Route for Change

Transforming The Boulevard

Roosevelt Boulevard

Section 2 – Appendix 9

Improving Transit on Roosevelt Boulevard (SEPTA)

October 2018

Improving Transit on Roosevelt Boulevard:

Focus 2025: Analysis & Recommendations

SEPTA SP+A Strategic Planning +Analysis

March 2020

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INTRODUCTION

Roosevelt Boulevard today doesn't work for anyone. Buses and cars are stuck in traffic, neighborhoods are divided by 12 lanes of high speed traffic, and on average over 10 people lose their lives on the roadway each year, many of them pedestrians. Bus stops are blocked by parking, crosswalks faded, sidewalks intermittent, and aggresive driving is the norm. Attempts to expand vehicle capacity and relieve congestion have only done the opposite. Meanwhile, transit has been relegated to the background.

The City of Philadelphia and SEPTA have been working together to address these problems; recently having made remarkable progress with the Direct Bus program, Phase A of which debuted in 2017. Prominent express stops now exist at key intersections on the Upper Boulevard, and will soon come to the lower Boulevard as well. But while these major stop areas have seen improvements, most of the Boulevard is still an unwelcoming and inhospitable place to be a pedestrian or transit rider.

If we are to improve the Boulevard, we have to increase the visibility of transit and pedestrian facilities and decrease the prominence of vehicles. Since we will never have more space than we do now, SEPTA believes we will only solve our congestion issues by using the space we have more wisely. Transit is the best tool we have to accomplish this goal.

Despite an environment that is hostile to transit users and pedestrians alike, tens of thousands of transit riders use it every day. High capacity and super-frequent transit already exists on the Boulevard — it just needs to be strengthened with the goal of becoming a frequent mode of choice. That means moving beyond Direct Bus to start improving highly productive local services, and their bus stops.

This Report

Part 1 of this report is an overview of existing conditions of transit on the Boulevard. It shows that Roosevelt Boulevard is the most frequent, highest capacity transit corridor in SEPTA's network outside of Center City. It is also the highest ridership transit corridor that is comprised completely of buses. As Roosevelt Boulevard is often synonymous with car travel and congestion, transit is disproportionately underrepresented in conversations about the roadway and its future.

Part 2 of this report details the preliminary actions taken by SEPTA, the City of Philadelphia, and other stakeholders to improve the transit experience on the Boulevard based on the previous analysis. While some improvements are a while off, we can start building towards them now.

PART 1

Transit Services
Overview

More than just a roadway, the Boulevard is a transit network in itself.

Four bus routes use the Boulevard for the majority of their routes, six more use it for a significant portion of their routes, and 18 bus routes intersect the Boulevard - together making a network of 28 bus routes, some of which are among SEPTA's most frequent.

Routes that primarily follow the Boulevard:

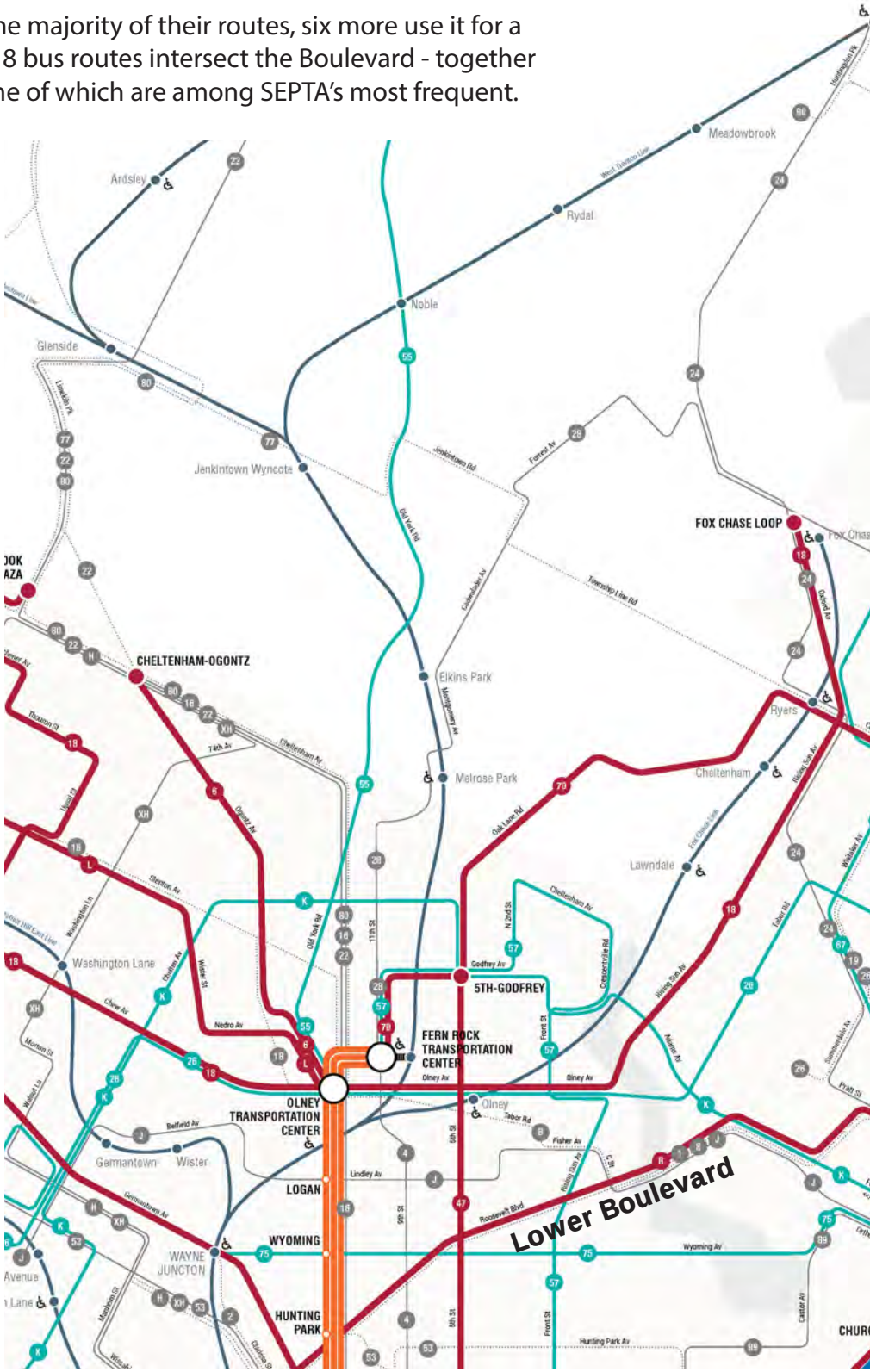
R BLVDDIR
14
1

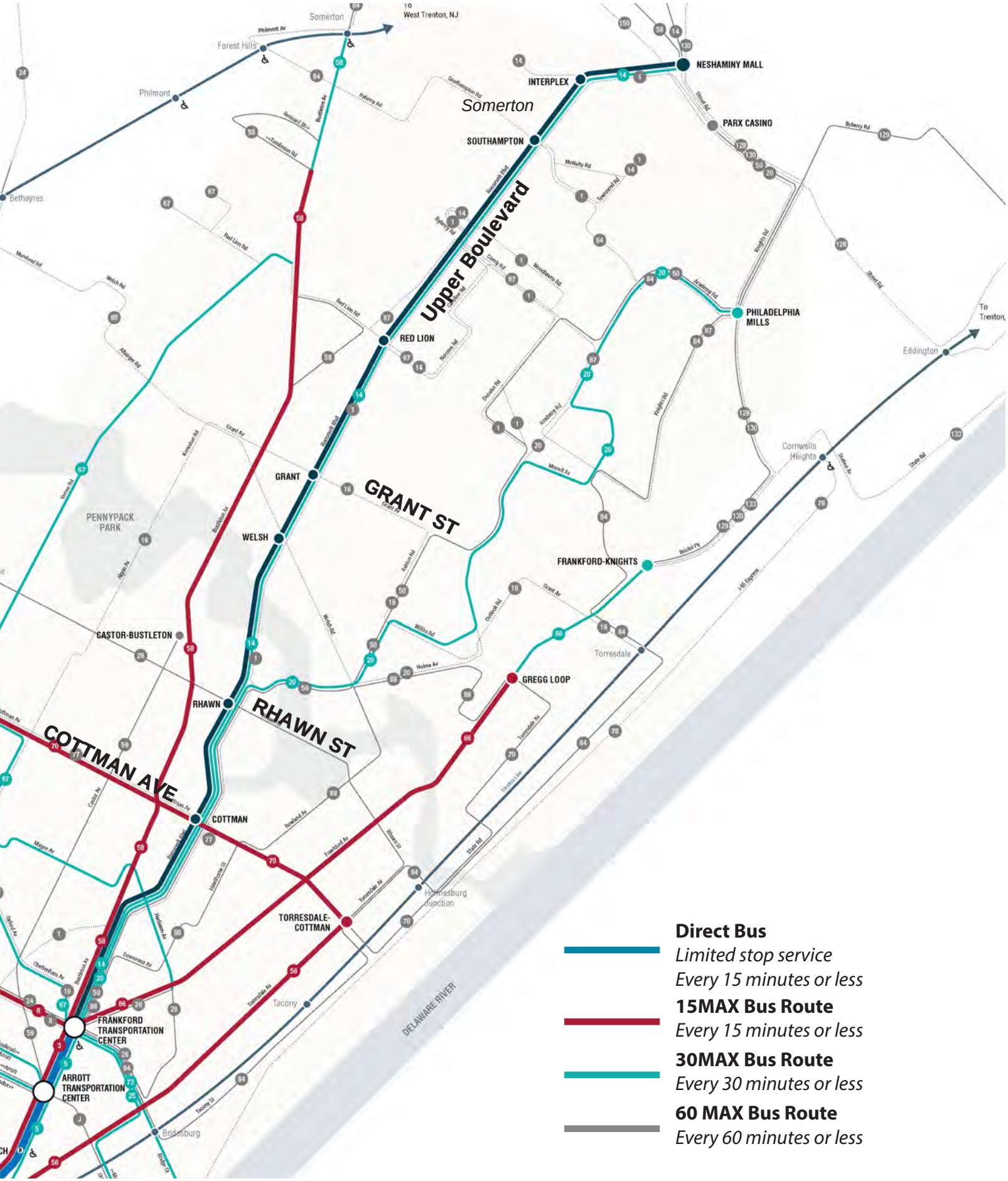
Routes that use the Boulevard for a portion of their routes:

K 20
J 8 50

Routes that intersect the Boulevard:

18 47 58 70
4 26 67 75
19 24 28 53 59
77 84 88




Somerton
To West Trenton, NJ
Forest Hills
Philmont
Bethayres
INTERPLEX
NESHAMINY MALL
Somerton
SOUTHAMPTON
PARX CASINO
Upper Boulevard
RED LION
PHILADELPHIA MILLS
To Trenton
Eddington
Cornwells Heights
GRANT
GRANT ST
PENNYPACK PARK
WELSH
FRANKFORD-KNIGHTS
CASTOR-BUSTLETON
Torresdale
GREGG LOOP
RHAWN
RHAWN ST
COTTMAN AVE
COTTMAN
TORRESDALE-COTTMAN
Holmesburg Junction
Tacony
FRANKFORD TRANSPORTATION CENTER
ARROTT TRANSPORTATION CENTER
Bridesburg
DELAWARE RIVER
Direct Bus
Limited stop service
Every 15 minutes or less
15MAX Bus Route
Every 15 minutes or less
30MAX Bus Route
Every 30 minutes or less
60 MAX Bus Route
Every 60 minutes or less

Transit Ridership
Overview

Despite being synonymous with vehicle congestion and automobile dependence, Roosevelt Boulevard is one of Philadelphia's most heavily used transit corridors.

In 2017, the core bus services operating on Roosevelt Boulevard (R, 1, and 14) together accommodated 25,046 trips on an average weekday - comparable to SEPTA's highest ridership Regional Rail Line, the Paoli-Thorndale Line. The six secondary bus services which use the Boulevard for a significant portion of their routes (J, K, 8, 26, 20, 50) have a combined ridership of 34,112 on an average weekday.

By comparison, the average annual daily traffic (AADT) on the Boulevard's busiest sections can reach 100,000 vehicles. Based on a vehicle occupancy rate of 1.54 people per vehicle, that amounts to an estimated 146,142 people per day traveling on the Boulevard in cars.

The Boulevard Runs on Transit...

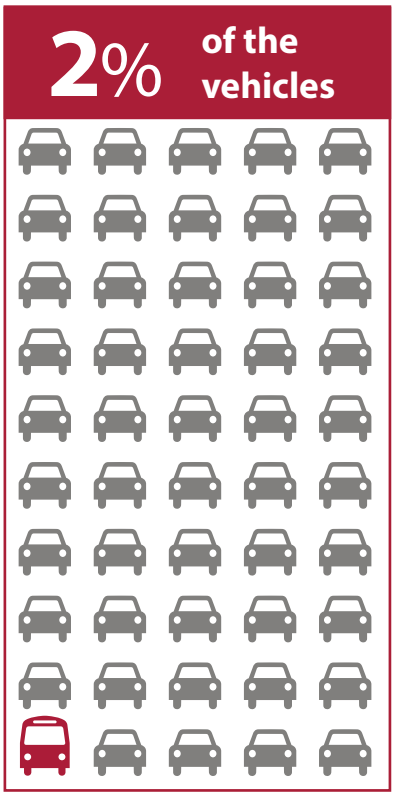
Peak Hour People Movement at Cottman & the Boulevard:

Transportation is for people, and the performance of our transportation network is best measured by the number of people (not vehicles) it serves.

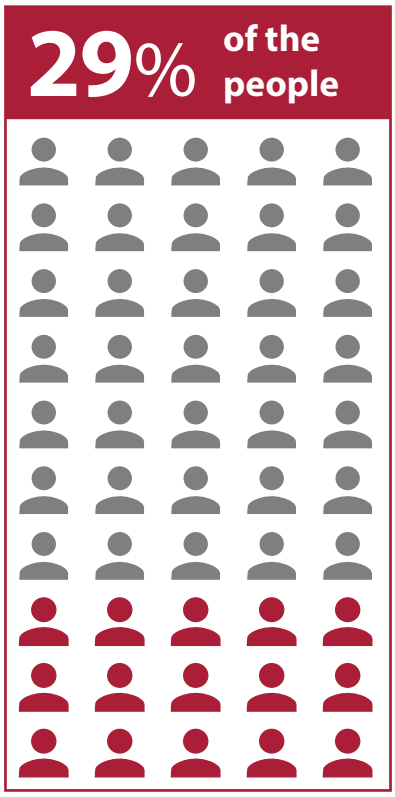
For example, at the southbound morning peak hour, only 2% of the vehicles in the Boulevard's outer lanes are buses, but they carry 29% of the people — showing that transit is an extremely efficient use of resources.

Improving transit ridership is the best way to decrease congestion, move more people, and make Boulevard safer and more livable for all.

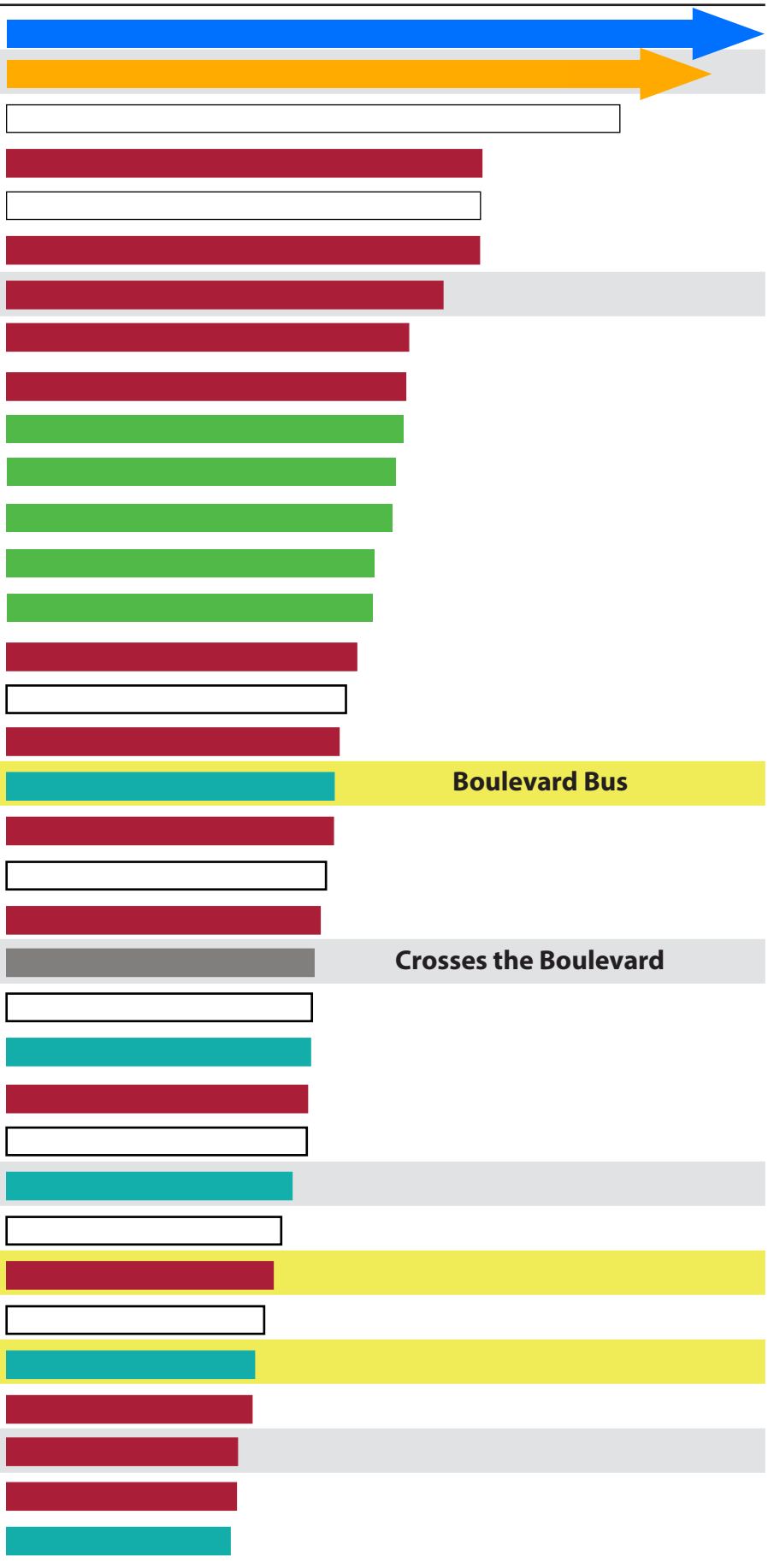
Buses make up...



But they carry...



#	Route	Daily Ridership
1	MFL	187,449
2	BSL	124,218
3	Paoli-Thorndale	22,938
4	18	17,760
5	Lansdale-Doylest..	17,706
6	23	17,672
7	47	16,299
8	G	15,011
9	52	14,900
10	11	14,822
11	13	14,512
12	36	14,406
13	34	13,723
14	10	13,645
15	33	13,061
16	Trenton Line	12,656
17	17	12,400
18	14	12,214
19	60	12,187
20	West Trenton Line	11,906
21	56	11,690
22	26	11,460
23	Media-Elwyn Line	11378
24	42	11,327
25	66	11,216
26	Manayunk-Norris..	11187
27	57	10,634
28	Wilmington Line	10,226
29	R	9,927
30	Warminster Line	9,586
31	K	9,228
32	3	9,132
33	58	8,586
34	21	8,545
35	65	8,311

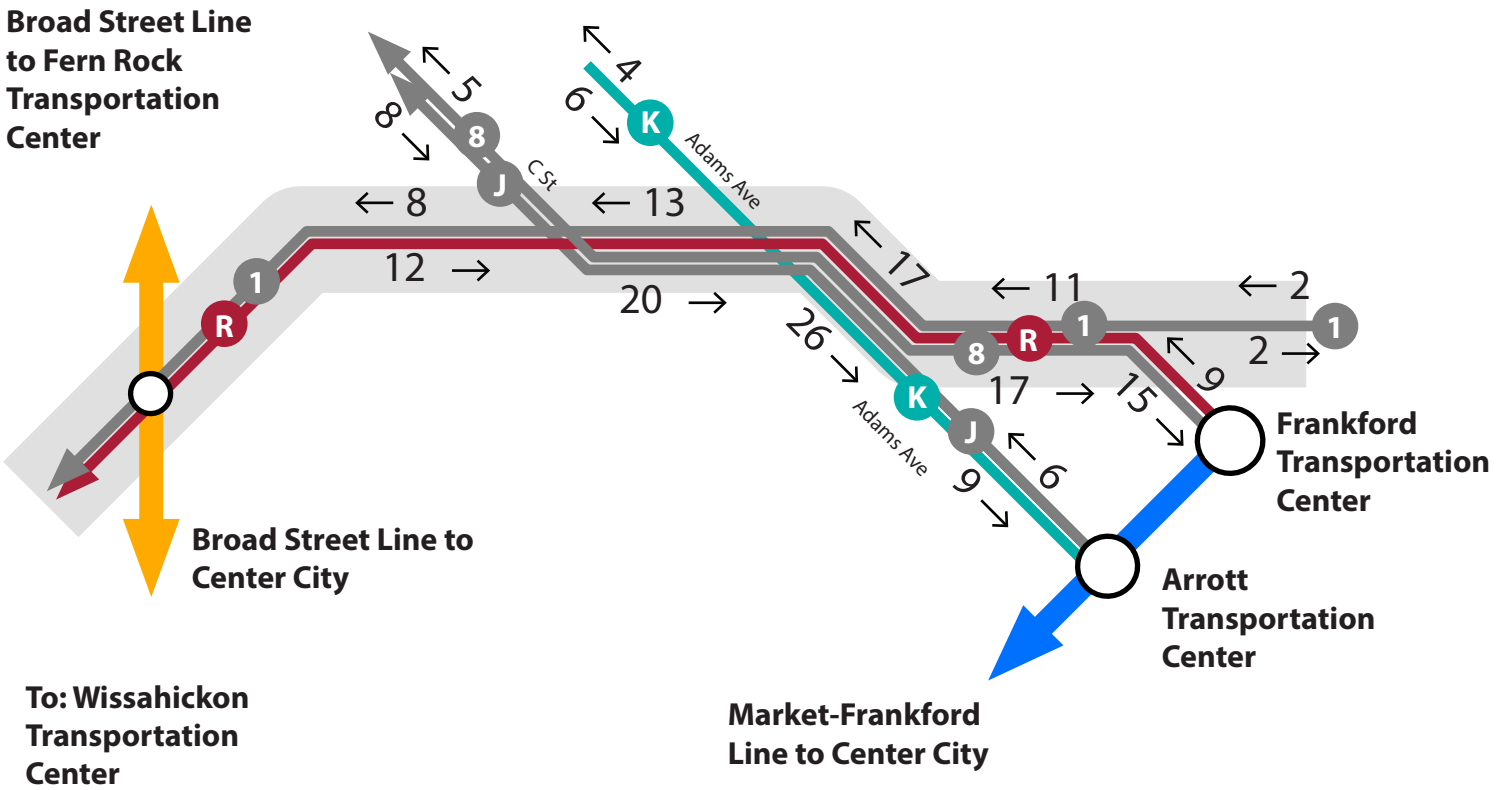


Transit Services
Diagram

The most transit-heavy portions of the Boulevard host so many overlapping bus routes that they offer a superfrequency that surpasses even the Market Frankford Line during the peak hour.

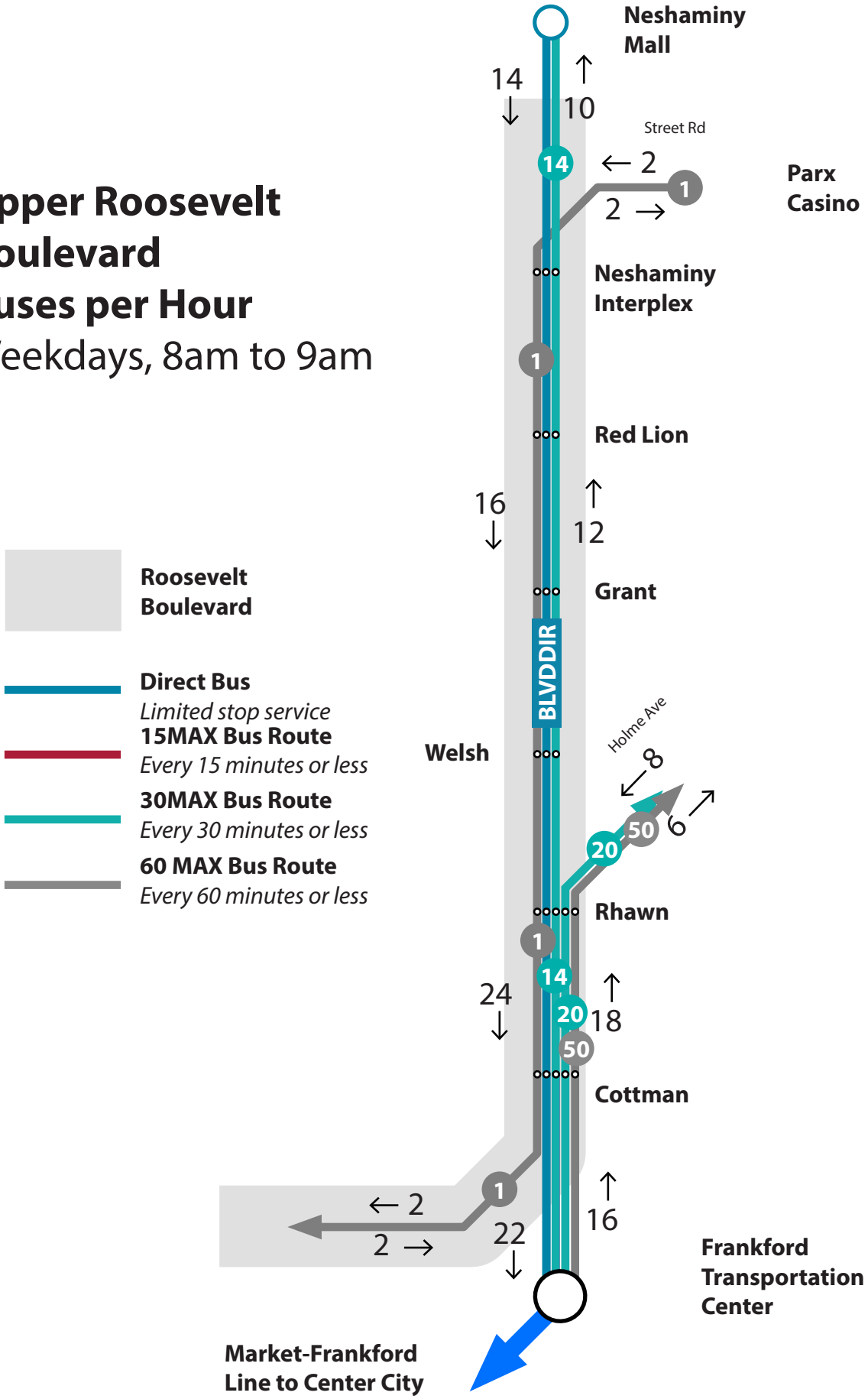
While all of Roosevelt Boulevard has transit, certain portions of the corridor serve as key transit trunks with massive capacity and nearly unparalleled service frequency. For example, the Boulevard from Rhawn Avenue and Bustleton Avenue has multiple highly frequent bus lines converging and overlapping. This approximately 2-mile corridor sees on average one bus every 2 minutes and 30 seconds during the morning peak - even better frequency than the Market-Frankford Line, which operates at 4 minute headways during the same time period.

Lower Roosevelt Boulevard
Buses per Hour
Weekday, 8am to 9am



Upper Roosevelt Boulevard Buses per Hour

Weekdays, 8am to 9am

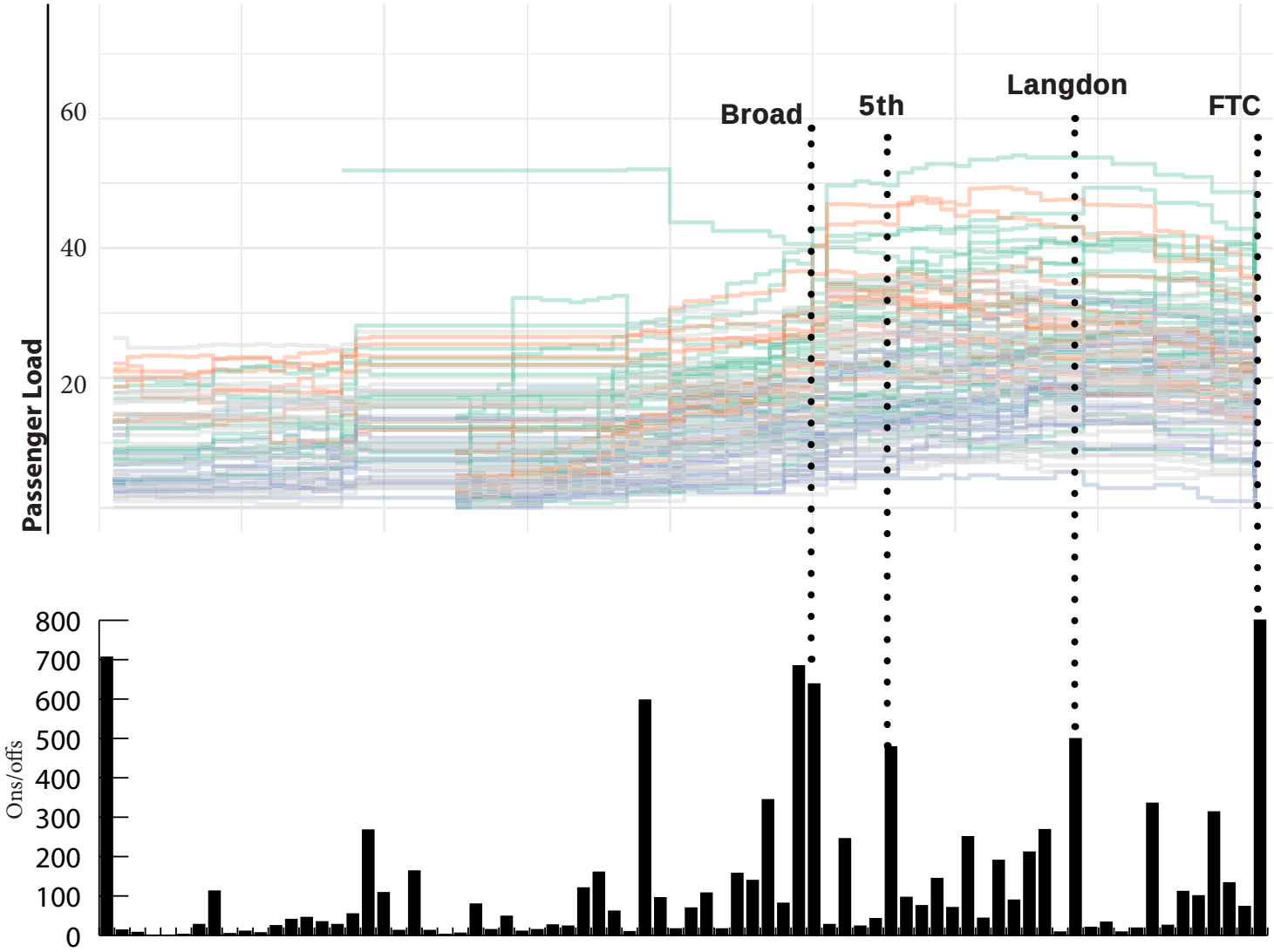


Transit Ridership
Core Routes Focus

The 14 and the R are most crowded on the Boulevard between Broad Street and Cottman Avenue. The routes depend heavily on their connectivity to FTC.

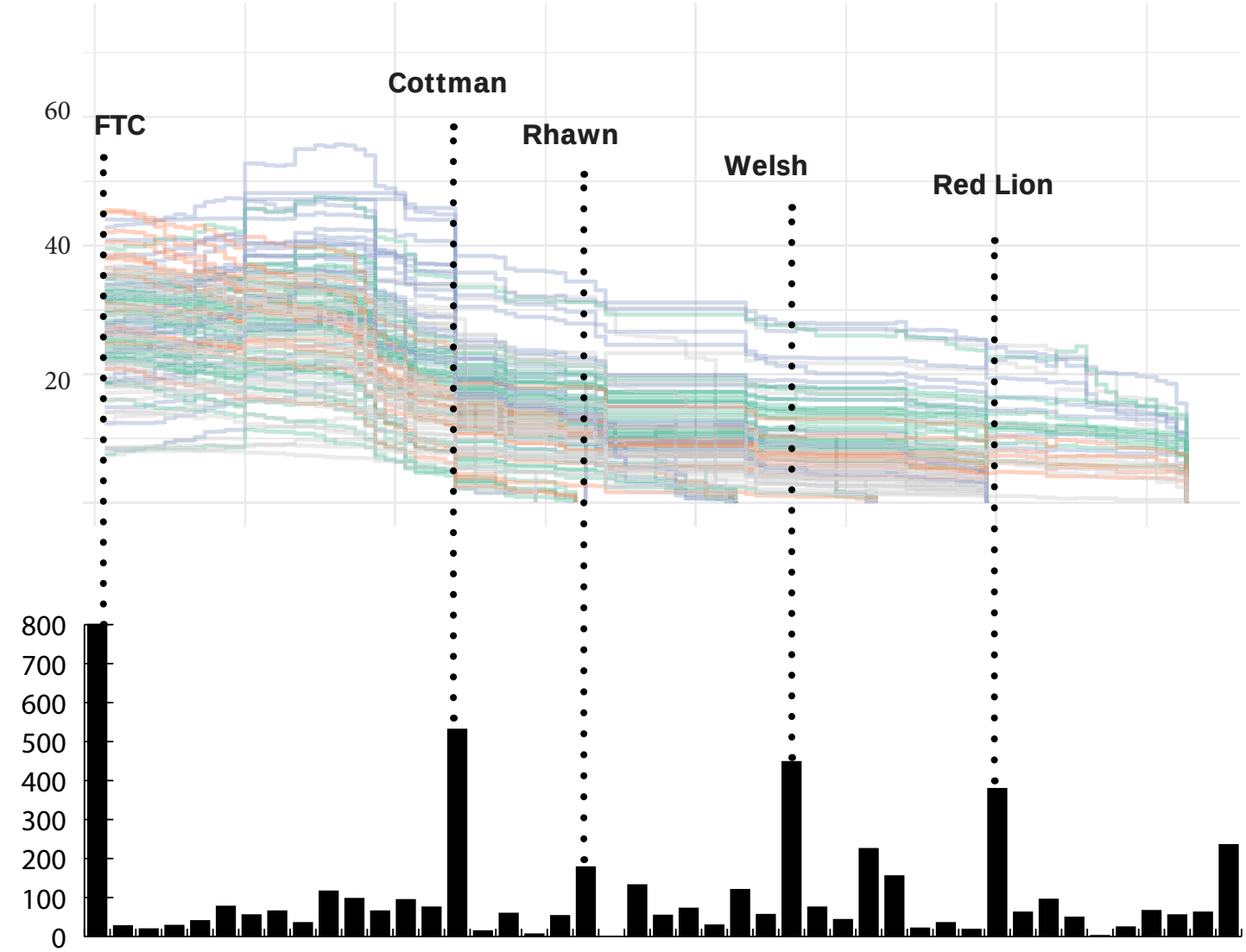
The Route 14 and the Route R are the core routes for the Upper Boulevard and Lower Boulevard, respectively. They each represent a large portion of transit riders, and they follow the Boulevard for the majority of their routes. The load profiles below show the flow of passengers heading in the eastbound/northbound direction.

R Eastbound: WTC to FTC



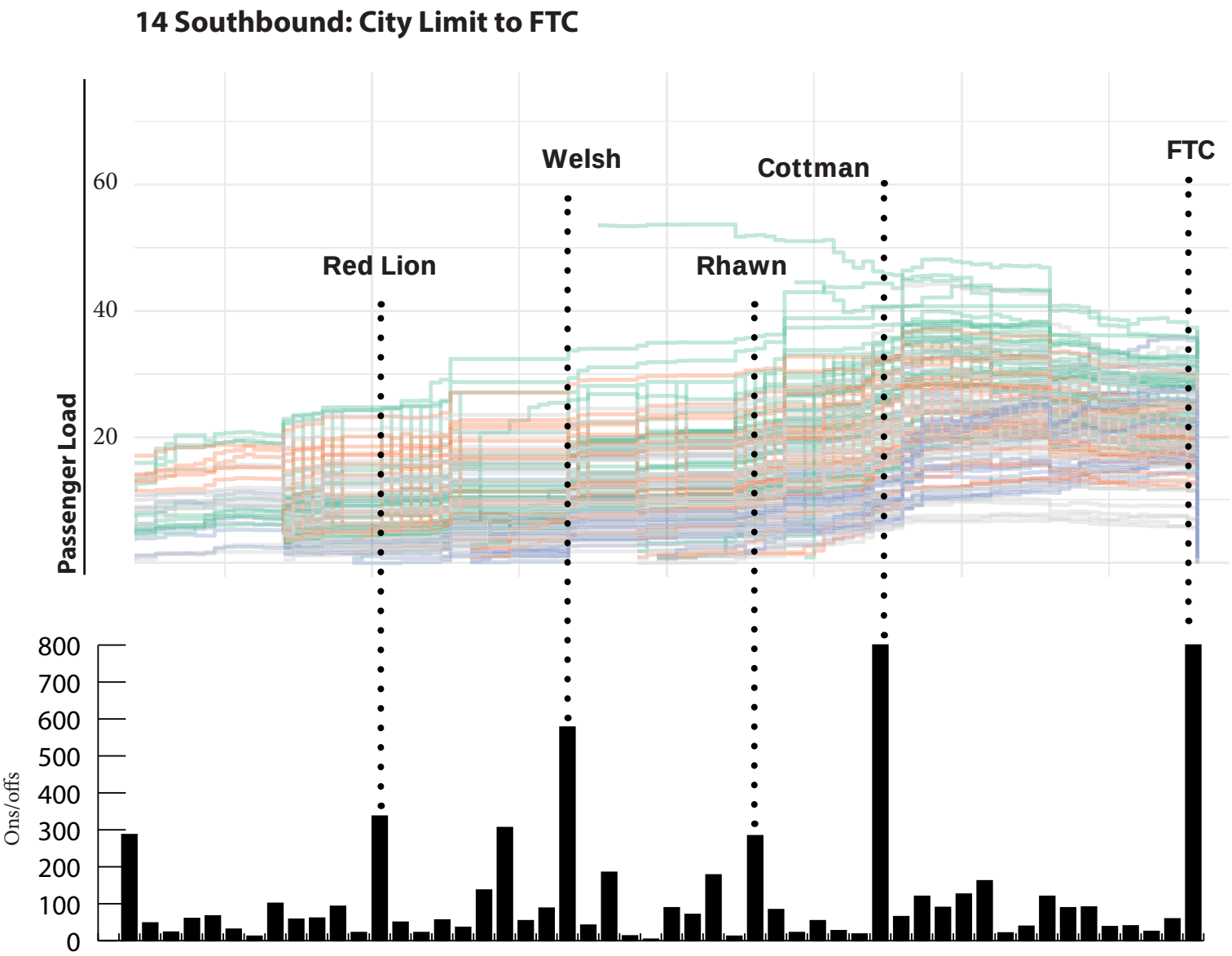
The load profiles show that the Route R is most utilized between Broad Street and FTC, when it runs on Roosevelt Boulevard. In this direction, it become significantly more crowded east of Broad Street, and maintains a large load until the end of the line at FTC. Likewise, the Route 14 picks up a large amount of passengers at FTC, and steadily distributes them along the Boulevard.

14 Northbound: FTC to City Limit



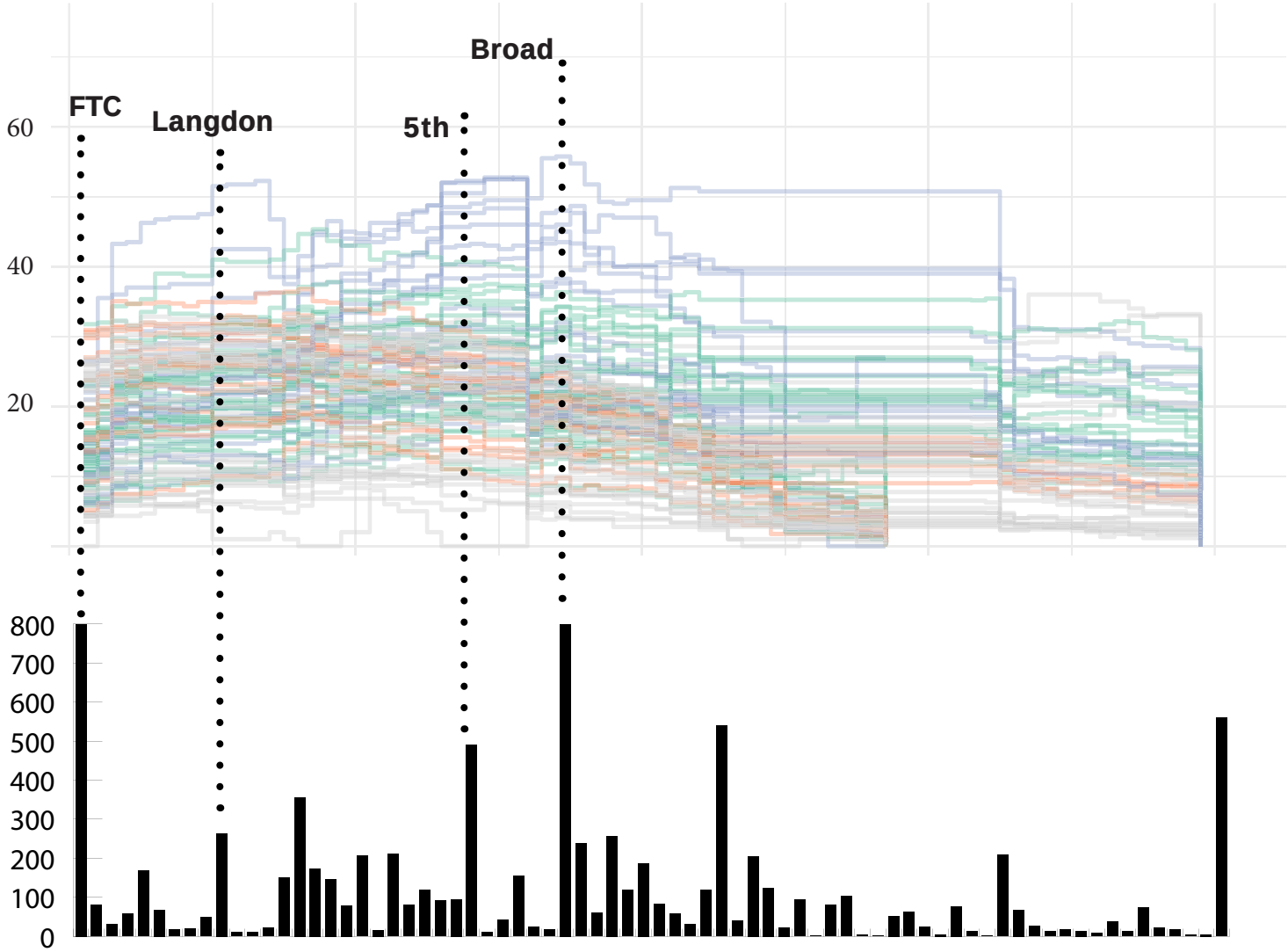
Transit Ridership
Core Routes Focus

The load profiles below show the flow of passengers heading in the southbound/ westbound direction.



The load profiles show that the Route 14 becomes more crowded as it moves south towards FTC, where many of its riders likely transfer to other services, like the Market Frankford Line. The R, for comparison, picks up a significant number of passengers at FTC, but also picks up additional westbound passengers.

R Westbound: FTC to WTC

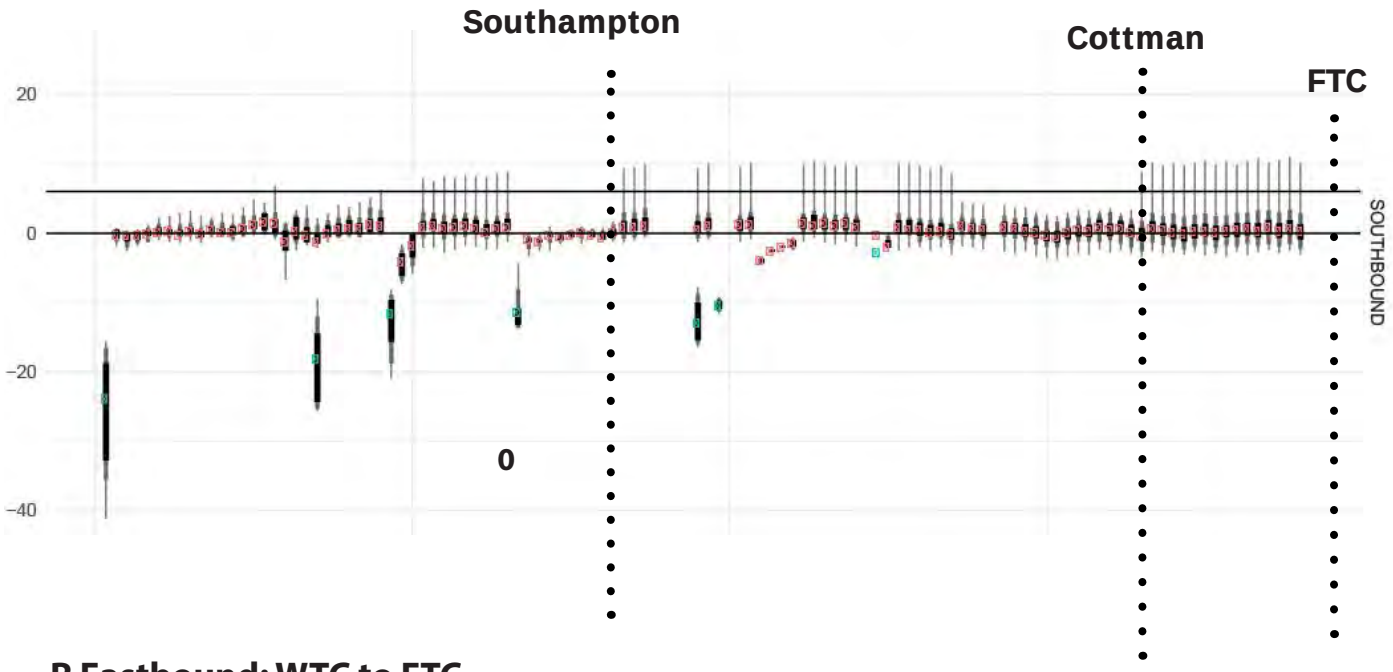


Transit On-Time Performance (OTP)

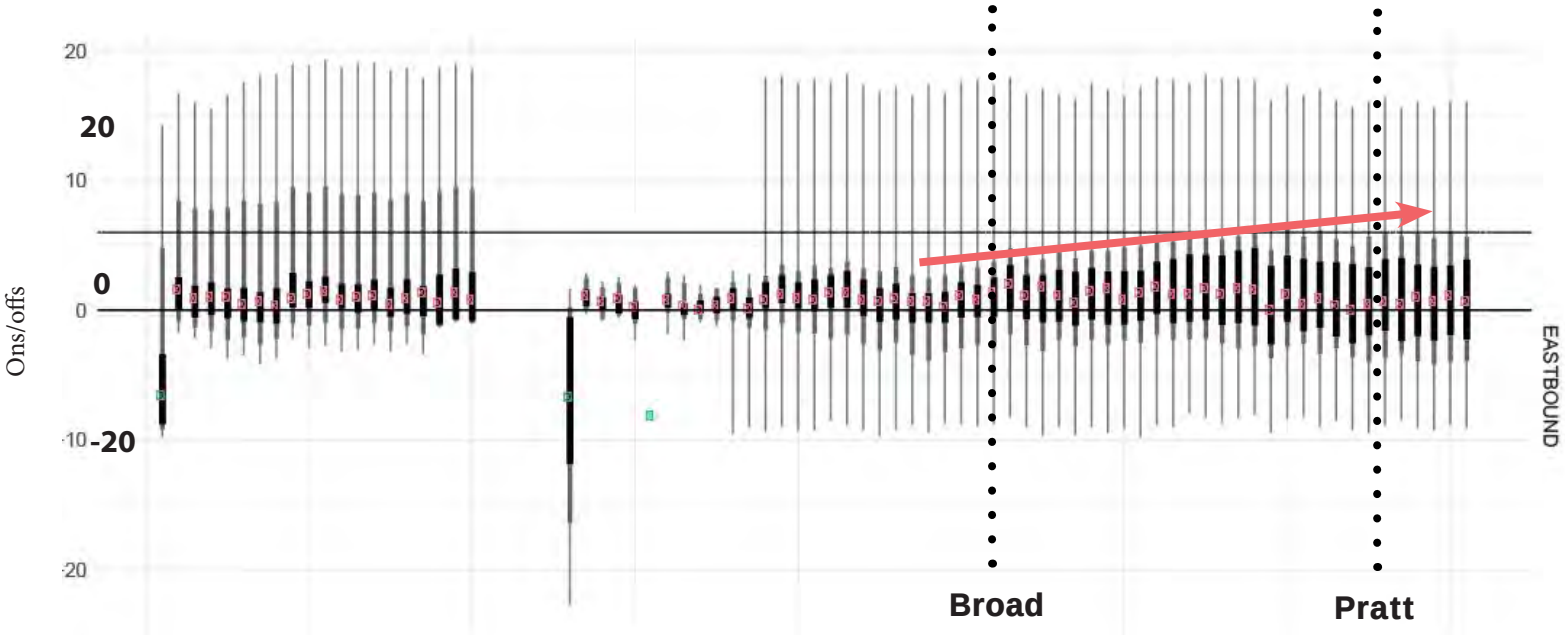
Core Routes Focus

The OTP graphs below show typical on time profiles for two of the Boulevard's major routes, the R and the 14.

14 Southbound: Oxford Valley Mall to FTC



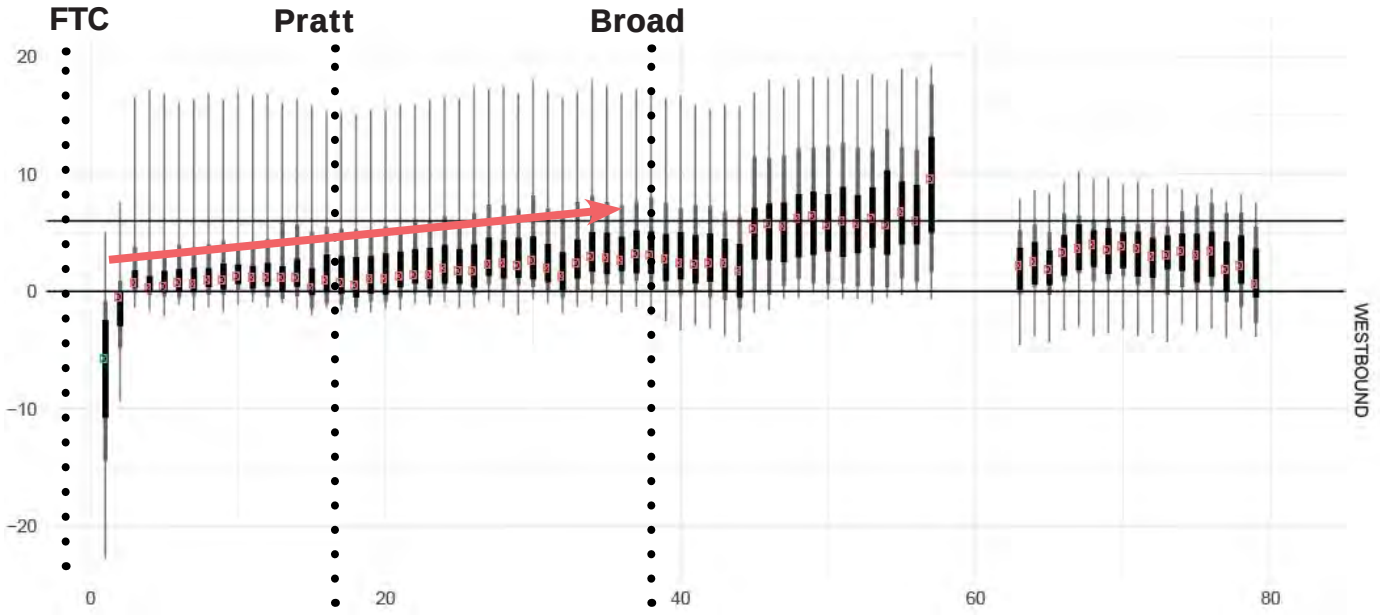
R Eastbound: WTC to FTC



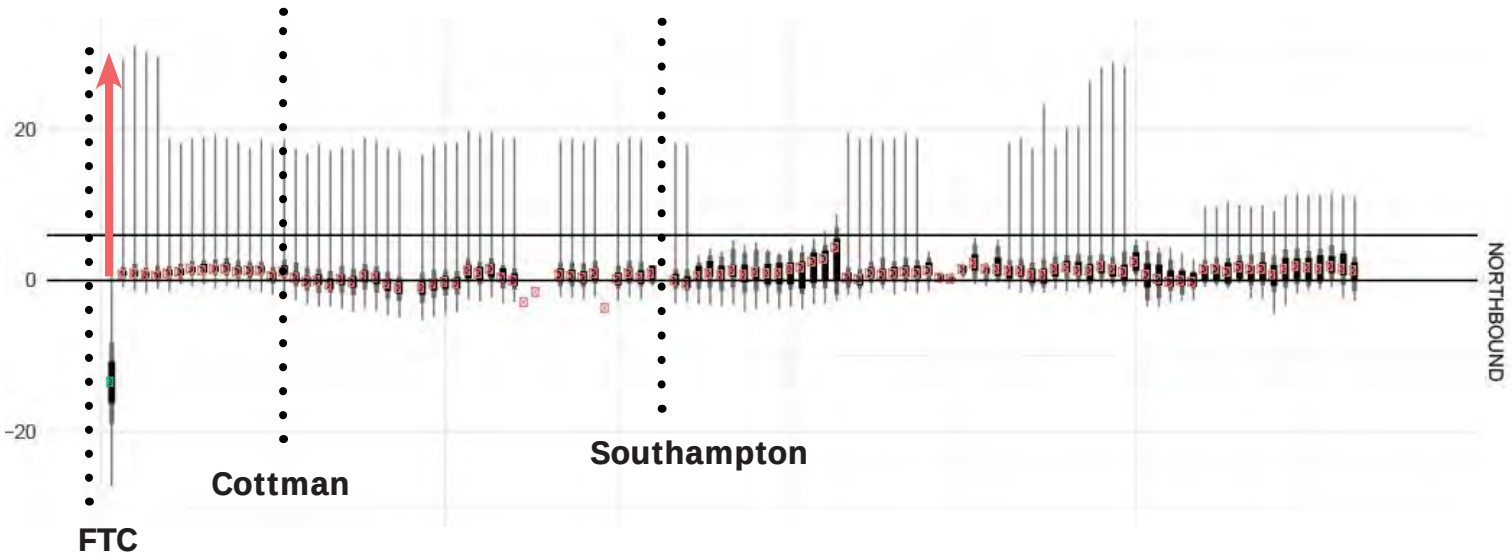
The 14 southbound appears to commonly adhere to its schedule, while the 14 northbound commonly has OTP problems, especially before Cottman Avenue, sometimes with an OTP variation of up to 30 minutes late.

Similarly, the R eastbound steadily accumulates lateness east of Broad Street, and the R westbound experiences similar issues between FTC and Broad Street.

R Westbound: FTC to WTC



14 Northbound: FTC to Oxford Valley Mall



Transit Space

Eyes on the Street

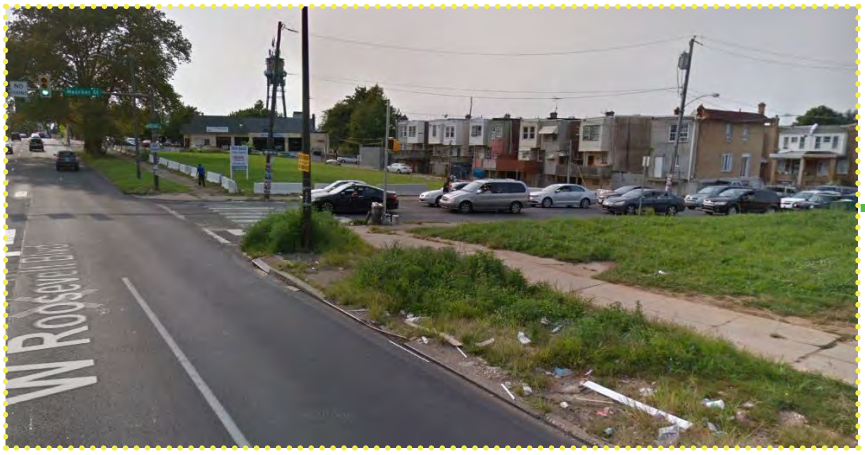
Despite the remarkable transit volumes operating on Roosevelt Boulevard, and the corridor's importance within the SEPTA network, transit is mostly invisible.

While up to 29% of Boulevard users are bus riders, none of its roadway area has been dedicated to transit. Even on the curb, bus stops are often difficult to spot, overgrown with vegetation, blocked by curb cuts or parked cars, and dangerous to access.

This page shows a typical Boulevard cross section and bus stop, located at Mascher Street.

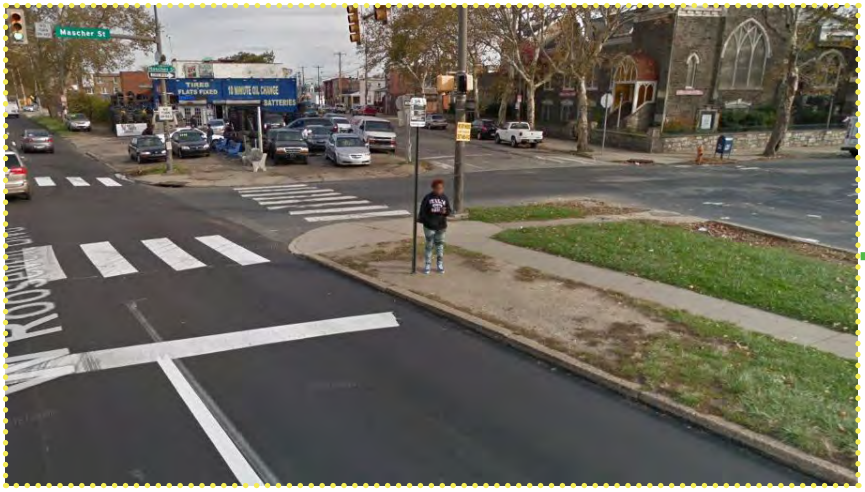
Mascher - WB
119 people per day

- Overgrown
- Strewn with trash
- Poor signage/not visible
- Broken sidewalks



Mascher - EB
144 people per day

- Unpaved boarding area
- No amenities
- Decent signage
- Missed opportunity



Transit on Roosevelt Boulevard is **264%** more productive with existing space than cars.

253 feet

144 feet (12 lanes)
Primarily vehicles

1,014 People per foot per day

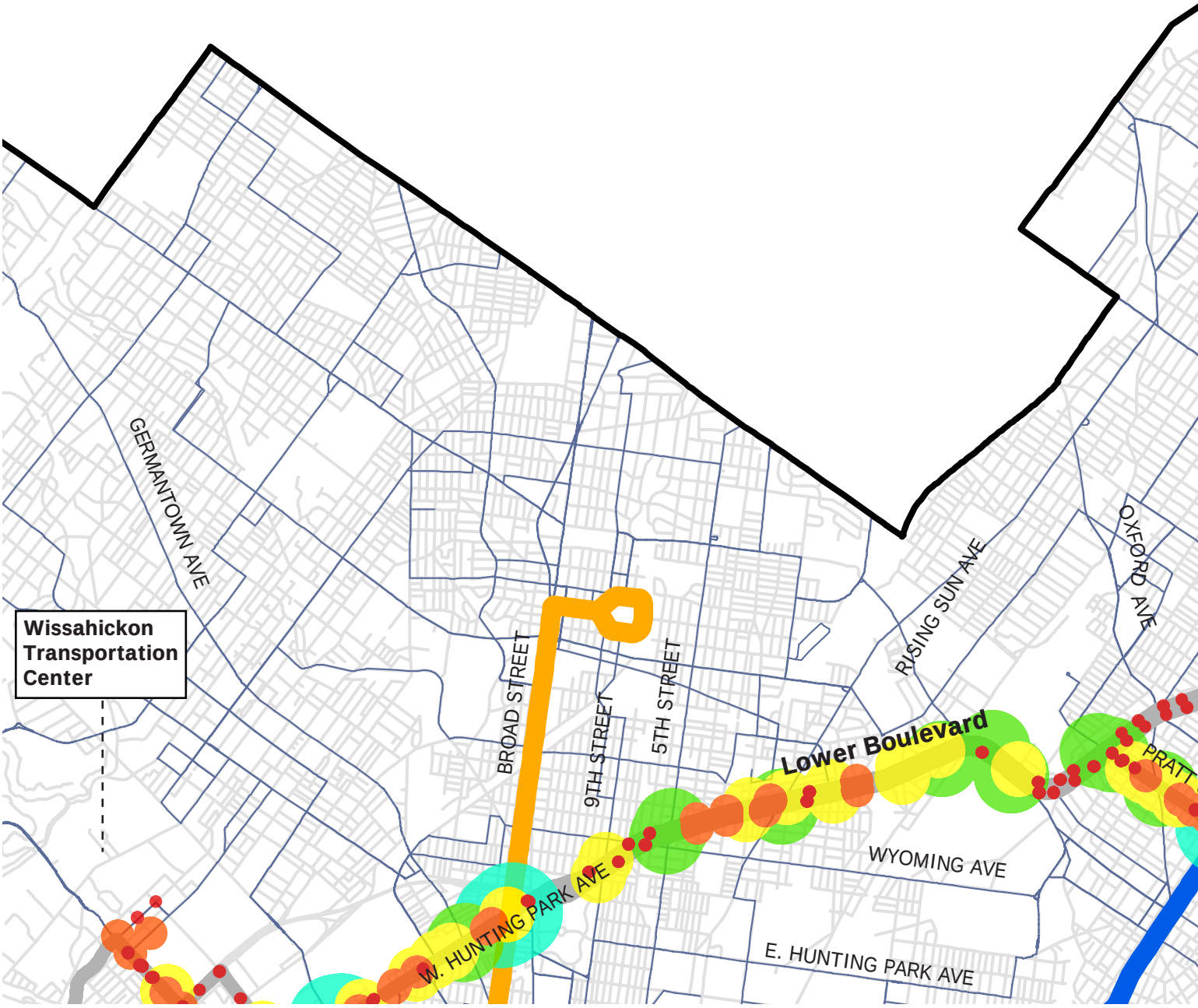
24 feet (2 lanes)
Shared buses/vehicles

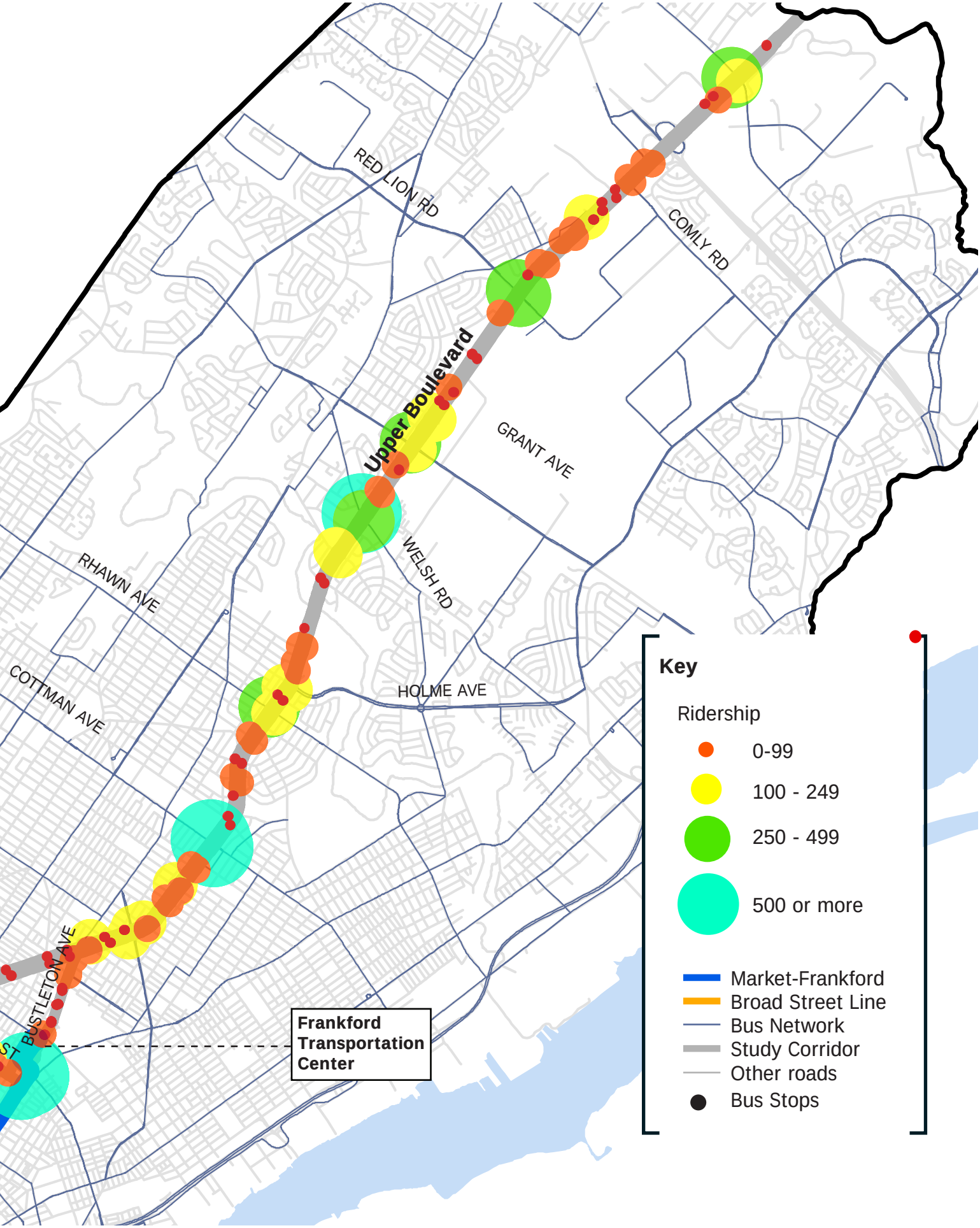
2,685 People per foot per day

Transit Space

Bus Stops - Ridership

Bus stops on the Boulevard vary dramatically in usage. Some accommodate hundreds or thousands of people per day, while some serve a handful, or none. Ridership tends to be heavily concentrated at bus stops which provide transfers to cross routes, or which are located at multiple converging bus routes. High ridership bus stops also tend to be distributed evenly throughout the corridor, making stop prioritization easier to imagine.




RED LION RD
COMLY RD
Upper Boulevard
GRANT AVE
WELSH RD
RHAWN AVE
COTTMAN AVE
HOLME AVE
ST BUSTLETON AVE
Frankford Transportation Center
Key
Ridership
0-99
100 - 249
250 - 499
500 or more
Market-Frankford
Broad Street Line
Bus Network
Study Corridor
Other roads
Bus Stops

Roosevelt Boulevard Local Bus Stop Improvement Program

PART 2

City-SEPTA Workshop

In response to Part 1 of this report, OTIS worked with SEPTA to complete a visual audit and bus stop ridership analysis (2017) to develop draft recommendations for changes at each of the 142 local bus stops along Roosevelt Boulevard, from Broad Street to the Philadelphia County line shared with Bucks County. These draft recommendations were further reviewed in a workshop with representatives from SEPTA, OTIS, Streets Department, and the Philadelphia City Planning Commission in order develop a proposal for changes at bus stops.

Below is the typology of recommendations at local bus stops:

Direct Bus Stations	• Stations built in 2017 as part of Direct Bus, Phase A • Stations to be built as part of Direct Bus, Phase B
Improve	• Recommendation for relocating the bus stop • Recommendation for a new bus shelter or seating • Recommendation for a concrete landing pad • Stop has already been improved with a new bus shelter
No Change	• Stop does not require any other changes
Elimination	• Unsafe or inadequate pedestrian infrastructure

Currently, of all bus stops on the Boulevard...

8% have shelters

70% have a crosswalk

96% have a sidewalk

23% are located in a curb cut

30% are not located at a signal

14% have no opposite direction pair

68% have a ridership of fewer than 100 boards and alights per day

Recommendation Process

Rider safety was the primary reason for determining whether the local bus stop should be improved or eliminated. This included making sure all local bus stops are ADA-accessible and are located where riders can safely cross the street. Currently, there are bus stop locations along Roosevelt Boulevard that put riders at risk, such as stopping just far enough from an intersection, encouraging mid-block crossing. The number of riders influenced recommendations for improvements. Bus stops with over 75 or more daily riders boarding are recommended to have a new bus shelter. Bus stops with between 40 and 75 riders boarding per day were identified as locations to explore seating.

Stop eliminations were recommended primarily where there was not adequate, safe pedestrian infrastructure. Stops were also eliminated if the spacing between the stops was too close, which often disperses a low number of riders to multiple stops, creating operational challenges. The recommendations also ensured that riders who use that stop still have close access to another stop by ensuring the distance between two stops typically does not exceeding 1,000 to 1,300 feet.

Final Recommendations

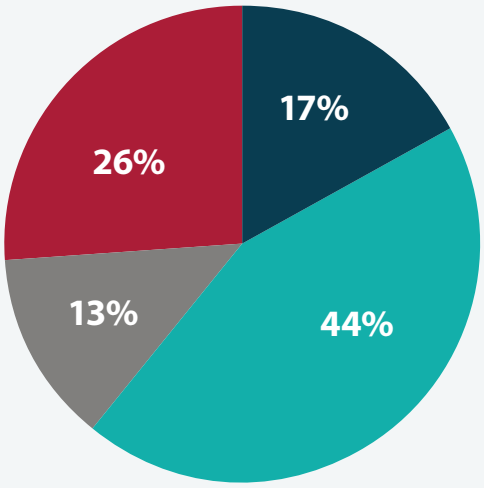
Of the 142 bus stops on Roosevelt Boulevard, the process improvements for 44% of stops serve 31% of riders. To improve safety, 26% of stops are proposed to be eliminated. However, these stops only serve 8% of riders. With the improvements complete and stops eliminated for safety, almost all riders on the Boulevard will board at either a Direct Bus stop or an improved local bus stop. This will be a significant improvement for the 23,000+ people that board and alight buses every day on Roosevelt Boulevard.

	Number of Stops	Percent of All Stops	Number of Riders	Percent of All Riders
Direct Bus	24	17%	13,464	58%
Improvement Planned	62	44%	7,090	31%
No Change	19	13%	739	3%
Stop Elimination	37	26%	1,791	8%

> 75 riders per day	>>>>>	*Pursue bus shelter*
40 to 75 riders per day	>>>>>	*Pursue seating/bench*
Unsafe or inadequare pedestrian infrastructure	>>>>>	*Pursue elimination*

With the improvements complete and stops eliminated for safety, 89% of riders on the Boulevard will board at either a Direct Bus stop or an improved local bus stop.

Percent of all *stops*



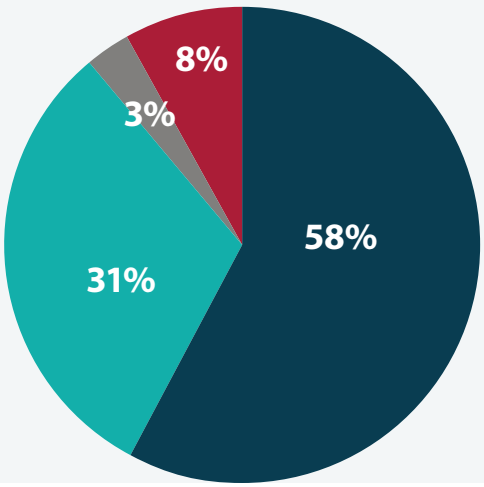
Direct Bus

Improvements Planned

No Change

Stop Elimination

Percent of all *riders*



The results are bus stop improvements that are **prioritized by ridership**; designed to impact the most people.

VISION 2040

Moving Forward

Direct Bus was the first step at imagining and implementing better transit on the Boulevard, however, with limited stations and no dedicated right of way.

The recommendations within this report provide a framework to reaching improved transit service on the Boulevard to 2025. However, they also begin to create a stop pattern of prioritized stops more characteristic of higher capacity, dedicated modes such as BRT and Rail Transit. It is our hope that the 2025 recommendations begin to lay the groundwork for more ambitious 2040 solutions in which transit plays a major role in addressing the Boulevard's inherent problems.

Transit is the best tool we have to move large amounts of people efficiently. If the Boulevard's safety issues are to be addressed, transit must be given a more prominent role.

Next Steps

The next steps should progressively lead to safer, higher capacity, quicker and more convenient transit that is more visible on the Boulevard. The recommendations for 2025 should lead to and support the advancement of more long-term solutions for transit along Roosevelt Boulevard. The City of Philadelphia, SEPTA, and when appropriate, PennDOT, should complete the following:

- Integrate optimal bus stop locations and stop design guidelines when advancing intersection geometric improvement into engineering
- Develop a public education campaign to communicate bus stop location changes prior to implementation
- Eliminate bus stops that meet the recommended criteria, while advancing the improvements of bus stop locations, to be implemented as a system-wide change in 2021 and 2022
- Continue to participate in the Roosevelt Boulevard Route for Change Program to further develop 2040 alternatives
- Conduct 2040 alternative analysis to further investigate the use of dedicated right of way along Roosevelt Boulevard for either BRT or light rail

Route for Change

Transforming The Boulevard

Roosevelt Boulevard

Section 2 – Appendix 10

Business Access and Transit Lanes White Paper

December 2017

The purpose of this memorandum is to identify best practices for delineating Business Access and Transit (BAT) lanes and to compare options for signage and striping of the lanes. The memorandum includes brief descriptions of the:

- proposed BAT lanes for Roosevelt Boulevard as part of the *Route for Change* program,
- potential benefits of the lanes,
- standards for BAT Lane delineation,
- existing BAT lanes in other peer cities,
- options for signing and striping of BAT lanes, and
- advantages and disadvantages of the signing and striping options.

1. Proposed BAT Lanes

While bus ridership and frequency are relatively high along Roosevelt Boulevard, unreliable service and relatively long passenger travel times tends limit the appeal of transit use in the corridor. During the am and pm peak hours, transit travel times can be nearly twice as long as a comparable private automobile trip. This is a direct result of the bus routes having to share the congested roadway network and make frequent stops for passenger boarding and alighting. In response to this deficiency, the Roosevelt Boulevard *Route for Change* program includes the introduction of Business Access and Transit (BAT) Lanes in the outermost northbound and southbound curb lanes of the roadway.

Initially, the northbound BAT lane would extend from Harbison Avenue to the City/County Line and the southbound BAT lane would extend from the City/County Line to Cottman Avenue. In the future, the BAT lanes would potentially extend between Pratt Street and Broad Street along Roosevelt Boulevard (to be determined in future analysis). Ideally, the BAT lanes would be in effect for 24 hours a day but may only be in effect for am and pm peak hours if full-time use is not feasible.

BAT Lanes are specially marked travel lanes restricted for use by buses and right turning vehicles only, which provides unimpeded flow of buses and still allows vehicular access to cross-streets and driveways for businesses and residences. Travel in this lane for non-transit vehicles is limited to one city block for right turn access. The purpose of BAT lanes is to allow buses to travel along the corridor with minimum delay, increasing transit speed and reliability while maintaining vehicular accessibility to properties along the route. The specialized lanes optimize the use of limited street space to move more people, help the larger transit system operate efficiently, improve reliability, and provide more predictable transit travel times by bypassing congested general travel lanes.

Figure 1: BAT Lane and Signage in Seattle

Source: Greater Greater Washington

The proposed BAT Lanes would accommodate both SEPTA's regular local bus service and the new Boulevard Direct bus service that was launched on October 22, 2017. The Direct Bust service utilizes specially branded 60' buses with enhanced stations, shelters, benches, transit signage, and other customer amenities. The new service extends along Roosevelt Blvd from the Frankford Transportation Center to the Neshaminy Mall. Boulevard Direct is an enhancement of the Route 14 bus service providing frequent and faster service with fewer stops. The Route 14 service will also continue to operate along the corridor.

2. Benefits of BAT Lanes

The separation of transit in BAT lanes from other vehicles in general-use lanes improve safety by reducing bus/vehicular conflicts. Often when people driving are stuck behind a bus in the curb lane, they'll try to merge into the adjacent lane and pass on the left, causing delays or "friction" that slows traffic and increases the potential for traffic accidents. On busy transit routes, the curb lane where buses travel often doesn't operate at full capacity because of these merges. Typically, fewer than 25 percent of drivers with three available travel lanes will stay in the curb lane[1]. Because transit and cars move at different paces, separate facilities can also help improve overall traffic flow on the roadway.

Reserved lanes for bus transit also have the potential to boost transit ridership. Los Angeles, Cleveland, and Boston have established reserved bus lanes on their busiest transit corridors and subsequently have seen transit ridership grow, with minimal impact to traffic:

[1] *Best Practices in Rapid Transit System Design: http://www.smartergrowth.net/wp-content/uploads/2015/08/2015-BRT-best-practices-guide.pdf*

- In Los Angeles, 25 percent of Orange Line riders previously drove; another 28 percent of riders previously did not make the trip at all.[2]
- In Cleveland, 30 percent of ridership on the HealthLine is due to new trips to transit.[3]
- In Boston, two years after opening, more than 30 percent of riders on Phase I of the Silver Line were new to transit.[4]

All the local bus routes that operate in the portion of the corridor served by the proposed BAT lanes are forecast to experience travel time savings when compared to existing conditions. The Roosevelt Boulevard BAT Lanes are forecast to result in an 8 to 14 percent reduction in bus travel times in the northbound direction and a 1 to 7 percent reduction in the southbound direction.[5]

3. Guidance on BAT Lane Pavement Markings and Signage

This section describes guidance and standards for pavement markings and signage for bus only and BAT lanes. This information and the example BAT lanes from other cities described in Section 4 are used to develop potential options for signing and striping BAT lanes for Roosevelt as presented in Section 5. The introduction of BAT lanes requires the removal of the existing lane striping in the outer curb lanes, placement of new striping in these lanes, and the installation of signage along the outer curb lanes to inform drivers of the new lane configuration and vehicular restrictions. Lane widths for the dedicated BAT lanes should be between 11'-12' but can be as narrow as 10' at stops.

Pavement Markings

The 2009 Manual on Traffic Control Devices (MUTCD) issued by the Federal Highway Administration (FHWA) have specific guidance regarding signing and pavement markings for reserved lanes. Most of these standards relate to HOV and light rail facilities but it is noted that these standards can be applied to bus lanes. Although many reserved bus lanes used the diamond symbol on pavement markings and signage, the MUTCD indicates that it should only be used if the bus lane is also available for all types of High Occupancy Vehicles (HOV).

MUTCD standard lane markings for right-hand side preferential bus lanes are shown in Figure 2. For reserved bus lanes, the preferential markings should consist of the words BUS ONLY. The lettering should be white and positioned laterally in the center of the transit lane, with the words ordered in the direction of travel. Spacing of the pavement

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[2] *Metro Orange Line BRT Project Evaluation, Federal Transit Administration: http://www.fta.dot.gov/documents/FTA_Research_Report_0004_FINAL_2. pdf*

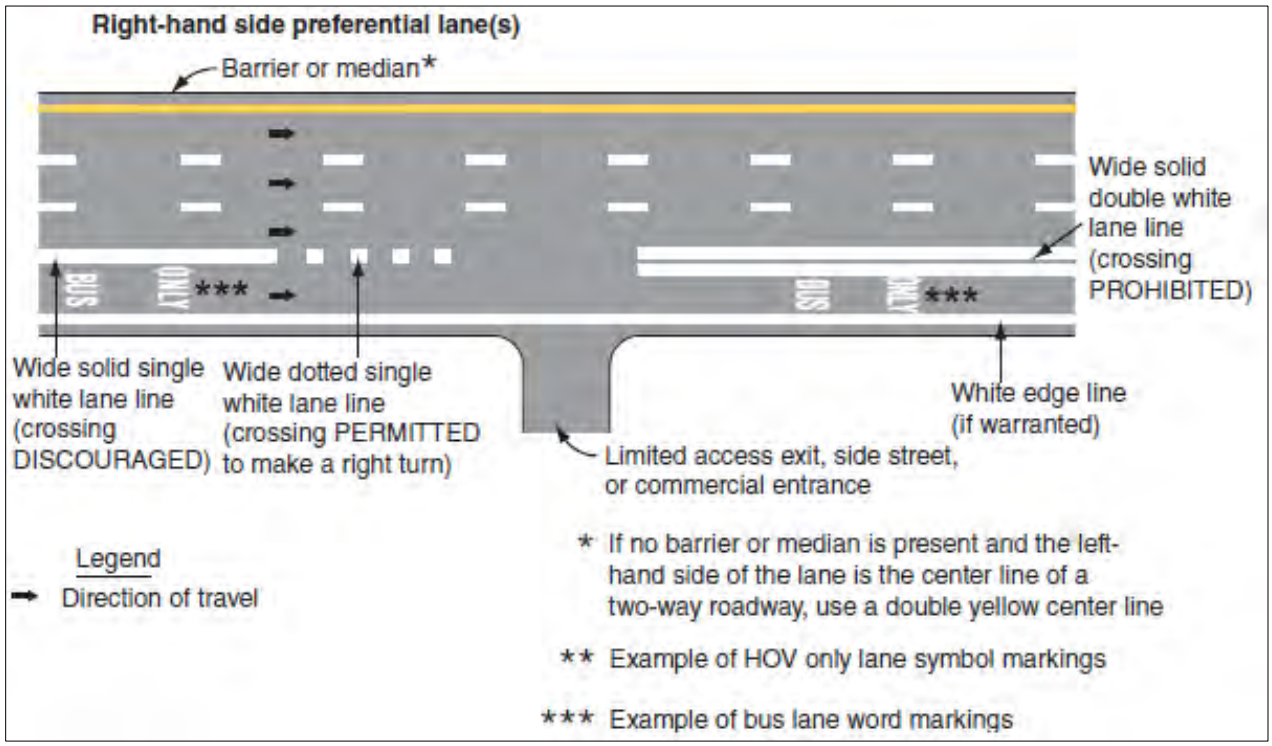
[3] *Peer-to-Peer Information Exchange on Bus Rapid Transit (BRT) and Bus Priority Best Practices, Federal Transit Administration. http://nacto.org/docs/usdg/brt_report_panero.pdf*

[4] Ibid

[5] *Roosevelt Boulevard Enhanced Bus Service Operational Analysis, Delaware Valley Regional Planning Commission, January 2017*

markings should be based on the prevailing speed, block lengths, distance from intersections, and other factors and may be spaced as close as 80 feet apart.

Figure 2: MUTCD Pavement Markings for Right-Hand Side Preferential Bus Lanes



Source: Manual on Uniform Traffic Control Devices

As shown in Figure 2, the separation of the bus lane from the general-use lanes can be demarcated with combinations of the following pavement markings:

- Two wide white solid lines indicating that entering the bus lane is prohibited.
- A single wide solid white line where crossing into the bus lane is allowed but discouraged.
- Wide dotted single white lane to indicated that crossing into the bus lane is permitted for right turning traffic. The dotted line can be for a fixed distance based on volume of right turns and engineering judgement.

Some BAT and bus only lanes use a solid red colored painted surface to more clearly differentiate the lanes from general-use lanes. The use of red colored pavement for bus-only lanes is currently experimental and not compliant with MUTCD. The use of colored pavement in these settings requires approval from the FHWA's Office of Transportation Operations. Agencies that desire to experiment with colored pavement should only do so where an engineering study can determine that increased travel speeds will be expected by the public transit vehicle, reduced overall service time through the corridor will be expected by the public transit vehicle, and the implementation of the colored pavement to a converted general-purpose lane will not adversely affect the traffic flow in the remaining general-purpose lanes.

The Transit Street Guide developed by the National Association of City Transportation Officials (NACTO) indicates that it is critical that curbside bus lanes be designated using single or double solid white lines as well as a stenciled “Bus Only” pavement marking. The NACTO guide also recommends that the transit lane be marked with red color.

Signs

The MUTCD indicates that reserved lanes should include ground-mounted preferential lane signs in conjunction with overhead preferential lane signs. The signs should indicate that the lane is for buses only. For BAT lanes, the signs typically indicate that right turning traffic is permitted. The sign spacing should be determined by engineering judgement based on prevailing speed, block length, distance from adjacent intersections, and other considerations. Appropriate “No Parking” and “No Stopping” signs should also be placed along the curbside. In locations where there are overhead intersection lane control signs, the transit priority lane should have an overhead “BUS LANE” sign.

The NACTO Transit Design Guide indicates that signage must designate the transit lane is restricted (i.e. “BUSES ONLY”) and be placed on the curbside or overhead.

4. Existing BAT Lanes in Other Cities

The following describes BAT lane pavement markings and signage practices in five large, urban settings similar to the Roosevelt Boulevard corridor.

Metroway - Arlington and Alexandria, VA

The Metroway is a premium bus service with BAT lanes located in the Crystal City area of Arlington and the northern part of the City of Alexandria in Virginia. Metroway service offers increased frequency, late night service and consolidated bus stops with real-time bus arrival screens. The Metroway is the DC region’s first Bus Rapid Transit system. According to the Washington Metropolitan Area Transit Authority, the service increased daily ridership in 2015 by 23 percent compared to the route it replaced.

During the peak periods, the Metroway segment along Crystal Drive between 26th St and 18th Street operates along a dedicated curb-side bus-only lane. Right turning vehicles are permitted to utilize the bus lane. The BAT lanes are separated from the general-use lanes by a solid white line pavement and a diamond shaped pavement marking. Motorists are informed of the lane restrictions by a combination of overhead variable message signs and roadside sign as shown in Figure 3. The overhead sign at signalized intersections caries the diamond symbol and indicates that the lane is for buses only. The variable message signs are only illuminated during the peak hours when the lanes are enforced. The roadside sign also shows the diamond symbol and indicates that the right lane is for authorized buses and right turns only. The peak hours when the lanes are in for are also shown on the roadside sign.

Figure 3: Metroway - Arlington and Alexandria VA

Source: HNTB

RapidRide D and E Lines- Seattle, WA

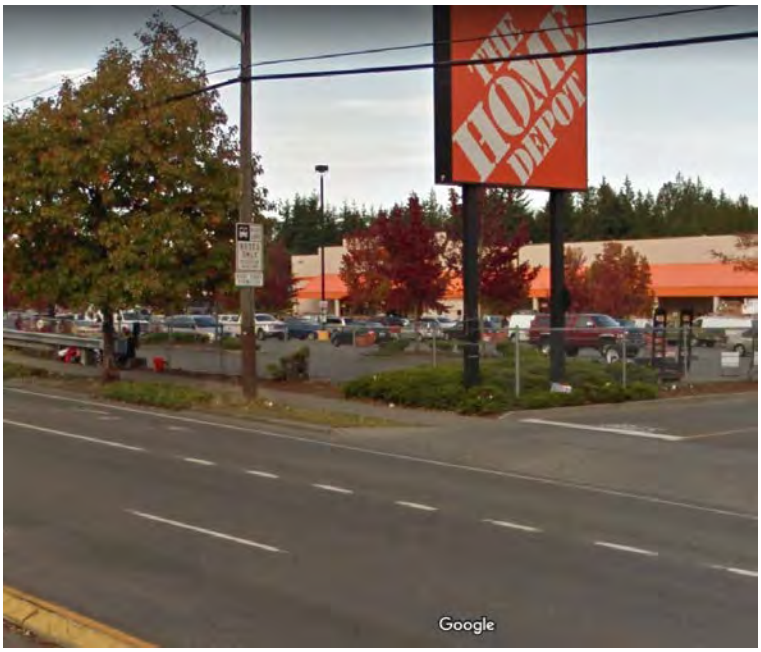
King County Metro in the Seattle, Washington area has implemented the RapidRide system, a network of limited stop bus services with some Bus Rapid Transit features. The network consists of six routes totaling 64 miles that carried riders on approximately 64,860 trips on an average weekday in 2016, comprising about 17 percent of King County Metro's total daily ridership. The system provides shorter and more reliable trip times through exclusive bus, HOV or BAT lanes, and transit signal priority at some key intersections.

The RapidRide D and E Lines include BAT lanes along 15th and Aurora Avenues in Seattle, serving dense urban neighborhoods and retail activity centers just outside the downtown core. The dedicated lanes are delineated by a solid white stripe and Bus Only pavement markings as shown in Figure 4. Figure 5 shows an opening in the dedicated bus lanes, delineated with dashed white line pavement marking, that allow regular motorists to access businesses along the 15th Avenue RapidRide route.

Figure 4: Aurora Ave Bus Lane

Source: Google Streetview

Figure 5: Dashed Line Opening in Bus Lane for Business Access



Source: Google Streetview

Georgia Avenue- Washington DC

In 2016, the District of Columbia Department of Transportation (DDOT) repurposed the two outside lanes along a stretch of Georgia Avenue NW as dedicated bus only lanes. Georgia Avenue NW is one of the most frequently used bus routes in the District and the segment between Barry Place NW and Florida Ave NW was among the most congested along the route.

Figure 6 shows the dedicated bus lanes along Georgia Avenue NW. Non-transit vehicles may use the bus lane for 40 feet prior to making a right turn. Taxis and cyclists are also allowed to utilize the bus lane. The BAT lanes are separated from the general traffic lanes by two solid white lines and “Bus Only” pavement markings. The BAT Lanes are also delineated using a red colored high friction pavement surface and accompanying pavement markings. The coloration and texture of the pavement help to make it clear to vehicular traffic that the lanes are not for general traffic. The coloration and texture were added to the pavement marking after the lanes were initially opened and DDOT staff have noted that violation of the lanes by general vehicular traffic has declined considerably since those features were added.

Figure 6: Georgia Avenue, DC Bus Lanes

Source: HNTB

Select Bus Service- New York, NY

Select Bus Service (SBS) is the name for Bus Rapid Transit in New York City. There are currently 17 SBS routes along 15 corridors throughout the city. According to the NYC DOT, SBS routes have increased ridership by about 10 percent and have 95 percent customer satisfaction.

SBS utilizes dedicated bus lanes which include Bus Only pavement markings and are colored with dark red terra cotta paint. Right turning vehicles can utilize the bus lanes. In certain locations, the bus lanes are off-set from the curb with the extra space used as parking, as shown in Figure 7. The lanes are separated from the general travel lanes by a solid white stripe and bus only pavement markings.

Figure 7: NYC Select Bus Service

Source: http://www.nyc.gov/html/brt/html/about/sbs-features.shtml

Overhead signage and at least one sign per block are placed to ensure that motorists are clearly informed regarding the lane restrictions. Figure 8 shows overhead signage indicating that the lanes are for bus use only. Roadside signs indicate that the lane is for buses and right turning vehicles. Cameras are used to enforce the restrictions along the dedicated lanes.

Figure 8: SBS Lane on Nostrand Ave (near Flatbush Ave), Brooklyn

Source: Google Streetview

Loop Link – Chicago, IL

The Loop Link project is a set of bus service enhancements in Chicago's Loop neighborhood. Almost half of all travelers along the corridor served by Loop Link travel

on buses. The project added dedicated bus lanes and created enhanced bus stops—called Loop Link Stations—in the city's core.

Compared to other cities, signage is not as widely utilized in informing motorists of the bus lane restrictions. Instead, the city primarily relies on the red coloring of the bus lanes and pavement markings as shown in Figure 9. In some locations where right turns are permitted, there are turn bays on the outside of the bus lanes

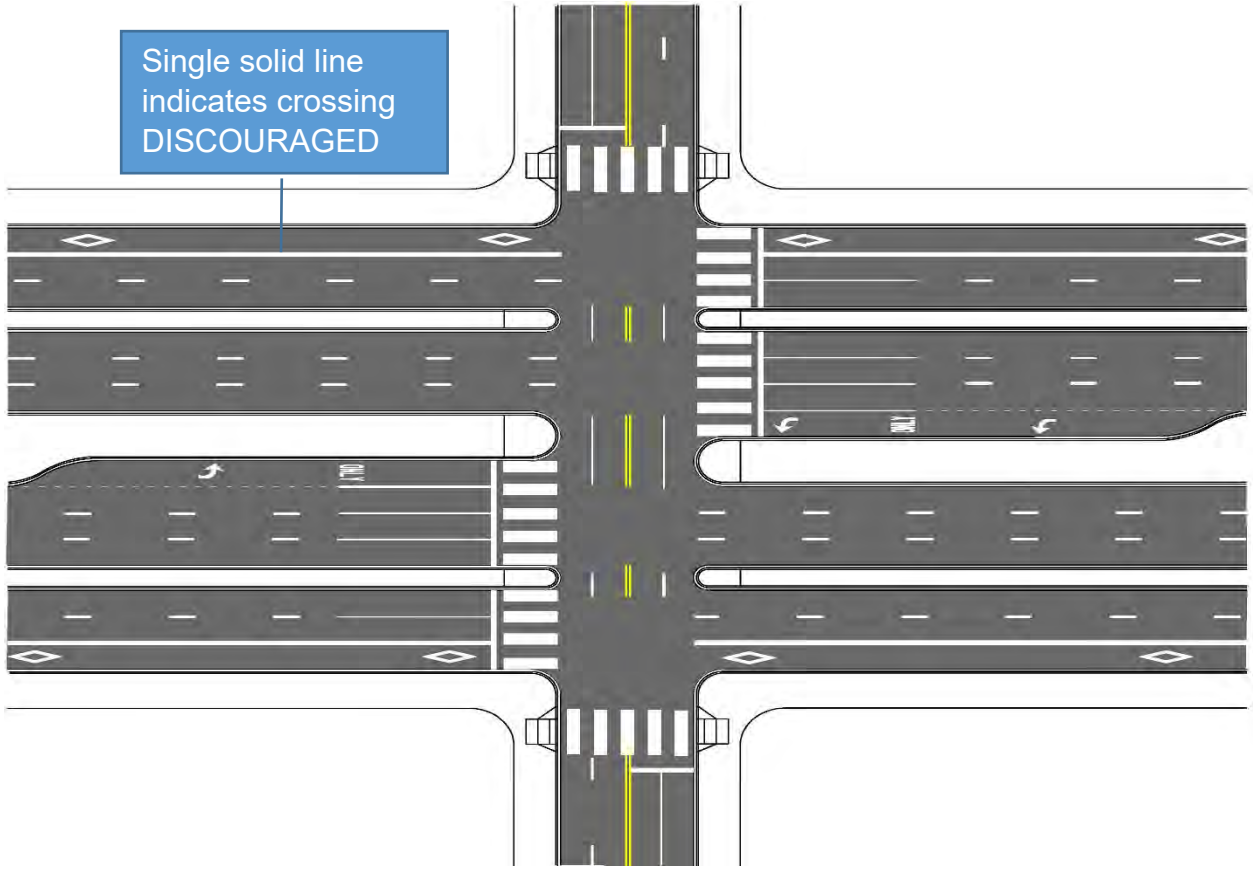
Figure 9: Loop Link – Chicago, IL

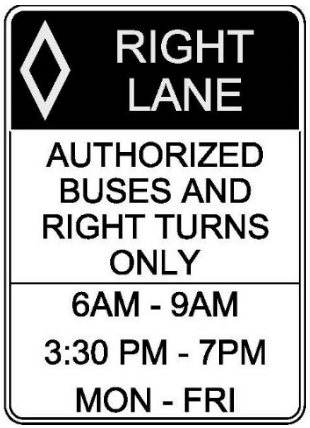
Source: HNTB

5. BAT Lane Signage and Striping Options

This section presents three different options for signing and pavement markings to delineate BAT Lanes for a cross-section similar to Roosevelt Boulevard. These options are based on pavement markings and signage from MUTCD and NACTO guidance for bus only lanes presented in Section 3 and the existing BAT Lanes in other US cities presented in Section 4. Figures 10, 11, and 12 on the following pages show the three pavement marking and signage options and the advantages and disadvantages of each.

Figure 10: Option 1 - Diamond Lanes





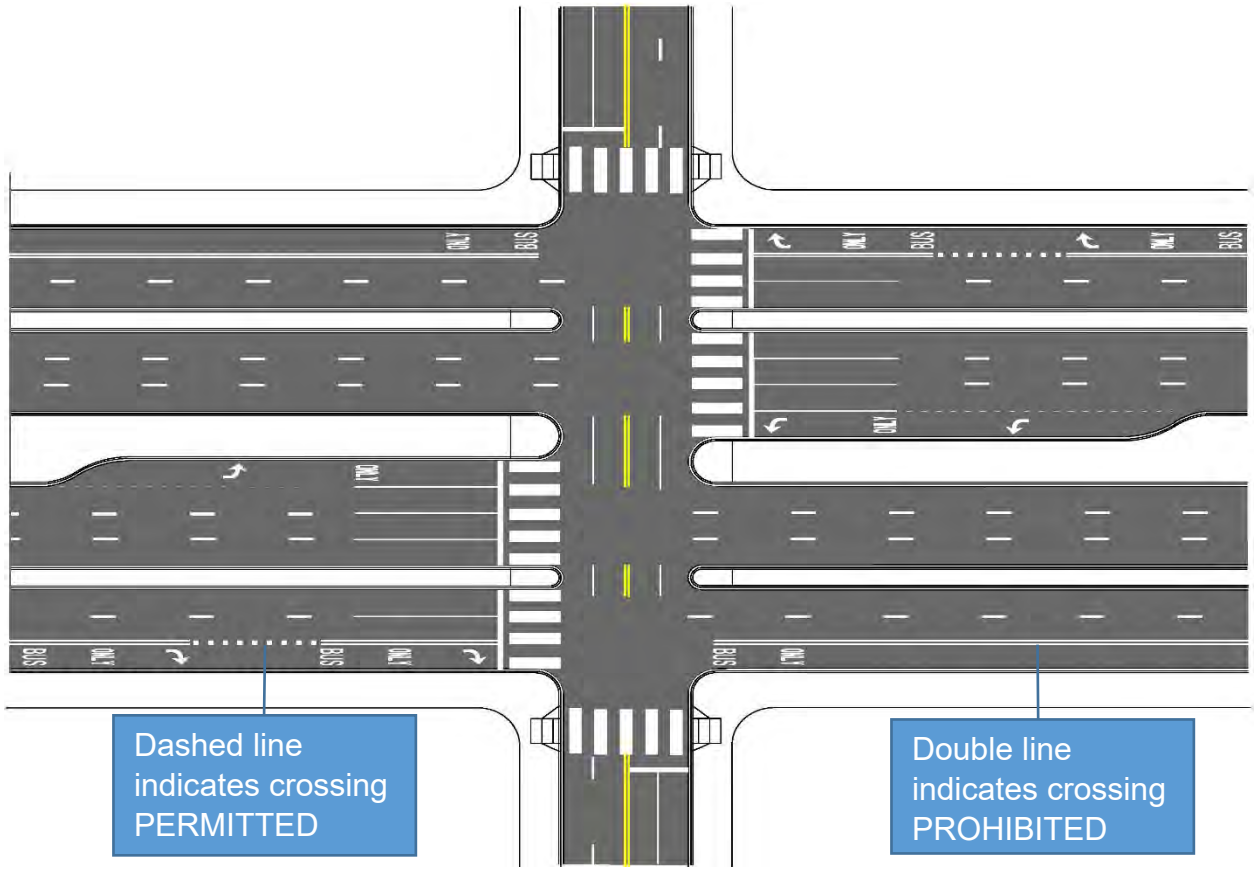
Advantages

- Lowest cost
- May be some confusion as to whether right turning traffic is allowed to cross the white solid line to enter the BAT Lane

Disadvantages

- Diamond markings may be confusing as these are typically used for High Occupancy Vehicle Lanes
- Although diamond symbols are sometimes used to delineate bus only lanes, the signage and markings are inconsistent with Manual on Uniform Traffic Control Devices (MUTDC) guidance for Bus Lanes

Figure 11: Option 2 - Dashed, Single, and Double Lines



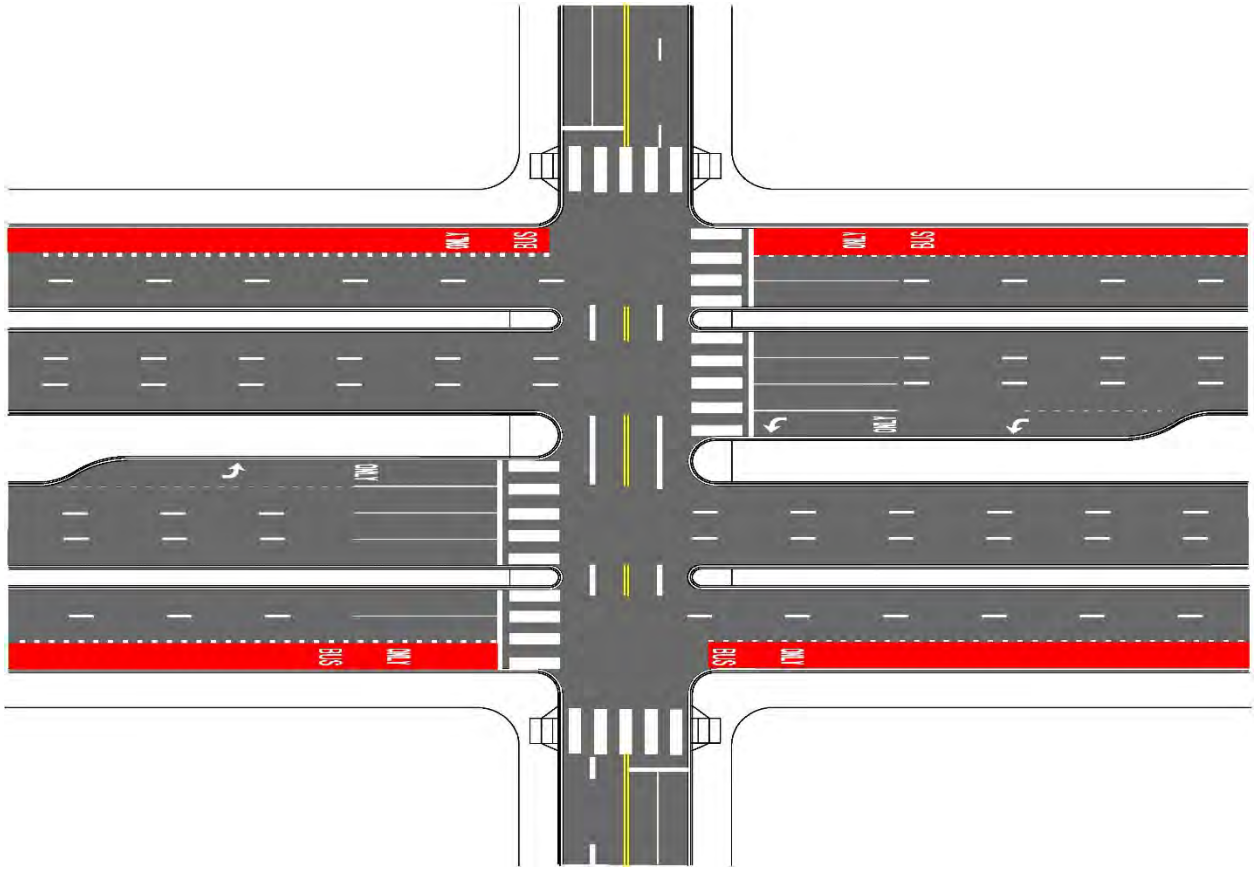
Advantages

- Low Cost
- Easy for motorists to identify that right turns are permitted
- Enhances safety by controlling where lane changes can occur
- Consistent with Manual of Uniform Traffic Control Devices (MUTCD) Standards

Disadvantages

- Motorists may not understand the difference between the solid, dashed, and double lines leading to driver confusion

Figure 12: Option 3 - Colored Pavement



Overhead Sign

Advantages	Disadvantages
• Red pavement and overhead signs are clearest way to delineate the BAT lanes • Typically has fewer lane violations	• Higher cost to implement and maintain • May be confusing to off-peak drivers if BAT lanes are only enforced during peak hours • Not currently consistent with MUTCD, need special permission from FHWA for experimental use

Route for Change

Transforming The Boulevard

Roosevelt Boulevard

Section 2 – Appendix 11

Vision Zero Education Strategies

September 2019

Introduction

Vision Zero is the City of Philadelphia's strategic initiative to reduce traffic related deaths to zero by 2030. The underlying principle of Vision Zero is that preserving human life takes priority over convenience and that traffic deaths are preventable and unacceptable. Education is one of the City's five core priorities identified in the City's Vision Zero Three-Year Action Plan.

On November 17, 2016, Mayor Jim Kenney signed Executive Order 11-16 creating a Vision Zero Task Force to work towards eliminating traffic-related deaths in Philadelphia by 2030. In September 2017, the task force published a Vision Zero Three-Year Action Plan. The plan identified five priorities:

- Equity – Identify equitable solutions developed on behalf of all Philadelphians
- Evaluation – Evaluate Vision Zero efforts to prioritize investments and ensure resources are being used effectively
- Engineering – Engineer streets to reduce risk of crashes
- Education – Educate Philadelphians to promote a culture of safe driving, walking and biking
- Enforcement – Enforce traffic laws to reduce and prevent unsafe roadway behaviors

Education includes sharing information to raise awareness about Vision Zero and urge people to change their behavior on the streets. This memorandum and accompanying strategy matrix provide a framework for short- to medium-term Vision Zero education efforts to accompany the medium- to long-term infrastructure changes along the Roosevelt Boulevard corridor.

Communities Along Roosevelt Boulevard

Neighborhoods around the Boulevard vary greatly in their characteristics. Around lower Roosevelt Boulevard, near N. Broad Street, the surrounding neighborhoods are majority Black and Hispanic and lower income. Households in this area have a lower rate of car ownership. In contrast, around upper Roosevelt Boulevard, the surrounding neighborhood is majority White, higher-income, and households have a higher rate of car ownership. However, compared to the larger region, the Boulevard is diverse, with high proportions of racial and ethnic minorities, people with limited English proficiency, people who are foreign-born, youth, and seniors. The metrics show large concentrations of indicators of potential disadvantage throughout the Program area, indicating the need for investment in equitable transportation solutions.

Education efforts should be tailored to one or more of these subgroups, offered in multiple languages, and through various channels to achieve the best results. It will also be important to pretest campaigns and messaging with the target audience and evaluate whether or not they resonate and have the intended effects.[1]

[1] https://www.researchgate.net/publication/251590277_Improving_the_effectiveness_of_road_safety_campaigns_Current_and_new_practices

Target Audiences

The target audiences for the educational efforts along the corridor can broadly be divided into two categories: vulnerable users and drivers. Each of these can then be further refined into subcategories as shown in Table 1 below:

Table 1 – Roosevelt Boulevard Target Audiences

Vulnerable Users	Drivers
Immigrants/Non-English Speakers Seniors Youth • Elementary • Middle and High School	General Population Seniors Professional Drivers • Fleet Drivers • Taxi/Ride Hailing Drivers

Key Partners

An effective educational campaign requires partnership with other organizations to create and share a more multifaceted program that is interesting and compelling. Key partnership with groups like healthcare providers, major employers, senior centers, and schools, along with sister agencies, will play an important role in creating a culture of safety along Roosevelt Boulevard.

Health Care Providers

There are three hospitals and health centers within a half-mile of the Program area. The hospitals include: Eastern Regional Medical Center, Friends Hospital, and Nazareth Hospital. There are also health centers in the area, including Quality Community Health Care's Cooke Family Health Center, Philadelphia Department of Public Health (PDPH) Health Center 10, and Esperanza Health's Hunting Park location. All three are community-based health care providers and identified as Federally Qualified Community Health Centers, which provide free or low-cost comprehensive primary care for children, adults, pregnant women, and seniors. As reliable sources of information, health care professionals can provide information on the benefits of walking and bicycling and tips for staying safe on the road, regardless of travel mode. The Program recommends building a coalition with the three hospitals and other healthcare providers and supplying materials they can share with their visitors and staff.

Chamber of Commerce & Major Employers

Throughout the Program's development, the Greater Northeast Philadelphia Chamber of Commerce (GNPCC) has helped promote public forums and has invited the Program to make presentations. The Program recommends continuing to work with GNPCC to bridge the connection between the Program and major employers because approximately two-thirds of people in the Program area drive. Major employers in North and Northeast Philadelphia can help distribute information to their employees and explores ways to incentivize employees to make non-single occupancy vehicle trips. In addition, the Program recommends partnering with the growing industrial development occurring in Northeast Philadelphia to share traffic safety information specific to large vehicle drivers with freight distribution and parcel delivery companies.

Senior Centers

Senior Centers and other organizations that provide services for seniors can help provide Vision Zero educational materials to seniors. They can host workshops, help identify infrastructure concerns, and provide alternative transportation options. These organizations are an effective forum for reaching seniors to understand when it is time to stop driving and share mobility resources that will allow seniors to still reach services, visit family, and explore their community while maintaining independence. The Program recommends reaching out to senior centers and hosting a brainstorming session to determine the best way to partner and share information.

Schools

There are over 50 schools and education centers within a half-mile of the Program area, serving students in preschool through high school. Approximately half of the schools are public schools within the School District of Philadelphia, and the highest concentration of schools along the Boulevard is south of Pennypack Park. Educational outreach efforts at schools have the potential to reach not only students, but parents and school staff as well.

The Program recommends collaborating with Safe Routes Philly, which is a school and community-based program of the City of Philadelphia that helps educators create safe, healthy environments for students to actively commute to and from school. This partnership could develop specific pedestrian safety curriculum for educators and support the growth of community events like Walk to School Day and walking school busses.

Agency Collaborators

In addition, the Program encourages the transportation agencies to partner with sister state and local agencies to promote the Vision Zero message. While the term Vision Zero is familiar to some, it is critical that outer public-facing departments understand its meaning in order to share correct information. In addition, there are numerous municipally managed resources along the corridor, including four fire stations, two police substations, four libraries, eight swimming pools, and dozens of playgrounds, parks, and recreation centers. These are great venues to post information about Vision Zero and agencies can incorporate safety messages in their own communications to community members.

Key Themes for Roosevelt Boulevard

As a major corridor and part of Philadelphia's High Injury Network (HIN), all of the themes and strategies outlined in the Vision Zero Action Plan should be applied to Roosevelt Boulevard. In addition to focusing on the most common violations that contribute to serious crashes, education and outreach efforts on Roosevelt Boulevard should reminding residents, business owners, and the community at large of the Route for Change and Vision Zero programs' overall purpose in order to generate and maintain support, while at the same time influencing changes to individual behavior that result in improved safety.

Content

The Program recommends creating a multichannel campaign that promotes a clear safety message across multiple channels in order to maximize opportunities to reach people. Vision Zero and safety on the Boulevard should be the umbrella message; however, content can build upon the "Safety Six", which was created as part of Philadelphia's Vision Zero Action Plan. This highlights the six the most common violations

that result in severe injuries and deaths along the City's High Injury Network (HIN). As one of the highest risk corridors on the HIN, education and enforcement efforts along Roosevelt Boulevard could educate people about the Safety Six violations:

1. Reckless or careless driving - including speeding and drag racing
2. Red light and stop sign running
3. Driving under the influence
4. Failure to yield – focusing on driver left turn movements and yielding to pedestrians
5. Parking enforcement - on or within 20 feet of crosswalks, on a sidewalk, or in a bike lane)
6. Distracted driving

It is important to note that traffic crashes are one of the leading causes of premature death in the United States and deserve to be taken seriously. However, people living in communities of concern are also dealing with pressing employment, housing, health and economic security challenges that compete for their attention. It will be important to treat the intersectionality of these complex issues with respect and consideration and ensure that enforcement efforts do not disproportionately burden these communities.

Long-Term Benefits

Any programs and communications related to Vision Zero or future infrastructure changes along Roosevelt Boulevard should include information about the long-term benefits of the project. In today's fast-paced world, the collective focus is often on the immediate situation (travel time delays, temporary changes in traffic patterns due to construction) rather than the future outcomes (improved safety, increased travel options, reinvestment). Opposition is often well organized and loud, while supporters are often less organized and less vocal. Precedents for Roosevelt Boulevard can be found in other large-scale transportation projects in major metropolitan areas on the East Coast including the "Big Dig" in Boston and the Purple Line light rail corridor in Maryland.

Big Dig

- Description: This project rerouted 1.5 miles of Interstate 93 in the heart of Boston from an elevated expressway into a tunnel. It created an extension of Interstate 90 to Logan International Airport and built a new bridge over the Charles River.[2]
- Planning/Construction timeframe: Construction began in 1991, completed in 2006.
- Cost: $14 billion
- Outcomes: The project was plagued by faulty construction and cost overruns. However, in the long-term, it created the 1.5-mile-long linear park (Rose Kennedy Greenway) and new development along the corridor. Traffic congestion has been reduced, and carbon monoxide levels have dropped 12 percent citywide.[3]

[2] https://www.mass.gov/info-details/the-big-dig-project-background

[3] https://www.boston.com/cars/news-and-reviews/2015/01/05/can-we-talk-rationally-about-the-big-dig-yet

Purple Line

- Description: 16-mile light rail line with 21 stations connecting Bethesda, Silver Spring, College Park and New Carrollton.
- Planning/Construction timeframe: Right-of-way purchased in 1980; construction began in 2017 (delayed by several lawsuits); passenger service expected to begin in 2022.
- Cost: $2 billion (estimated)
- Outcomes: Improve east-west transportation options; increase access to jobs, spur economic development. Estimated daily ridership is 74,000.

As construction for the Purple Line is underway, the project website provides general updates, plans, and a kid's page with activities and safety information.[4] The Purple Line also includes a public art component called Art in Transit and is supported by a broad coalition of elected officials, local businesses and other organizations under the umbrella advocacy organization called Purple Line NOW.[5,6] Similar promotion of public art and the creation of a supportive network of community leaders and organizations can help promote the long-term, positive changes coming to the Roosevelt Boulevard corridor.

Vision Zero Education Strategy Matrix

Table 3 on the following pages contains 35 education strategies from the Philadelphia Vision Zero Action Plan and other Vision Zero cities. Ten strategies in Table 2 are highlighted as priorities for the Program to look into further as possibilities for pursuing. The ten priority strategies are balanced among key topics and are intended to reach all of the target audiences.

Table 2 -Priority Education Strategies for Roosevelt Boulevard

Topic	Strategy
Communication	Vision Zero Artist In Residence
Communication	Vision Zero at Work Signs
Drivers (Seniors)	"We Need to Talk"
Equity	Walkable Community Engagement
Equity	Outreach and Education Grants for Community Organizations
Equity	Vision Zero Speaker's Bureau
Safety Six	Vision Zero Health Outreach
Safety Six	Automated Speed Enforcement
Safety Six	Anti-Speeding/Drag Racing Campaigns
Vulnerable Population (Youth)	Safe Routes Philly

[4] http://www.purplelinemd.com/en/kids-page
[5] http://purplelinemd.com/artintransit/
[6] http://www.purplelinenow.com/who_we_are

Table 3- Vision Zero Education Strategies

Topic	Education Strategy	Target Audience	Potential Partners	Notes	Priority for the Boulevard?
Communication	**Vision Zero Artist in Residence; Los Angeles, CA** In 2016 the LA DOT hired an Artist in Residence, Alan Nakagawa, to support Vision Zero efforts. Nakagawa's objective was to develop creative approaches to raise public awareness. He installed haiku poems about LA's roads and created an art installation to draw attention to traffic deaths. https://drive.google.com/file/d/1Aehukh66iwEhF5QNRg8VvtoPtzoH1eZz/view	Youth Drivers Seniors	Community Organizations Parks & Recreation Philadelphia Mural Arts SEPTA	Opportunity to reach diverse populations along the corridor; art can transcend language barriers. Costs could range low to high.	Yes
Communication	**Vision Zero Monthly Highlight Videos; San Francisco, CA** These 60-90 second videos showcase infrastructure projects and Vision Zero education and outreach activities. Posting them on YouTube makes them accessible to anyone with an internet connection and allows for easy sharing. https://www.youtube.com/playlist?list=PLY4u2DrUJju4qKg8_q2NwR48kAKiU-f1T	All	oTIS Office of Innovation & Technology	Monthly reminders of progress being made towards long-term goal.	
Communication	**Vision Zero at Work Signs; San Francisco, CA** The City of San Francisco is posting Vision Zero at Work signs at locations with safety-related engineering installments. The signs match the city's Vision Zero branding and help road users "learn more about protected bike lanes, bus bulb outs, pedestrian scrambles, shark's teeth, daylighting, and other street improvements they might have recently seen for the first time in their neighborhoods." https://www.visionzerosf.org/visionzeroatwork-signs-placed-around-sf/	All	oTIS Office of Innovation & Technology PennDOT Philadelphia Department of Streets	Consistent branding throughout VZ and Roosevelt Boulevard projects can help link them in the public consciousness.	Yes
Communication, Long-Term Benefits	**Purple Line NOW; Montgomery and Prince George's County, MD** Purple Line NOW! is a coalition of business, labor, environment, neighborhood, and civic organizations that works with local, state, and federal government officials in pursuit of a mission to build the Purple Line. The group was formed in 2002, and actively promotes better transit at local events and on their website. Since construction began in fall 2017, their website has provided construction updates and recaps of meetings with local governments. http://www.purplelinenow.com/	All	Business Owners Community Organizations Major Employers	Coalition of advocates can help counteract opposition, educate and promote project.	
Communication, Long-Term Benefits	**Purple Line, Montgomery & Prince George's Counties, MD** • Description: 16-mile light rail line with 21 stations connecting Bethesda, Silver Spring, College Park and New Carrollton. • Planning/Construction timeframe: Right-of-way purchased in 1980; construction began in 2017 (delayed by several lawsuits); passenger service expected to begin in 2022. • Total cost: $2 billion • Outcomes: Improve east-west transportation options; increase access to jobs, spur economic development. Estimated daily ridership is 74,000. https://www.purplelinemd.com/en/ https://wamu.org/story/17/08/28/everything-need-know-purple-line/	All	oTIS PennDOT SEPTA	Comprehensive project website	

Topic	Education Strategy	Target Audience	Potential Partners	Notes	Priority for the Boulevard?
Communication, Long-Term Benefits	**Art In Transit, Purple Line; Montgomery & Prince George's Counties, MD** "The mission of the Purple Line Art-In-Transit Program is to make public art an integral element of the transit project and to further enhance the Purple Line's high-quality station, aesthetic treatments and landscape designs. Art will be incorporated into stations as well as other project structures including bridges, fencing, lighting, etc." https://purplelinemd.com/artintransit/	All	oTIS PennDOT SEPTA	Opportunity to reach diverse populations along the corridor; art can transcend language barriers.	
Communication, Long-Term Benefits	**Purple Planet, Purple Line; Montgomery & Prince George's Counties, MD** Purple Planet is the kid's page on the Maryland Department of Transportation's Purple Line website. It features a kid-friendly explanation of the project, safety tips, and multiple activities including coloring pages, word searches, trivia and a maze. http://www.purplelinemd.com/en/kids-page	Youth	oTIS PennDOT SEPTA Schools	This approach includes future generations of transit riders in more than just safety education. Low cost addition to overall project website.	
Communication, Long-Term Benefits	**"Big Dig" Boston, MA** • Description: Rerouted 1.5 miles of Interstate 93 in the heart of Boston from an elevated expressway into a tunnel; created tunnel to connect Interstate 90 to Logan International Airport and Bunker Hill Memorial Bridge over the Charles River. • Timeframe: Construction began in 1991, completed in 2006. • Cost: $14 billion • Outcomes: The project was plagued by faulty construction and cost overruns. However, in the long-term, it made way for a 1.5-mile-long linear park (Rose Kennedy Greenway) and new development along the corridor. Traffic congestion has improved, and carbon monoxide levels have dropped 12 percent citywide. https://www.boston.com/cars/news-and-reviews/2015/01/05/can-we-talk-rationally-about-the-big-dig-yet https://www.bisnow.com/boston/news/construction-development/ten-years-after-completion-boston-says-the-big-dig-was-catalyst-for-a-city-building-boom-93821 https://en.wikipedia.org/wiki/Big_Dig	All	oTIS PennDOT SEPTA	Example of large-scale, long-term infrastructure project with transformative results.	
Communication, Long-Term Benefits	**Rose Kennedy Greenway; Boston, MA** The Rose Kennedy Greenway was created after a previously elevated section of Interstate 93 was relocated to an underground tunnel. The Greenway is a series of plazas, gardens and tree lined promenades that help link the Boston waterfront to downtown. The Greenway is managed by the Rose Fitzgerald Kennedy Greenway Conservancy and funded through a 50-50 public/private funding model established by the State Legislature in 2008. https://www.rosekennedygreenway.org/about-us/greenway-history/	All	Community Organizations Parks & Recreation	Result of large-scale, long-term infrastructure project with transformative results.	

Topic	Education Strategy	Target Audience	Potential Partners	Notes	Priority for the Boulevard?
Equity	**Walkable Community Engagement; Philadelphia, PA** Led by the Philadelphia Department of Public Health, and funded by a grant from the Centers for Disease Control and Prevention, Asociación de Puertoriquenos en Marcha (APM) and the Hunting Park NAC have worked to educate community members about walkability, engage community in conversations about transportation options and safety, perform walk audits to identify barriers to walking, and encourage increased physical activity by establishing and promoting recreational walking groups. These initiatives have included training and engagement of residents and walkability ambassadors through bilingual activities and demonstrations and the collection of community feedback meant to identify barriers to walkability. The feedback collected and walk audit data will inform a report on the status of walkability in Eastern North Philadelphia as the Department of Public Health continues to work with residents to address barriers to walking and promote active living. -City of Philadelphia, Vision Zero Year One Update, 2018	Immigrants/Non-English Speakers	Community Organizations Health Care Providers	This type of partnership and small-group conversations are key to equitable outcomes. Recommendations should be community-driven and reflect their needs.	Yes
Equity	**Outreach and Education Grants for Community Organizations; Los Angeles, CA** LA developed a straightforward process to invest in the community organizers and influencers who are already doing on-the ground work. They hope the focus on high injury network corridors (instead of intersections) broadens the network of stakeholders, including groups working in arts and culture, labor, public health, education and community development. The program honors that traffic violence is an incredibly personal and visceral experience and that community partners are better suited to communicate Vision Zero's core principles across diverse communities. LADOT worked with the Department of Cultural Affairs on a Request for Qualifications for community-based outreach and education to support the City's commitment to Vision Zero. Eight teams of community organizations were awarded up to $32,000 each for their proposed corridor-based traffic safety education campaigns. -Vision Zero Partnership; Vision Zero Equity Strategies http://visionzeronetwork.org/wp-content/uploads/2017/05/VisionZero_Equity.pdf	Immigrants/Non-English Speakers Youth	Community Organizations Libraries Parks & Recreation Schools	Community organizers need to be compensated for their time advancing Vision Zero work. Grants are one avenue for the city to consider.	Yes
Equity	**Vision Zero Community Program; Denver, CO** The Vision Zero Community Program offers community members an opportunity to design a project to increase Vision Zero awareness and promote safer streets in their neighborhood. In December 2018, seven projects were selected out of 26 submissions. These projects focus on everything from data collection and tactical urbanism pop-ups to a Vision Zero Art Festival, and will take place in seven neighborhoods throughout Denver, primarily along the High Injury Network. The projects will be implemented by summer of 2019. https://www.denvergov.org/content/denvergov/en/vision-zero/culture-of-safety.html	Drivers Seniors Youth	Community Organizations Parks & Recreation	Additional marketing efforts and application support may be needed to ensure submissions accurately represent all the communities along the corridor.	
Equity	**Multilingual VZ Outreach Toolkit; Philadelphia, PA** Philadelphia already has Vision Zero materials available in multiple languages, including Spanish and Chinese. Best practices for Vision Zero communications recommend using crash data to identify the target audience for outreach materials. In New York City, that meant developing messaging targeted at "adult male drivers because they were overwhelmingly involved in pedestrian injury and fatality crashes." This could also mean looking at the most vulnerable populations to ensure outreach is conducted at locations that serve them and is delivered in an appropriate manner. https://visionzeronetwork.org/project/communications-strategies-to-advance-vision-zero/	DriversSeniorsYouth	Community Organizations Major Employers	More research is needed on how to create messaging that will resonate with drivers prone to aggressive behaviors. Engineering and enforcement measures may be more effective.	

Topic	Education Strategy	Target Audience	Potential Partners	Notes	Priority for the Boulevard?
Equity	**Vision Zero at Existing Events; Seattle, WA** The City of Seattle has tried to include Vision Zero messaging and activities at existing, well-attended events including Summer Streets and SDOT's Play Street Program. Seattle has also developed "Traffic Safety in a Box" with supplies and instructions for organizations interested in including a Vision Zero Activity at their events. The kits include: a set of instructions, mini traffic safety cones, sidewalk chalk, tape, and safety swag like reflectors." https://www.seattle.gov/visionzero/resources/traffic-safety-in-a-box	Drivers Seniors Youth	Community Organizations Parks & Recreation Schools	Tabling at community events and locations with high volumes of foot traffic increases the visibility of Vision Zero efforts. Tabling can be done by community partners or members of a speaker's bureau.	
Equity	**Vision Zero Speaker's Bureau; San Francisco, CA** The City established a Vision Zero Speakers' bureau, training local leaders and residents to be ambassadors for the initiative in their organizations and neighborhoods. The aim is to engage community leaders and outside voices to carry the Vision Zero message. https://visionzeronetwork.org/project/communications-strategies-to-advance-vision-zero/	Drivers Immigrants/Non-English speakers Seniors Youth	Community Organizations Health Care Providers Libraries Senior Centers Schools	Consider compensating participants for their time to increase participation	Yes
Safety Six (Contributing Behaviors)	**Automated Speed Enforcement** The City of Philadelphia supports State legislation, Senate Bill No. 172, that gives the City of Philadelphia the ability to provide automated speed enforcement system along Roosevelt Boulevard in Philadelphia. Roosevelt Boulevard is a Vision Zero priority. -City of Philadelphia, Vision Zero Year One Update, 2018	Drivers	Police Department	Education and outreach should precede any enforcement campaign. Consider graduated or tiered fines for traffic violations, so that low-income people are not disproportionately burdened.	Yes
Safety Six (Contributing Behaviors)	**Vision Zero Hero; Austin, TX** The City's Vision Zero in Action education and enforcement initiative includes a Vision Zero Street Team, which promotes safety through an on-the-ground education and awareness campaign and launch of a media campaign. The campaign includes a Vision Zero Hero online pledge program7 which enables participants to post a video or photo to Twitter/Facebook which states their name, explains why they want to be a Vision Zero Hero and what they pledge to do to make streets safer, and nominate someone else to join them. A sample script includes:"Hey y'all! My name is XYZ, and I'm proud to announce that I've been nominated as a Vision Zero Hero for Austin, Texas! I'm excited to help Austin reduce all traffic-related deaths and injuries to zero. I took the pledge online and I promise to drive slower on neighborhood streets to keep families safe (or add your own pledge here). I nominate WXY to be a Vision Zero Hero, too!" http://austintexas.gov/Visionzerohero	Drivers Youth	Community Organizations Schools	Provide in other languages Make hard copy pledge cards available at libraries, recreation centers and schools	
Safety Six (Contributing Behaviors)	**Boston's Safest Driver App, Boston, MA** The City of Boston developed a mobile app called Boston's Safest Driver that provides motorists with feedback on their driving based on speed, acceleration, braking, cornering and phone distraction. The city ran a competition awarding cash prizes to participants for achieving high scores in the app. Almost 5,000 people participated in the challenge in 2018 and the city is planning to hold the competition again in the summer of 2019. The City reported that 1,100 participants saw their speeding drop by 35 percent and phone distraction drop by 47 percent. The City of Philadelphia can sponsor a similar competition for safe driving along the Boulevard. https://www.boston.gov/departments/new-urban-mechanics/bostons-safest-driver-competition	Drivers	Major Employers	Would likely require considerable promotion to achieve widespread adoption. More suitable for a city-wide campaign	

Topic	Education Strategy	Target Audience	Potential Partners	Notes	Priority for the Boulevard?
Safety Six (Contributing Behaviors)	**Safety Videos for Professional Drivers; San Francisco, CA** The driver safety video program has been a significant component of San Francisco's communications effort, targeting training to those clocking in significant time on the road. For example, the city partnered with the Teamsters and the California Trucking Association to create a training video that educates truck drivers on the evolving street designs they encounter when they exit the freeway and enter denser urban areas. In addition, the video covers specific urban scenarios and how to maneuver safely through bicycle and pedestrian infrastructure. Additional educational videos target taxi drivers, individual motorists and city fleet drivers.	Professional Drivers	Major Employers Police Department	Ensure content of educational materials is data-driven; consider providing incentives for completing educational modules	
Safety Six (Contributing Behaviors)	**Vision Zero Street Teams; New York City, NY** In areas with high crash histories and high concentrations of pedestrians and drivers, a two-pronged effort is deployed. Members of DOT's Street Team target people using all modes of transportation in specific geographic locations, handing out flyers and talking to members of the public about the effort. NYPD precincts and Borough Patrols are intricately involved providing on-foot patrol during the week of education. This is followed up with a period of enforcement as NYPD targets the most common driving and cycling violations.	All	Community Organizations Schools	Can be coupled with tabling efforts at existing events and Speaker's Bureau	
Safety Six (Contributing Behaviors)	**Speed Boards; New York City, NY** Arterial Slow Zones are being established throughout the city. These are long two-way corridors where the speed limit is changed to 25 MPH along the entire route. To make sure drivers are aware of these changes, DOT puts display boards out and drivers can see how fast they are driving. Speed boards are also placed in locations where Street Teams are educating the public about the consequences of reckless driving and in areas where the community has asked for speed boards to slow traffic in their neighborhoods.	Drivers	Police Department	Must be coupled with enforcement; use portable speed boards to vary location depending on need	
Safety Six (Contributing Behaviors)	**Revised Taxi Driver Curriculum; New York City, NY** The Taxi and Limousine Commission (TLC) is using outreach and education to promote traffic safety among the private for-hire fleets. The TLC works with taxi fleets, car service bases, and industry associations establishments to discuss Vision Zero and traffic safety. TLC staff and drivers discuss safe driving tips and the leading causes of serious crashes, and at the end of the session drivers sign the TLC Safe Driver Pledge. All new taxi drivers must attend taxi school before obtaining a license. TLC worked with DOT to update its taxi school curriculum to include new Vision Zero content. The class educates drivers about safety principles such as the correlation between speeds and accident outcomes, watching out for pedestrians when turning and the rules of the road for bike and bus lanes. In addition, TLC has introduced new vehicle markings, including a "Turning? People are Crossing" sticker in all licensed vehicles, which serve as a reminder to drivers to be vigilant for pedestrians and cyclists. Finally, all TLC-licensed drivers now receive a copy of TLC's "10 Tips for Safe Drivers" when they renew their licenses. The NY Taxi and Limousine Commission requires all new taxi drivers to attend taxi school which includes Vision Zero content as part of the curriculum. https://www1.nyc.gov/assets/tlc/downloads/pdf/taxi_school_vision_zero.pdf	Professional Drivers	Parking Authority	Include ride hailing companies; consider Vision Zero stickers with safety reminders for all city vehicles	
Safety Six (Contributing Behaviors)	**Vision Zero Health Outreach; New York City, NY** The Department of Health and Mental Hygiene (DOHMH) includes traffic safety as part of its work with communities, health care providers, and other public health partners. The Health Department promotes traffic safety messages through health fairs, educational activities for families of young children, outreach to primary care providers, and more.	Drivers Seniors Youth	Health Care Providers	Good potential to expand health care providers' role in promoting active travel and safe driving habits; create branded material for distribution and posting in waiting rooms	Yes

Topic	Education Strategy	Target Audience	Potential Partners	Notes	Priority for the Boulevard?
Safety Six (Contributing Behaviors)	**Street Racing, Problem-Oriented Guides for Police No. 28** Background: • "Street racing typically involves a younger crowd that conducts its activities in an underground fashion to avoid police attention and presents significant risks of serious personal injury." • "Roadway location and design can also contribute to street racing. For example, a roadway located in a remote, perhaps industrial, area that is straight, wide, and close to arterial streets (for quick getaways from the police) will be favored by street racers." • "Several race-related websites exist that may be used by the police to track racers' activities as well as provide useful information to racers...[websites] such as RaceLegal.com and the National Hot Rod Association's NHRA.com, focus more on encouraging legal racing, and attempt to educate their readers about related laws and statistics (e.g., numbers of illegal racers who were recently killed, injured, cited, arrested, or who had vehicles seized or licenses revoked)." Enforcement strategies with success in other jurisdictions: • Increased fines/penalties for participation in street racing (see CA and TX) • Impounding vehicles used in street racing (CA) • Closing streets and/or altering or restricting traffic flow and parking (CA) • Creating or encouraging racers' legal alternatives, such as relocating to a legal racing area (CA, FL, NV) https://popcenter.asu.edu/sites/default/files/street_racing.pdf	Drivers	Health Care Providers Police Department Schools	Difficult problem to address through education and enforcement alone; roadway design is a contributing factor	Yes

Topic	Education Strategy	Target Audience	Potential Partners	Notes	Priority for the Boulevard?
Safety Six (Contributing Behaviors)	**Aggressive Driving, Problem-Oriented Guides for Police No. 61** Background: • "Two-thirds of traffic fatalities involve behaviors commonly associated with aggressive driving, such as speeding, running red lights, and improperly changing lanes. One-third of all traffic injuries result from aggressive driving. Speeding, a commonelement in aggressive driving, contributes to about one-third of fatal crashes." • "Car crashes are the leading cause of accidental death and injury in the United States and the leading cause of all deaths amongst young people. Aggressive drivers kill two to four times more people than drunken drivers. Aggressive driving creates an atmosphere of incivility on the roads, heightening driving anxiety and triggering more driving anger." • "There appear to be two primary personality types prone to becoming aggressive behind the wheel. One is an antisocial, hostile personality; the other, a competitive one." • "There is significant overlap between aggressive and violent drivers and their victims. One study found that road rage offenders were more than five times as likely as the general population to have been past victims of a road rage incident." • "To the extent the culture values convenience, individuality over the common good, primacy of cars over bicycles, fast-paced lifestyles, and competition, it promotes aggressive driving... Currently, mainstream society does not stigmatize vehicle crimes in the same way as other crimes." Enforcement strategies with success in other jurisdictions: • Deploying surveillance technologies. • Conducting high-visibility enforcement. • Referring habitual aggressive drivers to state licensing agencies. • Timing traffic signals to reduce aggressive driving triggers. • Encouraging employer monitoring of professional drivers' driving. • Requiring anger management treatment for aggressive drivers. https://popcenter.asu.edu/sites/default/files/sites/default/files/problems/pdfs/aggressive_driving.pdf	Drivers	Health Care Providers Police Department Schools	Difficult problem to address through education and enforcement alone; consider diversion programs for anger management and behavioral counseling for repeat offenders	Yes
Safety Six (Contributing Behaviors)	**"Struck" PSA Campaign; Portland, OR** As part of the City of Portland's Vision Zero effort, the Portland Bureau of Transportation produced 'Struck,' a safety education campaign designed to slow drivers down. It was the first major campaign launched as part of the Vision Zero effort. The centerpiece of the campaign is a 30-second video that conveys a unique message about the impacts of traffic crashes. The video recreates a car crash without any cars to put full focus on the toll deadly crashes have people. The campaign speaks to the impact on the victim, who just lost his or her life, and to the vehicle driver, who just destroyed the life they knew. The campaign was launched with a TV spot during the NCAA Championship game, and on strategically placed billboards, buses, movie theaters and social media channels. https://www.youtube.com/watch?v=pOPfdMO9ZVw&feature=youtu.be&utm_medium=email&utm_source=gov	Drivers	Health Care Providers Police Department Schools	Cohesive, multi-media approach	

Topic	Education Strategy	Target Audience	Potential Partners	Notes	Priority for the Boulevard?
Safety Six (Contributing Behaviors)	**Anti-speeding ads targeted at male drivers; New South Wales, Australia** "The Roads and Traffic Authority, NSW, Australia, has just launched an anti-speeding campaign aimed at young men, using the tagline, 'Speeding. No one thinks big of you'. The 45 second TV ad, launched tonight, features a young man burning rubber on a city street, hoping to impress the girls….The 'Speeding. No one thinks big of you' campaign takes a totally different approach. It offers young drivers an immediate consequence… speed and people will think poorly of you. It purposely talks to young guys in their language." http://theinspirationroom.com/daily/2007/speeding-no-one-thinks-big-of-you/ "A new anti-speeding campaign from the NSW Government is urging people to slow down this summer. It's one minute long and utterly devastating. Two cars are set to collide at a country intersection, but time stops. The car's drivers – both men – get out and confront one another." The add concludes that people make mistakes, and speeding can mean the difference between being able to react in time to avoid a crash or not. https://www.mamamia.com.au/nsw-anti-speeding-ad/	Drivers	Health Care Providers Police Department Schools	Further research among the target demographic can help identify messages and messengers that will resonate.	
Vulnerable Populations (Seniors)	**Senior Pedestrian Safety Campaign; San Francisco, CA** In 2018, the San Francisco District Attorney's Office initiated the Senior Pedestrian Safety Campaign. The campaign seeks to decrease seniors' risk of pedestrian injury and increase safety. Although seniors constitute 14 percent of the city's population, they suffered 50% of pedestrian fatalities in 2017. Thus, the city sought to prioritize the safety of the city's increasing senior population. The city began raising bright yellow flags in all high injury corridors today with messages for drivers, such as "Drive Slow / Seniors Crossing" and "Drive Slow / Give Seniors a Brake." Because many seniors in San Francisco are not English speakers, the flags are available in three languages — English, Spanish, and Chinese — depending on the demographic composition of the neighborhood. https://sfdistrictattorney.org/introducing-senior-pedestrian-safety-campaign-honor-elder-awareness-month	Immigrants/Non-English Speakers Seniors	Health Care Providers Libraries Parks & Recreation Senior Centers	Banners could be adapted for school zones or areas around parks	
Vulnerable Populations (Youth)	**Youth Ambassadors; Montgomery County, MD** In late 2018, the Montgomery County Department of Transportation invited students to serve as ambassadors to promote the county's Vision Zero initiative. The ambassadors act as advocates to promote a countywide plan to eliminate pedestrian fatalities. Students selected to be ambassadors will attend training focusing on road safety, public speaking and campaign development. The selected students will then lead a Vision Zero youth summit where they will serve as speakers and lead a campaign design challenge. The Vision Zero Youth Ambassador Program is a collaborative effort between the Montgomery County Department of Transportation and National Organizations for Youth Safety to encourage youth to have an active role in road safety efforts and improvements. https://bethesdamagazine.com/bethesda-beat/schools/mcps-students-invited-to-apply-for-vision-zero-ambassador-program/	Youth	Schools	Incorporate Vision Zero into driver's ed classes	

Topic	Education Strategy	Target Audience	Potential Partners	Notes	Priority for the Boulevard?
Vulnerable Populations (Youth)	**NYC Vision Zero School Outreach; New York City, NY** The Department of Transportation (DOT) employs Safety Educators to conduct school outreach. With the help of the Office of Safety and Youth Development at the Department of Education and the New York City Police Department (NYPD), the Safety Educators visit over 300 schools each academic year. An additional 200 schools per year are visited by assembly programs, a more interactive and exciting way for children to learn about street safety. Curriculum has been developed for students Kindergarten through 12th Grade. Pre-K classes are conducted for parents and caregivers.	Youth	Parks & Recreation Schools	Similar to existing SRP program	
Vulnerable Populations (Youth)	**Safe Routes Philly; Philadelphia, PA** Safe Routes Philly promotes biking and walking as fun, healthy forms of transportation in Philadelphia elementary schools. Since 2010, more than 90,000 students have received walking or bicycling safety lessons. As a well-established education and encouragement program, Safe Routes Philly is a natural partner for Vision Zero. In fact, CONNECT: Philadelphia's Strategic Transportation Plan (October 2018) notes that: "Vision Zero is an opportunity to bring fresh perspectives to traffic safety education. Through a coordinated and comprehensive public education campaign, a culture of traffic safety and responsibility can be fostered throughout Philadelphia." The plan further states that Vision Zero education will start in the schools with expanded Safe Routes Philly programs. By working with the School District of Philadelphia and other educational partners, the City aims to ensure that children have a sound understanding of traffic safety do's and don'ts that will keep them safe as they walk and bike around their neighborhoods. Schools will also be targeted for engagement based on health and traffic safety data. By working with schools and communities with the highest need, Safe Routes Philly will champion education and street redesigns to make walking and biking to school the safe and easy choice for families. http://saferoutesphilly.org/about/	Youth	Parks & Recreation Schools	Expand existing program	Yes
Vulnerable Populations (Youth)	**Walk and Roll San Jose; San Jose, CA** Walk n' Roll San José is a holistic effort to improve pedestrian/bicycle safety near schools and improve children's physical fitness and overall health, as well as reduce transportation- related emissions. To accomplish these program goals, the City has partnered with the Lucile Packard Children's Hospital to bring attention to the health benefits of increased physical activity and healthy nutrition. The program helps children to: instill healthy and active lifestyle behaviors by encouraging daily physical activity in a fun and social environment; improve community safety by increasing the visibility and number of students walking and biking to school; reduce traffic congestion around school zones while reducing air pollution and greenhouse gases; and increase their sense of community. The program: offers education through bike rodeos, assemblies and other activities. The City provides pedestrian and bicycle safety tips, information on the benefits of an active and healthy lifestyle and highlights the positive impact students can have on their environment through biking and walking; helps school staff and parents organize fun activities to encourage students to walk and bike. These activities include Walking School Buses, Bike Trains, and special events such as International Walk to School Day, Bike to School Day, and monthly Walk/Bike to School Day events. The program produced a toolkit to assist school administrators and parents who are implementing Safe Routes to School strategies as part of the City's Walk n' Roll program. http://www.getstreetsmarts.org/walknroll/	Youth	Health Care Providers Parks & Recreation Schools	Similar to existing SRP program	

Topic	Education Strategy	Target Audience	Potential Partners	Notes	Priority for the Boulevard?
Vulnerable Populations (Seniors)	**"We Need to Talk;" AARP and Alexandria, VA** Part of Alexandria, Virginia's Vision Zero strategy is providing resources and working with community partners to help seniors and their families understand when it's time for them to stop driving. To help facilitate these conversations, AARP developed a three-part online seminar. The first module covers "what driving means to older adults and the emotions involved with having to give it up;" the second teaches caregivers how to objectively observe driving skills and talk about alternatives while the third module focuses on the conversation itself. The seminar is available in English and Spanish. https://www.aarp.org/auto/driver-safety/we-need-to-talk/	Immigrants/Non-English Speakers Seniors	AARP Community Organizations Health Care Providers Senior Centers	Promoting alternatives to driving could potentially reduce crashes and allow seniors to maintain their independence	Yes
Vulnerable Populations (Seniors)	**Bike Rodeos for Seniors** "Bike Walk Tompkins partnered with Ithaca Bike Rental, a program of the Ithaca Youth Bureau, to provide bikes for seniors, along with the Lime. In addition to traditional bicycles, the group offered tandems, cargo bikes, and a few tricycles as well. In fact, the recumbent tricycle was so popular and useful for seniors navigating sloped streets that Bike Walk Tompkins recommends any organization working with older individuals purchase at least one or two." "But it's also important to remember that seniors can have different limitations than younger riders. For example, the sense of vulnerability that comes from the possibility of a fall is important. Older individuals can have much worse results in unexpectedly ending up on the ground." http://betterbikeshare.org/2018/10/23/seniors-in-ithaca-are-eager-to-embrace-bike-share/	Immigrants/Non-English Speakers Seniors	AARP Community Organizations Health Care Providers Senior Centers	Seniors may not think of bicycling as a transportation option and may need to be reintroduced to bicycling basics in a low-risk environment. Adaptive bikes and e-bikes can help overcome mobility limitations.	
Vulnerable Populations (Seniors)	**Senior Transit Card Events; Boston, MA** In addition to picking up their transit pass at a Charlie Card store downtown, seniors in Boston can attend events hosted by their local council on aging or senior center. "Councils on Aging and senior centers occasionally host Senior CharlieCard events where you can apply for a card. You'll need to bring a valid, government-issued license or ID for proof of age, fill out an application, and get your photo taken. Staff at the event will mail your application to the MBTA, and your permanent Senior CharlieCard will arrive in the mail in 4-6 weeks. If you are a staff member at a Councils on Aging or senior center, you can host an event." https://cdn.mbta.com/sites/default/files/fares/2019-01-09-senior-charliecard-event-form-instructions.pdf	Immigrants/Non-English Speakers Seniors	AARP Community Organizations Health Care Providers Libraries Senior Centers	Local events help market transit as a transportation option for seniors and eliminate the barrier of having to travel to pick up a special senior pass.	

Route for Change

Transforming The Boulevard

Roosevelt Boulevard

Section 2 – Appendix 12

2025 Lighting & Signage Strategy

February 2019

BACKGROUND

Through the Roosevelt Boulevard Route for Change Program, the City of Philadelphia, PennDOT and SEPTA, are developing a series of improvements to create a more inviting corridor that is safe, accessible, and reliable for all users. The purpose of this memo is to document ideas related to intersection signing and wayfinding, along with lighting, to assist people who drive, walk, bike, and ride transit along Roosevelt Boulevard.

In addition to a long-term vision for the corridor, interim year improvements are also being developed as part of the Routes for Change Program. The ideas below should be considered as part of the interim improvements along the corridor to reduce confusion, enhance the user experience, and improve safety along Roosevelt Boulevard.

SIGNAGE RECOMMENDATIONS

1. Comprehensive Inventory and Upgrade Plan

A comprehensive sign inventory is recommended along the corridor and along intersecting streets approaching the corridor. This inventory should document the existing sign designation, size, and retro reflectivity, or the ratio of light returned from a sign to a driver that assist in nighttime visibility. If necessary, the Program recommends creating a signage upgrade plan to replace signs that do not meet standards in order to provide consistency and clarity in the signed messaging along the corridor. Improved signage can help reduce confusion by drivers and improve safety along Roosevelt Boulevard.

2. Intersection Signage

According to the Manual on Uniform Traffic Control Devices (MUTCD) the functions of signs are to provide regulations, warnings, and guidance information for road users. To avoid conflicts, all intersection users must be aware of what movements are permitted and what movements are prohibited from a given lane group. This can be accomplished through signage. Recommendations to be considered for intersection signage on Roosevelt Boulevard are given below.

1. Section 2B.18 of the MUTCD provides guidance on the placement of movement prohibition signs. Many intersections along the Roosevelt Boulevard include No Right-Turn (R3-1), No-Left Turn (R3-2), or No Turns (R3-3) signs. These signs should be placed at all intersections to indicate turn restrictions from the inner (express) lanes or outer (local) lanes of Roosevelt Boulevard.

2. Sections 2B.19 through 2B.22 of the MUTCD provides guidance on the placement of lane control signs. Intersection lane control signs should be added to the left most inner (express) lane on Roosevelt Boulevard to indicate if it is a left-turn only (R3-5) or shared through/left-turn lane (R3-6). If possible, these signs should be mounted overhead above the applicable lane. No lane control signs are required if a No Turns (R3-3) sign has been

installed. If present, pavement marking arrows should confirm the allowable movements from a lane group.

3. Left-turn only (R3-5), shared through/left-turn (R3-6) or through-only (R3-5a) signs should be added to indicate the lane control of the centermost lanes within the median. If present, pavement marking legends should confirm the allowable movements from a lane group.

4. No Crossover signs should be installed at all locations where there is a break in the median between the express lanes and service lanes and crossovers are not permitted.

5. Use Crosswalk (R9-3bP) signs should be installed at intersections with only one crosswalk across Roosevelt Boulevard to direct people to the side of the intersection with the crosswalk. The signs should be placed on both sides of Roosevelt Boulevard, outside of the outer (local) lanes at the corners with the missing crosswalk and pointing pedestrians towards the crosswalk. The can be used to supplement existing NO PEDESTRIAN CROSSING signs.

3. Crossover Signage

The crossovers on Roosevelt Boulevard enable traffic to flow between the inner (express) lanes and the outer (local) lanes and provides access for drivers needing to turn onto local streets. Specifically, at signalized intersections, left-turns onto the side streets are made from the inner (express) lanes and right-turns are made from the outer (local) lanes. Therefore, drivers move from the outer (local) lanes to the inner (express) lanes to turn left and from the inner (express) lanes to the outer (local) lanes to turn right.

At some signalized intersections motorists from the side streets turn directly onto either the inner (express) lanes or the outer (local) lanes. At other signalized intersections and unsignalized intersections, motorists can only turn right onto the outer (local) lanes and must use the crossover to access the inner (express) lanes. With these crossovers between the inner (express) lanes and the outer (local) lanes, drivers must navigate to the appropriate lanes in advance of their turns sometimes with limited signage directing their movement.

In the existing conditions, some crossover locations have no signage, while others have signage identifying the crossover and side street that is served by the crossover; however, those signs are often small and may not be seen by drivers (see **Figure 1**). There is also no advanced advisory signage upstream of the crossovers.

Figure 1 – Example of Existing Crossover Signage

The crossover signage needs to serve two functions: 1) alert drivers to the presence of the crossover and 2) inform drivers of the upcoming side streets that can be access through the crossover. The existing crossover signage is located almost exclusively in the median between the inner (express) lanes and outer (local) lanes with the side street names in small, sometimes abbreviated text, which is difficult to read.

These crossover signs should be reinstalled with a Crossover (D13-1) sign that conforms to recommended sizing in the MUTCD. The arrows on these signs should be diagonal pointing in the direction of the crossover and the side streets accessible through the crossover should be of a consistent size. These signs should be placed both just before the location of the crossover and at a quarter mile in advance of the crossover locations. Where the placement of a quarter mile is not possible due to a closely spaced intersection or additional crossover, the advance crossover sign should be placed as far in advance of the crossover as possible.

In general, drivers unfamiliar with the Roosevelt Boulevard corridor may be unaware that left-turns are generally not permitted from the outer (local) lanes and that right-turns are not permitted from the inner (express) lanes. Signs indicating such should be installed periodically throughout the corridor in the median space. This information will make drivers aware that they may be required to use the crossovers in order to make their desired turn.

4. Transit Signage

Real time transit information should be provided at both the Direct Bus and key local bus stops, informing riders about the arrival of the next buses. Additionally, it should be explored if real-time information at local bus stops could also include the arrival time of the next Direct Bus and the expected transfer times if riders are considering transfers at the next Direct Bus stop. This transfer time information will allow riders to make informed decisions about the delay they may experience at the Direct Bus stop as compared to remaining on the local bus to their intended destination.

5. Signing for People Riding a Bike

Bicycle wayfinding signs should be added along roads with bike facilities. These wayfinding signs should be consistent with the MUTCD and the City of Philadelphia's bicycle network wayfinding sign standards. The City of Philadelphia standard for these signs is to include information relating to connections to other bicycle routes, connections to key destinations (such as parks, libraries, etc.), and travel time information.

6. Navigation Tools

The existing corridor can be particularly challenging for drivers to navigate if they are not familiar with the area. Many people use GPS navigation tools, which should provide intuitive directions; however, in practice these tools often encourage use of the inner (express) lanes even if the driver will only be on the corridor for a short distance and will need to use a crossover to access the outer (local) lanes. Project partners should work directly with GPS navigation providers, such as Google Maps, Garmin, etc., to establish threshold distances for which the tool would not recommend using the inner (express) lanes.

EXISTING CORRIDOR LIGHTING

As shown in **Figure 2**, the corridor lighting consists of 30 to 40 feet tall conventional highway light poles with "cobra head" fixtures located along the outside of the outer (local) lanes (adjacent to the sidewalk) and along the center median (between the inner (express) lanes). The conventional highway lights are oriented with the light fixtures positioned above the travel lanes. The existing light poles are generally spaced between 120 and 150 feet apart along the corridor. Lighting locations are not consistent at each signalized and unsignalized intersection. Some locations have light poles on the near-side of an intersection, while others have light poles on the far-side of an intersection.

Figure 1 – Existing Lighting Fixtures Example

Lighting of crosswalks, bus stops (except Boulevard Direct stops), and sidewalks currently relies on the light provided by these highway lights. Furthermore, the corridor includes many tall trees that could obscure the light fixtures. There are pedestrian-scale lighting fixtures installed in 2017 at Boulevard Direct bus stops as shown in **Figure 2**.

Figure 2 – Boulevard Direct Stop Pedestrian-scale Light Fixture

RECOMMENDED CORRIDOR LIGHTING

Street lighting is a key tool to improve visibility of the road. It enhances the experience and improves the safety of people driving, walking, riding a bike, or riding a bus along Roosevelt Boulevard. Currently, the City is in the process of converting its High- Pressure Sodium (HPS) streetlights to Light Emitting Diodes (LED). This change will produce energy and cost savings while improving visibility for all users.

1. Intersection Lighting

As part of FHWA's Pedestrian Safety Guide, lighting of crosswalks should reduce glare for drivers. Lighting should be placed in advance of crosswalks on both approaches, which will illuminate the front of the person walking and eliminate silhouette. The analysis will determine whether moving the light pole from its current location will achieve the preferred lighting luminance; however, underground utilities may restrict changes to light pole locations. Intersections with high ambient lighting may consider higher lumen output in order to provide improved visibility of people walking.

The lighting inventory should also document the light levels along sidewalks, especially in locations with curb cuts and driveways. In addition, lighting at local bus stops should make bus riders feel comfortable and secure while improved lighting will help bus operators see passengers waiting to be picked up. When lighting along sidewalk segments and at bus stops do not meet the standards, the Program recommends develop an improvement plan.

2. General Corridor Lighting

As part of regular maintenance operations, the existing nighttime lighting levels should be measured in order for the City to develop a comprehensive strategy for upgrading and supplementing lighting to meet the recommended Uniformity Ratio and Illumination Levels. The strategy should prioritize locations that fall short of the standards, locations with high crash rates, and locations with high volume of people walking. Efforts to correct issues may include:

- Trimming vegetation or removing vertical elements that currently obstruct lights
- Cleaning or replacing light fixture lenses to improve existing performance
- Replacing/upgrading fixtures or bulbs

Route for Change

Transforming The Boulevard

Roosevelt Boulevard

Section 2 – Appendix 13

Travel Demand Management Strategies

January 2019

BACKGROUND

The following memorandum discusses transportation demand management (TDM) and its potential role to support the vision for Roosevelt Boulevard. TDM is a tool that can be used to transform Roosevelt Boulevard to a livable and walkable boulevard. These ideas can be implemented in the short term and can be modified and expanded upon based on which alternative moves forward. For example, if 2040 Alternative 2 Neighborhood Boulevard is selected for advancement, it will be vital to have an aggressive TDM program in place that is capable of significantly reducing single-occupancy vehicle trips. Similarly, TDM can support a reduction in the number of outer (local) lanes from existing conditions if 2040 Alternative 2 Partially Capped Expressway is selected for advancement.

TDM strategies are policies, programs, and incentives that seek to reduce single-occupancy vehicle (SOV or "solo") trips. TDM does not try to stop people from traveling or making trips. Instead, TDM strategies attempt to influence the mode people choose, the time of day that they make trips, and where or how long their trips are. These changes are often measured in terms of vehicle trip reduction (VTR), which simply places a target on how many SOV trips are taken off the road because of the policies enacted.

TDM attempts to change how people make transportation decisions. Drawing on behavior economics, TDM strategies nudge people towards making certain decisions.

There are three main reasons that explain why TDM policies can "nudge" or otherwise convince travelers to change their behavior:

- **Costs.** Generally, SOV travel can be the least expensive option available in terms of actual cost, time spent traveling, and convenience. TDM policies seek to change this by making non-SOV trips cheaper, faster, and more convenient. They can also try to achieve the same result in the opposite way: by making SOV trips more expensive or less convenient. Either way, TDM policies try to tip the scales so that non-SOV travel makes more economic sense.

- **Encouragement.** New travel options and decisions can seem complicated. TDM policies seek to remove the uncertainty and confusion that can surround new travel options through facilitation (i.e., making it easier for new users to sign up and participate).

- **Awareness.** On a basic level, travelers will not change how they make decisions if they do not know that other options are available. TDM policies generally include marketing and advertising so that all travelers know about the range of options that are available to them.

MANAGEMENT AND OVERSIGHT

Successful TDM programs have dedicated management and oversight organizations. These organizations may be called different names depending on the scale and the reach of the program. Management and oversight duties may be consolidated in one organization or could be shared between different partner organizations. Transportation Management Associations (TMAs) are generally responsible for managing TDM programs. This is typically done in association with Metropolitan Planning Organizations (MPOs) and local government.

One definition of a TMA that is broad enough to cover most organizational structures, is "an organized group applying carefully selected approaches to facilitating the movement of people and goods within an area."[1] TMAs grew out of a coordinated effort in the 1980s to pool the resources of major employers within geographic areas in order to assist employees with their commutes and to lobby government for transportation infrastructure and transit service improvements. Now, most TMAs are spearheaded by community coalitions – including business, developers, and the public sector including public sector employers and local government and planning associations – and oversee TDM programs including policy creation, monitoring, and evaluation.

TMAs have various funding mechanisms available to them. Members generally pay dues to the TMA, which are often charged on a sliding or graduated fee scale based on number of employees or square feet of development. Programs and services can include funding mechanisms through service fees, and local businesses may be required to support TMA activities (for example, through developer impact fees or traffic mitigation funds).

Federal grants and appropriations from local government also provide an important source of funding. For example, the Congestion Mitigation and Air Quality (CMAQ) program can provide federal funds to start a new TMA or expand an existing organization's scope.

TDM policies that are not voluntary in nature are enacted legally by municipalities, which pass bylaws or ordinances to encourage or enforce these regulations. Municipalities can also pass bylaws or ordinances to support a TMA's mission; for example, by requiring that any new development or employer over a certain threshold join the TMA and support it financially. These bylaws or ordinances may apply to the entire municipality or to certain corridors or specific areas. Dedicated management and oversight organizations help keep policies organized, enforced, and coordinated, since TDM programs often involve multiple municipalities or counties.

Local Level Programs

Historically, TDM has focused on reducing traffic congestion at the local scale by targeting trip generators. A trip generator is development, such as a business or a new neighborhood, that adds traffic to local roads. Local level programs may be based around specific sites that act as trip generators, targeting employees, shoppers, or other types of travelers. They may also be based on municipal programs targeting general travel behavior. Local level programs are often managed by a TMA, may be directly overseen by municipal government, or the TMA may be a part of municipal government or another government entity such as a regional planning organization.

A municipality can implement TDM in a portion of its jurisdiction by creating an overlay district called a Transportation Management District (TMD). A TMD defines a certain area or section of a city, town, or county and states that TDM policies apply to that area only. This flexibility allows municipalities to impose different types of TDM policies in different areas according to local transportation needs. Local level programs may respond to a municipality's needs in three ways:

- Mitigate the impact of new development.
- Increase travel choices and meet policy objectives through comprehensive planning and policymaking.
- Achieve a sustainable local transportation network.

[1] Texas A&M Transportation Institute Mobility Investment Priorities.

Bicycle/Pedestrian Facilities and Programs

Bicycle and pedestrian facilities refer to exclusive or sidepaths, sidewalks, and otherwise enhanced networks so that people may access jobs and services by walking or biking. Bicycle and pedestrian programs refer to policies and strategies that make walking or biking more attractive, ranging from economic benefits such as monthly credits for bicycle maintenance to quality-of-life improvements such as having showers and changing rooms in office buildings. Implementing bicycle and pedestrian facilities and programs reduces VMT and vehicle trips taken. Estimates range from 3-5% vehicle trips reduced in the absence of subsidies to 16-19% vehicle trips reduced with subsidies, although data is limited. In these cases, subsidies refer to economic incentives provided by the government to convince people to try other modes of transportation in their everyday lives.

Bicycle and pedestrian programs have been found to be **moderately effective** in reducing SOV trips. They have also been found to be highly effective in improving overall livability.

Car-sharing and Vanpooling

Car-sharing simply refers to sharing passenger vehicles, while vanpooling refers to the same concept but with larger vehicles such as vans or SUVs. While their primary effect is to reduce VMT, car-sharing and vanpooling also often reduce vehicle trips taken. Measured together, car-sharing and vanpooling have been shown to reduce work-purpose SOV trips by up to 14-22%. In general, car-sharing effectiveness in trip reduction is 4-5%, although studies predate the availability of TNC providers. Car-sharing has been found to be moderately effective in achieving the following TDM policy goals: increased mobility, improved air quality, and improved livability.

Employer-Based TDM Programs

Employer-based TDM programs refer to different strategies to keep employees off the road during peak travel times. Four popular employer TDM programs are:

- Flexible work hours, which allow employees to set their own schedules within given guidelines.
- Staggered work schedules, which break shift arrival and departure times into smaller groups which arrive in staggered intervals.
- Compressed work weeks, which allow employees to work their full number of weekly hours in less than five days, for example, in four ten-hour days.
- Telecommuting, which allows employees to work from home or off-site.

Employer-based TDM programs have a primary effect of reducing VMT and vehicle trips taken; they also generally shift travel times to reduce the impact of peak period travel. In terms of reducing vehicle trips, employer-based programs may reach reduction levels of between 15% and 25%. Generally, reduction levels are determined through municipal ordinances proposed by a TMA.

Highway/Roadway Pricing and Management

Two popular highway/roadway pricing and management strategies are lane management and road pricing.

HOV, HOT, and Managed Lanes

HOV, HOT, and Managed Lanes are a category of roadway lane management strategies:

- HOV (High Occupancy Vehicle) lanes are only open to vehicles traveling with a certain number of occupants.

- HOT (High Occupancy Toll) lanes are free for HOV vehicles, but SOV travelers may use the lanes for a fee.

- Managed Lanes operate as normal lanes during some parts of the day and operate as HOV or HOT lanes during peak periods.

The primary effects of these strategies are reduced VMT and overall vehicle trips made. Overall, the U.S. Department of Transportation and other transportation research groups consider them to be moderately effective in improving mobility, likely effective in relieving congestion, improving air quality, and spurring economic development, and nominally effective as a combined land use strategy, to promote goods movement, and to improve overall livability.

Road Pricing

Road pricing is a more holistic approach to charging users for using any road in a given area. Therefore, it is a more restrictive policy set than HOV/HOT/Managed Lanes because a traveler cannot necessarily avoid payment by traveling in groups or switching to a different road. If a traveler or a group of travelers wants to access an area affected by road pricing, they will have to pay.

There are three main road pricing strategies:

- **Cordon pricing**, which sets a boundary around an area. When a vehicle chooses to cross the boundary and enter the area, the vehicle must pay. The incentive is to not drive into the area.
- **Congestion pricing,** which sets a similar boundary as cording pricing, but vehicles must only pay if congestion rises above a given threshold.
- **VMT tax,** which is a sliding-scale tax that is charged based on how many miles a vehicle has traveled. In the United States, VMT tax implementation has been very limited. Currently, there are only trial programs in Oregon and Illinois.

All three strategies have been found to be highly effective in reducing congestion, with estimates showing trip reduction levels of between 2% and 8%.

Park and Ride Facilities

Park and ride facilities are parking lots with connections to public transportation or ridesharing. Commuters leave their SOVs and transfer to a shared transportation mode for the remainder of their trip. While the primary effect of implemented park and ride facilities is to reduce the number of vehicle trips made, park and ride facilities may increase vehicle trips in some cases. This mixed effect is due to the different types of transportation options that can be offered at a park and ride facility (for example, some facilities may emphasize ride-sharing), and due to the fact that quality facilities may actually encourage people to make shorter SOV trips to take advantage of

transportation options that would not be available to them without the park and ride lot. Due to their mixed effects on vehicle trips, the impact of park and ride facilities on vehicle trip reduction rates is undetermined.

Parking Pricing and Management

Parking pricing and management refers to reducing the amount of free parking available in an area and replacing all the reduced parking, or a portion of it, with paid parking areas. The result may keep the same amount of parking spaces but change the mix between free and paid parking or may reduce the overall number of spaces available for parking. The overall goal is to right-size parking availability and to discourage excess SOV trips that could be made by a mode that does not require public parking, such as transit or walking. Therefore, parking pricing and management has a primary effect of reducing both VMT and vehicle trips taken, with estimates showing reduction levels between 1% and 3%.

Different parking strategies differ in terms of their effectiveness in achieving TDM policy goals:

- Parking information infrastructure has been shown to be moderately effective in increasing mobility.
- Parking supply management has been shown to be moderately effective in congestion relief.
- For more long-term goals, both parking supply management and parking pricing strategies have been shown to be moderately effective in improving land use interactions and increasing livability.

Transit Service Enhancement and Advertising

Transit service enhancement sounds just as the name implies: strategies and operational changes that enhance, or improve, the quality and accessibility of transit service. Their primary effects are to reduce VMT and vehicle trips taken. While different transit service enhancements have different levels of impact, two types have been studied in detail: transit signal prioritization and BRT systems have been effective in improving mobility. While economic incentives such as subsidies and vouchers follow the same trend of reducing VMT and vehicle trips taken, they are not considered as cost-effective in the long term as infrastructure and operational enhancements. Transit service enhancements have been shown to reduce trip levels between 1% and 7%. Long-term enhancements tied with land use can achieve trip reduction levels of up to 20%.

Transit advertising refers to increasing the public's knowledge about available transit service. It can also refer to "transit amenities" such as improved bus stops and other public-facing infrastructure improvements that attract the public to transit. These policies have been shown to reduce VMT and vehicle trips taken, with limited estimates showing reduction levels of about 1%.

RECOMMENDATIONS

The U.S. Department of Transportation highlights that TDM must be part of a larger planning process to achieve long-term goals of reducing the number of trips made by car, especially SOV trips[2]. **The Route for Change Program provides an opportunity to incorporate TDM planning and make TDM a foundational element of the Boulevard's forward-looking multimodal strategy.** The following are recommended to make that possible:

1. Establish a TMA that covers Roosevelt Boulevard in Philadelphia. Because this TMA will need to work closely with the Clean Air Council and with TMA Bucks, those organizations will be able to provide important institutional support and guidance in forming the TMA given local conditions. The TMA could be a community-led effort and private sector champions could lead its formation after discussions with local government and planning agencies.

2. Conduct a feasibility analysis to determine the principal transportation problems to solve, and potential membership.

3. Form the TMA.

4. Commence operations, both administratively and in terms of delivery of programs and services. Administratively, the TMA would hire support staff and strengthen connections with existing TDM organizations in the region. The TMA could then develop a suite of programs and services for commuters and travelers, which would be divided into those that the TMA will directly manage and those policies that require local government action to put into place.

[2] U.S. Department of Transportation Federal Highway Administration Office of Operations, "Integrating Demand Management into the Transportation Planning Process: A Desk Reference." August 2012.