



Enhanced Bus Service (EBS)

Progress since May 19, 2021

AJ Jordan, Manager of Planning and Scheduling

April 20, 2022

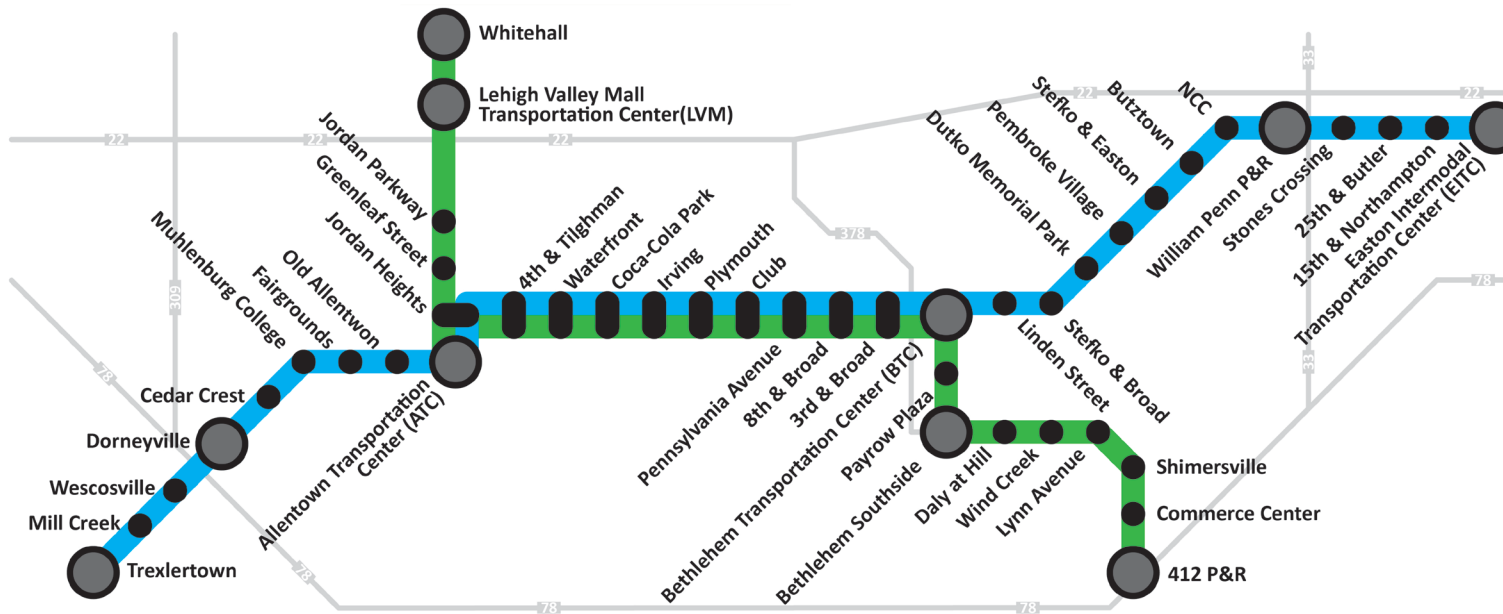
Enhanced Bus Service (EBS)

Bus Rapid Transit (BRT) for the Lehigh Valley.

➤ What is BRT?

BRT provides fast, frequent, and comfortable transit service along a dedicated transit line or corridor.

BRT provides most of the features expected by both frequent and casual mass transit riders without the expensive costs of rail.



MAJOR ELEMENTS OF BRT

Wide choice of running ways

BRT systems can operate on all types of running ways—mixed flow arterials, mixed flow freeways, dedicated arterial lanes, at-grade transitways, fully grade-separated surface transitways, managed lanes, and in tunnels.

Enhanced stations

Aesthetically-designed stations make BRT systems attractive while providing passenger amenities such as shelters, benches, lighting, ticket vending machines, security features, and next vehicle arrival information.

Innovative vehicles

Stylized and specialized buses can operate along BRT corridors, with emphasis on comfort, aesthetic enhancements, easy access, passenger circulation, and environmentally-friendly propulsion. Purchase costs for higher-end BRT vehicles can range from \$370,000 to \$1.6 million, depending on the size and propulsion technology.

Improved fare collection

Electronic fare cards, off-board fare collection, or proof-of-payment options allow for shorter dwell times and shorter overall travel times.

State-of-the-art technologies

BRT incorporates ITS (intelligent transportation system) applications such as transit signal priority, advanced communication systems, automated scheduling and dispatch systems, and real-time traveler information at stations and on vehicles for faster and more convenient trips.

Improved service

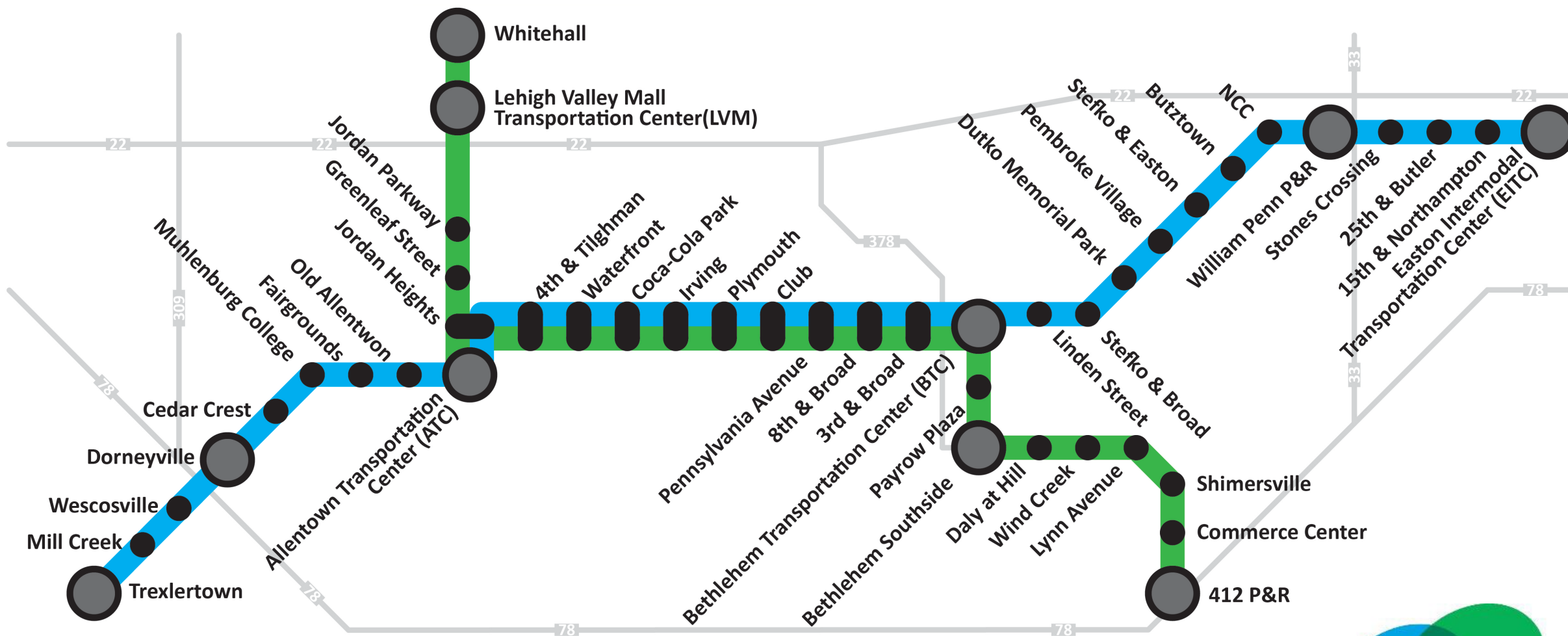
BRT systems generally include rapid transit features such as all-day service spans, greater spacing between stations, and more frequent service than local bus service. The flexibility and lower-cost of BRT allow it to provide greater network coverage.

Modern branding and marketing

Distinctive logos, colors, styling and technologies for vehicles and facilities help develop a system identity. BRT services can be marketed as a new bus route or a new tier of service or as part of a multi-modal rapid transit network.



Enhanced Bus Service (EBS)



Transit Service Progression

Where we are

Where we're aiming

Buses per Hour along Corridor

Stop/Station
Scale & Amenities

Current Levels

LANTA
EB/BRT
Phase I

LANTA
EB/BRT
Phase II

LANTA
EB/BRT
Phase IV

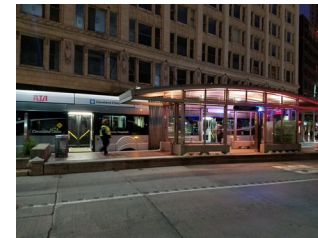
Added Capacity
based on Demand

Added Capacity
based on Demand

Mode Shift based
on Demand and
Cost Efficiencies



BRT/Limited Express Bus



Enhanced Bus Service (EBS)

EBS Case Studies for Station Stop Improvements

Realtime Signage, Unique Branding, Ticket Vending Machines, Lighting and Shelter at all Station Stops.



Enhanced Bus Service (EBS)

What will stations look like?



A Pylon markers help riders identify stations from a distance.

B Real-time NexTrip signs provide bus information, and on-demand annunciators speak this information for people with low vision.

C Shelters provide weather protection and feature push-button, on-demand heaters and shelter lighting. Shelter sizes will vary based on customer demand (small shown here).

D Ticket machines and fare card readers collect all payment before customers board the bus.

E Emergency telephones provide a direct connection to Metro Transit police. Stations also feature security cameras.

F Stations feature trash and recycling containers.

G Platform edges are marked with a cast-iron textured warning strip to keep passengers safely away from the curb while the bus approaches. Many stations also feature raised curbs for easier boarding.

H Platform areas are distinguished by a dark gray concrete pattern.

I Benches at stations provide a place to sit.

J Most stations have bike parking.

Some stations have pedestrian-scale light fixtures to provide a safe, well-lit environment.

At some stations, railings separate the platform from the sidewalk.

Enhanced Bus Service (EBS)

Larger Scale BRT

Full scale stations with passenger waiting amenities.

Larger in scale than current plans. Built using different funding streams only available to larger regions.

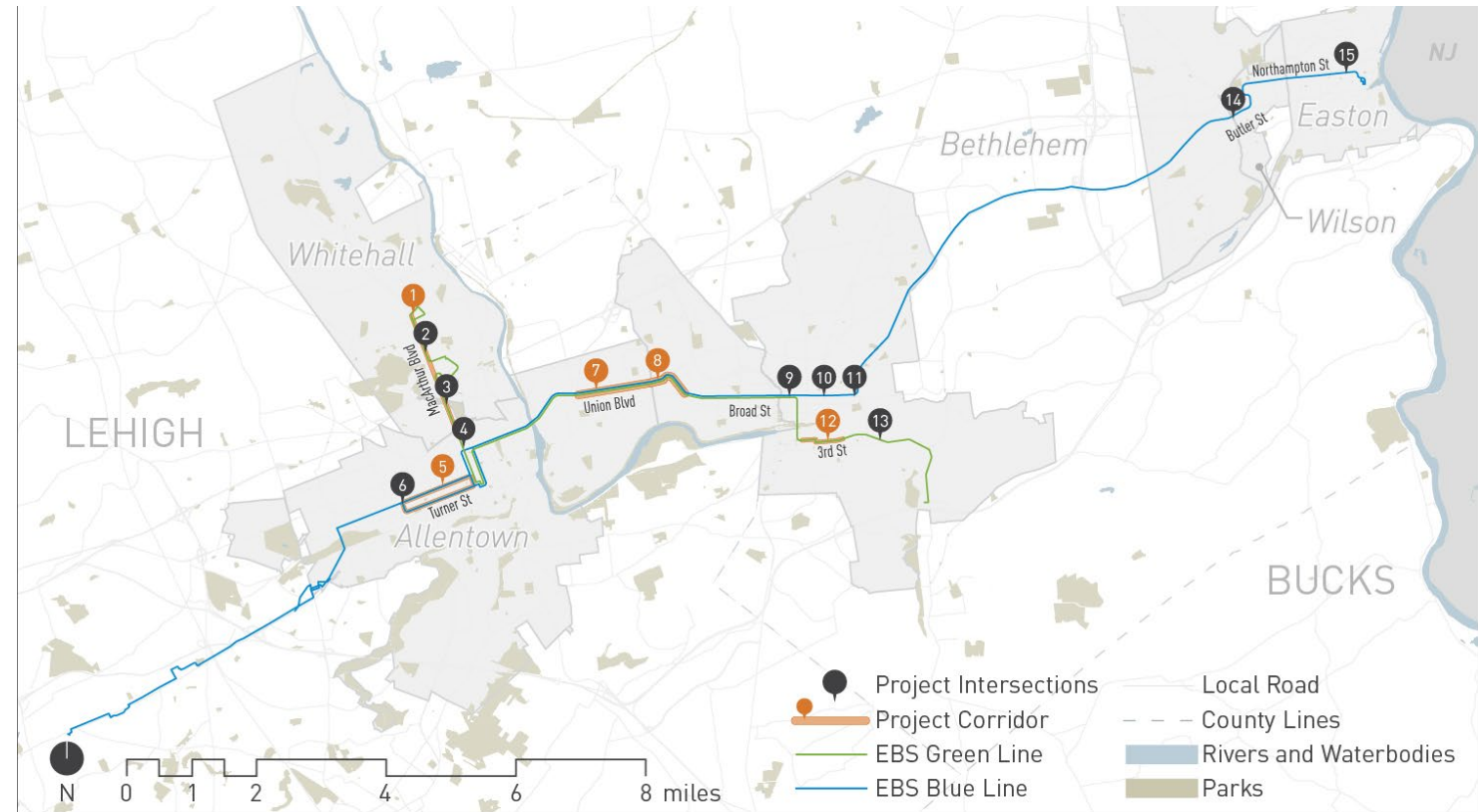


Metro Red Line
Metro Transit/MVTA
Apple Valley, MN

Enhanced Bus Service (EBS)

➤ Progress since 2021

- Route 101 (Blue Line) Implemented June 2021 base service levels
- Route 100 (Green Line) will be implemented June 2022 with base service levels
- PennDOT funded Transit First Corridor Study
 - Findings across Valley, with three key project locations identified in Whitehall:
 - Small shelters needed on MacArthur at Jordan Pkwy
 - New stops & shelters should be added on MacArthur at Mickley w/Pedestrian Crossing
 - Bus Only Lanes should be added to MacArthur between Royal and Sumner.
- Stakeholder Engagement (3/7/2022)
- PennDOT Meeting (Today)



Enhanced Bus Service (EBS)

➤ MacArthur Blvd Project

| | |
|-----------------------|---|
| Project Number | #1 – MacArthur Rd (Royal Ave to Sumner St) |
| Project Type | <ul style="list-style-type: none"> • Bus only lanes |
| Project Description | <ul style="list-style-type: none"> • Install bus-only lanes from Royal Ave to Sumner St |
| Benefits | <ul style="list-style-type: none"> • Reduces travel times and delays and increases reliability • Reduces transit delays due to traffic congestion |
| Action Items | <ul style="list-style-type: none"> • Develop conceptual design alternatives and a preferred alternative for bus lanes • Determine Bus Lane markings paint type • Complete HOP (Highway Occupancy Permit) during design process • Conduct traffic analysis to determine feasibility of bus lane configurations (e.g., repurposing travel lanes, widening, or mixed-flow operations) • Identify environmental “red flag” issues • Conduct detailed survey for base map and utilities • Determine project financial feasibility and implementation plan |
| Capital Cost Estimate | <ul style="list-style-type: none"> • \$1,924,013.00 • Assumptions: Pavement markings only |
| Benefit Estimate | <ul style="list-style-type: none"> • \$4,264,998/year in Travel Time Savings • Current Corridor Ridership is 655,955 Annual 15% of System Ridership. (2200 each weekday) |

Enhanced Bus Service (EBS)

MacArthur Road Concept

MacArthur Road, Whitehall Township

Express Bus Service, bike lanes and good sidewalks expand transportation options and move people around the region efficiently. This new infrastructure can be supported by planning for the decline of in-store shopping and repurposing developed land for new housing and mixed-use development, a transformation that is key to maintaining and growing the economy. Areas like MacArthur Road are good places to start because the concentration of people, jobs and large lots make them good candidates for new and expanded uses.



US-33 Broad Street, Richmond, VA



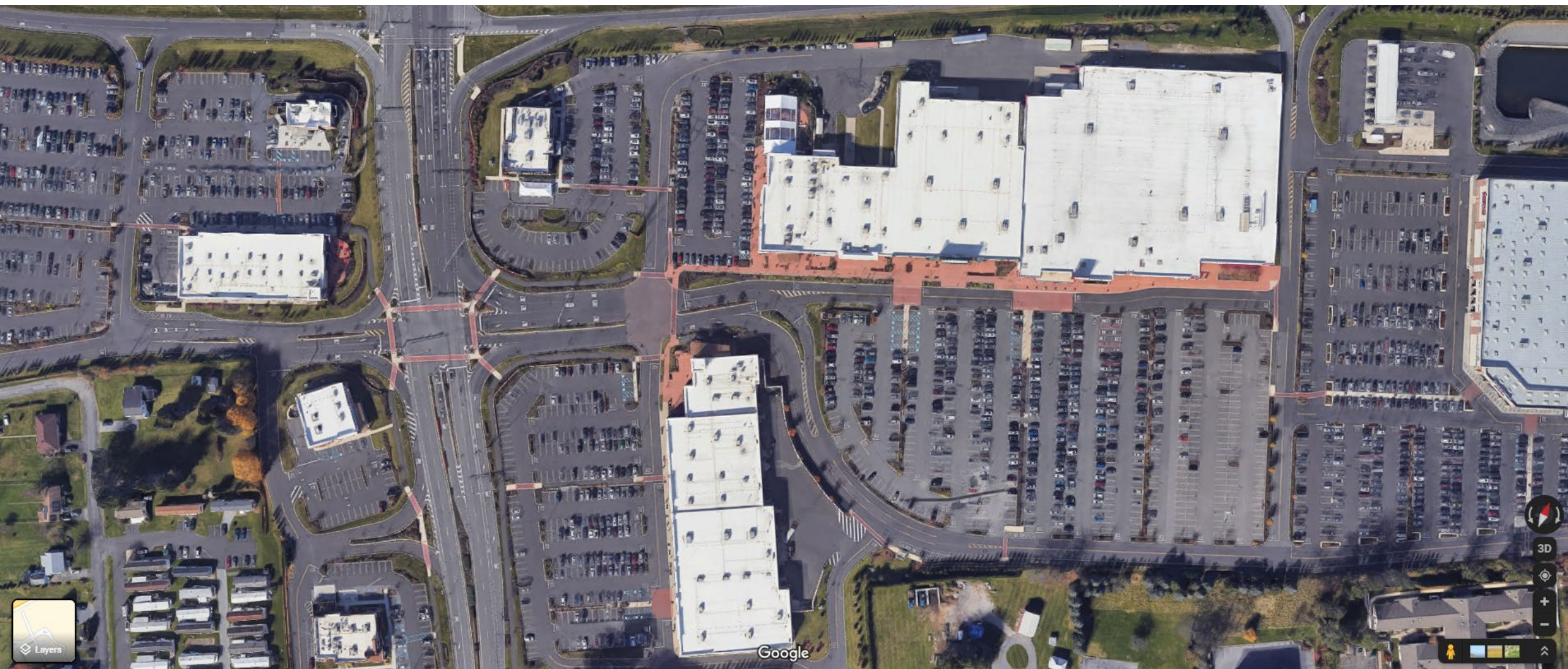
US-33 Broad Street, Richmond, VA



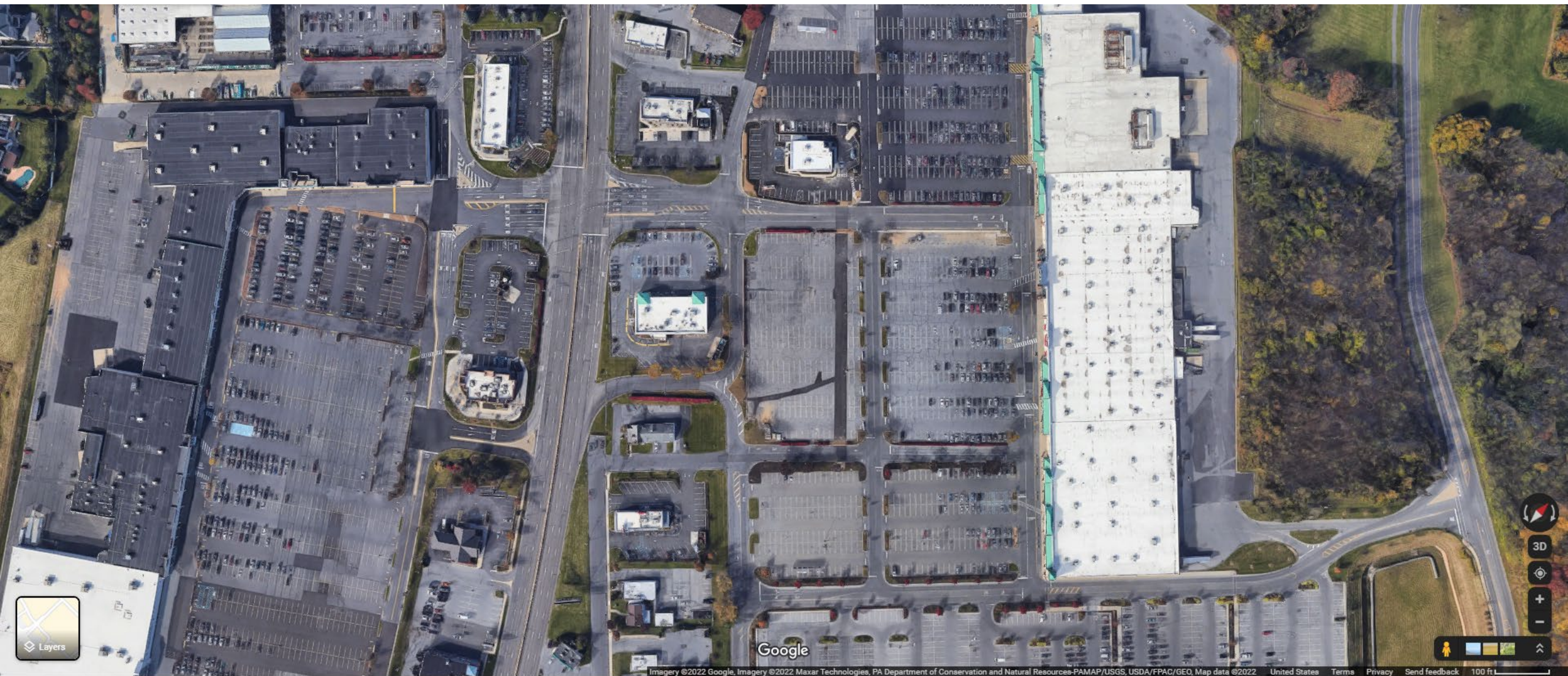
US-33 Broad Street, Richmond, VA



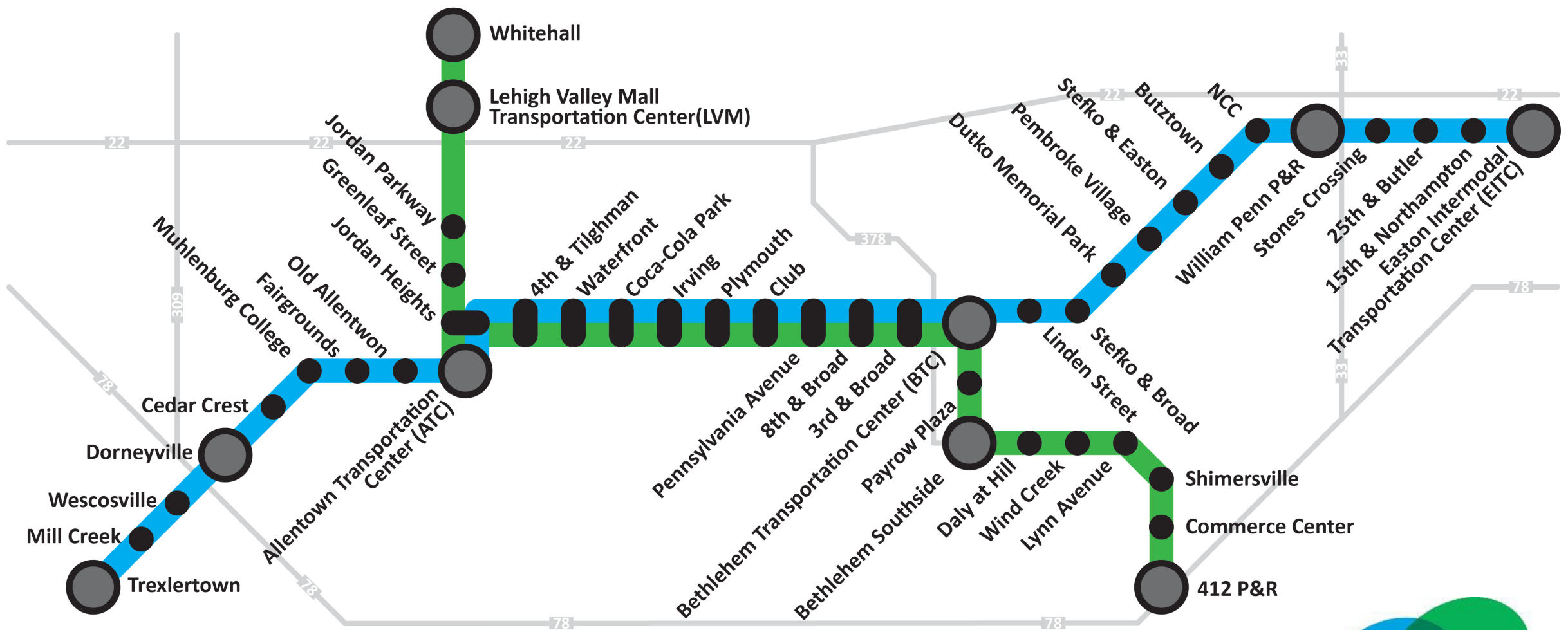
Pedestrian Connections



Pedestrian Connections

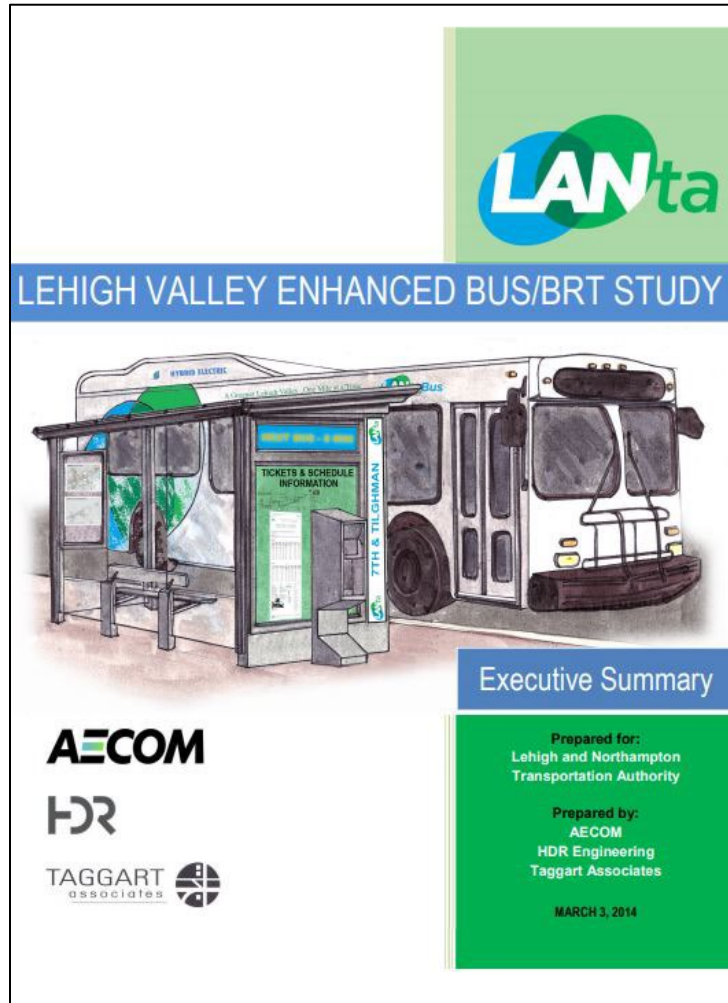


Enhanced Bus Service (EBS)

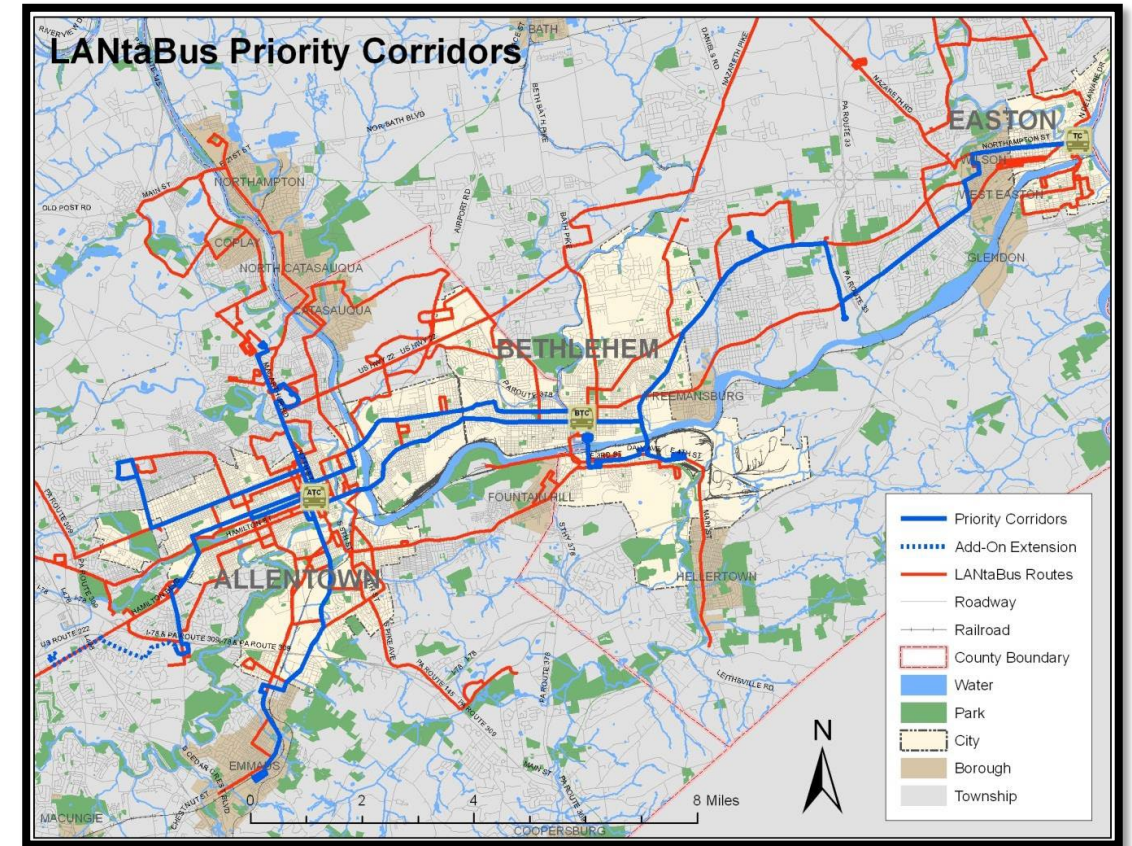


Enhanced Bus Service (EBS)

- Lehigh Valley began the process in 2012, completing the Lehigh Valley Enhanced Bus/BRT Study in 2014.



- Core network corridors and alignments were identified and assessed.
- Additional analyses and assessments have provided additional refinement of alignments. And station stop placements.
- Two Lines have been identified as productive BRT corridors for development.





Enhanced Bus Service (EBS)

EBS plays an integral role in key regional plans, including FutureLV, LRTP, Eastern RMTCT ROP, and various municipal plans.



2.3

Encourage enhanced transit connections to improve mobility and job access.

- Enhance public transit service and pedestrian and bicycle facilities
- along corridors.
- Link growing job and population centers.
- Strengthen mixed-transportation access to regional transit hubs.
- Improve connections between mass transit and pedestrian and bicycle infrastructure.
- Support mass transit access to neighboring regions.

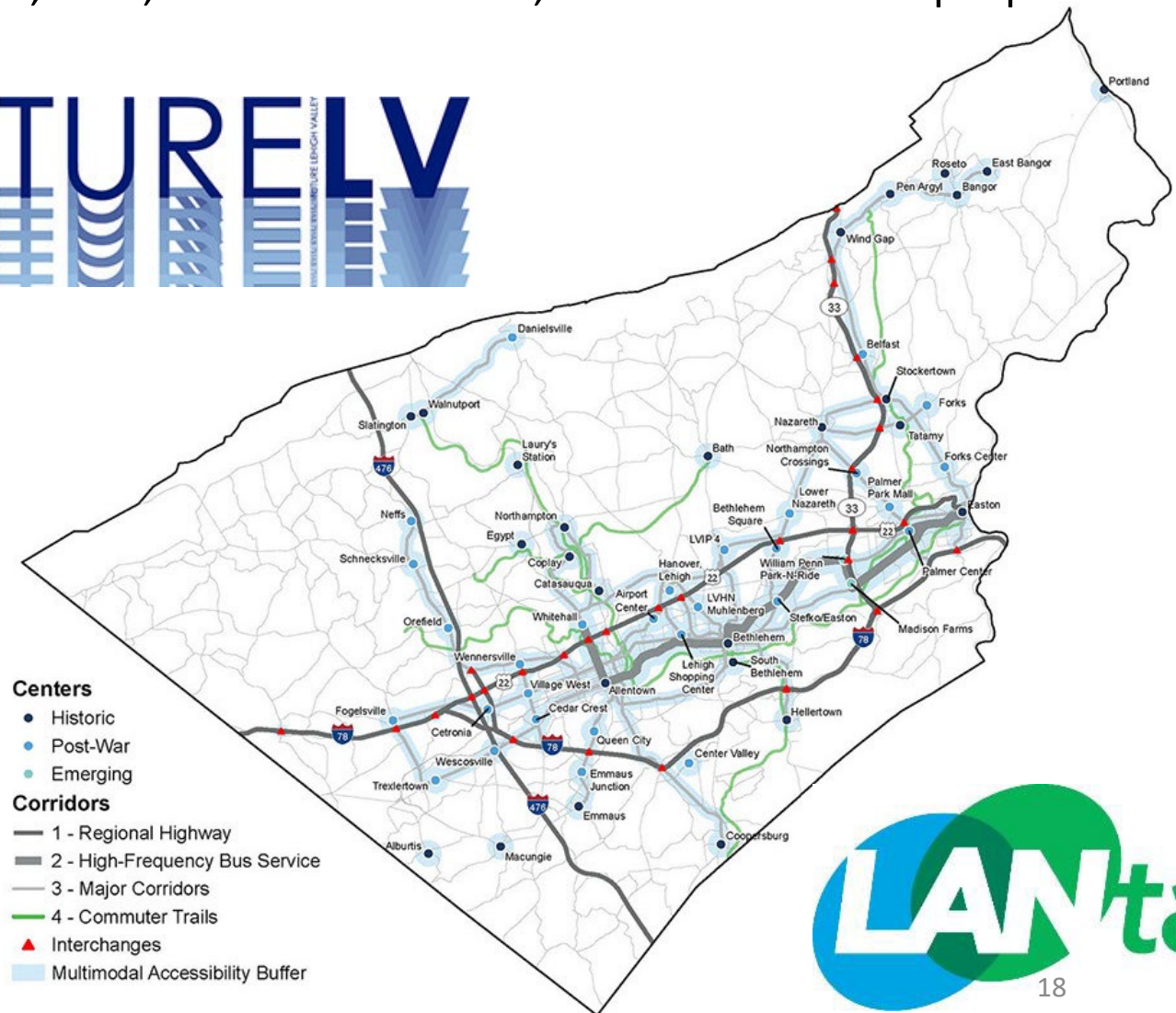
Themes



Implementation Partners

Lehigh Valley Planning Commission, Pennsylvania Department of Transportation, US Department of Transportation, Lehigh and Northampton Transportation Authority, Lehigh and Northampton Counties, 62 Municipalities, Workforce Board Lehigh Valley, Community Advocates

Related Policies



Enhanced Bus Service (EBS)



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EBS Case Studies for Station Stop Improvements

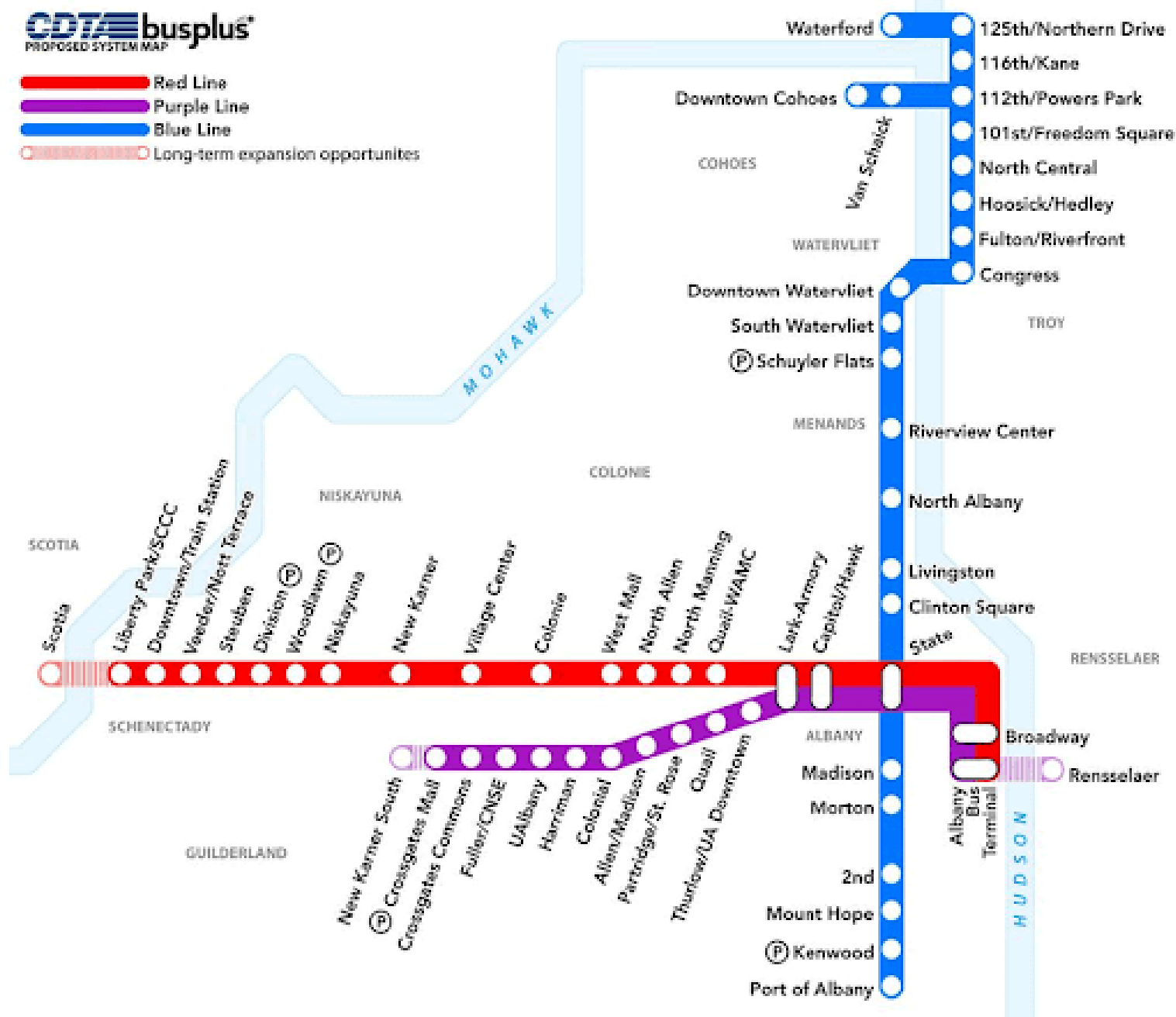
Realtime Signage, Unique Branding, Ticket Vending Machines, Lighting and Shelter at all Station Stops.



Albany, NY
CDTA
BusPlus



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Albany, NY
CDTA
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EBS Case Studies for Station Stop Improvements

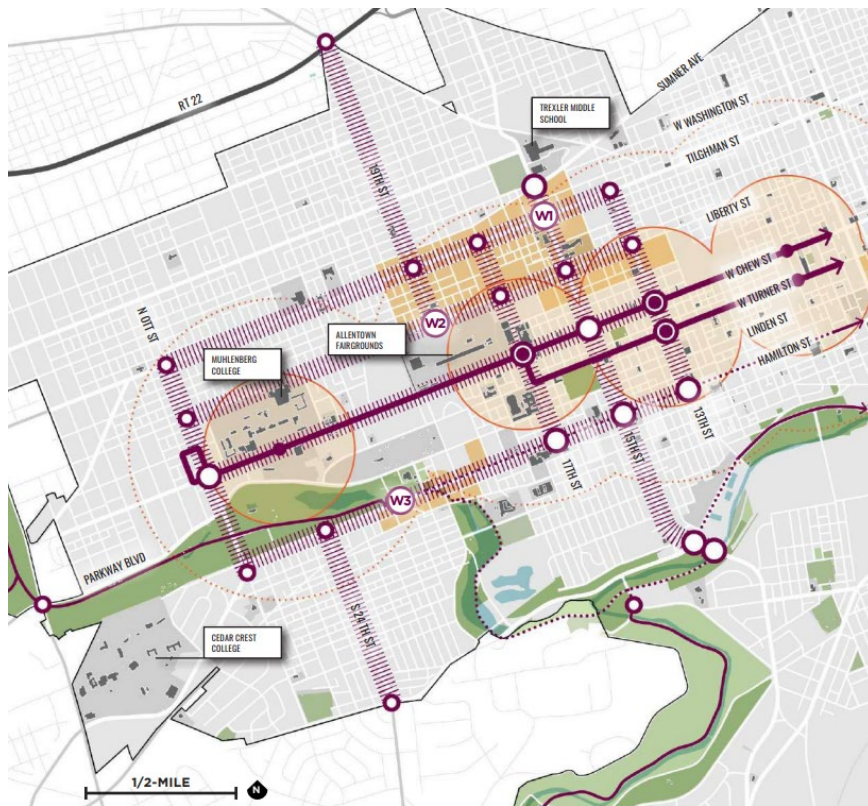
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Richmond, VA
GRTC
Pulse

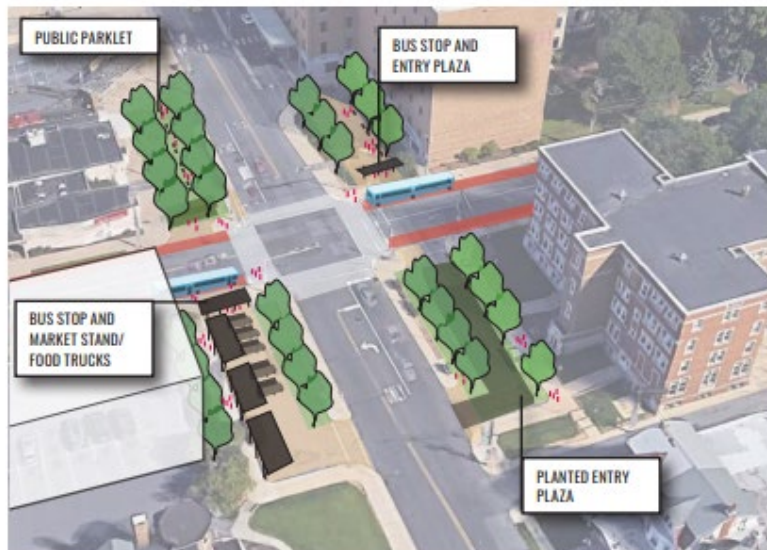
Enhanced Bus Service (EBS)

Coordination with municipal comprehensive plans in the region. These are from Allentown Vision 2030, the City of Allentown's comprehensive plan.



MOBILITY HUB *Example: Chew and 17th Streets*

The site at Chew and 17th Streets could become a mobility hub with prioritized signals for bus service and unused pull-off areas could be repurposed for public plazas. These improvements would benefit students at nearby Allen High School and major employers in the area as well as attract other infill development.



WHAT WE HEARD...

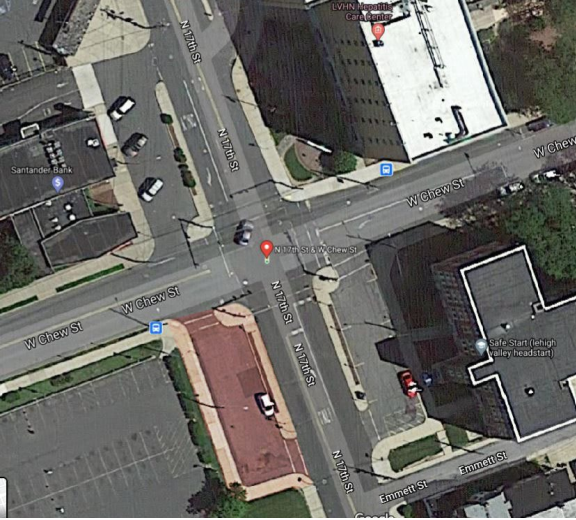
People in Allentown sometimes say "Allentown is built out," meaning there is no room for development. In fact, there is a great opportunity for infill development. The darker orange blocks above have large parking lots or have buildings with less square footage than the lot size (FAR<1). This area would be ideal for a commercial-flex district and could attract infill development.

LEGEND

- Commercial
- Low Density Commercial
- Theatre District
- Park or Open Space

Enhanced Bus Service (EBS)

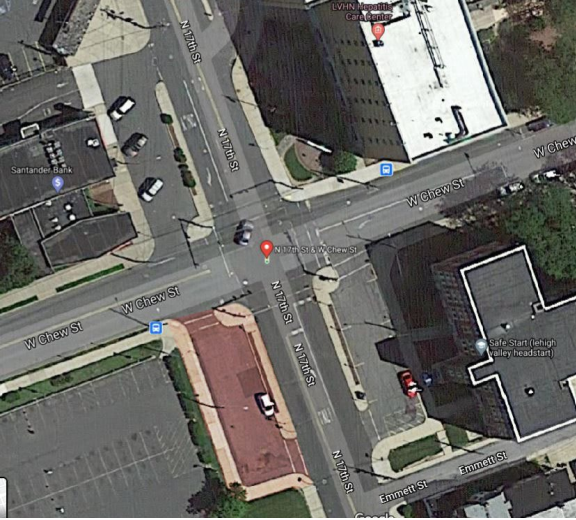
Fairgrounds Station – 17th & Chew Mobility Hub



Google

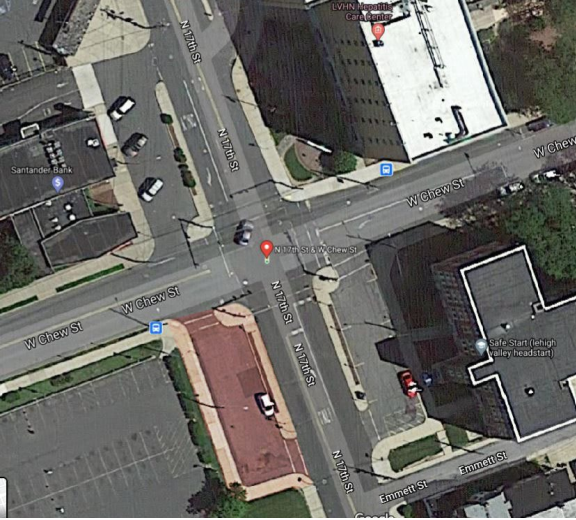
Enhanced Bus Service (EBS)

Fairgrounds Station – 17th & Chew Mobility Hub



Enhanced Bus Service (EBS)

Fairgrounds Station – 17th & Chew Mobility Hub



Enhanced Bus Service (EBS)

➤ What will we gain?

- Lower cost per rider
- Increased economic activity
- Enhanced safety
- More robust tourism
- Increased property values
- High frequency bus service corridors
- Corridors for targeted regional development

Significantly decreased travel time

Exclusive transitways have been shown to operate at an average of 17 to 30 miles per hour. This can achieve an overall travel time savings as high as 55% compared to regular bus services and compares well with rail transit.

- The Silver Line Washington Street has experienced reductions in mean running times as high as 25%, especially in the midday and PM peak periods.
- Las Vegas experienced 37% (northbound) and 43% (southbound) reductions in running times compared to pre-MAX bus services.
- With the implementation of BRT, travel time in the BRT corridor in Pittsburgh decreased 55%.
- In Los Angeles, the MetroRapid achieved travel savings as high as 40%, equally attributed to fewer stops, transit signal priority, and low floor vehicles.

Increased reliability

BRT's use of exclusive transitways, level boarding, improved fare collection, and automated vehicle location technologies allow for greater reliability.

Improved accessibility

Vehicle, station, ITS, and fare collection design options can greatly improve the accessibility of a BRT system to mobility-impaired and other riders.

Increased safety and security

With modern technologies and facilities, customers report BRT systems to be safer than other local bus service.

- In Boston, passengers rating the safety as "above average" increased 19% after the Silver Line began operating.
- In Las Vegas, 69% of riders rated MAX vehicles as "excellent" and 54% rated safety at MAX stations as "excellent."



Enhanced Bus Service (EBS)

➤ What's Next?

1. Corridor Scoping (Substantially Complete)
2. Corridor Plan Development (18-24 months)
 - Establish Technical Advisory Committee (TAC)
 - Plan scoping
 - Interagency issue resolution & early public engagement (6-12 months)
 - Recommended Corridor Plan development & review (1-2 months)
 - Plan Public Comment (1-2 months)
 - Final Plan Adoption by TAC (2-3 months)
3. NEPA (~24 months)
 - Determination of Categorical Exclusion, Section 106, Section 4(f), DCE Documents, etc.
4. Engineering (~24 months)
5. Construction (~12 months)

Following funding securement, project can be completed in 3-5 years.

Enhanced Bus Service (EBS)

➤ What will it cost build?

| Name | Location | Miles | New | New | New | Stations per Mile | Total Capital Cost (\$YOE) | Section 5309 | Section | Non-CIG | Annual Operating Cost | Capital Cost | Capital Cost | Capital Cost | Capital Cost |
|--|--------------------|-------|----------|-------|--------|----------------------|-------------------------------|----------------------|-----------------------|----------------------|--------------------------|---------------|--------------|--------------|--------------------|
| | | | Stations | Buses | VRM | | | CIG Value (\$YOE) | 5309 CIG Share (%) | | | per Mile | per Station | per Vehicle | of New Facility |
| METRO Gold Line Bus Rapid Transit | St. Paul, MN | 10.3 | 16 | 12 | 117000 | 1.6 | \$ 460,900,000 | \$ 207,410,000 | 45.0% | \$ 253,490,000 | \$ 9,360,000 | \$ 44,747,573 | | | |
| South Corridor Rapid Transit Project | Miami, FL | 20 | 16 | 0 | 491000 | 0.8 | \$ 299,810,000 | \$ 100,000,000 | 33.4% | \$ 199,810,000 | \$ 39,280,000 | \$ 14,990,500 | | | |
| Woodhaven Boulevard Select Bus Service | New York City, NY | 6.1 | 11 | 41 | 352000 | 1.8 | \$ 258,840,000 | \$ 97,170,000 | 37.5% | \$ 161,670,000 | \$ 28,160,000 | \$ 42,432,787 | | | |
| Downtown-Uptown-Oakland-East End Bus Rapid Transit | Pittsburgh, PA | 15 | 46 | 15 | 777000 | 3.1 | \$ 249,900,000 | \$ 99,950,000 | 40.0% | \$ 149,950,000 | \$ 62,160,000 | \$ 16,660,000 | | | |
| IndyGo Blue Line Rapid Transit | Indianapolis, IN | 24 | 36 | 20 | 138875 | 1.5 | \$ 220,000,000 | \$ 100,000,000 | 45.5% | \$ 120,000,000 | \$ 11,110,000 | \$ 9,166,667 | | | |
| BusPlus Full System | Albany, NY | 40.4 | 52 | 44 | 238875 | 1.3 | \$ 301,390,000 | \$ 176,880,000 | 58.7% | \$ 124,510,000 | \$ 19,110,000 | \$ 7,460,149 | | | |
| IndyGo Purple Line Rapid Transit | Indianapolis, IN | 14.8 | 23 | 15 | 102000 | 1.6 | \$ 155,000,000 | \$ 77,500,000 | 50.0% | \$ 77,500,000 | \$ 8,160,000 | \$ 10,472,973 | | | |
| Pacific Avenue/SR 7 Corridor BRT | Tacoma, WA | 14.3 | 32 | 17 | 14125 | 2.2 | \$ 150,000,000 | \$ 59,870,000 | 39.9% | \$ 90,130,000 | \$ 1,130,000 | \$ 10,489,510 | | | |
| Capital Area Transportation Authority BRT | Lansing, MI | 8.5 | 27 | 15 | 95250 | 3.2 | \$ 141,850,000 | \$ 97,820,000 | 69.0% | \$ 44,030,000 | \$ 7,620,000 | \$ 16,688,235 | | | |
| North-South Bus Rapid Transit | Chapel Hill, NC | 8.2 | 16 | 14 | 73750 | 2.0 | \$ 141,390,000 | \$ 100,000,000 | 70.7% | \$ 41,390,000 | \$ 5,900,000 | \$ 17,242,683 | | | |
| Madison Street BRT | Seattle, WA | 2.3 | 10 | 9 | 83375 | 4.3 | \$ 121,180,000 | \$ 59,900,000 | 49.4% | \$ 61,280,000 | \$ 6,670,000 | \$ 52,686,957 | | | |
| The Rapid BRT Full System | Grand Rapids, MI | 11.4 | 26 | 8 | 235250 | 2.3 | \$ 189,890,000 | \$ 109,500,000 | 57.7% | \$ 80,390,000 | \$ 18,820,000 | \$ 16,657,018 | | | |
| Ogden/Weber State University BRT | Ogden, UT | 5.3 | 13 | 8 | 30000 | 2.5 | \$ 99,680,000 | \$ 64,500,000 | 64.7% | \$ 35,180,000 | \$ 2,400,000 | \$ 18,807,547 | | | |
| RapidRide Roosevelt Project | Seattle, WA | 6.1 | 13 | 0 | 205250 | 2.1 | \$ 90,210,000 | \$ 45,000,000 | 49.9% | \$ 45,210,000 | \$ 16,420,000 | \$ 14,788,525 | | | |
| EBS Full System | Allentown, PA | 35 | 44 | 54 | 420000 | 1.3 | \$ 86,314,800 | \$ 47,473,140 | 55.0% | \$ 38,841,660 | \$ 6,475,000 | \$ 2,466,137 | \$ 750,000 | \$ 580,000 | \$18,750,000 |
| Swift Orange Line BRT | Everett, WA | 11.3 | 13 | 16 | 116250 | 1.2 | \$ 84,160,000 | \$ 41,650,000 | 49.5% | \$ 42,510,000 | \$ 9,300,000 | \$ 7,447,788 | | | |
| BusPlus Purple Line | Albany, NY | 8.5 | 16 | 16 | 36250 | 1.9 | \$ 81,180,000 | \$ 60,890,000 | 75.0% | \$ 20,290,000 | \$ 2,900,000 | \$ 9,550,588 | | | |
| Swift II BRT | Everett, WA | 12.3 | 18 | 13 | 77000 | 1.5 | \$ 73,630,000 | \$ 43,190,000 | 58.7% | \$ 30,440,000 | \$ 6,160,000 | \$ 5,986,179 | | | |
| The Rapid Laker Line BRT | Grand Rapids, MI | 13.3 | 11 | 16 | 59875 | 0.8 | \$ 72,760,000 | \$ 56,190,000 | 77.2% | \$ 16,570,000 | \$ 4,790,000 | \$ 5,470,677 | | | |
| Wake Bus Rapid Transit: New Bern Avenue Project | Raleigh, NC | 5 | 10 | 6 | 30875 | 2.0 | \$ 71,450,000 | \$ 35,050,000 | 49.1% | \$ 36,400,000 | \$ 2,470,000 | \$ 14,290,000 | | | |
| Milwaukee East-West BRT | Milwaukee, WI | 9.1 | 19 | 11 | 75875 | 2.1 | \$ 54,790,000 | \$ 40,930,000 | 74.7% | \$ 13,860,000 | \$ 6,070,000 | \$ 6,020,879 | | | |
| Mill Plain BRT | Vancouver, WA | 10 | 21 | 7 | 18375 | 2.1 | \$ 49,860,000 | \$ 24,890,000 | 49.9% | \$ 24,970,000 | \$ 1,470,000 | \$ 4,986,000 | | | |
| EBS Green Line (Whitehall-South Bethlehem) | Allentown, PA | 14.1 | 17 | 18 | 169200 | 1.2 | \$ 43,541,400 | \$ 23,947,770 | 55.0% | \$ 19,593,630 | \$ 2,608,500 | \$ 3,088,043 | \$ 750,000 | \$ 580,000 | \$18,750,000 |
| Central Avenue Bus Rapid Transit Project | St. Petersburg, FL | 11 | 17 | 9 | 47125 | 1.5 | \$ 41,360,000 | \$ 20,360,000 | 49.2% | \$ 21,000,000 | \$ 3,770,000 | \$ 3,760,000 | | | |
| BusPlus Blue Line | Albany, NY | 16 | 30 | 20 | 36875 | 1.9 | \$ 40,880,000 | \$ 32,700,000 | 80.0% | \$ 8,180,000 | \$ 2,950,000 | \$ 2,555,000 | | | |
| BusPlus Red Line | Albany, NY | 17 | 18 | 15 | 27656 | 1.1 | \$ 36,500,000 | \$ 16,000,000 | 43.8% | \$ 20,500,000 | \$ 2,212,500 | \$ 2,147,059 | | | |
| The Rapid Silver Line BRT | Grand Rapids, MI | 9.6 | 18 | 10 | 27250 | 1.9 | \$ 35,285,000 | \$ 28,228,000 | 80.0% | \$ 7,057,000 | \$ 2,180,000 | \$ 3,675,521 | | | |
| EBS Blue Line Phase One (Muhlenberg-Easton) | Allentown, PA | 19.7 | 20 | 26 | 236400 | 1.0 | \$ 32,050,000 | \$ 17,627,500 | 55.0% | \$ 14,422,500 | \$ 3,644,500 | \$ 1,626,904 | \$ 750,000 | \$ 580,000 | |
| EBS Blue Line Phase Two (Muhlenberg-Trexlerstown) | Allentown, PA | 7.1 | 7 | 9 | 85200 | 1.0 | \$ 11,313,400 | \$ 6,222,370 | 55.0% | \$ 5,091,030 | \$ 1,313,500 | \$ 1,593,437 | \$ 750,000 | \$ 580,000 | |

Figures are assumptions based on peer assessment of FTA Small Starts Submissions.
Formal costing is required to refine costs.