APPENDIX E:
LOCATIONS FOR BICYCLE NETWORK IMPROVEMENTS REQUIRING ADDITIONAL STUDY

This appendix discusses specific locations that require more detailed attention beyond the recommendations in Chapter 7 of the Plan. Twenty locations are included and, in some cases, pedestrian issues are addressed as well as bicycle issues.

Tacony Palmyra Bridge

Rhawn Street and State Road

Roosevelt Boulevard

Bustleton Avenue

Henry Avenue

Hunting Park Avenue

Belmont Avenue

City Avenue

Benjamin Franklin Bridge Approaches

Dock Street and Spruce Street

City Hall

Chestnut Street in Center City

Eakins Oval

JFK Boulevard, Market Street, and 30th Street Station

Washington Avenue

Walnut Street and Chestnut Street

Pine Street and Woodland Avenue

Grays Ferry Avenue Bridge

Bartram Avenue

Platt Bridge

APPENDIX E: LOCATIONS FOR BIKE NETWORK IMPROVEMENTS REQUIRING ADDITIONAL STUDY

The purpose of this Appendix is to discuss specific locations that were not addressed in detail in the body of the report due to the complexity of alignment, traffic, or other issues. Recommendations for locations with detailed design or phasing options are provided below. The locations are not organized in priority order.

1. Tacony Palmyra Bridge

Improvements are needed to enhance bicycle and pedestrian connectivity in the vicinity of the Tacony Palmyra Bridge. New proposed trails and sidepaths, supplemented by pavement markings and signage, can provide a connection to Lardner's Point Park, which is now under construction at the base of the bridge. This will connect to the proposed Kensington & Tacony Trail, while also enhancing connections to the Tacony neighborhood via Levick Street, which is one of the few connector streets to the neighborhood under I-95. Finally, improvements will enhance connections to existing walkways on the Tacony Palmyra Bridge, one of the only ways to walk and bike to/from New Jersey. To improve conditions accessing the walkways, a crosswalk and "Yield to Pedestrians" signs should be provided where the ramps intersect with New State Road. A proposed routing option is highlighted in Figure E1 below.

Figure E1: Potential Trail Connections in the vicinity of the Tacony Palmyra Bridge

2. Rhawn Street and State Road

This heavily travelled signalized intersection in Northeast Philadelphia is the focal point of two state roads, one at-grade multi-use trail crossing, and an entrance to a major City park. It is one block from a Regional Rail station.

Pennypack Park and Trail users cross five lanes of motor vehicle traffic on State Road at Rhawn Street (two through lanes in each direction, and center left turn lanes) from the main park and trail on the west side of State Road to access the entrance to Pennypack on the Delaware a short distance south of Rhawn on the east side of State Road. Interstate 95 crosses this intersection diagonally on a viaduct, creating a potential visibility problem for motorists. The north crosswalk is mostly under the viaduct, thus in shadow, and trail users in this crosswalk must also contend with motor vehicle traffic turning left from Rhawn Street onto northbound State Road at the same time. There are no pedestrian signals at the intersection.

Figure E2: North Delaware Riverfront Rail Stations Urban Design Studies

To improve crossing conditions, a pedestrian countdown signal should be installed. High visibility crosswalks should be added at all pedestrian crossings. Wayfinding signs should be added at the intersection to direct path users to the proper route. In addition, some trail users currently use the sidewalk on the south (east) side of State Road to make the connection between the intersection at Rhawn and the asphalt path that leads to Pennypack Park on the Delaware. The east shoulder of State Road in this section could be converted to expand the sidewalk for shared use by bicyclists and pedestrians and to allow for landscaping and buffering from the motor vehicle traffic on State Road.

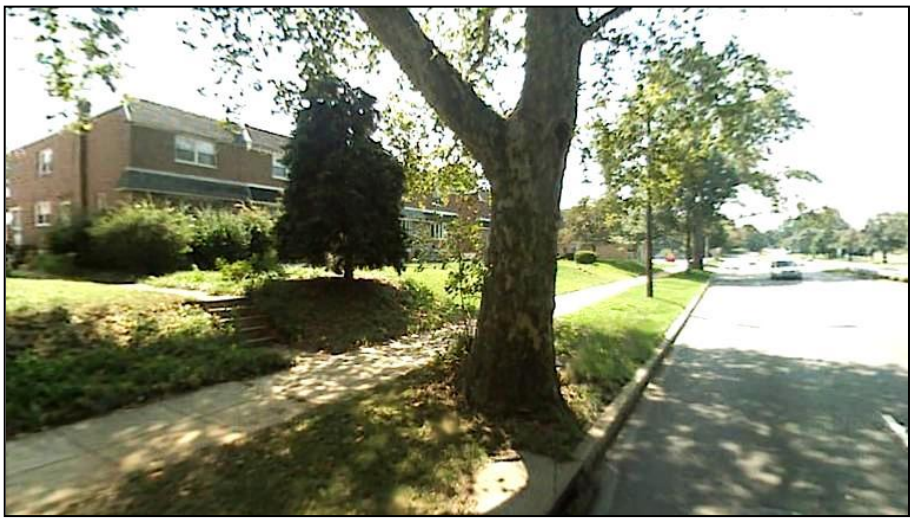
3. Roosevelt Boulevard

Originally conceived in the very early 20th century as a parkway linking Broad Street and Hunting Park Avenue to northeast Philadelphia, this major arterial highway links residential, commercial and industrial areas across North and Northeast Philadelphia. Over time it became a part of US Route 1, and was linked with the Lincoln Highway into Bucks County and the Roosevelt Expressway to the Schuylkill Expressway (I-76). Traffic volumes on Roosevelt Boulevard range from 75,000 up to more than 90,000 vehicles per day, a level that rivals many grade-separated limited access highways. Owing to major interruptions in the city's street network posed by very large parks such as Pennypack and Tacony, and large industrial areas, Roosevelt Boulevard is often the only direct link between destinations. However,

its high-speed, high-volume motorized traffic, along with numerous irregular intersections, make it an uncomfortable and unpleasant route for bicycles.

To provide a safe and attractive bicycle facility, the sidewalk on the eastern and southern side of the Boulevard should be examined for enhancement as a generous sidepath. In some areas of the Boulevard there is no sidewalk; the sidepath would fill such gaps. The design of this sidepath should respect the needs of bicyclists, as well as pedestrians and transit riders. While the original boulevard design generally created setbacks that will allow for the development of a sidepath, conflicts with pedestrians will need to be resolved in older residential areas with numerous front walkways coming out to the existing sidewalk. Also, there are numerous bus stops along the length of Roosevelt Boulevard, and conflicts with transit riders will need to be resolved as well. Sidepaths in Philadelphia should be a minimum of 10' with a decrease to 8' only where absolutely necessary. Additional study is needed to assess the existing right-of-way along the entire stretch of Roosevelt Boulevard to determine the width of sidepath that is possible, and if pinch points exist, to implement special designs to address them.

E3: Sample Locations along Roosevelt Boulevard



Existing sidewalk near Hartel Avenue could be enhanced to become a 10' sidepath. This would most likely require the cooperation of adjacent landowners. In this section of the Boulevard, most residents enter their homes from the rear driveways unless they are taking transit.

E4: Sample Locations along Roosevelt Boulevard

Existing sidewalk near Whitaker Avenue could be enhanced to become a 10' sidepath. However, in this area of older rowhomes, there are numerous front steps and pedestrian movements which will need to be considered because of their potential conflicts with bicycle traffic.

E5: Sample Locations along Roosevelt Boulevard

Existing sidewalk and crosswalk looking south at Adams Avenue are typical of the numerous diagonal roadway intersections which create hazardous crossings for pedestrians and, similarly, for bicyclists either in the road or on a sidepath. Although the Boulevard itself has three medians, some of the wider cross streets might be considered for bulb-outs or medians to break up the long crossings into manageable segments.

E6: Sample Locations along Roosevelt Boulevard

Commercial development along Roosevelt Blvd is generally automobile-oriented and served by sidewalks. This existing sidewalk near Tyson Avenue could be enhanced to become a 10' sidepath. This would most likely require the cooperation of adjacent landowners. In addition, the sidepath design should include considerations for improved landscaping, storm-water management, and striping and safety signage at the numerous driveways and curb cuts.

E7: Sample Locations along Roosevelt Boulevard

On industrial portions of Roosevelt Boulevard, such as this one near Red Lion Road, there are bus stops, but no sidewalk. A new sidepath would link existing sections of sidewalk along the Boulevard and to the existing bicycle network on Red Lion Road.

4. Bustleton Avenue

Bustleton Avenue provides unique directional access in northeast Philadelphia and in many locations no alternative parallel routes are available. There are bike lanes on some parts of Bustleton, but not the northern portion. It represents the only crossing of commuter rail tracks for a significant distance, while also providing unique access to the Somerton SEPTA station. Bustleton Avenue is a four-lane road with intermittent center turn lanes. It may be feasible to remove the continuous center turn lane and create raised median/crossing islands. One stretch where the center turn lane might be converted is in the vicinity of Trevose Avenue. In addition, the road needs access management in places. The painted shoulder may be converted to bike lanes in selected locations. North of Philmont Avenue, the Bicycle Coalition of Greater Philadelphia has suggested an alternate route for bikes on side streets, which is reflected in the recommended bicycle network map.

5. Henry Avenue

Henry Avenue is an important connection for bicyclists and pedestrians in many locations as it connects the Roxborough, East Falls, and Strawberry Mansion neighborhoods. Bike lanes exist along long stretches of Henry Avenue, but they are not consistent along the length of the roadway. This major arterial is designed to accommodate heavy traffic volumes at peak periods and, as a result, motor vehicles routinely exceed the posted speed limit, which makes using the existing bike lanes uncomfortable. Where bike lanes do not exist, the right-of-way is constrained, in some cases by bridges, and adding bike lanes would be difficult. A design study should focus on developing concepts for traffic calming and bikeway design alternatives from Ridge Avenue to Hunting Park Avenue with special emphasis on the section from Queen Lane to School House Lane.

6. Hunting Park Avenue

Hunting Park Avenue provides unique access as a connector between numerous neighborhoods, both because of its angle across the grid and the lack of parallel routes. North of Clearfield Street, the road is challenging for bicyclists due to lack of space, higher traffic speeds, longer blocks and auto-oriented uses. Creating appropriate bicycle conditions may require removal of a combination of travel and parking capacity or consideration of a sidepath where appropriate.

7. Belmont Avenue

One and one-half miles of four-lane Belmont Avenue, between Conshohocken Avenue and Parkside Avenue, is lined on both sides with a patchwork of sidewalk, sidepath and multi-use trail, in varying states of repair. Approximately one mile lies within Fairmount Park.

Intermittent five-foot wide shoulders serve as de facto bike lanes. However, these shoulders disappear at the approach to signalized intersections, with the dual motor vehicle lanes shifting to the right against the curb to make room for center left turn lanes. This is especially concerning given the high prevailing speeds and a 2007 average daily traffic volume of around 27,000.

Significant sidewalk and trail traffic is generated at the north and south ends of this stretch of Belmont Avenue. Near the intersection with Parkside Avenue is Carousel House, a City recreation center for the

physically disabled; one and one-half miles to the north is Inglis House, a skilled nursing care facility for 297 adults with physical disabilities. In addition to the need for those residents to make trips between the two sites, Inglis House and several other rehabilitative, medical and nursing care institutions near the corner of Belmont and Conshohocken Avenues employ hundreds of care-givers, many of whom do not drive to their jobs.

Belmont Avenue's existing patchwork of sidewalks and trails connects with several existing multi-use trails in Fairmount Park. Upgrading and completing the multi-use side paths on both sides of Belmont Avenue, between Conshohocken Avenue and Parkside Avenue is recommended.

Figure E8: Sample Section of Belmont Avenue

The existing sidepaths along both sides of Belmont Avenue should be resurfaced where necessary. Given the existing and potential volumes of wheelchair traffic between the Inglis House and the Carousel House, particular attention must be given to meeting ADA requirements.

8. City Avenue

City Avenue is currently difficult for bicyclists given heavy traffic volumes, high speeds, and relatively narrow travel lanes. However, it provides a critical link between important destinations such as shopping centers, health institutions, St. Josephs University, and SEPTA Stations. If and when properties along City Avenue redevelop, the City should preserve space for a shared use sidepath on City Avenue. Developers should contribute to the long term vision as part of their projects, as required by the City Avenue Overlay District provisions of the Zoning Code. The overlay standards support new pedestrian, bike, and transit-friendly high density commercial, institutional, and residential uses. They limit the number, width, and location of driveways and require sidewalks with a minimum width of 14 ft. These wide sidewalks can potentially serve both pedestrians and bicyclists. Lower Merion has recently adopted a similar overlay provision. Development of a sidepath, with possible eventual conversion to one-way cycle tracks on either side of City Avenue, will be a long term effort, and will require redevelopment along large portions of the corridor to be realistic. It will also have to be balanced with the other goals and provisions of the West Park District Plan.

Figure E9: West Park Plan Vision

(Credit: West Park District Plan, PCPC)

9. Benjamin Franklin Bridge Approaches and Vicinity

The area around the foot of the Benjamin Franklin Bridge presents challenges for both bicyclists and pedestrians. Better bicycle and pedestrian connections between the City street network and the bridge will require working with the Delaware River Port Authority. The key issue is safe access to and from the bridge walkways. Since often only one of the walkways is open at a time, two-way approaches are recommended to both the north and south walkways.

- *North Walkway:* Two-way bicycle access should be provided on the eastern above-ground portion of 5th Street between the north walkway and Vine Street. Northbound motor vehicle traffic coming off the bridge should be directed onto the western above-ground portion of the 5th Street right-of-way, and access to the eastern above-ground portion of 5th Street and New Street should be blocked (See Figure E10). Crossing improvements should be provided at the intersection of New Street (see Figure E10) and the east roadway of 5th Street, including a crosswalk, traffic control signage, a curb extension or, possibly, a raised crossing. The direction of New Street should be reversed to run west-bound to create a one-way street from New Street to 5th Street west to north.

- *South Walkway:* A two-way sidepath is recommended along the existing Belgian Block sidewalk on the east side of 5th Street between Race Street and the beginning of the south walkway across the Ben Franklin Bridge. There are two feasible options for connecting northbound bicyclists on 5th Street to the proposed sidepath. The first option would direct bicyclists straight on 5th Street along with car traffic to the bridge on-ramp (See Figures E11 and E12). This option provides a direct connection but requires that bicycles merge and cross paths with traffic heading to the 5th Street tunnel and the east roadway connection to 5th Street, respectively. The second option is to direct bicyclists to the right to cross at the intersection of the east roadway and Race Street. The east roadway serves very light traffic volumes, and is a safer route for bicyclists. There is potential for the street to be closed to motorized traffic and converted to a bicycle trail and pedestrian space with green landscaped elements. However, since the 401

Race Street project has plans to reopen and use the east driveway directly across from this roadway, closure of the roadway has become less likely. Traffic analysis and pedestrian and bicycle counts should be conducted at these locations to help determine the appropriate design. The preferred design should minimize conflicts and delay for bicyclists accessing the sidepath. Figure E12 below illustrates a potential solution.

Figure E10: Access to North Walkway

Figure E11: Alternative bikeway approaches to south walkway of the Ben Franklin Bridge

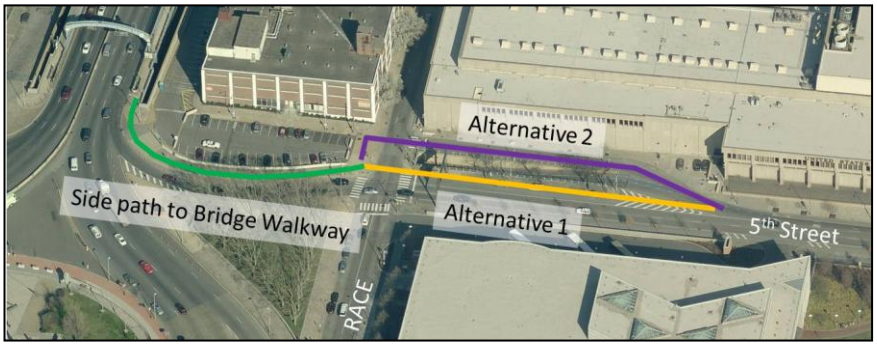
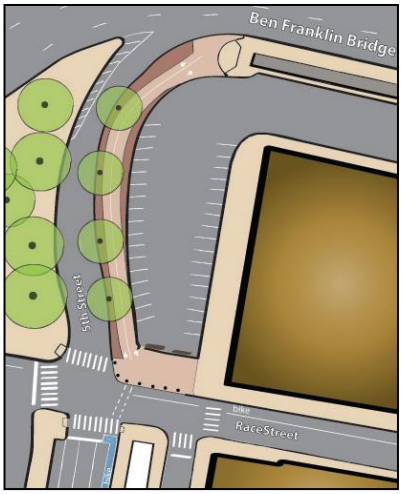


Figure E12: Sidepath proposal for 5th Street approach to south walkway of the Ben Franklin Bridge; shows Alternative 1 on 5th Street south of Race Street. (credit: Bicycle Coalition of Greater Philadelphia)



- *Connection to Columbus Boulevard:* A westbound bike route can be developed from Columbus Boulevard to the South Walkway, primarily by using existing Florist Street. East of 2nd Street, it would be possible to use a contra-flow lane on Race Street.

- *Pedestrian Improvements:* One of the problems for pedestrians in the bridge area is the possibility of becoming stranded on the island at the foot of the bridge. There is little reason for going to this island, but pedestrians walking south on the east sidewalk of 6th Street may find themselves there, with no safe crossing in any direction. A sign should be placed on the east side of the 6th Street crosswalk under the Vine Expressway, telling pedestrians to cross here in order to proceed further south. In addition, signs should be placed to inform pedestrians about the short east-west connection on the Vine Street alignment from 6th Street to Randolph Street, and from there, further east.

Figure E13: Benjamin Franklin Bridge Entrance and Off Ramp

10. Dock and Spruce Streets

There are currently Belgian Blocks along Dock Street between 2nd and Spruce Streets, and along Spruce Street between Columbus Boulevard and Dock Street. This is an important connection area, linking the riverfront to the Spruce Street bike lane. Belgian Block pavers are difficult for many bicyclists, but they are designated as historic by the Philadelphia Historical Commission, and all changes to this material must be approved by the Commission. Consideration should be given to the feasibility of integrating a narrow section of bricks or smoother blocks into these historic street segments.

Figure E14: Belgian Block with smoother block path

11. City Hall

City Hall, at the intersection of Market and Broad Streets, is one of Philadelphia's enduring icons. The resulting traffic patterns, however, pose significant challenges for bicyclists and drivers navigating this area. The combination of numerous intersecting streets, heavy turn volumes, and lane crossovers all contribute to a high conflict area for bicyclists. A study of the traffic patterns should be conducted that models the effects of the lane changes that would be required to provide dedicated bikeways. However, dedicated bike space could be problematic due to the many turn movements on the circle. In the interim, improvements should be focused on safe bicyclist movements from the inner circle travel lanes to the turn movement lanes. This could be accomplished by bike boxes at each signalized intersection as well as several "share the road" type signs and sharrows. In addition, converting 15th Street, Juniper Street, and 13th Street to bicycle friendly streets with marked shared lanes and/or shared roadway signage and connecting to the proposed JFK and Market Street cycle tracks would significantly improve bicycle facilities in the immediate area.

12. Chestnut Street in Center City

Chestnut Street in Center City has an existing marked shared bike/bus lane in the right lane. It does not function well due to insufficient width for buses and bikes to pass each other and because of legal use by turning vehicles and illegal use by general traffic, as well as lack of enforcement. The right lane should be re-designated and signed for buses and right turns only and a marked shared lane should be installed in the left lane of the roadway.

13. Eakins Oval

Eakins Oval is at a critical juncture of heavily travelled routes along and across the Schuylkill River at Spring Garden Street and the Benjamin Franklin Parkway. The conditions include difficult merging and crossings of higher-speed, curving, wide, multilane roadways. There are several existing bicycle facilities and lanes that converge in this area, but there is no clear way to traverse the area safely by bicycle. Several proposals have been developed for reconfiguration of Eakins Oval with benefits to bicyclists and pedestrians but no consensus on a design concept has been reached, nor is funding likely in the near future. Therefore, a number of short term improvements are suggested. (See Figure E16) These suggestions, which draw on a study done by JzTI for the Parkway Council Foundation, and which have been developed further by City staff from PCPC, MOTU, Streets, and PPR, include pavement markings, minor curb revisions, new signals, sidewalk improvements, and wayfinding.

Overall:

- Convert shoulders on both sides of the Oval to bike lanes by adding appropriate symbols. The existing shoulders have sufficient width at most locations but, with a few exceptions, are not marked as bike lanes with symbols or signage. (Green lines on map are presently marked bike lanes; blue lines are suggested for marking.) Many of these shoulders are presently used by bicyclists, although not formally designated as bike lanes.
- Mark bike lanes on adjacent streets that connect to existing bicycle lanes or trails, specifically: Spring Garden Street east and MLK Drive. In some cases, as on the sections of Spring Garden Street between the Oval and Pennsylvania Avenue, shoulders already exist.
- At signalized intersections, add advanced stop bars, bike boxes, preferably with colored pavement and bike symbols, and consider use of separate bicycle phase.
- Add bicycle and pedestrian awareness signage.
- Add directional signage for pedestrians and bicyclists and for the East Coast Greenway.

Location-specific suggestions are shown at numbered points on the map:

1. Extend island and sidewalk further south on outer section of Oval (shown in red); add crosswalk (shown in yellow) and signal to allow safe pedestrian crossing to westbound Spring Garden Street and adjacent green space. On the northeast side of this intersection, create a signed and painted bicycle refuge area to allow a jughandle or “Copenhagen left turn” for cyclists traveling in the outer lanes who wish to go around the Oval rather than continuing north on Kelly Drive.
2. This intersection is the safe crossing between the Oval and the Art Museum. Pedestrian route signage, pavement markings, and landscaping, both in the Oval and along the Parkway, should be added to direct pedestrians to this intersection “for the Rocky statue and the Art Museum” (shown in dashed red lines). A photo of a sidewalk marking for a walking route is shown on the right.
3. Convert the curb lane in front of the Art Museum to a passenger loading lane, reducing the number of traffic lanes on Eakins Oval from five to four. This will curtail the problem of vehicles parking in the bike lane and will clarify traffic movement and reduce extreme weaving by aggressive drivers.
4. Create a new pedestrian crossing from the southwest side of PMA to the large grassy area south of MLK Drive. Evaluate options for signal control. Modify pavement markings so that

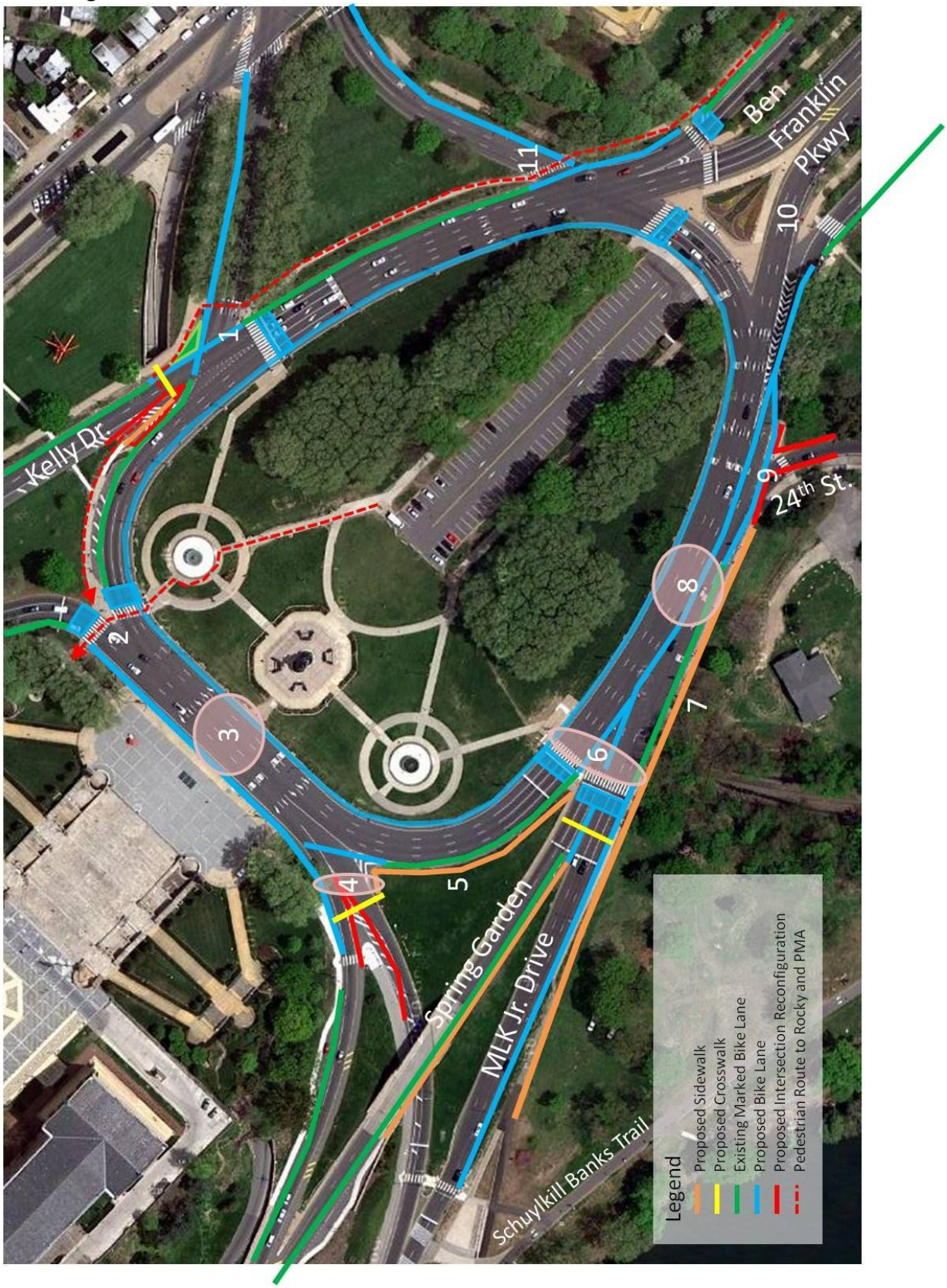
bikes headed around the Oval in the outer bike lane can make a two-stage crossing of motor vehicle traffic headed to the Spring Garden Street and MLK Drive bridges.

5. Add a sidewalk with buffer (shown in orange), with curb ramps where needed, along the west side of the Oval connecting location 4 to location 6, from the MLK Drive westbound ramp to the Spring Garden Street eastbound approach.
6. Add a second crosswalk for the MLK Drive and Spring Garden Street approaches, and extend the sidewalk on the south side of the Spring Garden Street Bridge to the new crosswalk.
7. Upgrade the sidewalk along MLK Drive and the Oval in this vicinity (shown in orange) by adding a buffer and widening where possible (steep grade is a constraint). If a bike lane cannot be accommodated on MLK Drive approach to location 6, then the sidewalk should become a sidepath up to the intersection.

Figure E15: Sidewalk Marking for a Walking Route

8. Reevaluate lane striping between locations 6 and 10. Consider narrowing roadway and adding dashed bike lane striping with green conflict paint to guide cyclists across traffic lanes to join outside bike lane east of 24th Street.
9. Calm the intersection of 24th Street and the Oval to improve the safety of pedestrian and bike movements.
10. Add safety measures at unprotected crosswalk: Yield to Pedestrians sign, possibly a Rapid Flash Beacon, and wayfinding signs to guide pedestrians to PMA.
11. Add a dashed bike lane across the intersection of eastbound Spring Garden Street and the Oval, and a pedestrian signal for people walking along the Parkway.

Figure E16: Eakins Oval



14. JFK Boulevard, Market Street, and 30th Street Station

JFK Boulevard and Market Street are parallel arterial streets with excess capacity that could be used to create an east-west bicycle route linking Center City with the 30th Street Station and University City. A variety of approaches are being considered for different segments of this corridor to create such a bicycle route.

- Between 15th and 20th Streets these streets consist of one-way streets with four travel lanes each, plus parking lanes. In this section, it would be desirable to remove some of the highway capacity to improve the streets for all roadway users, especially pedestrians. The Streets Department in 2011 tested the concept of providing left side, one-way cycle tracks on each street and found that that treatment could accommodate current motor vehicle traffic. Another approach would be to provide a two-directional cycle track on JFK and other, roadway narrowing enhancements on Market Street.
- West of 20th Street, each street becomes two directional. JFK Boulevard extends for over 2,000 feet to 30th Street Station with no traffic signals to control vehicle speeds. Very little traffic flows in the eastbound direction. PennDOT is currently developing plans to reconstruct the decks of bridges that carry JFK over 21st, 22nd, and 23rd Streets. As part of that project, a variety of measures should be available to accommodate a two directional cycle track or sidepath and these will be further evaluated in coming years.
- 30th Street Station. The City has conducted an initial sketch planning exercise to evaluate whether room would be available to extend a two directional cycle track around the north side of 30th Street Station using the inside of the existing circulatory roadway. This analysis indicates that sufficient room would be available. Additional work with stakeholders in the area would be required to confirm that the project would be feasible.
- West of 30th Street. Drexel University and the Philadelphia Water Department have a number of projects under consideration along JFK Blvd between 30th and 32nd Streets that would allow a bicycle facility to continue west at least as far as 32nd Street.

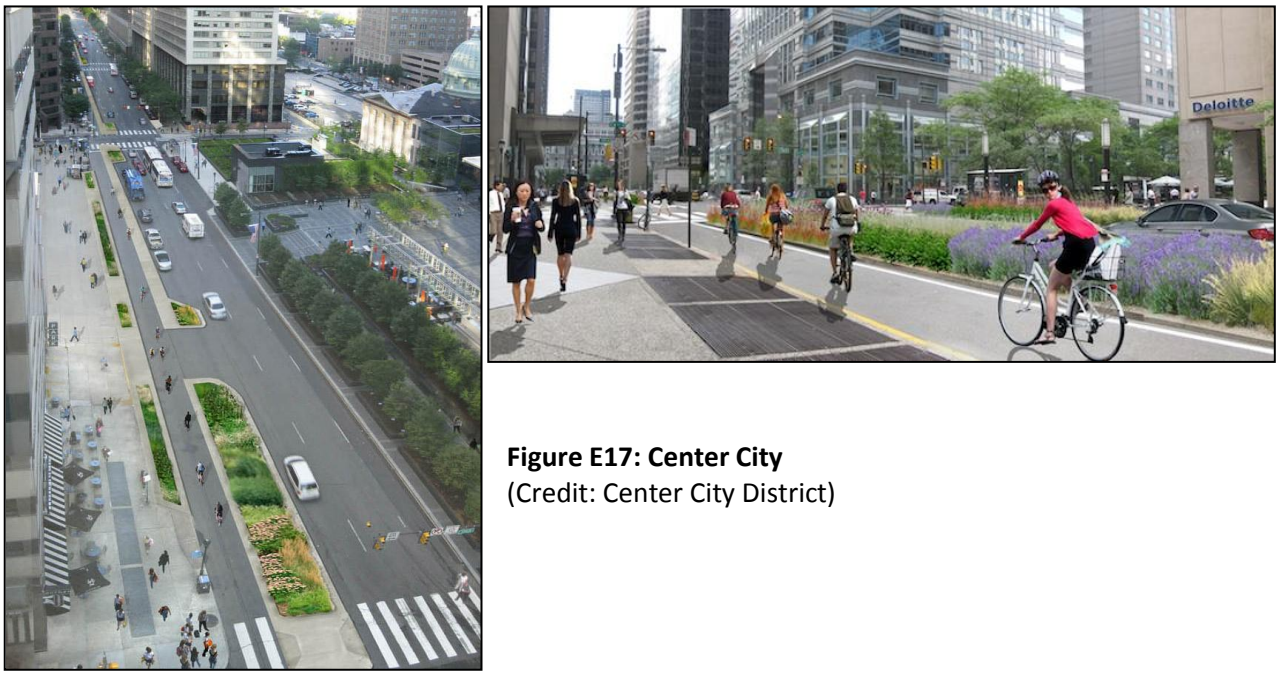


Figure E17: Center City
(Credit: Center City District)

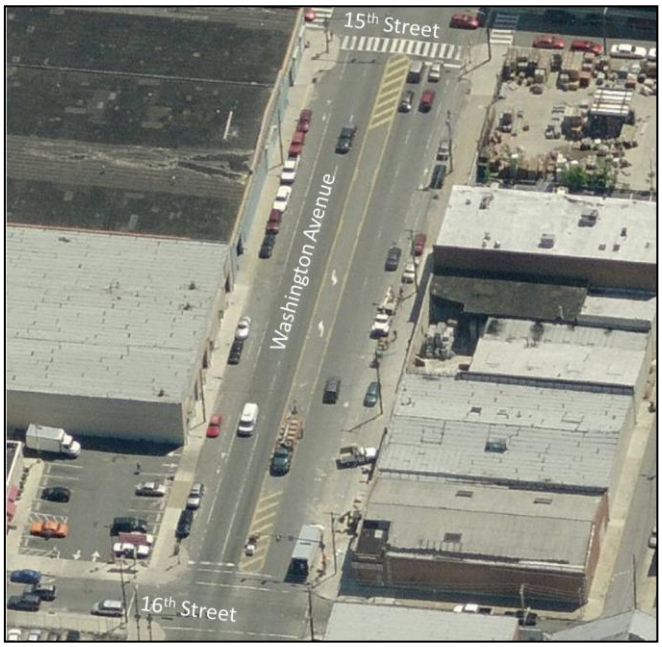
15. Washington Avenue

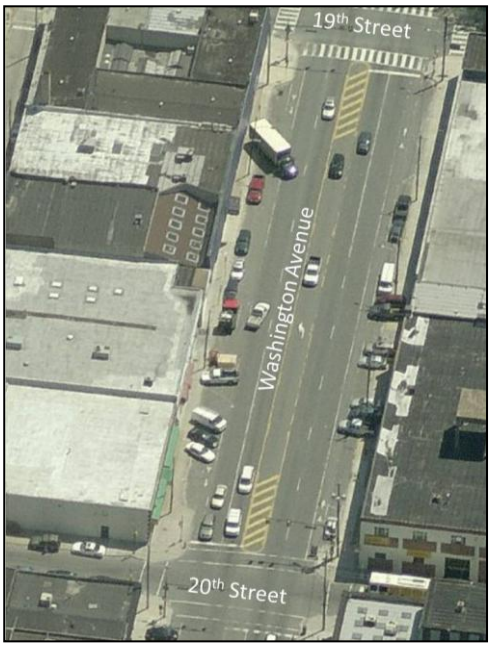
Washington Avenue has existing bike lanes between its western limit at Grays Ferry Avenue to 4th Street, except for the section between 7th and 11th Streets, which is slightly more narrow. While the bike lanes provide an important east-west link in the city, problems with parking in the bike lane and on sidewalks in commercial areas, especially west of Broad Street, create conflicts for bicyclists and pedestrians. There are also significant issues with the construction and auto-related industries along Washington Avenue, as sand and gravel debris, parked cars, and truck loading often block the bike lane. See Figures E18 and E19 for examples of these issues on the 1500 and 1900 blocks of Washington Avenue.

A parking-protected cycle track would be difficult to retrofit because of the existing curb extensions. An alternate approach that should be considered is moving the bike lanes to the center of the street. This would mean fewer conflicts with loading vehicles and with parking. A traffic analysis is needed to determine how many through lanes are required and where turn lanes must be preserved.

To provide additional connectivity for bicyclists traveling east and west in this part of the study area across the city, Wharton and Federal Streets are recommended for Bicycle Friendly Street improvements.

Figures E18 and E19: Angled parking, construction debris, parking of loading vehicles, and faded pavement marking of the bike lanes on Washington Avenue.





16. Walnut Street and Chestnut Street

As part of this study, the project team conducted a preliminary analysis of retrofit options for Chestnut Street and Walnut Street in West Philadelphia. These roads are especially important given their ability to directly connect the Schuylkill River Trail system and the Cobbs Creek Park Trail system. The goal is to provide this connection via an enhanced facility that increases bicyclist comfort on the roadway. Enhancing facilities along Chestnut Street and Walnut Street would increase access to open space and recreation facilities for underserved neighborhoods, while at the same time improving conditions for transportation and recreation trips made by bike along the corridors.

There are upcoming projects on these streets that may serve as implementation opportunities. For example, PennDOT is planning to resurface Walnut Street in 2012. This will require restriping and could potentially include a reorganization of travel lanes. Similar resurfacing projects are pending for Chestnut Street and a re-decking of the Chestnut Street Bridge is planned. The recommended Streets Department restriping plan will consider left-side bicycle facilities, which would significantly decrease conflicts with SEPTA bus traffic and passenger loading. This change should be considered as a first level of upgrade to the existing bike lanes. Additional analysis will be needed, for example focusing on transit operations and potential conflict points between bikes and buses given the different alignment options discussed below.

The analysis below and on the following pages was presented to and discussed with the Steering Committee in fall 2011. As noted at the time, a more detailed design study will be needed to fully examine all potential options.

Options

Three options were examined to upgrade existing bicycle facilities on Walnut Street and Chestnut Street. These options were selected for analysis as they have been found to increase comfort and to attract additional ridership where they can be properly implemented. Alternative alignments are presented for selected options as Figure 20 on the following pages.

- Option 1: A *buffered bike lane* provides a striped buffer between a bike lane and a motor vehicle travel lane. While the buffer increases lateral separation between bikes and cars, there is no physical separation between the two modes. The lack of physical separation leaves the bike lane open to encroachment by moving vehicles or vehicles stopping or parking illegally.

- Option 2: A *one-way cycle track* would combine the positive user experience of a separated path with the on-street infrastructure of a conventional bike lane. It would be physically separated from motor traffic and distinct from the sidewalk.

- Option 3: A *two-way cycle track* would provide a physically separated facility as in Option 2, and two-way operations would serve more desired trips on each street; however, the space requirements, and potential turning conflicts are greater than the previous two options, particularly given the heavy volume of bicycle traffic that can be expected on this corridor. The space constraints mean that in most segments it is impossible to meet minimum recommended width standards for the two-way cycle track and an adequate door zone buffer without either eliminating an entire lane of parking or reducing general traffic to just one lane. Two-way

operation also means more impacts on traffic signal operations, with greater likelihood that additional phases may be needed to mitigate conflicts, increasing delay for all users, including pedestrians and transit riders.

Key Considerations

The spreadsheets on the following pages provide alternatives for the allocation of space given the options outlined above. However, this is only one of the considerations in selecting the desired facility. A more detailed study is needed to fully analyze the existing curb to curb widths, parking restrictions, driveways, and other features of the existing roadway, as they relate to the geometric, operational, and safety requirements for each option. Additional considerations that will need to be assessed and accounted for include:

- *Changes to on-street parking:* One of the most common ways to create a cycle track in an urban environment is to use on-street parking as the physical separation between the bicyclists and the moving traffic. If this is to occur however, restrictions are needed in advance of driveways, alleys, and uncontrolled intersections where turning conflicts are likely. Most of the cycle-track options recommend eliminating the peak-hour restriction on parking where it currently applies. Lifting this restriction would further reduce traffic capacity at peak hour, but would allow curb extensions to be added to the street corners to reduce crossing distances.

- *Potential conflict points:* Each option might contribute to different potential turning conflict points created for example by driveways, alleys, and intersections. At uncontrolled crossings such as minor streets, alleys, and major driveways, it may be desirable to restrict some parking to open up sight lines between the two modes and/or to elevate the cycle track or provide traffic calming device to slow turning motorists. Conflicts at street crossings can be mitigated by signal timing (leading or protected phasing), geometric treatments which improve sight lines and slow conflicting movements, or turn restrictions.

Additional factors will have to be considered as well, including sight line design issues, and mode interactions. These issues are nuanced and require an engineering study to develop design plans which will provide a safe and comfortable environment for all users. They were discussed in detail with the Steering Committee in order to provide a framework for the more comprehensive analysis and design exercise that is recommended.

Figure E20: Chestnut Street and Walnut Street Cycle Track Analysis

CHESTNUT STREET

TYPICAL SECTIONS: LOOKING WEST TO EAST - WITH TRAFFIC

LEGEND

LR = LOSE RESTRICTION
LT = LOSE TRAVEL LANE
+P = ADD 1 PARKING LANE
(1) CT = 1 WAY CYCLE TRACK
(2) CT = 2 WAY CYCLE TRACK
BU = BUFFER
T = TRAVEL LANE
P = PARKING LANE
T/Pa = AM PEAK RESTRICT
T/Pp = PM PEAK RESTRICT
T/Pb = AM/PM PEAK RESTRICT
SW = SIDEWALK EXTENSION
AR = ADD PEAK PARKING RESTRICTION

Segment 1: 44TH STREET TO 41ST STREET

*AM RESTRICTED - NO PARKING LANE LINE (BROKEN OR SOLID)

Existing

44'	*P*	*T*	*T*	*T*	*P**
DRIVES	5				2
ALLEYS	0				0
BUS STOP	0				3

Proposed

Option 1	**LR/LT**	**P**	**T**	**T**	**BU**	**BL**	**P**	**ROAD WIDTH (FT)**
Buffered Bike Lane		**8**	**10**	**10**	**3**	**6**	**7**	44
Option 2	**LR/LT**	**(1) CT**	**BU**	**P**	**T**	**T**	P	
1-way Cycle Track		**7**	**3**	**7**	**10**	**10**	**7**	44
Option 3	**LR/LT**	**(2) CT**	**BU**	**P**	**T**	**T**	**P**	
2-way Cycle Track		**8**	**2**	**7**	**10**	**10**	7	44

Segment 2: 41ST STREET TO 38TH STREET

*AM RESTRICTED TO 9AM AND THEN 2 OR 3 HR PARKING FROM 9AM ON-- WITH WHITE SOLID PARKING LANE LINE

Existing

44'	*P*	*T*	*T*	*T*	*P**
AT 38TH	*LTL*	*T*	*T*	*RTL*	
DRIVES	5				5
ALLEYS	1				1
BUS STOP	0				3

Proposed

Option 1	**LR/LT**	**P**	**T**	**T**	**BU**	**BL**	**P**	**ROAD WIDTH (FT)**
Buffered Bike Lane		**8**	**10**	**10**	**3**	**6**	**7**	44
Option 2	**LR/LT**	**(1) CT**	**BU**	**P**	**T**	**T**	P	
1-way Cycle Track		**7**	**3**	**7**	**10**	**10**	**7**	44
Option 3a	**LR/LT**	**(2) CT**	**BU**	**P**	**T**	**T**	**P**	
2-way Cycle Track		**8**	**2**	**7**	**10**	**10**	7	44
Option 3b	**LT/AR**	**(2) CT**	**BU**	**T/Pb**	**T**	**T/P**		
2-way Cycle Track		**11**	**3**	**10**	**10**	**10**		44

Segment 3: 38TH STREET TO 34TH STREET

Existing

48'	*P*	*T*	*T*	*T*	*P**
DRIVES	0				2
ALLEYS	0				0
BUS STOP	0				0

*AM RESTRICTED UNTIL 9AM AND THEN 3 HR PARKING FROM 9AM ON-- NO PARKING LANE LINE (BROKEN OR SOLID)

Proposed

Option 1	**LR/LT**	**P**	**T**	**T**	**BU**	**BL**	**P**	**ROAD WIDTH (FT)**
Buffered Bike Lane		**8**	**11**	**11**	**3**	**7**	**8**	48
Option 2	**LR/LT**	**(1) CT**	**BU**	**P**	**T**	**T**	P	
1-way Cycle Track		**7**	**3**	**8**	**11**	**11**	**8**	48
Option 3	**LR/LT**	**(2) CT**	**BU**	**P**	**T**	**T**	**P**	
2-way Cycle Track		**11**	**3**	**7**	**10**	**10**	7	48

Segment 4: 34TH STREET TO 31ST STREET

Existing

44'	*T/Pb*	*T*	*T*	*T*	*BL*
DRIVES	3				1
ALLEYS	0				0
BUS STOP	0				3

Proposed

Option 1a	**LT/+P**	**T/Pb**	**T**	**T**	**BU**	**BL**	**P**	**ROAD WIDTH (FT)**
Buffered Bike Lane		**9**	**10**	**10**	**3**	**5**	**7**	44
Option 1b	**LR/LT/+P**	**P**	**T**	**T**	**BU**	**BL**	**P**	
1-way Cycle Track		**8**	**10**	**10**	**3**	**5**	**8**	44
Option 2	**LR/+P**	**(1) CT**	**BU**	**P**	**T**	**T**	**T**	
1-way Cycle Track		**5**	**2**	**7**	**10**	**10**	**10**	44
Option 3	**LR/LT/+P**	**(2) CT**	**BU**	**P**	**T**	**T**	**P**	
2-way Cycle Track		**8**	**2**	**7**	**10**	**10**	**7**	44

Segment 5: 31ST STREET TO 30TH STREET

*POCKET PARKING LANE FOR US POST OFFICE WITH BL ADJACENT

Existing

44'	*T/Pb*	*T*	*T*	*T*	*BL*	*P**
*52' **						
DRIVES	0				0	
ALLEYS	0				0	
BUS STOP	0				1	

Proposed

Option 1	**LR**	**P**	**T**	**T**	**T**	**BU**	**BL**	**P***	**ROAD WIDTH (FT)**
Buffered Bike Lane		**7**	**10**	**10**	**10**	**3**	**5**	**7**	52
Option 2	**LR**	**(1) CT**	**BU**	**P**	**T**	**T**	**T**	**P***	
1-way Cycle Track		**5**	**3**	**7**	**10**	**10**	**10**	**7**	52
Option 3	**LR/LT**	**(2) CT**	**BU**	**P**	**T**	**T**	**P***		
2-way Cycle Track		**11**	**3**	**8**	**11**	**11**	**8**		52

Segment 6: 30TH STREET TO END OF BRIDGE

Existing

44'	*T/Pb*	*T*	*T*	*T*	*BL*
AT SCH. AVE	*LTL*	*T*	*T*	*BL*	*RTL*
ON BRIDGE	*T/Pb*	*T*	*T*	*BL*	
DRIVES	0				0
ALLEYS	0				0
BUS STOP	0				0

Proposed

Option 1	**LR/LT**	**P**	**T**	**T**	**BU**	**BL**	**P**	**ROAD WIDTH (FT)**
Buffered Bike Lane		**8**	**10**	**10**	**3**	**5**	**8**	44
Option 2a	**LR**	**(1) CT**	**BU**	**P**	**T**	**T**	**T**	
1-way Cycle Track		**5**	**2**	**7**	**10**	**10**	**10**	44
Option 2b	**LR/LT**	**(1) CT**	**BU**	**P**	**T**	**T**	**P**	
1-way Cycle Track		**7**	**3**	**7**	**10**	**10**	7	44
Option 3a	**LR/LT**	**(2) CT**	**BU**	**P**	**T**	**T**	**P**	
2-way Cycle Track		**8**	**2**	**7**	**10**	**10**	**7**	44
Option 3b	**LT/AR**	**(2) CT**	**BU**	**T/Pb**	**T**	**T/P**		
2-way Cycle Track		**11**	**3**	**10**	**10**	**10**		44

Segment 7: **END OF BRIDGE TO 23RD STREET**

Existing

38'	*T/Pb*	*T*	*T*	*BL*		
AT 23RD	*T/Pb*	*T*	*RTL/SBL*			
DRIVES	0		1			
ALLEYS	0		0			
BUS STOP	0		1			

Proposed

Option 1a	**LT/+P**	**T/Pb**	**T**	**BU**	**BL**	**P**		**ROAD WIDTH (FT)**
		10	**11**	**3**	**6**	**8**		38
Option 1b	**LR**	**P**	**T**	**T**	**BU**	**BL**		
		8	**11**	**10**	**3**	**6**		38
Option 2	**LR**	**(1) CT**	**BU**	**P**	**T**	**T**		
		7	**3**	**8**	**10**	**10**		38
Option 3	**LR**	**(2) CT**	**BU**	**P**	**T**	**T**		
		8	**3**	**7**	**10**	**10**		38

Segment 8: **23RD STREET TO 22ND STREET**

Existing

35'	*T/Pb*	*T*	*T - BUS LANE*	
AT 22ND	*LTL*	*T*	*T - BUS LANE*	
DRIVES	0		0	
ALLEYS	0		0	
BUS STOP	0		0	

Proposed

Option 1	**LR**	**P**	**T**	**T**	**BU**	**BL**		**ROAD WIDTH (FT)**
		7	**10**	**10**	**3**	**5**		35
Option 2	**LR**	**(1) CT**	**BU**	**P**	**T**	**T**		
		5	**2**	**7**	**10**	**11**		35
Option 3a	**LR**	**(2) CT**	**BU**	**P**	**T**	**T**		
		8	**0**	**7**	**10**	**10**		35
Option 3b	**LT/AR**	**(2) CT**	**BU**	**T**	**P/T**			
		11	**4**	**10**	**10**			35

CHESTNUT STREET

NOTES FOR CHESTNUT STREET AND WALNUT STREET:

1) ASSUME THAT 1 LANE OF TRAVEL ON CHESTNUT STREET CAN BE CONVERTED

2) FOR CHESTNUT ST SEGMENT 1 - 3: SEE ASTERISK CONCERNING EXISTING CURB LANE. SIGNS SAY IT IS AM RESTRICTED, ALTHOUGH IT SEEMS TOO NARROW TO FUNCTION AS 4 LANES OF TRAVEL. HOWEVER, THE PROPOSED CHANGES ARE LABELED AS 'LR' - LOSE RESTRICTION, SINCE THE SIGNS ARE EXISTING IN THE FIELD

3) DRIVEWAYS, ALLEYS AND BUS STOP NUMBERS- THE RIGHT SIDE OF TRAFFIC (SOUTH SIDE ON CHESTNUT AND NORTH SIDE ON WALNUT) HAS MORE CHALLENGES DUE TO BUS STOPS. NUMBER OF DRIVEWAYS IS SIMILAR.

A) THE BUFFERED BIKE LANE OPTION WOULD ALSO WORK ON THE LEFT SIDE

B) THE CYCLE TRACK OPTIONS ARE BETTER SUITED ON THE LEFT SIDE OF TRAFFIC TO MINIMIZE FRICTION WITH BUSES

C) IN GENERAL KEEPING PARKING FULL TIME ADJACENT TO THE CYCLE TRACK IS PREFERRED

4) THE FOLLOWING MINIMUM WIDTHS ASSUMED TO PROVIDE THE MAXIMUM COMFORT AND SAFETY TO BICYCLISTS:

TRAVEL LANES - 10'
BIKE LANES - 5'
PARKING STALL - 7'
BUFFER - 2' (3' PREFERRED)
1 WAY CYCLE TRACK (NO PASSING)- 5'
1 WAY CYCLE TRACK (PASSING)- 7'
2 WAY CYCLE TRACK - 8'

* IF THERE WAS MORE WIDTH AFTER ALL MINIMUMS WERE MET,WIDER LANES ARE ASSIGNED IN THIS PRIORITY:

BUFFER
CYCLE TRACK/BIKE LANE
PARKING LANE
TRAVEL LANE

5) THESE ARE CONCEPTUAL GRAPHICS AND DIMENSIONS, FURTHER DETAILED STUDY IS RECOMMENDED TO ASSESS PARKING, OPERATIONS, SIGHT LINE DESIGN, AND MODE INTERACTIONS.
ADDITIONAL PARKING RESTRICTIONS IN ADVANCE OF DRIVEWAYS, ALLEYS, AND INTERSECTIONS SHOULD BE CONSIDERED WHERE TURNING CONFLICTS ARE LIKELY.

6) IT SHOULD BE NOTED THAT BUS OPERATIONS UNDER EXISTING CONDITIONS ALLOW THE BUSES IN MOST CASES TO PULL OUT FROM TRAFFIC. DESIGNS PROPOSED WHICH REMOVE PARKING ON THE RIGHT SIDE WILL RESULT IN BUSES STOPPING WITHIN THE TRAVEL LANE WHICH MAY DISRUPT TRAFFIC OPERATIONS.

7) IT IS NOT RECOMMENDED THAT TWO WAY CYCLE TRACKS BE DEVELOPED WITHOUT PROVIDING THE DOOR ZONE BUFFER (3 FEET) IT MAY BE NECESSARY TO ADD FURTHER PARKING RESTRICTIONS SHOULD IT BE DESIRED TO PROCEED WITH A 2-WAY CYCLE TRACK TO PROVIDE MULTIPLE LANES OF VEHICLE CAPACITY AND PARKING

WALNUT STREET

TYPICAL SECTIONS: LOOKING WEST TO EAST - AGAINST TRAFFIC

LEGEND

LR = LOSE RESTRICTION
LT = LOSE TRAVEL LANE
+P = ADD 1 PARKING LANE
(1) CT = 1 WAY CYCLE TRACK
(2) CT = 2 WAY CYCLE TRACK
BU = BUFFER
T = TRAVEL LANE
P = PARKING LANE
T/Pa = AM PEAK RESTRICT
T/Pp = PM PEAK RESTRICT
T/Pb = AM/PM PEAK RESTRICT
SW = SIDEWALK EXTENSION
AR = ADD PEAK PARKING RESTRICTION

Segment 1: 44TH STREET TO 43RD STREET

Existing

44'	*P*	*BL*	*T*	*T*	*P*
DRIVES	2				0
ALLEYS	0				0
BUS STOP	1				0

Proposed

Option 1	P	T	T	BU	BL	P	ROAD WIDTH (FT)
Buffered Bike Lane	7	10	10	3	6	8	44
Option 2	**P**	**T**	**T**	**P**	**BU**	**(1) CT**	
1-way Cycle Track	7	10	10	7	3	7	44
Option 3a	**P**	**T**	**T**	**P**	**BU**	**(2) CT**	
2-way Cycle Track	7	10	10	7	2	8	44
Option 3b LT/AR		**P/T**	**T**	**P**	**BU**	**(2) CT**	
2 Way Cycle Track		11	11	8	3	11	44

Segment 2: 43RD STREET TO 41ST STREET

Existing

45'	*P*	*BL*	*T*	*T*	*P*
DRIVES	4				1
ALLEYS	0				0
BUS STOP	1				0

Proposed

Option 1	P	T	T	BU	BL	P	ROAD WIDTH (FT)
Buffered Bike Lane	8	10	10	3	6	8	45
Option 2	**P**	**T**	**T**	**P**	**BU**	**(1) CT**	
1-way Cycle Track	7	10	10	8	3	7	45
Option 3	**P**	**T**	**T**	**P**	**BU**	**(2) CT**	
2-way Cycle Track	7	10	10	7	3	8	45

Segment 3: 41ST STREET TO 38TH STREET

Existing

44'	*P*	*BL*	*T*	*T*	*P*
DRIVES	1				1
ALLEYS	0				0
BUS STOP	1				0

Proposed

Option 1	P	T	T	BU	BL	P	ROAD WIDTH (FT)
Buffered Bike Lane	7	11	11	3	5	7	44
Option 2	**P**	**T**	**T**	**P**	**BU**	**(1) CT**	
1-way Cycle Track	7	10	10	7	3	7	44
Option 3a	**P**	**T**	**T**	**P**	**BU**	**(2) CT**	
2-way Cycle Track	7	10	10	7	2	8	44
Option 3b LT/AR		**T/P**	**T**	**T/P**	**BU**	**(2) CT**	
2-way Cycle Track		10	10	10	3	11	44

Segment 4: 41ST STREET TO 38TH STREET

Existing

43'	*P*	*BL*	*T*	*T*	*P*
AT 37TH	*RTL*	*BL*	*T*	*T*	*P*
DRIVES	1				1
ALLEYS	0				0
BUS STOP	1				0

Proposed

Option 1	P	T	T	BU	BL	P	ROAD WIDTH (FT)
Buffered Bike Lane	7	10	10	3	6	7	43
Option 2	**P**	**T**	**T**	**P**	**BU**	**(1) CT**	
1-way Cycle Track	7	10	10	7	3	6	43
Option 3a	**P**	**T**	**T**	**P**	**BU**	**(2) CT**	
2-way Cycle Track	7	10	10	7	1	8	43
Option 3b LT/AR	**T/P**		**T**	**P**	**BU**	**(2) CT**	
2-way Cycle Track	11		10	8	3	11	43

Segment 5: 37TH STREET TO 36TH STREET

Existing

44'	*P*	*BL*	*T*	*T*	*P*
DRIVES	0				1
ALLEYS	0				0
BUS STOP	1				0

Proposed

Option 1	P	T	T	BU	BL	P	ROAD WIDTH (FT)
Buffered Bike Lane	7	11	11	3	5	7	44
Option 2	**P**	**T**	**T**	**P**	**BU**	**(1) CT**	
1-way Cycle Track	7	10	10	7	3	7	44
Option 3a	**P**	**T**	**T**	**P**	**BU**	**(2) CT**	
2-way Cycle Track	7	10	10	7	2	8	44
Option 3b LT/AR	**T/P**		**T**	**P**	**BU**	**(2) CT**	
2-way Cycle Track	11		11	8	3	11	44

Segment 6: 36TH STREET TO 34TH STREET

Existing

42'	*P*	*BL*	*T*	*T*	*P*
DRIVES	0				2
ALLEYS	0				0
BUS STOP	1				0

Proposed

Option 1	P	T	T	BU	BL	P	ROAD WIDTH (FT)
Buffered Bike Lane	7	11	10	2	5	7	42
Option 2	**P**	**T**	**T**	**P**	**(1) CT**		
1-way Cycle Track	7	11	10	7	7		42
Option 3a	**P**	**T**	**T**	**P**	**BU**	**(2) CT**	
2-way Cycle Track	7	10	10	7	0	8	42
Option 3b LT/AR	**T/P**		**T**	**P**	**BU**	**(2) CT**	
2-way Cycle Track	10		10	8	3	11	42

WALNUT STREET

Segment 7: 34TH STREET TO 33RD STREET

Existing

	42'	*P*	*BL*	*T*	*T*	*T/Pb*
	AT 34TH	*P*	*BL*	*T*	*T*	*LTL*
	DRIVES	1				0
	ALLEYS	0				0
	BUS STOP	1				0

Proposed

Option 1	**LR**	**P**	**T**	**T**	**BU**	**BL**	**P**	**ROAD WIDTH (FT)**
		7	**11**	**10**	**2**	**5**	**7**	42
Option 2	**LR**	**P**	**T**	**T**	**P**	**BU**	**(1) CT**	
		7	**10**	**10**	**7**	**3**	**5**	42
Option 3a		**P**	**T**	**T**	**P**	**BU**	**(2) CT**	
		7	**10**	**10**	**7**	**0**	**8**	42
Option 3b	**LR/AR**	**P/T**		**T**	**P**	**BU**	**(2) CT**	
		10		**10**	**8**	**3**	**11**	42

Segment 8: 33RD STREET TO MIDBLOCK BTWN 32ND AND 31ST

Existing

	44'	*P*	*BL*	*T*	*T*	*T/Pb*
	DRIVES	2				0
	ALLEYS	0				0
	BUS STOP	2				0

Proposed

Option 1	**LR**	**P**	**T**	**T**	**BU**	**BL**	**P**	**ROAD WIDTH (FT)**
		7	**11**	**11**	**3**	**5**	**7**	44
Option 2	**LR**	**P**	**T**	**T**	**P**	**BU**	**(1) CT**	
		7	**11**	**10**	**7**	**2**	**7**	44
Option 3a	**LR**	**P**	**T**	**T**	**P**	**BU**	**(2) CT**	
		7	**10**	**10**	**7**	**2**	**8**	44
Option 3b	**LT/AR**		**P/T**	**T**	**P**	**BU**	**(2) CT**	
			11	**11**	**8**	**3**	**11**	44

Segment 9: MIDBLOCK BTWN 32ND AND 31ST TO 30TH STREET

Existing

	44'	*P*	*BL*	*T*	*T*	*T*
	DRIVES	2				0
	ALLEYS	0				0
	BUS STOP	0				0

Proposed

Option 1	**LT/+P**	**P**	**T**	**T**	**BU**	**BL**	**P**	**ROAD WIDTH (FT)**
		7	**11**	**11**	**3**	**5**	**7**	44
Option 2	**LT/+P**	**P**	**T**	**T**	**P**	**BU**	**(1) CT**	
		7	**11**	**10**	**7**	**2**	**7**	44
Option 3a	**LR**	**P**	**T**	**T**	**P**	**BU**	**(2) CT**	
		7	**10**	**10**	**7**	**2**	**8**	44
Option 3b	**LT/AR**		**P/T**	**T**	**P**	**BU**	**(2) CT**	
			11	**11**	**8**	**3**	**11**	44

Segment 10: 30TH STREET TO SCHUYLKILL AVE

Existing

	43'	*P*	*BL*	*T*	*T*	*T*
	DRIVES	0				0
	ALLEYS	0				0
	BUS STOP	0				0

Proposed

Option 1	**LT/+P**	**P**	**T**	**T**	**BU**	**BL**	**P**	**ROAD WIDTH (FT)**
		7	**11**	**10**	**3**	**5**	**7**	43
Option 2	**LT/+P**	**P**	**T**	**T**	**P**	**BU**	**(1) CT**	
		7	**11**	**10**	**7**	**1**	**7**	43
Option 3a	**LT/+P**	**P**	**T**	**T**	**P**	**BU**	**(2) CT**	
		7	**10**	**10**	**7**	**1**	**8**	43
Option 3b	**AR**	**T/P**	**T**	**T**		**BU**	**(2) CT**	
		10	**10**	**10**		**3**	**10**	43

Segment 11: SCHUYLKILL AVE TO BRIDGE OVERPASS

Existing

	38'		*BL*	*T*	*T*	*T*
	AT SCH AVE	*RTL*	*BL*	*T*	*T*	*LTL*
	DRIVES	2				0
	ALLEYS	0				0
	BUS STOP	2				0

Proposed

Option 1	**SW EXT**	**SW**	**T**	**T**	**T**	**BL**		**ROAD WIDTH (FT)**
	ONLY	**2**	**11**	**10**	**10**	**5**		38
Option 2		**T**	**T**	**T**	**BU**	**BL**		
		11	**10**	**10**	**2**	**5**		38
Option 3a	**LT/+P**		**T**	**T**	**P**	**BU**	**(1)CT**	
			10	**10**	**8**	**2**	**8**	38
Option 3b	**LR/+P**		**T**	**T**	**P**	**BU**	**(2) CT**	
			10	**10**	**7**	**3**	**8**	38

* IF SIDEWALK EXTENSION IS MORE IMPORTANT THAN CYCLE TRACK BUFFER- CAN BE SWITCHED OUT

Segment 12: BRIDGE OVERPASS TO 22ND STREET

Existing

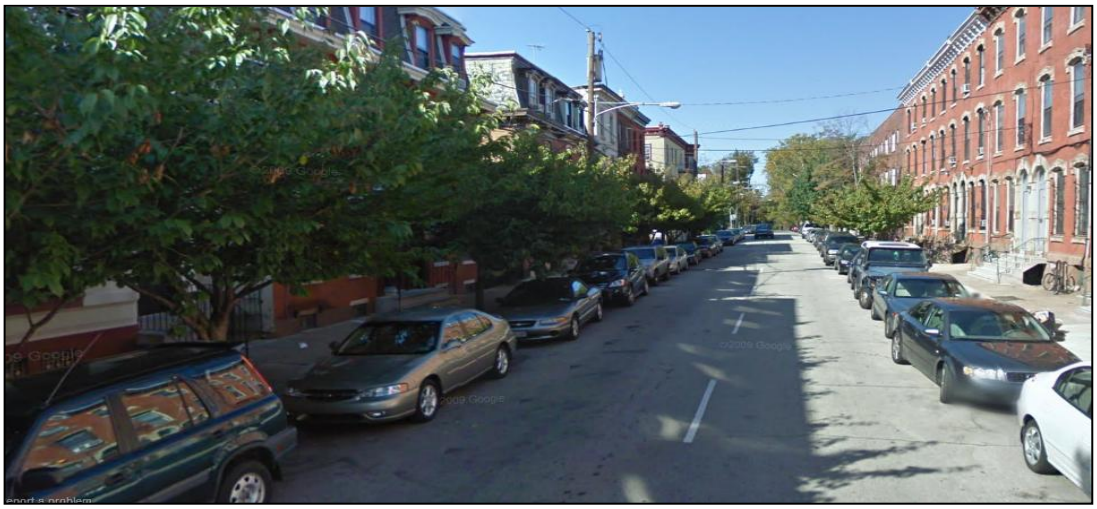
	38'		*BL*	*T*	*T*	*T/Pa*
	DRIVES	3				0
	ALLEYS	0				0
	BUS STOP	1				0

Proposed

Option 1	**LT/+P**	**T**	**T**	**BU**	**BL**	**P**		**ROAD WIDTH (FT)**
		11	**11**	**3**	**5**	**8**		38
Option 2	**LT/+P**		**T**	**T**	**P**	**BU**	**(1) CT**	
			11	**10**	**7**	**3**	**7**	38
Option 3	**LT/+P**		**T**	**T**	**P**	**BU**	**(2) CT**	
			10	**10**	**7**	**3**	**8**	38

17. Pine/Woodland

Figure E21: Sample Section of Pine Street



Pine Street is recommended as a Bicycle Friendly Street on the proposed bike network because it is currently comfortable for bicycling and provides a useful linear connection in West Philadelphia. However, a small segment of the road is a one-way street, which will limit its ability to provide optimal bicycle connectivity. In order to facilitate bike travel on the street, a contra-flow bike lane should be considered. This would allow a bicycle traveling west on Penn's Woodland Walk to connect to the two-way Bicycle Friendly Street section of Pine Street.

18. Grays Ferry Avenue Bridge

At the present time, recently completed and soon-to-be-constructed sections of the Schuylkill River multi-use trail are separated by the Schuylkill River, which is spanned at this location only by the high-speed multi-lane Grays Ferry Avenue Bridge. The bridge does include painted, unbuffered bike lanes, but high prevailing speeds on the immediately adjacent motor vehicle lanes and significant debris in the bike lanes make the bike lanes uncomfortable for many bicyclists. A long bridge - 1800 feet in length – it is also heavily travelled, with PennDOT traffic counts conducted in year 2007 indicating an average daily traffic volume of around 30,000.

Because the recently completed Grays Ferry Crescent multi-use trail connects to the south side of Grays Ferry Avenue, and because future connections on the other end of the bridge also connect from the south, the Bicycle Coalition has proposed the removal of the painted bike lanes and the implementation of a two-way shared-use sidepath on the south side of the existing bridge deck. By reallocating space on the 85 foot wide bridge, i.e., reducing the width of each of the dual eastbound motor vehicle lanes to 11 feet, there would be sufficient space for a five foot shoulder, a protective concrete "jersey" barrier, and a 12 foot wide shared use path. The existing 5 foot wide sidewalk on the north side could potentially be widened by converting some of the excess space from the roadway on the north side of the span.

As part of its design, the Bicycle Coalition has designed proposed pavement markings for the street network on the west approach to the bridge, with the intention of more safely accommodating cyclists. This should be considered as well.

Figure E22: Cross Section Proposed by the Bicycle Coalition of Greater Philadelphia

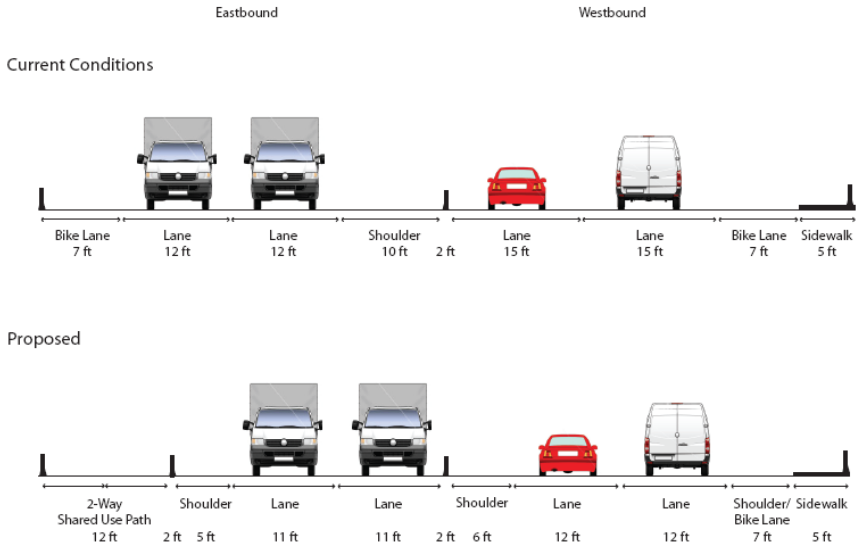
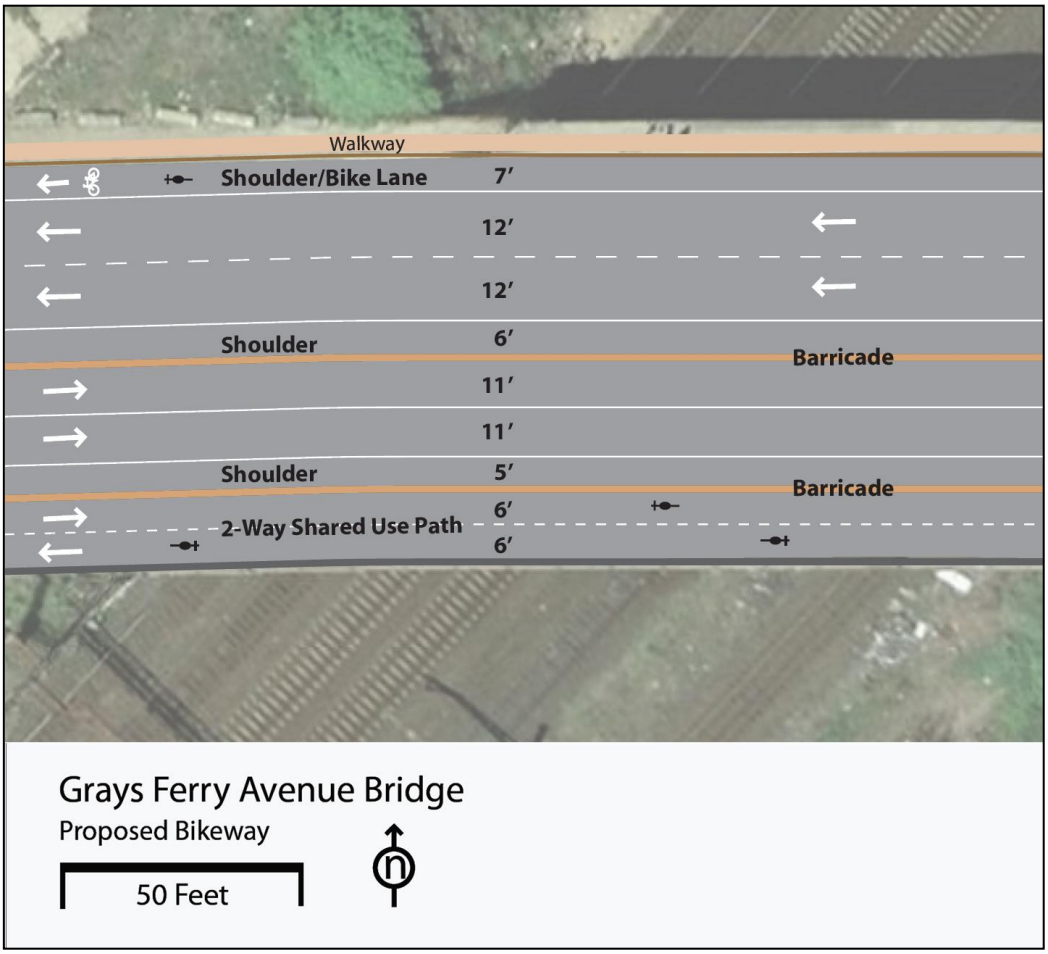


Figure 23: Recommended Grays Ferry Bridge Bikeway



(Credit: Bicycle Coalition of Greater Philadelphia)

19. Bartram Avenue

A. From Island Avenue to Industrial Highway

The implementation of a multi-use sidepath along the east side of two miles of Bartram Avenue, from the intersection with Island Avenue to the intersection with Industrial Highway/Governor Printz Boulevard (also known as Stevens Drive), just south of I-95, should be studied.

When Bartram Avenue (PA Route 291) was rebuilt as a divided multi-lane arterial highway, sidewalks were not part of the design. Some segments of sidewalk have since been added, as part of land developments on the east side of the highway, but these are separated by long gaps. The roadway does include painted, unbuffered bike lanes, but high prevailing speeds on the immediately adjacent motor vehicle lanes makes the lanes uncomfortable for many bicyclists. PennDOT traffic counts conducted in 2007 indicate an average daily traffic volume of around 23,000.

Several large employment centers have been developed along the east side of Bartram Avenue, most notably the PNC Bank Eastwick Center at 88th Street and Tinicum Boulevard (one of the largest financial transaction processing facilities in the United States, employing approximately one thousand people).

SEPTA's Eastwick train station is located on the west side of Bartram Avenue just south of the intersection with 84th Street. Trains serve Philadelphia International Airport and Center City, and run on a frequent (30 minute) basis. The sidewalk alongside the train station driveway ends abruptly at the point where the driveway connects to Bartram Avenue. A bus shelter for those awaiting southbound buses is connected to the train station driveway. A second shelter, for northbound buses, is located across Bartram Avenue with no crosswalk or signal to protect pedestrians as they cross the four high-speed lanes. In recent years at least one pedestrian has been struck and killed here, crossing for the bus. Sidewalks should be extended, at a minimum, between 84th and Tinicum Boulevard. A cut in the landscaped median should be created specifically for pedestrian crossings at the station driveway. Alternatively, moving both bus shelters to the signalized intersection with Tinicum Boulevard (located at the central 291 symbol in the map below), which already includes a signalized crosswalk just 250 feet south of the train station driveway, could be considered.

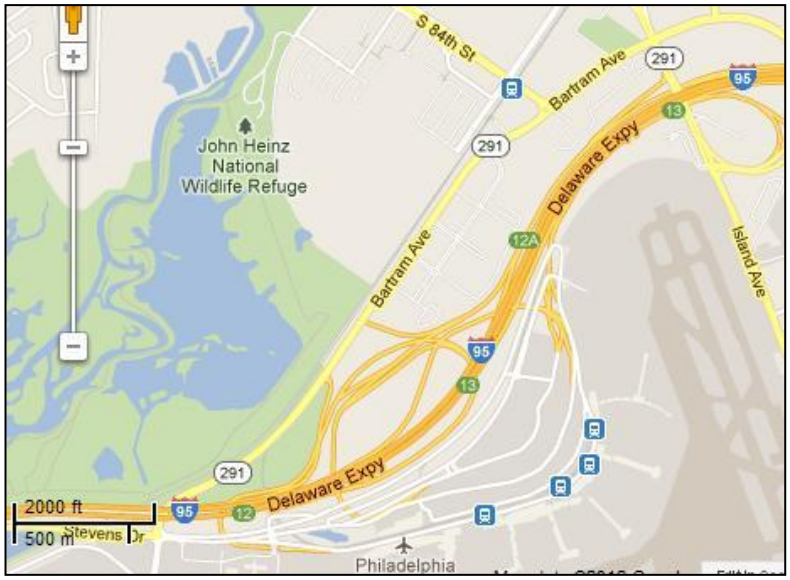


Figure E24: Bartram Avenue from Island Avenue to Industrial Highway

B. Island Avenue and Bartram Avenue Intersection

These very old roads over time were widened along the gradual development of the Philadelphia International Airport. They still provide direct links to the Cobbs Creek Trail, John Heinz National Wildlife Refuge, Fort Mifflin, and numerous residential, commercial, and institutional destinations, but have become large, multi-lane highways with approximately 30,000 average daily trips as of 2007. The Cobbs Creek Greenway is signed along this portion to Fort Mifflin, yet consistent bicycle and pedestrian facilities do not exist.

Breaking down large multi-lane highways such as Bartram Avenue with landscaped medians with areas of refuge for bicycles and pedestrians, as well as enhanced intersection design, two-stage bike boxes and similar measures should be investigated.

Figure 25: Island Avenue and Bartram Avenue

Island Avenue and Bartram Avenue today. The development of sidepaths, bike lanes, enhanced medians at the crossings, and bicycle-friendly signalization should be examined.

Figure E26: Enhanced Intersection Treatments

Enhance intersection crossing design must be employed with such large roads.

Figure E27: Sample Design Options

Typical shared-use sidepath along a busy highway at an intersection. Note the use of medians to reduce the length of crossing segment, and to allow for additional landscaping.

20. Platt Bridge

This key connection between South Philadelphia and the vicinity of Philadelphia International Airport is the last (i.e. furthest south) crossing of the Schuylkill River open to cyclists and pedestrians. Opened in 1951 to replace the old Penrose Avenue swing bridge, the 1.5 mile long span was constructed with sidewalks on both sides. 1970's construction of a highway ramp severed the sidewalk on the north side, but the south sidewalk remains open.

Issues needing to be resolved include safer access on both the east and west approaches to the bridge, and an adjustment to the surface of the sidewalk in two locations.

Because the walkway is on the south side of the bridge, cyclists and pedestrians approaching from the east (South Philadelphia) need to cross six lanes of traffic using pedestrian facilities, and then travel against one-way traffic on an access road parallel to Penrose Avenue for approximately 200 meters. This access road is heavily travelled by trucks serving a nearby car crusher/junkyard. The walkway at this point and along the bridge is 3 feet 7 inches wide, which is not comfortable biking width and can pose problems for passing other cyclists or pedestrians.

At the east approach, a two-way multi-use trail alongside but separated from the access road would be one solution. Also, signage should direct westbound cyclists and pedestrians to utilize existing crosswalks at the signalized intersection of 26th Street and Penrose Avenue, then to the proposed multi-use trail on the south side of Penrose Avenue, then to the walkway.

For eastbound cyclists, and for those exiting the bridge going westwards, there is no paved connection of any sort on the west approach to the walkway and one must scale a grass and dirt berm to reach the walkway and/or ride along or against the heavily trafficked Penrose Avenue. A paved trail connection should be investigated here, connecting to the local road network. In addition, the creation of a small break in the existing guard rail could accommodate those eastbound cyclists riding in the shoulder of Penrose Avenue.

At two locations, near the east and west ends of the bridge, the sidewalk is depressed between two concrete curbs. Trash, broken glass and windborne silt accumulate on the walkway in these two places. A design that would raise the walkway surface so that it is flush with the adjacent curbs should be investigated, thus alleviating the accumulation of debris on the walkway.

Figure E28: Platt Bridge East Approach

Figure 29: Platt Bridge West Approach