	894	3576
		Subtotal	894	894	894	894	
33	Fells Point Hotel	Hotel	32	22	32	30	116
		Subtotal	32	22	32	30	
34	H&S North Lot	Retail	36	21	53	50	633
		Office	138	14	23	124	
		Apartment	21	80	44	29	
		Subtotal	195	115	120	203	
35	Eastern Avenue Lot	Apartment	22	86	82	44	234
		Subtotal	22	86	82	44	
GRAND TOTAL			5832	3616	4455	6427	20330

VIII. Findings and Multi-Modal Mobility Strategy

Since the original iteration of the Southeast Plan in 2007, several million square feet of new developments have come online and even more are in various planning stages. In the same time period, Baltimore City DOT has constructed several intersection and roadway capacity improvements. In spite of these improvements, congestion is still prevalent at many Southeast intersections and along arterial corridors. Congestion is expected to worsen with additional new developments. Nearly half of all critical intersections are currently at or approaching capacity. DOT has identified a few capacity improvement projects within the Southeast Zone.

Increased use of non-single occupant vehicle transportation modes is essential to accommodate the expected growth in Southeast Baltimore. Improving upon the ability of Southeast to accommodate new trips requires:

- Increasing travel options to and within Southeast through expanded and prioritized transit and biking networks
- Enhancing connections between travel modes within the Southeast Zone
- Employing traffic management strategies

Based on these requirements, individual improvements across all travel modes are recommended. Specifically, key east-west and north-south corridors should be identified, planned, and reconfigured to prioritize specific modes of travel. These corridors can provide additional capacity through a mix of mode-specific treatments. New water transit routes and operations may provide additional capacity to move people to jobs, retail, and recreation.

In addition to accommodating all modes within the Southeast study area, specific Transportation Demand Management (TDM) and Transportation Management Associations (TMAs) are recommended to induce alternative transportation means. TDM is information, encouragement and incentives provided by local or regional organizations to inform people about all their transportation options to optimize all modes in the system – and to counterbalance the incentives to drive. A TMA is a non-profit agency typically composed of local businesses, and local jurisdictions funded by a public-private partnership. The TMA's mission is to provide/ support programs and information about parking and travel options.

A. Walking Network

Access to Transit

Good intermodal connections are critical in order for transit services to reach their full potential. Providing high-quality pedestrian access near stations will allow for greater access and is a proven strategy to increase transit ridership. Pedestrian facilities near transit services – are a priority including:

- Enhanced pedestrian crosswalks
- Pedestrian signals at all signalized intersections
- ADA curb ramps
- Increased pedestrian lighting at transit stops
- Direct bus and taxi connections
- Ride shares

- Wayfinding signing – including information on connections to other travel modes
- Walking distances between destinations and transit stops
- Real-time transit information

The following high-pedestrian corridors have been identified as high-priority for ADA upgrades:

- Boston Street;
- S. and N. Caroline Street;
- S. and N. President Street;
- S Broadway Street;
- Thames Street;
- Aliceanna Street;
- Fleet Street;
- S. Highland Avenue;
- Conkling Street; and
- Lancaster Street.

Implementing ADA enhancements throughout the transportation network improves the walking experience and attracts more people to use the network. The DOT ADA Self-Assessment is expected to be finished by the end of FY2018. ADA improvements will be implemented according the DOT ADA Transition plan by both public and private project entities.

B. Biking Network

Bike Sharing System

Southeast grid network of streets, short blocks and proximity of mixed uses, lends itself to short quick trips, served by bikeshare. With the launching a bike sharing system in Baltimore City including stations in the Southeast will increase the supply of bicycles on the street. The more bicycles on the transportation system, increases their visibility, which will have an effect of increasing driver's vigilance for cyclists, making it safer for all users. Bikeshare service, in conjunction with a network of dedicated biking infrastructure, has the potential to further encourage biking throughout the Southeast Zone and across the city, and expand access to areas that may not be cost-effective for transit to serve. This study supports the implementation of bikeshare and expansion throughout the Southeast Zone. Proposed docking stations would serve areas of high residential density, employment, retail, and transit hubs. The following commercial and employment centers have been identified as high-priority for Bikeshare:

- Canton
- Harbor East
- Harbor Point
- Fells Point
- Patterson Park
- Jonestown
- Little Italy
- Johns Hopkins Medical Institute

Bike Access to Transit

Providing safe and convenient cycling conditions near stations will allow for greater access and is a proven strategy to increase transit ridership. Cycling facilities near transit services – including bike share docks, bike racks; covered and secure bike racks/lockers; enhanced cycling crosswalks; cycling curb cuts; and increased lighting at transit stops is a priority. Bicycle wayfinding signage, including information on connections to other nearby destinations and transit hubs, is a critical element of bike-accessible transit infrastructure.

Bike Network Infrastructure Improvements

Additional cycling infrastructure improvements are recommended to create a more connected bike network throughout the study area and support the deployment of bikeshare stations. The Southeast Strategic Transportation Vision supports the Bicycle Master Plan recommendations in the Southeast Zone and recommends annual infrastructure investment to increase the network lane-mileage of bicycle facilities implemented throughout the study area. Specific improvements to enhance bicycle network connectivity and capacity are illustrated in **Figure 12** and include:

- Boston Street bike lanes, in each direction
- S. and N. Caroline Street bike lanes, between Bank Street and E Madison Street
- S. and N. East Avenue bike lanes
- Wolfe Street and S. and N. Washington Street bike lanes
- Potomac Street cycle track

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[illegible]

Existing Bicycle Network Proposed Bike Lane Proposed Climbing Lane Proposed Full Time Promenade Access
Proposed Bike Boulevard Proposed Buffered Bike Lane Proposed Cycle Track



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C. Transit Network

Three jurisdictions of transit operate in Baltimore City – 1) City-owned transit; 2) State-owned transit; and 3) Private transit. The Southeast Strategic Transportation Vision offers the following recommendations.

1) *City-owned Transit*

The Plan recommends continued funding of existing Charm City Circulator (CCC) and Harbor Connector (HC) Water Taxi operating expenses. Additionally, the following transit improvements are recommended:

- Supporting the current operations of the CCC.
- Establishing direct connections between the CCC and the Water Transit stops.
- Evaluating all routes to limit overlap between the CCC and MTA lines.
- Identifying appropriate layover and idling locations for efficiency of service.
- Implementing transit priority treatments on identified corridors for the CCC.
- Enhancing Pedestrian and bicycle access/parking at transit stops.
- Implementing and operating congestion management shuttle service to provide commuters safe, convenient, and reliable park and ride service from the perimeter of the mitigation zone to the major employment centers.

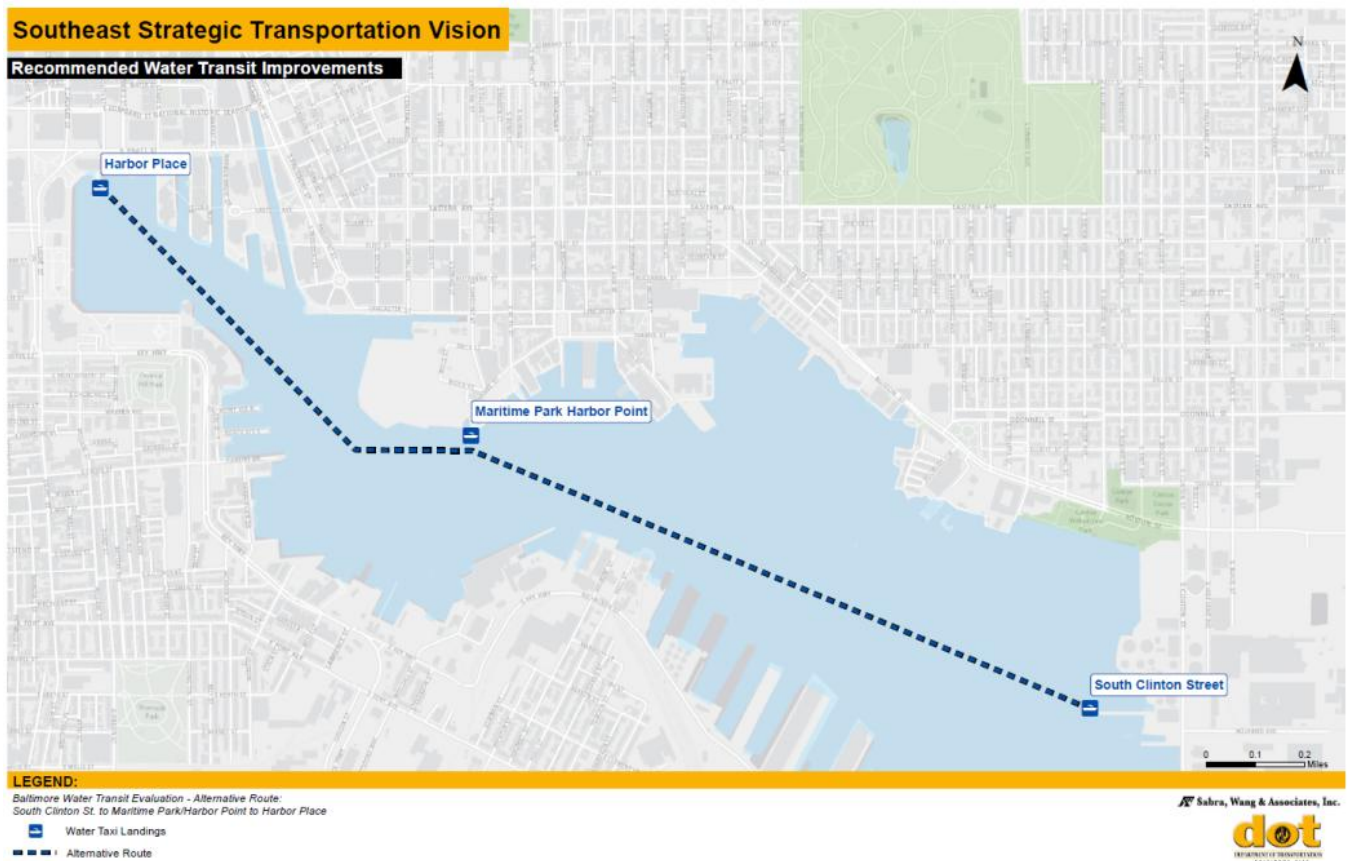
Water Transit services can provide additional peak period transportation system capacity for commutes from East Baltimore and the I-95 North Corridor to Harbor East / Harbor Point and to Downtown. A new Harbor Connector service with a park and ride parking deck should be developed along with the proposed Canton Crossing Transit Hub. The new Harbor Connector route should operate from Canton to Harbor Point and Downtown (see **Figure 13**). This new Harbor Connector service should be operated during peak hours (6:30 AM to 9:30 AM and 3:30 PM to 7:30 PM). Parking fees along with Harbor Connector fares should be utilized to offset a portion of the capital and operating costs.

DOT has recently completed a Baltimore Water Transit Strategic Plan. This Plan made several policy recommendations for the Water Taxi and Harbor Connector services, including branding the Water Taxi as an attraction and the Harbor Connector as an extension of the CCC. The Harbor Connector service is popular as a commuting option. Since its beginning in 2010 HC ridership has grown to more than 200,000 trips per year. From 2013 to 2014, HC average daily ridership grew by 47 percent. Additional policy recommendations include a new route from Canton Waterfront Park to Maritime Park/Harbor Point, additional park and rides, and increased wayfinding signage. The Southeast Strategic Transportation Vision supports DOT implementing the full range of recommendations in the Water Transit Strategic Plan. Specific recommendations for improving water transit in the Southeast Zone include:

- Rebranding the Harbor Connector so that it is an extension of the Charm City Circulator.
- Improving signage at the Harbor Connector landings and wayfinding signs at the Charm City Circulator stops to direct users between services.
- Improving the floating docks at Harbor Connector landings so that passengers may board the vessels without the need for portable stairs.

- Continuing to serve the Maritime Park / Harbor Point landing, via the CCC Green Route. This stop is important for customers using the HC to access jobs at Johns Hopkins.
- Evaluating a passenger fare system for HC routes.
- Adding a fourth HC route from Canton Waterfront Park to Maritime Park / Harbor Point on a one-year trial basis. Harbor East businesses should consider sponsoring this service.
- Expanding the Water Taxi Service as a reasonably priced year round service and/or realign the Harbor Connector to include a multi-stop HC route for off-peak and weekends should be for Inner Harbor residents.

Figure 13. Recommended Water Transit Improvements



2) State-owned Transit

State-owned transit in the Southeast Zone includes MTA Commuter bus service and MARC commuter rail service. The Southeast Strategic Transportation Vision offers recommendations for integrating these services in the Southeast Zone in order to offer a more robust set of transportation options for residents, employees and visitors.

- Improving station access for bicyclists and pedestrians including wayfinding signage, bicycle parking, and pedestrian-scale lighting.
- Coordinate with MTA as the State operators launch MTA BaltimoreLINKS.

Select locations should be branded as transportation hubs to act as multimodal transfer stations for the area. These hubs would provide strengthened intermodal connections across the following major regional transit services:

- Charm City Circulator
- Harbor Connector
- MTA buses,
- Private shuttles,
- the Metro Subway, and
- MARC.

These hubs should be targeted for additional investments in infrastructure as well as improved services through the MTA BaltimoreLinks. Offering users real-time time transit, parking and traveler information improves intermodal connections. Use of a single transit pass across all operators would allow seamless travel for transit riders. In order to maximize accessibility to these transportation hubs, provisions for bike sharing, car sharing, park and ride spaces, and bus depots should be considered. Improving pedestrian and cyclist access to stations and removing accessibility barriers is another key component to increasing transit use.

Working with MTA, DOT has identified the Bayview MARC (transit-oriented development rail station) as a priority transportation hub in the Southeast Zone. The Bayview MARC station is proposed along the existing MARC Penn Line on East Lombard Street. As an infill station in the Johns Hopkins Bayview Medical Center area, it would become an important transportation hub on the east side of Baltimore, providing commuter and inter-city rail service along the Northeast corridors of the Baltimore Region; improve access to Washington, D.C.; and provide a multitude of options for commuters from the Southeast. This Hub will provide parking and other amenities to connect commuters via a Park and Ride, MARC service and local MTA bus service. The transportation hub project is pending MTA decision to move forward with the MARC platform project in this location.

The Southeast Baltimore Complete Streets Plan previously identified several Bus Transit Priority Corridors for the implementation of transit priority treatments. Transit priority corridors are candidates for safe, secure and attractive operational improvements that prioritize transit throughout the Southeast Zone using

various physical and traffic control strategies. DOT is coordinating with MTA on identifying Bus Transit Priority Corridors in the Southeast Zone as part of MTA BaltimoreLink. The current MTA Link priority corridors are illustrated in **Figure 14**.

While MTA does provide commuter bus service to Downtown, DOT recommends MTA evaluate and implement a point-to-point commuter bus route from:

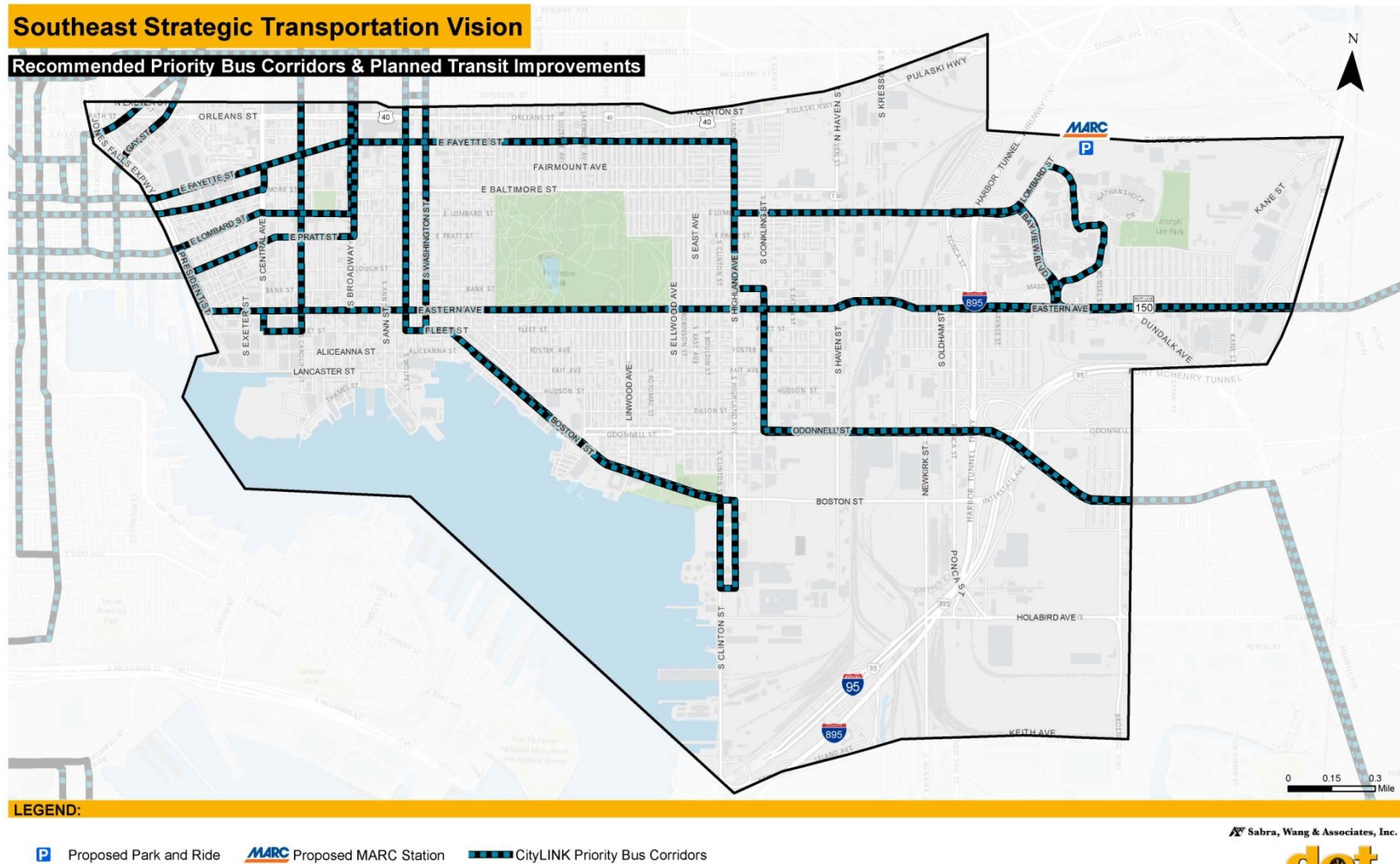
- White Marsh to Harbor East
- Howard County to Harbor Point
- Hunt Valley / Towson to Harbor East

The Southeast Strategic Transportation Vision recommends extending the span of service to provide flexibility for commuting before or after peak rush hours.

3) Private Transit

Partnership between the city and private operators is recommended to coordinate and consolidate transit stops and to eliminate overlap and duplication of service. Additionally, reduction of sign clutter for private vendors at stops is recommended.

Figure 14. Recommended Priority Bus Corridors



D. Roadway Network

Roadway improvements and traffic management include:

Intersection operations at Aliceanna Street and Boston Street

The eastbound approach of Aliceanna Street toward Boston Street currently experiences long vehicle queues and excessive delays. This plan recommends re-striping the approach from a single right turn only lane and a curbside parking lane to two (2) right-turn only lanes during the peak commuting period. On-street parking would remain during the non-restricted period(s). This double right turn is designed to significantly reduce eastbound delay and queuing on eastbound Aliceanna Street.

Boston Street Widening between S. Conkling Street to Ponca Street

The project is needed to increase capacity on Boston Street and relieve intersection bottlenecks. The widening will extend Boston Street from S. Conklin Street to the Railroad tracks east of S. Haven Street toward Ponca Street. The project will increase roadway capacity and improve vehicle operation issues along this corridor.

Boston Street Viaduct

The Boston Street Viaduct project proposes to create a grade separated crossing bridge over the railroad, for vehicles traveling east of Haven Street. The large, multitrack crossing used by three railroads often increases delays and backups. This project would provide additional capacity for vehicles and decrease delay caused by rail activity crossing Boston Street.

North-South Connection O'Donnell Heights (Boh-Donnell Connector)

Create a bypass between Boston Street and O'Donnell Street for additional capacity in the roadway network. This roadway segment will provide a direct link between Boston Street and O'Donnell Street west of the railroad crossing allowing traffic to bypass the crossing when trains block Boston Street.

S. Eaton Street Connection

Specific recommendation is to extend S. Eaton Street southward through Toone Street to connect directly to Boston Street at the existing signalized intersection. This short roadway segment will provide a direct link between Boston Street and O'Donnell Street west of the railroad crossing allowing traffic to bypass the crossing when trains block Boston Street.

Boston Street and Conkling Street Intersection Improvements

Revise striping at Boston Street and S Conkling Street and add a southbound right turn overlap phase from S Conkling Street to westbound Boston Street.

North-South Caroline Street

Caroline Street is a favored transit corridor and connects directly with Harbor Point and Thames Street. The recommendation is to encourage use of S. and N. Caroline Street by retiming the corridor signals to improve northbound progression in PM peak; restrict PM peak hour parking on the east side in the block between Lancaster Street and Aliceanna Street and on the approaches to other streets where northbound left turns are permitted.

ITS Signal Improvements

Improving signalization by integrating ITS communications between the 80 signalized intersections in the Southeast Zones with the Traffic Management Center (TMC) will allow DOT to manage traffic remotely, thus reducing the lag time between incident and corrective measures to move and reroute traffic.

Freight Movement within the Southeast Zone

The southeast mitigation zone includes large industrial and warehouse distribution operations on the eastern boundary. Freight movement within the Southeast Zone requires integration of the DOT Commercial Vehicle Management Plan to transportation network improvements outlined in this study. Wayfinding signage for freight carriers and enforcement mechanisms to direct freight movements to roadways that can best accommodate size, geometry, and frequency will aid DOT in managing traffic within the zone.

E. Traffic Management

In order to help better manage existing and future travel demand in the Southeast Zone, A Transportation Management Association (TMA) is recommended for engaging private stakeholders including major employers, employment centers and institutions in transportation outreach and education in Southeast Baltimore. A TMA is a non-profit agency typically composed of local businesses, and local jurisdictions funded by a public-private partnership. The TMA can provide information, encouragement and incentives to help people know about and use all their transportation options to optimize all modes in the system – and to counterbalance the incentives to drive. This is critical not just to accommodate growth and economic development in the area but temporary congestion anticipated during the construction of major transportation improvement such as Central Avenue extension. Example TMA functions may include:

- On-site Transportation Fairs and commuter related events
- Administration and analysis of commuter surveys
- Commuter mobility plans and transportation resource guides based on survey and zip code data
- Construction and traffic advisories
- Employee car and home insurance
- Signage for carpool, vanpool and bike parking
- Employer subsidized transit

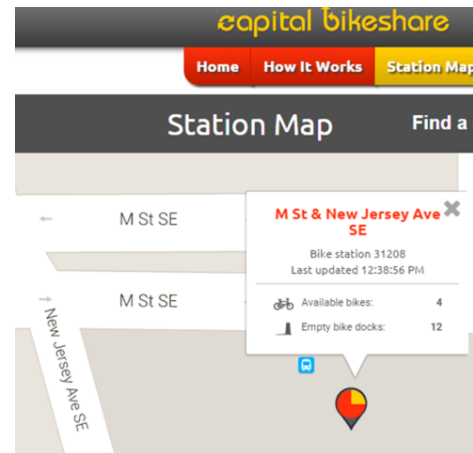
The Waterfront Partnership of Baltimore currently comprises a number of stakeholders that previously have united to guide and advocate for transportation improvements in the area through the “A Smarter Way to Get There” initiative. The TMA should focus on a variety of policies and programs such as:

- Mobility services (car shares, bike shares)
- Ridesharing services (carpools, van pools, taxi, shuttle connections to satellite parking /park and ride)
- Guaranteed Ride Home

- Parking Management (priority parking for carpools, performance and graduated parking, shared valet, shared parking agreements)
- Flex hours/ telecommuting
- Employer subsidies (parking cash out and transit passes)
- City subsidies (tax credits for live near your work programs)

Website Mobile Data/Data Sharing

Availability of open-source real-time GPS data for all bus and water transit is recommended. Additionally, availability of open-source bike share docking data (# of open docks, # of available bikes) is recommended. Allowing public-access to these data insures the proliferation of real-time programs and mobile apps that make utilizing transit/biking easier and more convenient.



Screen capture of real-time bike-share dock availability for capital Bikeshare in DC.

IX. Cost Estimates

Planning-level construction and operating costs for the mitigation strategies were developed and shown in **Table 4**. The construction projects that can be implemented with the 5-year plan were identified, and are shown in the following table. Sources include the Maryland State Highway Construction Cost Estimating Manual, Maryland Transit Administration, and Federal Highway Administration.

Table 4: Planning Level Cost Estimate for Mitigation Strategies

Item	Quantity	Time Line for Construction	Total Construction/ Operating Cost
Bike Share Station Support (Expansion throughout the SE zone)	11 stations	1 to 5 years	\$1,000,000
Transportation Centers	3 Centers/ Garages	6 to 10 years	\$30,000,000
Congestion Management Shuttle service	3 routes	3-10 years	\$15,000,000 ¹
Bike Network Installation	10 lane miles	1 to 5 years	\$5,000,000 ²
Implement ADA Self Assessment and Transition Plan		3 to 20 years	\$40,000,000 ³
Transit Priority Treatments	10 lane miles	3 to 10 years	\$6,000,000
Curbside Management	4 miles	2 to 6 years	\$2,000,000
Boston Street Widening between Hudson Street and Haven Street	1 mile	3-10 years	\$50,000,000 ⁴
North-South Connection Brewers Hill (Eaton Street Extension)	0.75 miles	1 to 5 years	\$6,000,000 ⁵
Construct Boston Viaduct over rail yard between Haven Street and Ponca Street	2 miles	4 to 20 years	150,000,000
North-South Connection O'Donnell Heights (Boh-Donnell Connector)	0.5 miles	5 to 10 years	\$5,000,000
Harbor Connector and Water Taxi operations and capital improvements	5 years additional capital and operating budget including new landing	1 to 5 years	\$9,000,000
Update Freight Signage and Routing throughout the SE zone	All signs on designated corridors	1 to 5 years	\$3,000,000
ITS Signal System Wireless Communication	250 signals @ \$25,000 Ea.	3 to 20 years	\$6,250,000
Grand Total			\$328,250,000

1, 2, 3, 4, 5: Footnotes are referenced on the following page

The total construction estimates for all traffic mitigation is \$328.3 Million with a construction period from 1 to 20 years. Of the proposed mitigations that can reasonably be constructed within 5 years (2017-2022), \$60,325,000.00* could be constructed to mitigate the negative impacts of the proposed development planned within the southeast mitigation zone. Projects funded by Department of Transportation Capital and/or operating budgets FY17 to FY22:

1. The congestion management shuttles are funded by DOT at \$3 Million for FY17, FY18, and FY19. The remaining \$12 Million for years FY20 – FY27 are currently unfunded.
2. The Bike Network Installation project in the Southeast Zone is funded for \$1 Million dollars. The total proposed projects required funding is \$4 Million.
3. The ADA Self-Assessment for the SE area is funded by DOT and the cost is \$600,000. The \$40,000,000.00 represents the estimated cost to construct and implement corrective ADA measures for pedestrian safety and accessibility throughout the Southeast Zone including walkways, curb ramps, and pedestrian signals, beacons, and signage. Whenever DOT initiates a capital construction project ADA upgrades are included. DOT capital projects do not separate ADA cost but incorporates them as part of the infrastructure cost.
4. The Boston Street widening project as part of the Red Line local contribution was funded at \$10 Million dollars. Because the Red Line project was cancelled, the funding was redirected to the TIGER VII Broening Highway Corridor project, which is in the Southeast Zone
5. North-South Connection Brewers Hill (S. Eaton Street Extension) is partially funded at \$2 Million dollars of the total project cost of \$6 Million.

X. Recommendations and Priority Projects

The following are priority recommendations for the South East Traffic Mitigation Zone which can advance into policy changes or detailed analysis, design and implementation. The projects are summarized into three categories Capacity, Operations, and Mode shift.

a. Operations:

- **Improve signalization by securing ITS communications hardware and software to integrate with the TMC (Traffic Management Center)** - Link the traffic signal network in the Southeast Zone through wireless signal monitoring and allow remote signal monitoring at the TMC.
- **Reconstruct traffic signals** at key Locations to support the implementation of ITS communications for the southeast network.
- **Update truck route signage within the Southeast Zone** – Direct truck drivers how to enter, exit, and travel through the Traffic Mitigation Zone using designated truck routes.
- **Pedestrian Signal Timing** – Evaluate increased ‘WALK’ and FLASHING ‘DON’T WALK’ intervals at high-pedestrian traffic locations along S. and N. President Street, Boston Street, and Eastern Avenue.
- **Aliceanna Street at Boston Street** – Provide 2nd right turn lane during PM peak hours (4-7 pm) by allowing PM peak hour restricted on street parking on Aliceanna Street between Boston and Chester Streets.
- **President Street** north of Fawn Street – Restripe to create optional left/through lane in second lane from median.

- **S. and N. Caroline Street** - Retiming the corridor signals to improve northbound progression in PM peak; restrict PM peak hour parking on the east side in the block between Lancaster Street and Aliceanna Street and on the approaches to other streets where northbound left turns are permitted.
- **E. Pratt Street at S. President Street** – Remove one of two right turn lanes and install wayfinding signage to encourage vehicles to travel further east to access Fells Point and Canton via S. Central Avenue and Broadway.
- **Holabird Avenue between Broening Highway and Boston Street and Boston Street to Interstate I-95** – Improve curve radius and clearance under the I-895 Viaduct to improve freight routing efficiency and separate freight movement from residential neighborhoods of Medfield and Graceland.

b. Capacity:

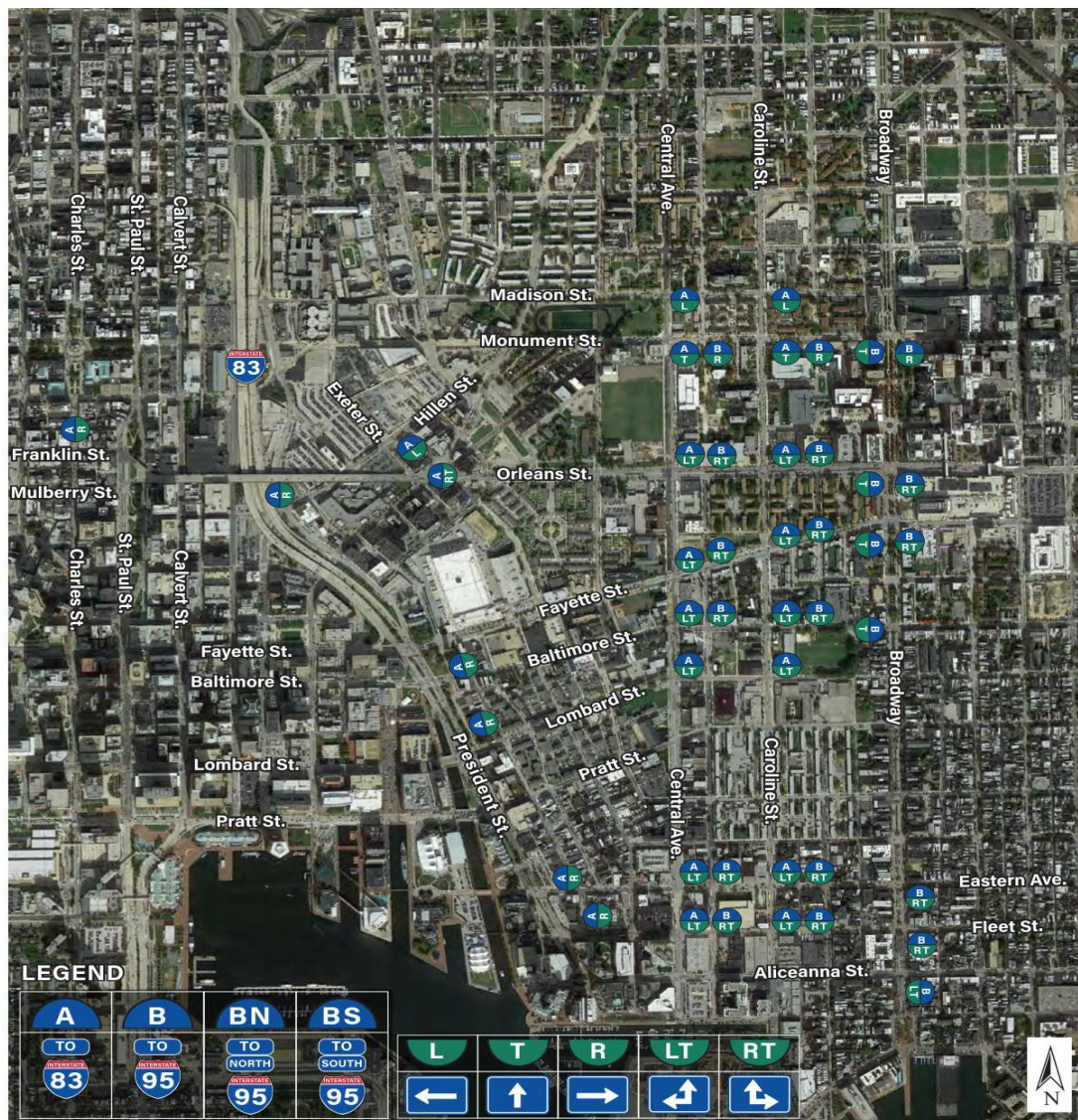
- **S. Eaton Street Connection** – extend S. Eaton Street southward through Toone Street to connect directly to Boston Street at the existing signalized intersection.
- **South Broadway and Eastern and South Broadway and Fleet** - create a left turn lane/movement and a through lane on the eastbound and westbound approach.
- **Widen Boston Street** and reassign signal phasing between S. Conkling Street and Ponca Street to improve capacity along Boston Street to accommodate additional development density.
- **Revise striping at Boston Street and Conkling** to add a southbound right turn overlap phase from Conkling Street to westbound Boston Street and restrict PM peak hour parking on the east side of Conkling Street to create an eastbound double left. Also extend the current left turn lane.
- **Wolfe Street and S. and N. Washington Street** – Install bike lanes from Pratt Street to Aliceanna Street
- **Broadway** – Install a buffered bike lane northbound and southbound between East Monument and Aliceanna Street.
- **Boston Street Viaduct** - Begin the planning and preliminary engineering for the Boston Street Viaduct to create a grade separated roadway from the existing rail crossing between Haven Street and Ponca Street.
- **Pratt Street** – Cycle Track between S. and N. President Street and Broadway.
- **Foster, Fleet and Hudson** – Implement bicycle boulevards (Hudson Street is obligated for FY16 implementation).
- **Potomac Street between Boston and Eastern Avenue** – Implement Cycle Track.
- **Patterson Park Avenue** - Implement a climbing Lane for bicycles.
- **North-South Caroline Street** – Implement corridor improvements to prioritize the corridor throughout the area for transit.
- **Implement ADA upgrades as identified in the DOT ADA Self-Assessment.**
- **Upgrade ADA ramps** at all key intersections along key corridors:
 - **Boston Street**
 - **S. and N. Caroline Street**
 - **S. and N. President Street**
 - **Broadway**

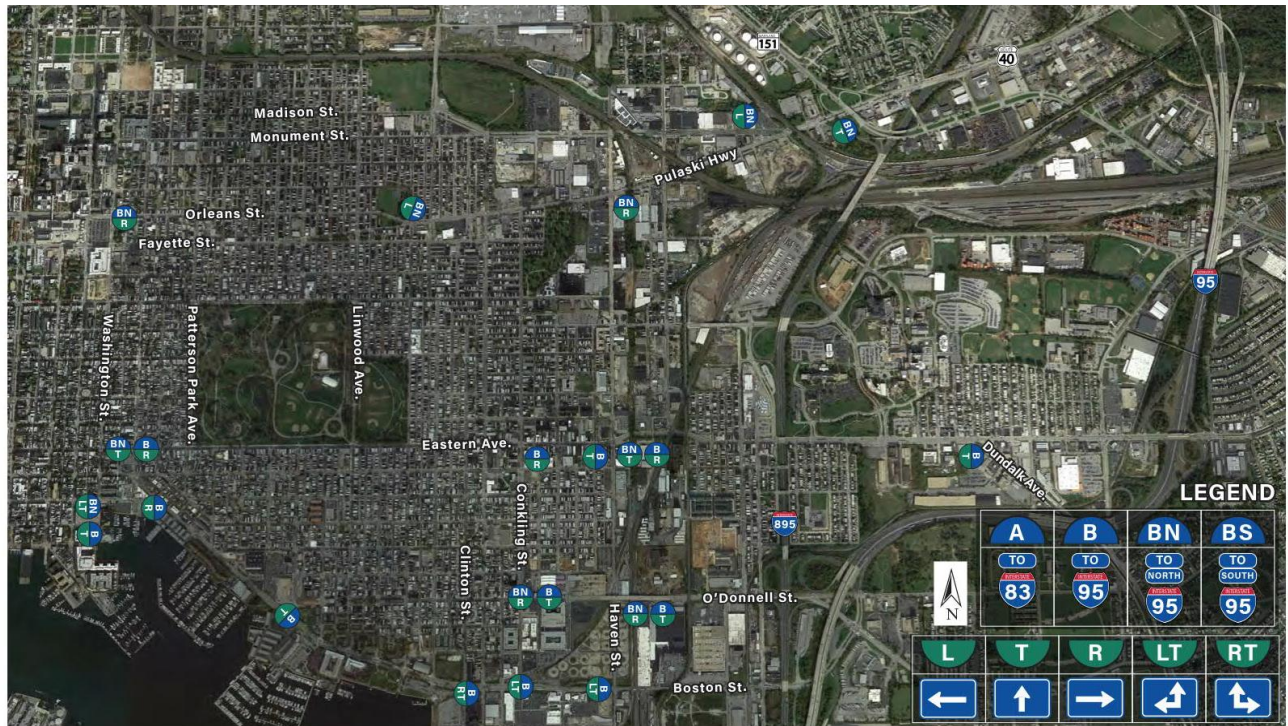
- **Lancaster Street**
- c. Mode Shift:
 - **Promenade** – Remove bicycle restrictions to allow bicycles to use the Promenade trail at all times.
 - **Water Transit – Implement the short-term** recommendations of the Water Transit Strategic Plan relating to the Harbor Connector specifically expanding the routes and constructing an additional landing in the Canton area.
 - **Congestion Management Shuttles** - Implement and operate congestion management shuttle service to provide commuters safe, convenient, and reliable park and ride service from the perimeter of the mitigation zone to the major employment centers.
 - **Support the launch and implementation of the bikeshare program** – Provide access improvements between pedestrian, transit, and commuter modes
 - **Implement Transportation Management Association(s) (TMA) for the South East Traffic Mitigation Zone.**
 - **Support the formation of TMA's and provide a liaison and technical support for these organizations in developing strategies for mode choice.**
 - **Support ride-share throughout the Southeast Zone.**
 - **Support the current operations of the CCC .**
 - **Establish direct connections** between the CCC and the Water Transit stops

XI. Addendum A: Projects under planning, design and implementation FY17 through FY19

The following projects have been identified for design, engineering, and implementation in FY17 through FY19.

I-83 and I-95 Trailblazer Signing is intended to provide guidance for visitor and commuters on direct routes to both I-83 and I-95 thereby minimizing congestion on primary corridors due to detours caused by construction and special events. Signs are scheduled for implementation in early FY17.

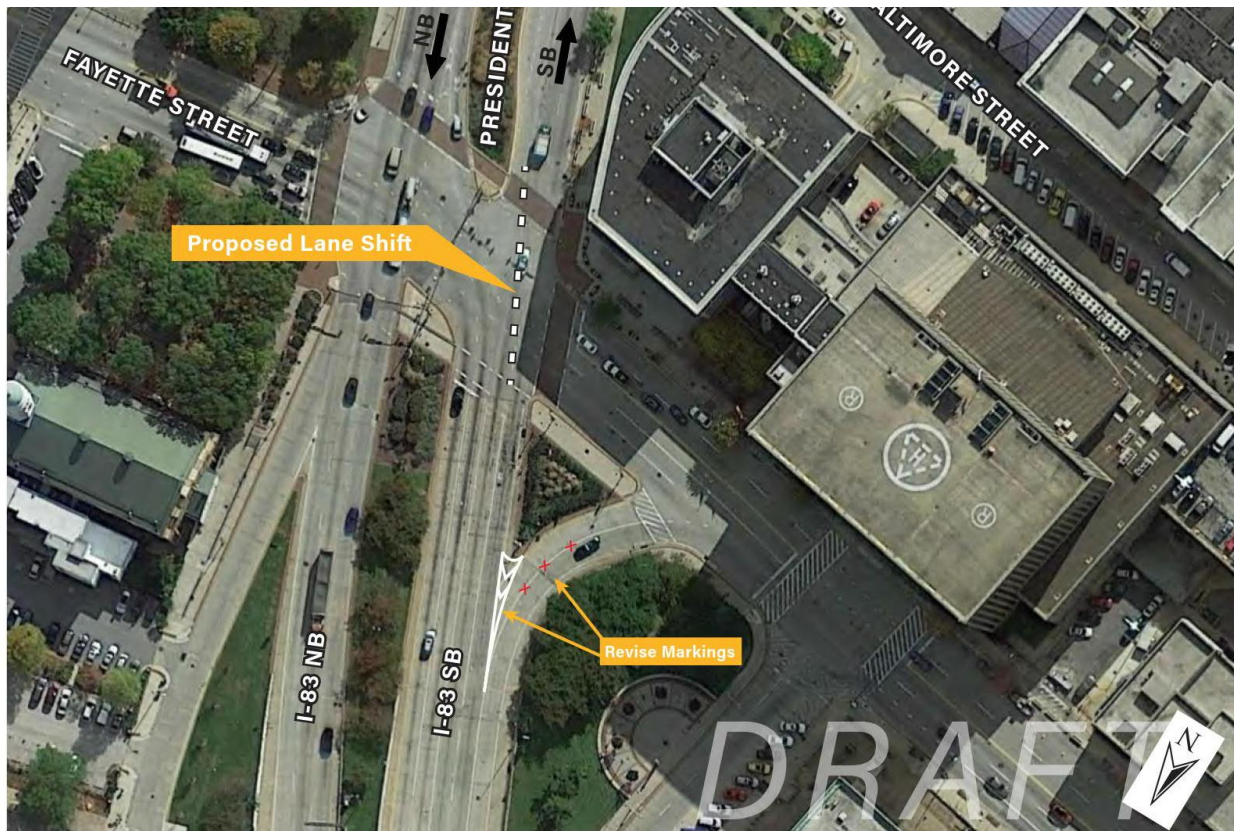




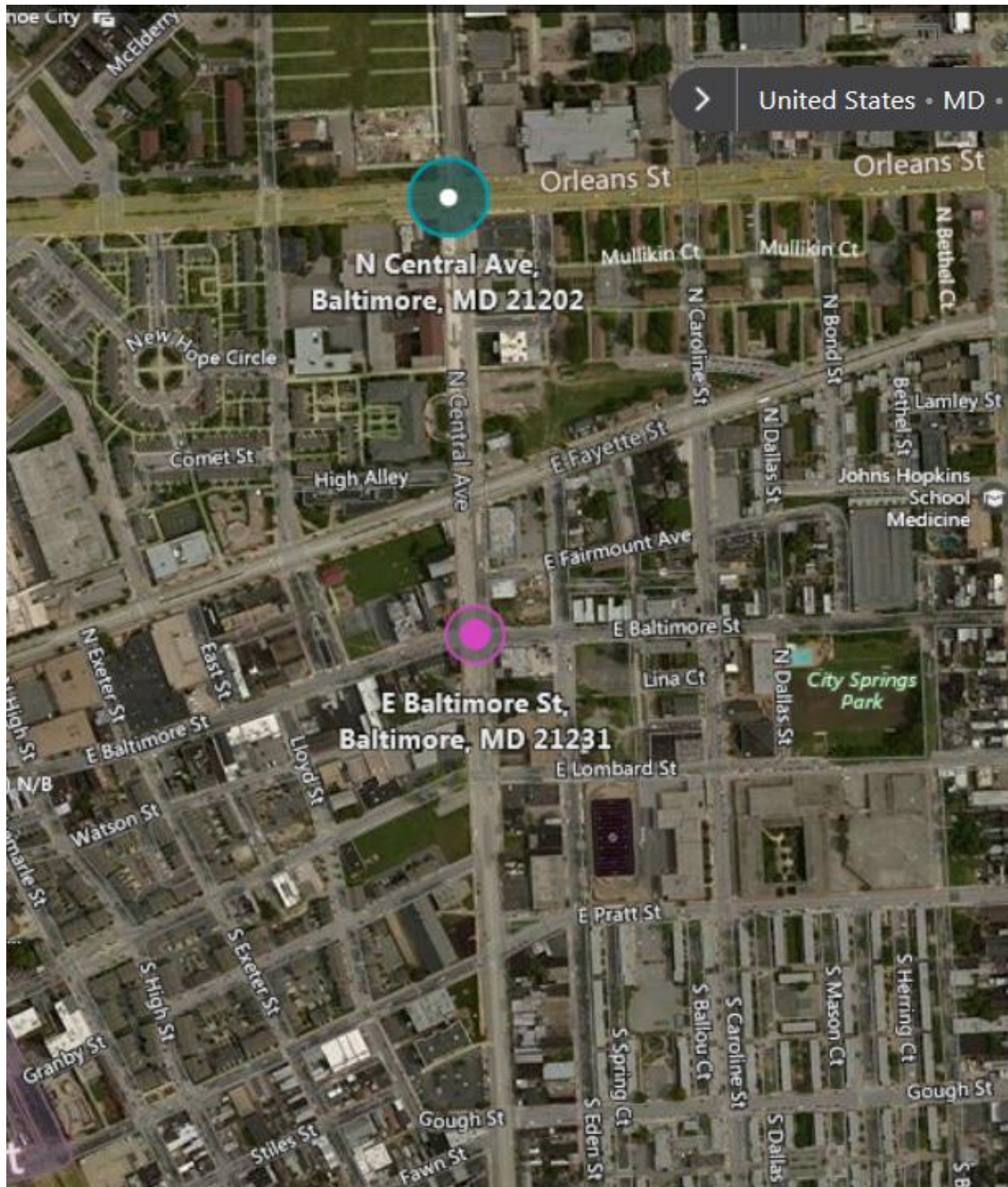
Northbound President Street Striping Modifications allows NB vehicles destined for Lombard Street to utilize two NB lanes at Fawn Street, which reduces last minute lane changes (middle lane to 2nd left turn lane). Implementation is scheduled for early FY17.



Southbound I-83 and President Street Striping Modifications shift lanes for better SB lane utilization. Allows the right most SB through lane an option to continue in the right-turn lane to Lombard St or to continue through on President Street. Implementation is scheduled for late FY16 to early FY17.



Central Avenue left turn signal modifications. New northbound left turn signals to be added at Baltimore Street and Orleans Street. Provides safer and more dependable turns for motorists who want to avoid most or all of President Street.



Boston Street Multimodal Corridor Study This planning study will identify multimodal transportation options, alignment, traffic and safety issues on Boston Street from I 95 to South Lakewood Avenue in order to close the transportation gap resulting from the proposed MTA rail transit project not moving forward. The study will provide alternative recommendations for improved truck access, pedestrian/bike accommodation, residential and commuter travel, and improved safety along the corridor. The study will also identify design alternatives for the corridor in order to accommodate multi modal transportation. This study will begin July 1, 2016 and be completed June 30, 2017.

New Traffic Signal at Holabird Avenue immediately west of Broening Highway: Currently in the design and engineering phase, this new signal will assist in managing the warehouse traffic from the Duke Reality site including traffic from the Amazon Distribution center.

Bicycle Facilities:

Potomac Street Cycle Track Phase I from Eastern Avenue to Boston Street is in engineering and is scheduled for implementation in FY17.

The Baltimore City Bikeshare launch FY17: Preliminary locations under investigation and specific locations will be announced when the preliminary investigation is complete.

Signal Timing modifications throughout the southeast zone are underway. Key intersections for phase 1 and phase 2 have been identified. Signal modifications are scheduled

