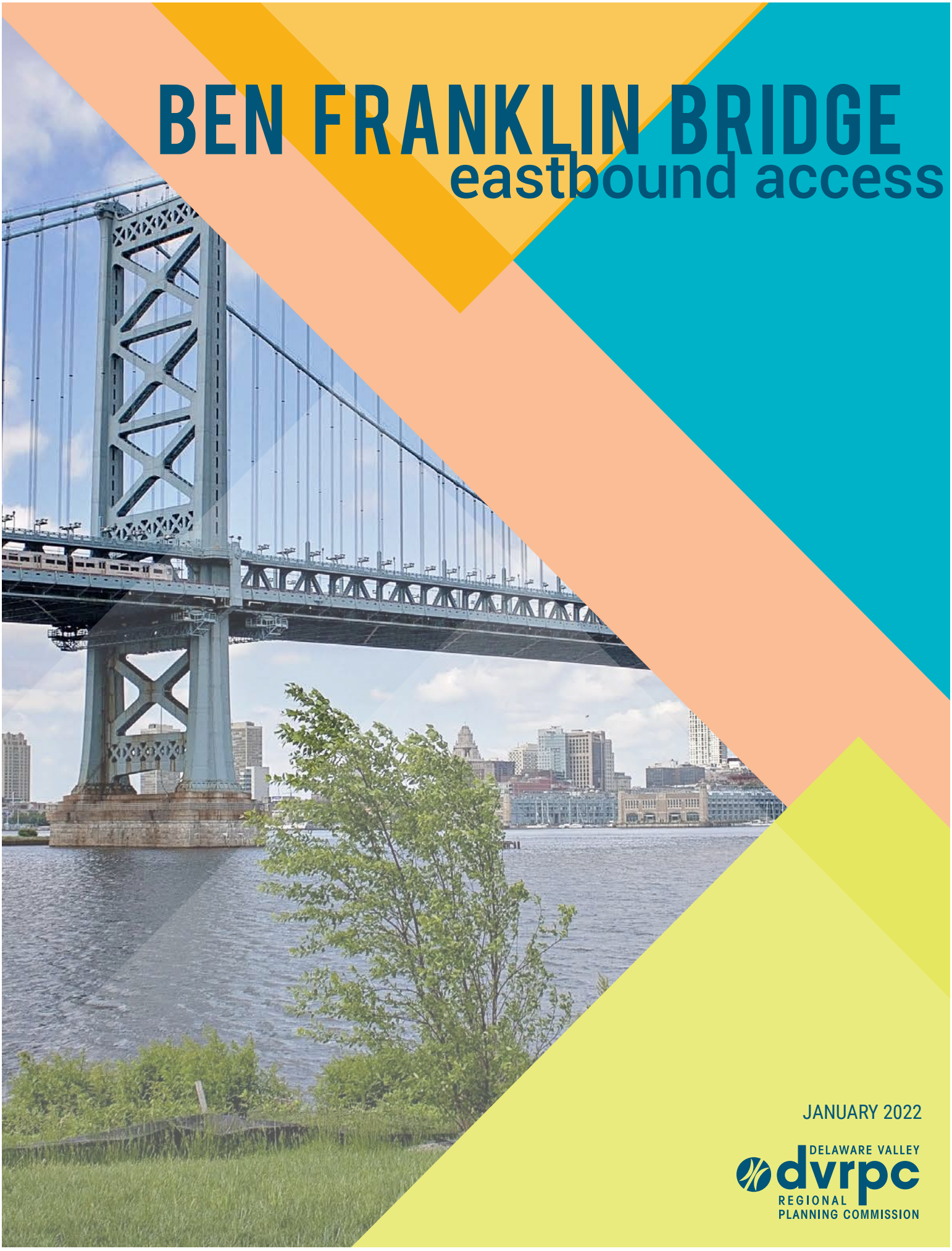
BEN FRANKLIN BRIDGE
eastbound access



JANUARY 2022

DELAWARE VALLEY
dvrpc
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EXECUTIVE SUMMARY

The eastbound entrance to the Benjamin Franklin Bridge in Philadelphia is supported by a roadway design that is primarily vehicle-oriented and poses a barrier to multimodal accessibility in the area. The purpose of this study, undertaken by the Delaware Valley Regional Planning Commission (DVRPC), was to explore alternatives for roadway reconfiguration and other streetscape improvements in an effort to provide safe multimodal connections.

The study was guided by two key goals:

- Improve safety and connectivity for bicyclists, pedestrians, and transit riders in the vicinity of the Benjamin Franklin Bridge eastbound entrance, while maintaining stable traffic flow.
- Evaluate potential roadway reconfiguration to support multimodal access and safety, particularly on the 5th Street and 6th Street approaches to the bridge (eastbound).

The DVRPC project team developed a public engagement plan to collect information about multimodal issues and challenges in the study area, working around the restrictions and safety considerations of the COVID-19 pandemic in the fall and winter of 2020. The engagement effort included an interactive webmap where users could place markers on the location of an issue and add notes or comments to provide more detail. The webmap included a short how-to video and a brief follow-up survey. Social media ads, postcards, and community organizations helped spread the word about the engagement opportunity. The project team was able to collect almost 200 responses.

Building on this public input, the project team worked with the steering committee to sift through previously proposed recommendations and develop three alternatives for evaluation.

- Alternative A: Street-level direct connection from I-676 to bridge; removal of 6th street ramp; 5th Street approach narrowed and ramp realigned slightly; Franklin Street ramp narrowed and stop control added;
- Alternative B: Overhead bridge connecting I-676 to bridge (local traffic would exit at 8th Street); 6th Street ramp narrowed to single lane; 5th Street approach and ramp narrowed; signal added to control merge with 5th and Race Street ramps; Franklin Street ramp realigned to signalized T-intersection with 6th Street;
- Alternative C: Race Street ramp closed and bridge-bound traffic diverted to widened 5th Street ramp; channelized turn lane on 5th Street closed; Franklin Street ramp narrowed, stop control added, and restricted for use by buses only.

The steering committee also helped to develop and rank a list of criteria with which to evaluate the reconfiguration alternatives. Alternatives were evaluated in comparison to the base conditions and to each other. Table 1 lists the evaluation criteria. The colored boxes represent how each alternative is forecast to perform with respect to each criteria.

Table 1: Evaluation Summary

EVALUATION CRITERIA	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Reduces pedestrian exposure to vehicles while crossing.			
Includes roadway design features known to decrease crash risk or severity.			
Reduces the total number of conflict points in the study area.			
Addresses known vehicle safety issues related to geometry.			
Reduces accessible pedestrian travel times between attractions and amenities.			
Closes gaps in the bicycle network and/or increases the quality of existing bike facilities.			
Reduces the total number of vehicle merging maneuvers.			
Expands the footprint of park and open space facilities.			
Reduces mixing between local and interstate traffic.			
Improves queue lengths where existing queues spill back into upstream intersections.			
Maintains or improves existing level of vehicle delay.			
Achieves study objectives at a low cost.			

Worst	Worse	Same	Better	Best

CHAPTER 1

INTRODUCTION

The eastbound entrance to the Benjamin Franklin Bridge in Philadelphia is surrounded by attractions and amenities for pedestrians, bicyclists, and transit riders. A newly completed ADA-compliant ramp on the Camden side of the bridge has improved accessibility for pedestrians and bicyclists of all ages and abilities to access the bridge. However, heavy traffic and a roadway design that is primarily vehicle-oriented continue to pose a barrier to multimodal bridge access on the Philadelphia side. The purpose of this study, prepared by the Delaware Valley Regional Planning Commission (DVRPC), was to explore alternatives for roadway reconfiguration as well as other streetscape improvements to provide multimodal connections between Franklin Square Park, Monument Plaza, the bicycle and pedestrian bridge path, and upcoming or proposed facilities such as the Franklin Square PATCO station and Race Street bike lane.

The study was guided by two key goals:

- Improve safety and connectivity for bicyclists, pedestrians, and transit riders in the vicinity of the Benjamin Franklin Bridge eastbound entrance, while maintaining stable traffic flow.
- Evaluate potential roadway reconfiguration to support multimodal access and safety, particularly on the 5th Street and 6th Street approaches to the bridge (eastbound).

To meet these goals, the DVRPC project team first reviewed prior studies related to the area and documented existing conditions. They engaged the public in the fall of 2020 to help identify multimodal issues. Then, the team prepared a microsimulation model to evaluate traffic operations based on existing conditions as well as with projected 2050 traffic volumes. Previously proposed lane reconfiguration alternatives were combined with multimodal concepts and evaluated for operational feasibility. The methodology and results of that evaluation are presented in this document.

STEERING COMMITTEE

Eastbound access to the Ben Franklin Bridge is impacted by roadway configurations well beyond the base of the bridge. Therefore, the project team convened a broad steering committee at each project milestone to inform the project approach and recommendations. The following organizations were invited to participate:

- Delaware River Port Authority (DRPA)
- City of Philadelphia
  - Office of Transportation, Infrastructure, and Sustainability (OTIS)
  - City Planning Commission (PCPC)
  - Parks and Recreation
- Pennsylvania Department of Transportation (PennDOT)
- NJ Transit
- SEPTA
- Pennsylvania Horticultural Society
- Bicycle Coalition of Greater Philadelphia
- East Coast Greenway
- Liberty Resources

- Historic Philadelphia
- Old City District
- Center City District
- Philadelphia Chinatown Development Corporation (PCDC)
- Northern Liberties Neighbors Association
- Callowhill Neighborhood Association
- Coopers Ferry Partnership
- Rutgers University – Camden
- Independence National Historical Trust
- Independence Visitor Center
- Philadelphia City Council District 1 (Mark Squilla)
- PA House District 175 (MaryLouise Isaacson)
- U.S. Congress PA District 2 (Brendan Boyle)
- U.S. Congress PA District 3 (Dwight Evans)

STUDY AREA

To capture the vehicular impacts of potential multimodal improvement recommendations, the study area includes at least one block beyond all eastbound bridge access points. Figure 1 highlights the project study area in blue, which includes:

- 6th Street between Callowhill and Arch
- 5th Street approaching bridge
- Race Street between 4th and 7th
- I-676 off-ramps approaching 6th
- Eastbound bridge ramps
- Interior plazas and path to pedestrian bridge

An expanded study area, including neighborhoods surrounding both east and west sides of the Ben Franklin Bridge, was considered as part of the existing conditions analysis and public engagement effort.

Figure 1: Project Study Area

Source: DVRPC, Nearmap 2020

CHAPTER 2

STUDY AREA HISTORY

The Benjamin Franklin Bridge has served as a significant connection between Philadelphia and New Jersey since its construction in 1922. When it was built, eastbound access to the bridge was provided via a single entry point at the intersection of 6th Street and Race Street. Access was expanded with the construction of the Vine Street Expressway, which is considered to be a turning point in multimodal access in the area. This chapter explores the history of the bridge and Franklin Square and illustrates how eastbound access came to be what it is today.

COMMUNITIES & THE BUILT ENVIRONMENT FROM THE 1700S – 1910S

The idea of Franklin Square, originally named North East Reblick Square, and four other public squares had been established in the 17th century by William Penn.[1] Prior to Franklin Square being considered a park, the area was utilized as the First German Reformed church's burial ground beginning in the late 1700s. Other portions of the land were utilized by numerous entities for different uses that range from cattle pastureland to an auction area. In the spirit of Penn's hope to create a place of religious coexistence,[2] the area surrounding the park was filled with several notable church communities such as Saint John's Lutheran Church, Saint George's United Methodist Church, and Saint Augustine's Roman Catholic Church which exists to this day.

Figure 2: Bridge Vicinity before Bridge Construction

By 1844 anti-Catholic and anti-immigrant sentiment begun to take root. Riots caused the destruction of St. Augustine, burning it to the ground until it was rebuilt in 1847.[3] In a similar time frame, a legal dispute between the First German Reformed church and the city over land usage persisted through the end of the eighteenth century, resulting in the city claiming the area as a park in 1836. Although the city had already renamed the area Franklin Square by 1825 to commemorate Benjamin Franklin, it wasn't until after the dispute that accommodations and amenities were added to beautify the park. These accommodations roughly transformed the park into what it is recognized as today.

[1] "Franklin Square History," historicphiladelphia.org/franklin-square/history/

[2] "Olde St, Augustine's Church," www.ushistory.org/tour/st-augustine.htm

[3] Kyriakodis, "A Church, A Riot, A Steeple, And The National Shrine of Santo Nino" hiddencityphila.org/2011/12/a-church-a-riot-a-steeple-and-the-national-shrine-of-santo-nino/

Wealthy residents left the area for the suburbs or other parts of today's Philadelphia, and by the 1890s, the once fought-over location of Franklin Square went from one of William Penn's four acclaimed parks[4] to what was perceived as a blight. Being that Franklin Square was the area's only source of open space, it provided shelter for the area's growing homeless population. Much of the square's surrounding neighborhoods had transitioned into a rooming house district to support the city's working class. Chinatown, a small community on Race Street which had been growing since the 1870s,[5] strove to distinguish themselves culturally from the surrounding area.

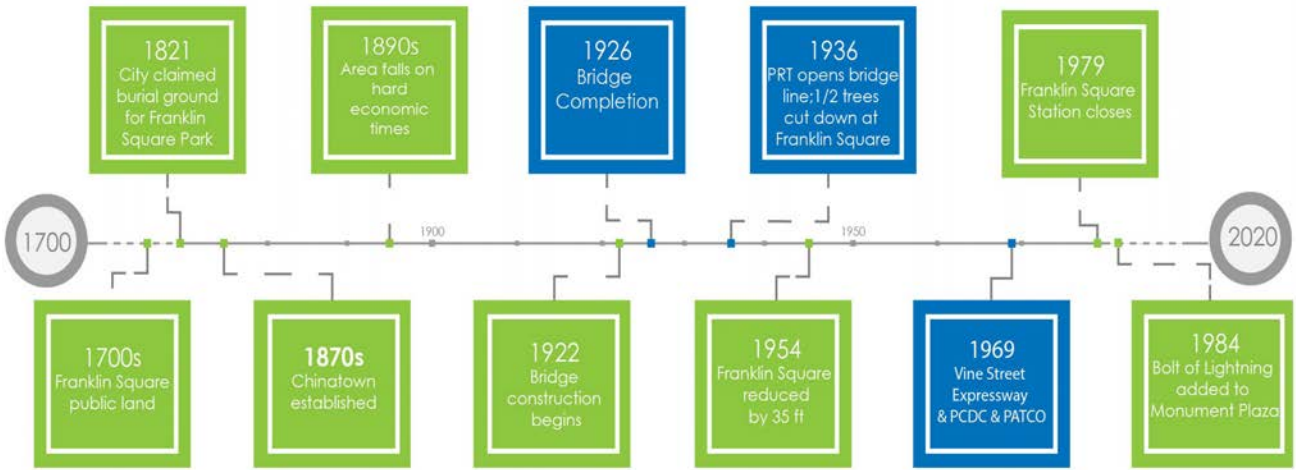
THE DESIRE FOR A BRIDGE

In contrast to the neighborhoods surrounding Franklin Square, by the 1920s both Philadelphia and Camden were experiencing a period of economic prosperity brought on by the post-WWI industrial boom. Modern assembly line factories provided companies with the capability to mass produce affordable automobiles, leading to a desire to expand supporting infrastructure. Prior to the Benjamin Franklin Bridge, travel across the river was limited to ferry services; notable ferry services were offered at the Pennsylvania R.R. Ferries terminal at Market Street and the Copper's Ferry Service in Camden. Constructing a bridge would provide drivers with the opportunity to cross the Delaware River using their own vehicle. Suburban representatives from the nearby counties of Camden and Gloucester also felt they had something to gain from the construction of a bridge and voted in favor of laws that would support its planning and construction.[6]

BUILDING THE BRIDGE

With the City Beautiful movement taking off and the 1926 World's Fair around the corner, Philadelphia and Camden officials were eager to construct a bridge that would showcase their grandeur and prosperity. The initiation of the "Camden First" campaign outlined how the creation of the bridge would benefit the city and even suggested the bridge be named Camden Bridge.[7] The bridge represented a token of their brotherhood and "friendly rival[ry]" between the two cities, while connecting their populations physically.

Figure 3: Ben Franklin Bridge Timeline



Source: DVRPC

[4] "A Walk in the Park: Franklin Square," www.ushistory.org/franklin/philadelphia/park.htm
[5] Chinatown Neighborhood Plan
[6] Howard, Images of America: The Benjamin Franklin Bridge, 14
[7] Howard, Images of America: The Benjamin Franklin Bridge, 14-19 & 75-79

Figure 4: Diagram of the grounds of the 1926 Sesqui-Centennial Exposition

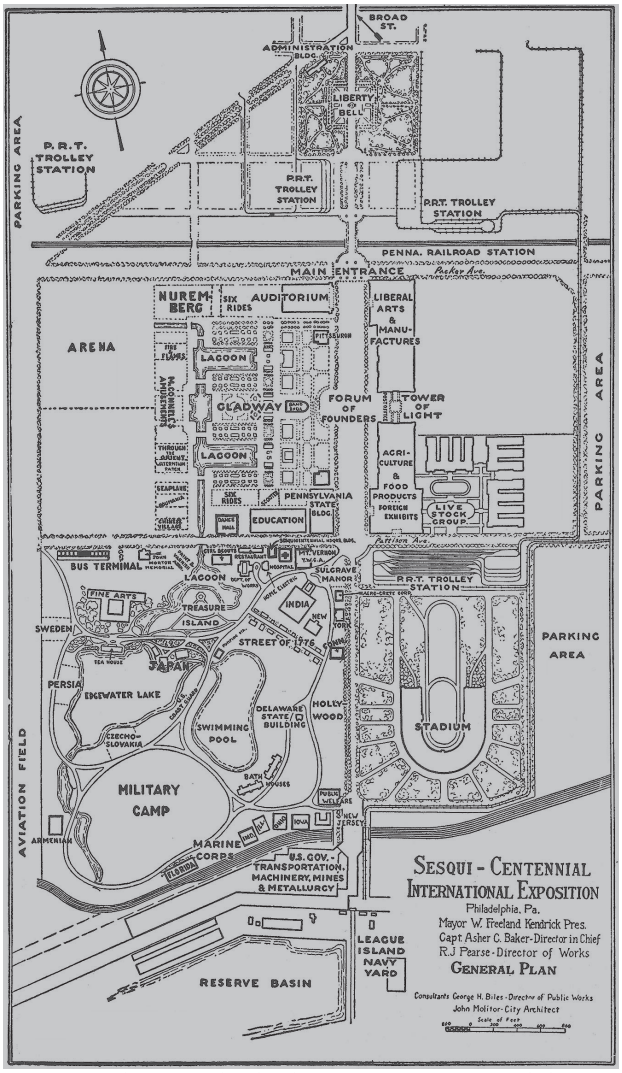


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Figure 5: Ben Franklin Bridge Cross Section

Paul Crett and Ralph Modjesk, the Chief Architect and Engineer, respectively, worked to design the Benjamin Franklin Bridge, originally named the Delaware River Bridge. In order to make room for their creation, several blocks adjacent to Franklin Square were demolished leaving residents, community groups, and businesses in search of a new home. On the Philadelphia side, a stretch spanning from Front Street through 6th Street was cleared for the bridge. On the other side of the river in Camden, 2nd Street & 3rd Street were demolished for several blocks. The construction of the bridge also led to the demolition of Saint John's Lutheran Church[8] and Saint Augustine Church being lowered 15 feet along with the rest of its street.

On July 1, 1926, the bridge, a showpiece of the 1926 World's Fair, the Sesquicentennial Exposition celebrating the 150th anniversary of the country, opened to the public. Residents from both cities celebrated with ceremonies and music as thousands walked across the bridge. After four years of construction, the bridge provided increased mobility for thousands of residents as its companion piece, Monument Plaza, welcomed Philadelphia's visitors. Today, the bridge is owned and managed by the Delaware River Port Authority (DRPA).

CONTINUED DEVELOPMENT OF THE AREA

PATCO

The original bridge design included six vehicular travel lanes, two lanes dedicated to streetcars, and two exterior lanes for rapid transit. The streetcar lanes were never used as designed and instead served as additional vehicle lanes. The Philadelphia Rapid Transit (PRT) Company opened the new bridge line in 1936 using the two exterior lanes. The line included four stations: Franklin Square and 8th Street in Philadelphia and City Hall and Broadway in Camden.[9]

[8] Kyriakodis, "Flash of History," hiddencityphila.org/2011/11/saga-of-st-johns-and-surroundings/
[9] The PATCO Hi-Speedline. www.trainweb.org/phillynrhs/patco.html

Throughout the 1950s and 1960s, Ashland and Kirkwood (Lindenwold) stations in South Jersey and the existing 10th Street, 12th Street and 16th Street stations in Philadelphia were added by PRT's successor, Philadelphia Transit Company (PTC). Following PTC, Port Authority Transit Company (PATCO), a subsidiary of the Delaware River Port Authority (DRPA), ran its first High-speedline trip in 1969. The Franklin Square Station would go on to close in 1979 due to low ridership.

VINE STREET EXPRESSWAY

Despite all the changes to the built environment near the park and bridge, much of the wealth created did not extend to the nearby communities. Amidst the country's urban renewal era, the city identified this neighborhood as an area in need of remediation. The city proposed a plan to expand the Vine Street Expressway in the late 1960s to deal with the abundance of bridge traffic by increasing roadway capacity. The construction also called for the demolition of much of the area's housing including parts of Chinatown.

In response, Philadelphia Chinatown Development Corporation (PCDC), the area's community organization, was created in 1969.[10] By widening the existing Vine Street to provide increased flow and access to the bridge, the expressway caused a rift between the Chinatown and Northern Chinatown communities. Through eminent domain, the city had claimed and was prepared to demolish much of the community's homes and business as well as Franklin Square and a prominent community center, the Holy Redeemer Church and School.[11] Due to community pushback and environmental oversight policies, construction did not begin for another decade.[12] Franklin Square was saved from demolition by the Historic Preservation Act. While the impact was reduced, Northern Chinatown was still separated from the rest of the community, and much of the working-class housing along Vine Street was demolished. This led to an increase in homelessness that expanded beyond the constraints of the old housing district.

BOLT OF LIGHTNING

In 1984, the City installed Isamu Noguchi's Bolt of Lightning statue at Monument Plaza.[13] The concept had been presented at Fairmount Park Art Association's first international sculpture exhibition nearly a decade after the bridge's completion, to commemorate Benjamin Franklin's famous experiment. With the installation of the statue, the Monument Plaza and Franklin Square area became what today's residents and visitors recognize.

PRESENT DAY

LAND USE

A variety of land uses surround the eastbound bridge entrance and project study area, as shown in Figure 6. Park and cultural land uses, such as Franklin Square, the National Constitution Center, and Independence Mall border the eastern and southern sides of the study area, while residential and commercial uses are primarily found beyond the immediate study area boundaries in all directions.

[10] "History," Philadelphia Chinatown Development Corporation, chinatown-pcdc.org/about/history/

[11] "Reviving Vine: Improving Multimodal Connections on Vine Street." DVRPC, www.dvrpc.org/Products/17070/

[12] "Vine Street Expressway." The Encyclopedia of Great Philadelphia, philadelphiaencyclopedia.org/archive/vine-street-expressway/

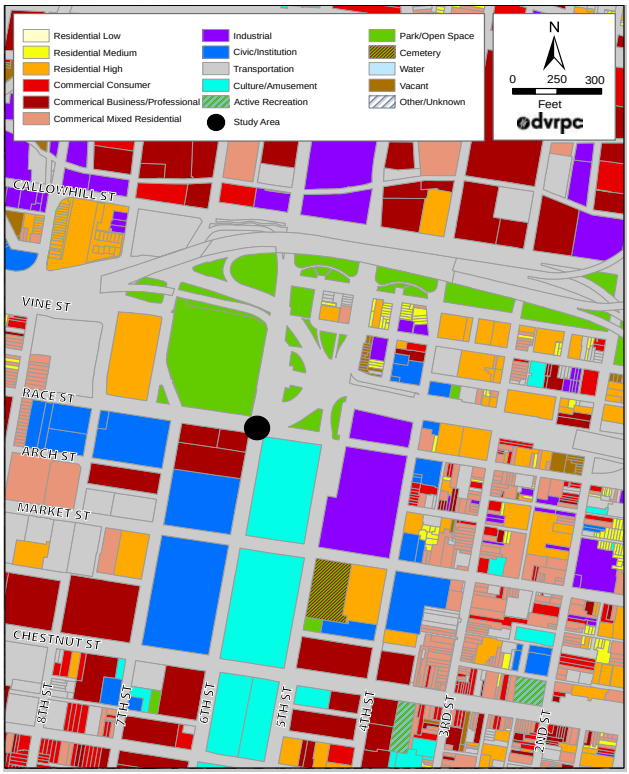
[13] Kopp, "Franklin Square: Philly's forgotten park morphs into modern attraction," www.phillyvoice.com/franklin-square-phillys-forgotten-park-morphs-into-modern-attraction/

COMMUNITIES AND DEMOGRAPHICS

Monument Plaza sits at the center of four communities: Callowhill to the northwest, Old City to the south, Chinatown to the west, and Northern Liberties to the north east, illustrated in Figure 9. Within the study area, there are also several Registered Community Organizations (RCOs): Old City District, Philadelphia Chinatown Development Corporation, Northern Liberties Neighbors Association, Callowhill Neighborhood Association, Center City Organized for Responsible Development, 5th Ward Republican RCO, Franklin Bridge North Neighbors Inc, and the Asian American Federation of the United States.

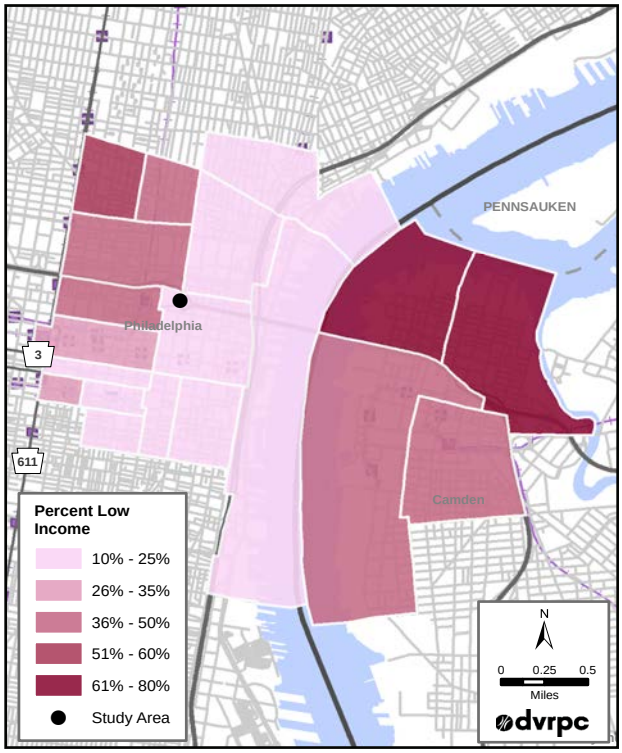
In addition to the large Chinatown community and Old City Neighborhood, present day Saint Augustine was adopted by and hosts the tri-state area's Filipino community. The area contains a diverse array of constituents ranging in age, race, and economic background.

Figure 6: Land Use



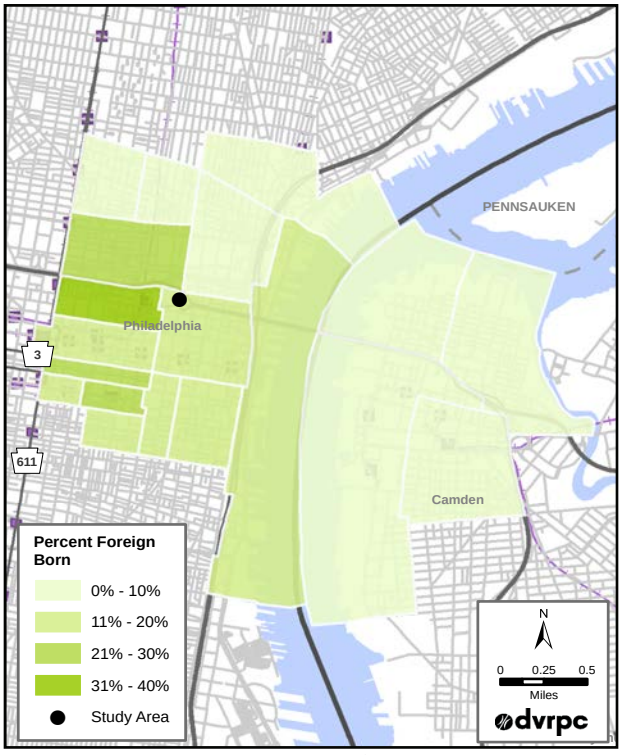
Source: Philadelphia City Planning Commission; DVRPC

Figure 7: Low Income Residents



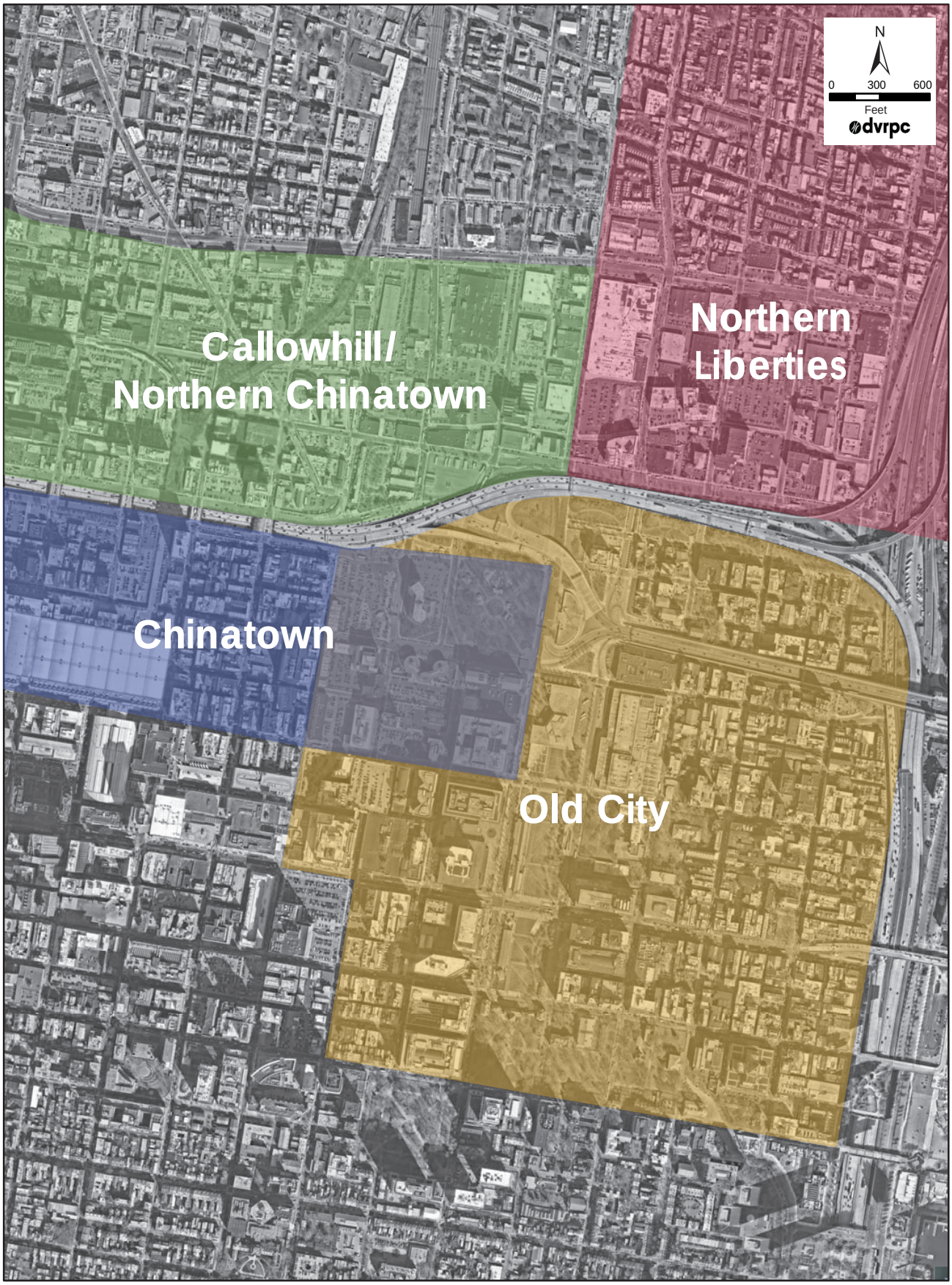
Source: US Census ACS (2013–2017 five-year estimates)

Figure 8: Foreign Born Residents



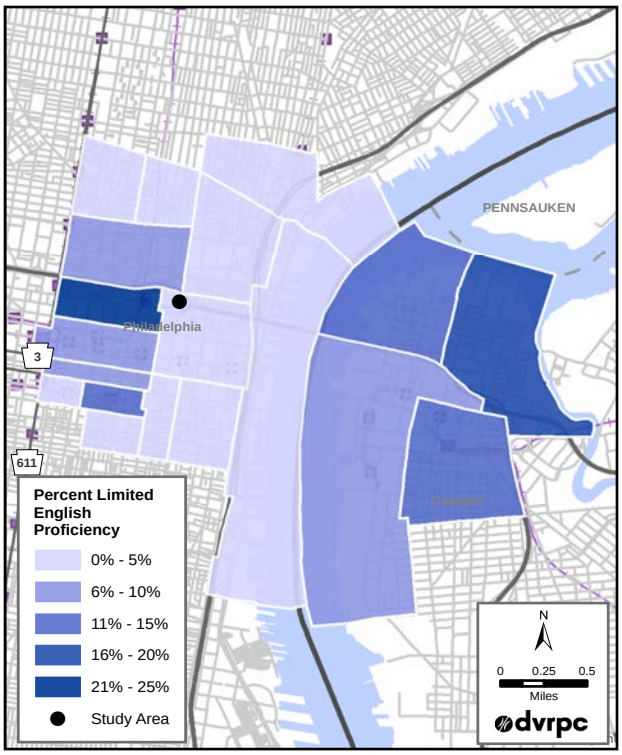
Source: US Census ACS (2013–2017 five-year estimates)

Figure 9: Neighboring Communities



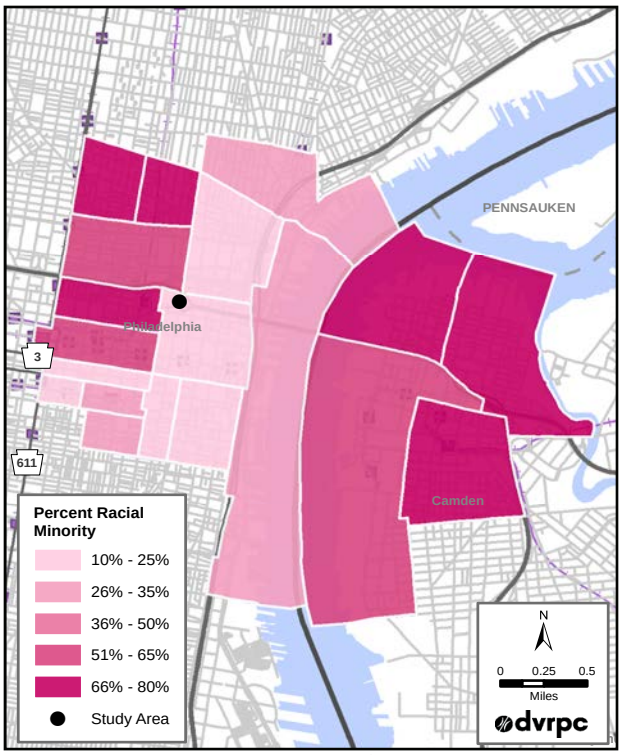
Source: Nearmap 2020, DVRPC

Figure 10: Limited English Proficiency



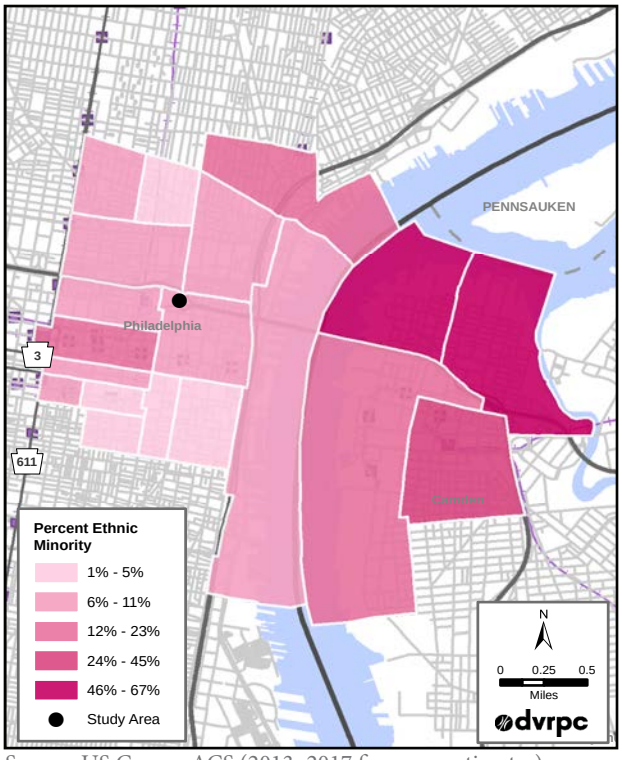
Source: US Census ACS (2013–2017 five-year estimates)

Figure 11: Racial Minority



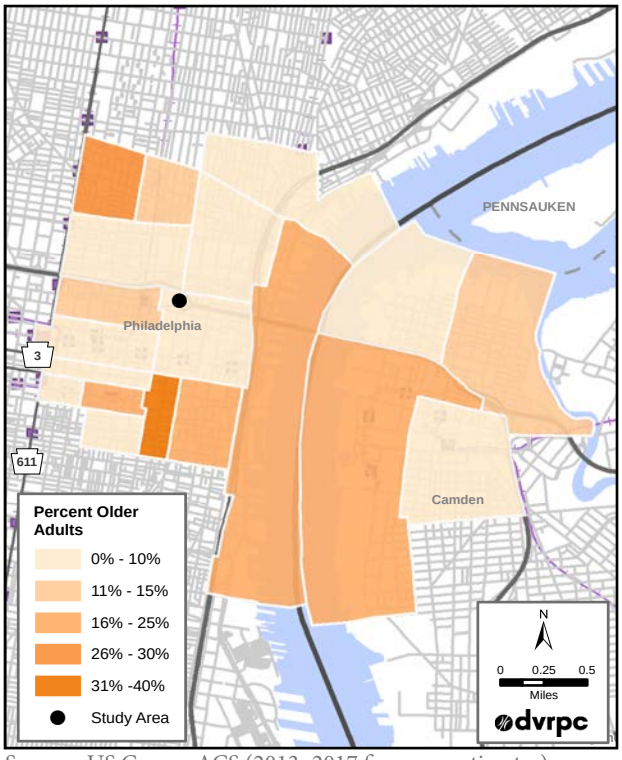
Source: US Census ACS (2013–2017 five-year estimates)

Figure 12: Ethnic Minority Populations



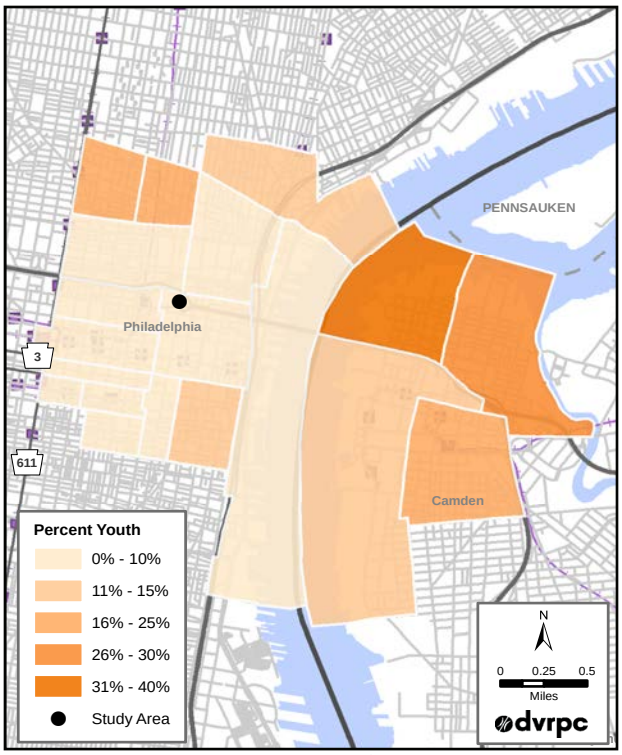
Source: US Census ACS (2013–2017 five-year estimates)

Figure 13: Older Adults



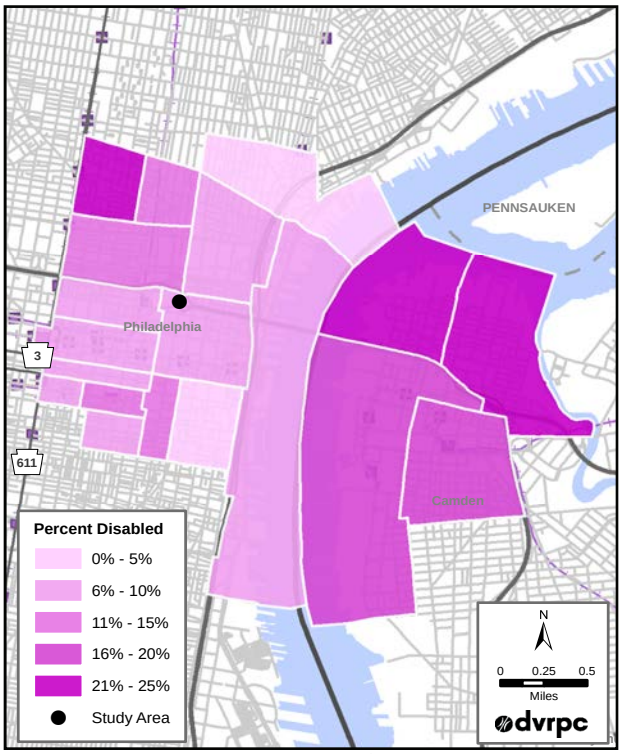
Source: US Census ACS (2013–2017 five-year estimates)

Figure 14: Youth Population



Source: US Census ACS (2013–2017 five-year estimates)

Figure 15: Disabled Population



Source: US Census ACS (2013–2017 five-year estimates)

While the Ben Franklin Bridge Eastbound Access study area is relatively small and includes only roadways, the project team used an expanded study area to identify who might be most impacted by proposed multimodal changes. The expanded study area included census tracts from Philadelphia and Camden. Within the expanded study area, the highest concentration of low income individuals resides in parts of Northern Camden (Figure 7).

The census tracts to the west of Franklin Square, roughly located in Chinatown, contain the highest percentage of foreign born residents (Figure 8). Compared to the rest of the study area, the census tracts near each bridge entrance include relatively high proportions of residents with limited English proficiency (Figure 10). Besides English, Mandarin and Spanish are the next most prominent languages spoken in the study area. Ethnic minority populations are most concentrated in northern Camden, while racial minority populations are spread across the study area (Figures 11 & 12).

The percentage of older adults living directly adjacent to the bridge is relateively low (Figure 13). Census tracts in north Camden have the highest percentage of youth residents (Figure 14) and disabled residents (Figure 16).

CHINATOWN

The Chinatown community has continued to provide cultural refuge for Chinese immigrants and their descendants. Since the Vine Street Expressway separated the community, PCDC has prioritized advocating for the capping of the expressway in order to reconnect the community.[14] Additionally, the Chinatown Neighborhood Plan discusses the necessity of maintaining or increasing the amount of open space available to ensure community health and economic vitality. Franklin Square serves as the primary source of open space to the nearby Chinatown community.

[14] Chinatown Neighborhood Plan, PCDC/Interface Studio LLC chinatown-pcdc.org/about/chinatown-neighborhood-plan-2017/

Recent plans to reopen the Franklin Square Station were met with mixed feelings from local community stakeholders. As planned, the PATCO station offers expanded access and economic development potential, at the expense of some of the park's limited green, recreational space.

During the peaks of the COVID-19 pandemic, green spaces like Franklin Square have proven to be one of the few safe places for residents to social distance safely outside of their homes. The revitalization of Monument Plaza could add to the amount of outdoor amenities, which would allow the community's strong population of elderly residents to age in place more comfortably. Like other nearby communities, Franklin Square draws the foot traffic of tourists, especially during the annual Lantern Festival. Increasing the area's open space provides the opportunity to draw more foot traffic and therefore more customers to the area.

OLD CITY

At the eastern side of Center City lies Philadelphia's historic district, Old City. Since 2000, there has been an increase in demand for housing in the neighborhood. The *Old City Vision 2026* plan details the community's desire to increase foot traffic which the community believes is partially hindered by a current lack of retail and office space. Similar to Chinatown and other urban communities, the district hopes to remediate this through developing pedestrian-friendly public spaces, specifically at Franklin Square or in the area under the Ben Franklin Bridge.

Community members feel as though, in comparison to the rest of Philadelphia's open spaces, Old City's open spaces do not generate as much through-traffic. The plan hopes to increase through-traffic by connecting Franklin Square to the proposed Delaware River Trail and the Race Street Pier with a bike-friendly passage along Florist Street. A connection like this would not only increase mobility in the area, but also access to open space. In combination with the proposed and partially completed Rail Park and the planned capping of a portion of I-95, reactivating Monument plaza could help provide these communities with highly desired open space.

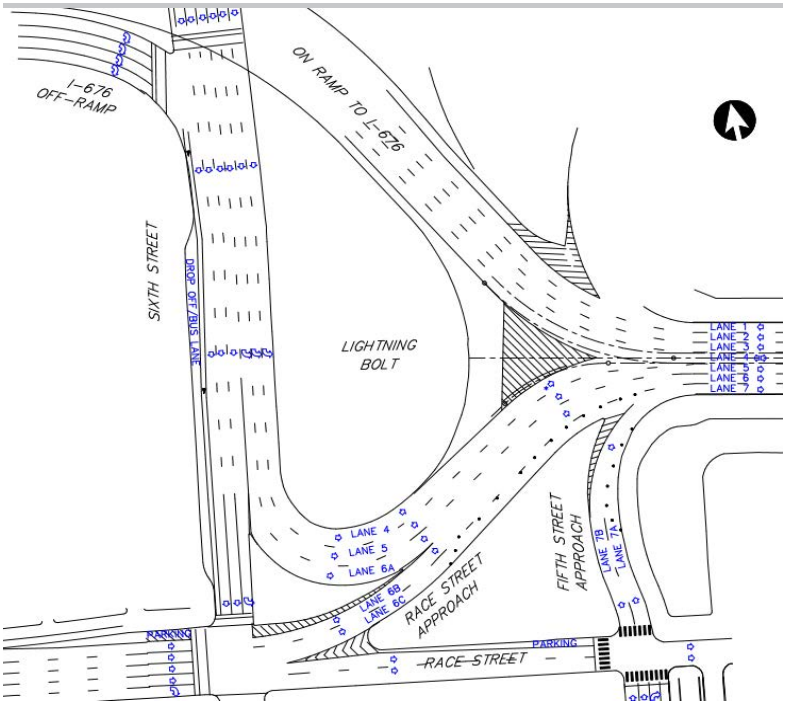
CHAPTER 3

TRANSPORTATION IN THE STUDY AREA

Currently, eastbound vehicles approach the Ben Franklin Bridge from three local roads, shown in Figure 17. Southbound traffic accesses the bridge via 6th Street, which provides six travel lanes southbound between Callowhill Street and Race Street. Three lanes proceed around the Lightning Bolt Monument in a counterclockwise direction and merge with traffic from Race Street. The I-676 off-ramp widens from two lanes to four lanes at the 6th Street intersection.

Race Street provides five eastbound travel lanes between 7th Street and 6th Street. Approaching 6th Street the two northern lanes are designated for bridge traffic via overhead signage. The through lanes carry local traffic east into Old City.

Figure 16: Eastbound Access Detail



Source: DRPA (McCormick Taylor), 2006

Figure 17: Configuration of Race Street at 5th Street

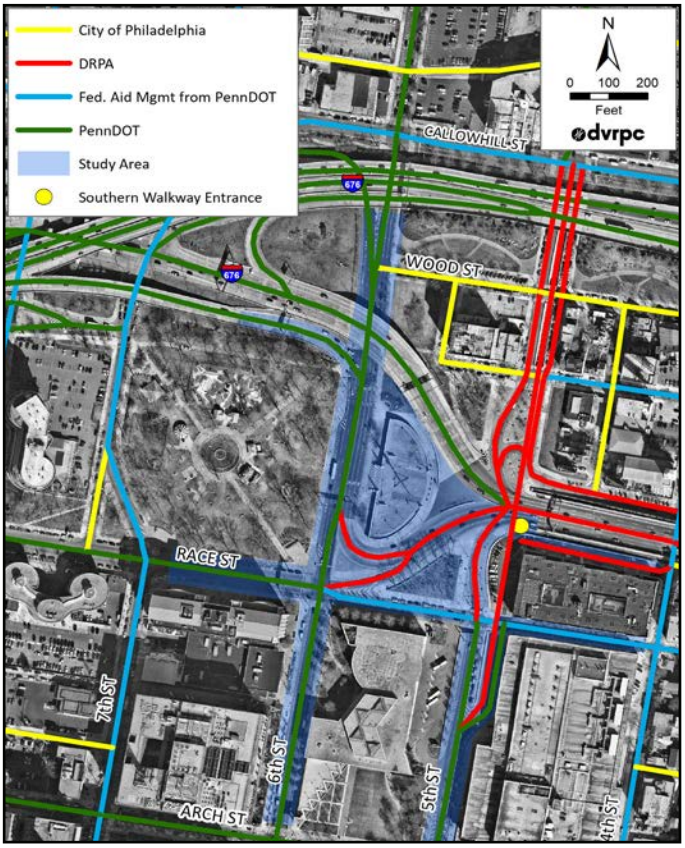
Source: Nearmap, 2021

5th Street provides three travel lanes northbound from Arch Street to Race Street. Approaching Race Street, the two western (left-most) lanes are designated for bridge traffic via overhead signage. Drivers turning right onto Race Street from 5th Street can use a right-turn lane at the traffic signal, or they can divert to a stop-controlled lane prior to the intersection (Figure 18). 5th Street also provides access to a multiuse path under the bridge.

ROADWAY JURISDICTION

The map in Figure 19 shows roads surrounding the study area by responsible agency, highlighting the complexity of managing eastbound access to the bridge. While DRPA is responsible for the 6th Street, Race Street, and 5th Street ramps, the approaches are owned and maintained by PennDOT. The City of Philadelphia works closely with PennDOT on roadway improvements in the area to ensure they connect safely with the surrounding multimodal network.

Figure 18: Roadway Jurisdiction



Source: PennDOT, DVRPC, Nearmap, 2020

SEPTA

Currently, no SEPTA buses traverse the road segments identified in the main study area, as shown in Figure 20. However, multiple buses travel through the surrounding area providing connections to North and South Philadelphia. The SEPTA Broad-Ridge Spur Chinatown station is located on the northwest corner of 8th and Race Street. It is currently surrounded by a surface parking lot, which visually isolates it from the rest of the area.

NJ TRANSIT

Figure 22 shows several NJ Transit bus routes that travel through the study area, stopping at the northwest corner of Race and 6th Streets. The stop currently serves the routes 400, 401, 402, 404, 406, 408, 409, 410, 412, 414, 417, and 551, creating opportunities for substantial foot traffic in the area. Several other tourism-focused bus lines use this stop as well, resulting in overcrowding on occasion. The location of the bus stop means the majority of passengers boarding and alighting are forced to cross Race Street, which presents safety concerns due to width.

PORT AUTHORITY TRANSIT CORPORATION (PATCO)

The study area is connected to New Jersey via the nearby PATCO rapid transit station at 8th and Market Street. This is one of the main stations for the PATCO system, and is currently the first station when entering Pennsylvania. More directly abutting the project area is the currently closed Franklin Square PATCO station. This station is currently under construction and is planned for reopening in 2023.

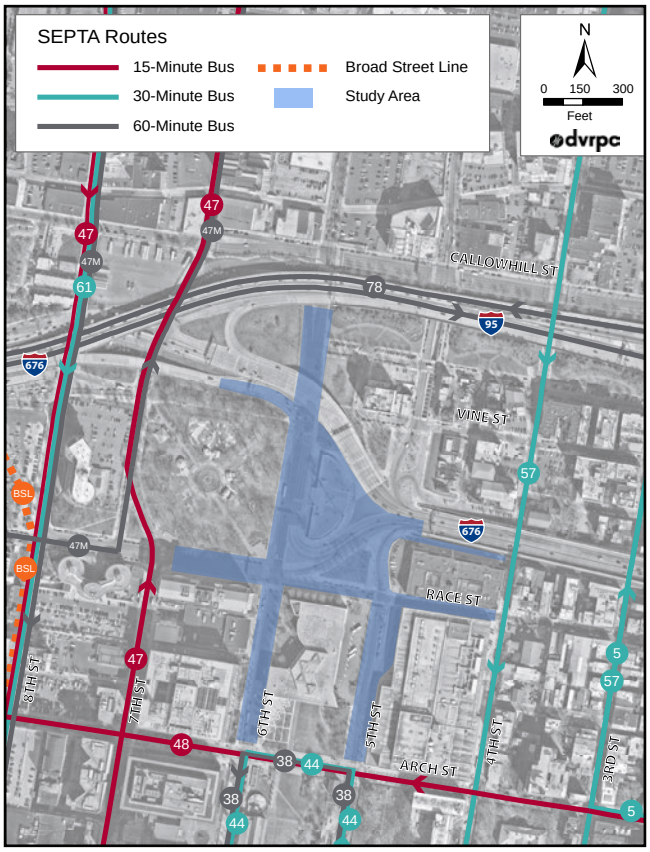
BICYCLE AND PEDESTRIAN ACCESS

Bicyclists and pedestrians can cross the bridge through a dedicated walkway on the south side of the bridge. The bicycle/pedestrian bridge on the north side is typically closed and is used as an alternate option when the south side walkway requires maintenance or construction.

From the Philadelphia side, the south side walkway entrance is located at 5th Street and Race Street. Adjacent to the 5th Street vehicle on-ramp, a pedestrian walkway consisting of large stone pavers and cobblestones leads to the entrance. The north entrance is located south of 5th Street and Vine Street. An underground tunnel connects both Philadelphia entrances. A ramp was constructed on the Camden side of the Bridge in 2019 to allow for better access and connections to and from the walkway.

Bicycle and pedestrian access to Monument Plaza and to the northeast corner of Race Street and 5th Street remains challenging, requiring multiple street crossings from most directions. Bicycle crashes are concentrated on Race Street and its intersections, which suggests that there may be safety issues on this street. Existing bicycle facilities are shown in Figure 23.

Figure 19: SEPTA Bus Routes



Source: DVRPC, Nearmap, 2020

PLANNED DEVELOPMENT

PHILADELPHIA POLICE HEADQUARTERS RELOCATION

The Philadelphia police headquarters at 750 Race Street, known as the "Roundhouse," occupies the entire south side of the Race Street block between 7th and 8th Streets, as shown in Figure 21. The police department plans to relocate its headquarters to 400 North Broad Street (former home of the Philadelphia Inquirer). The construction is proceeding, eventually leaving the large property vacant and open for redevelopment.

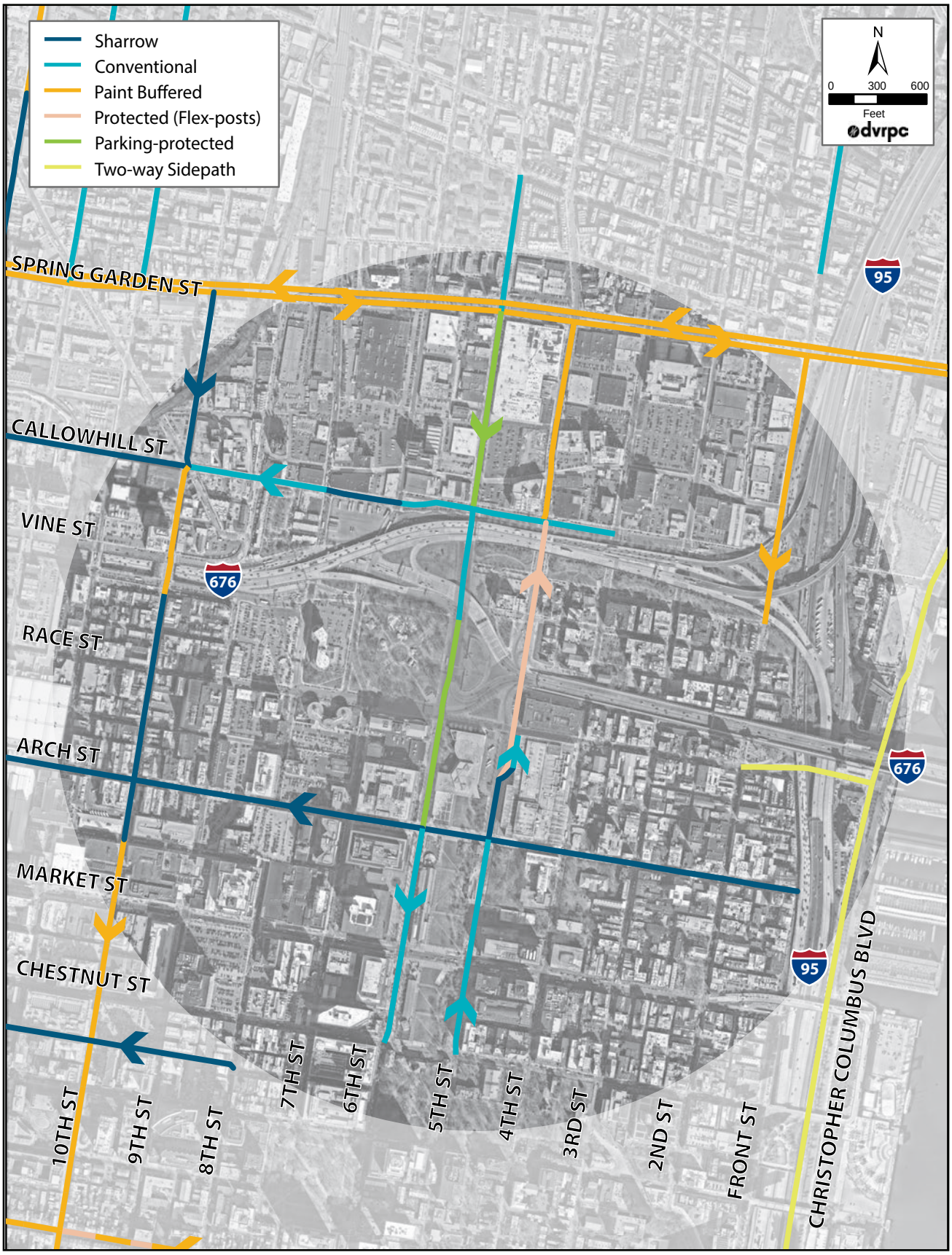
Figure 20: Police Headquarters (Roundhouse)

Source: Beyond My Ken, CC BY-SA 4.0, creativecommons.org/licenses/by-sa/4.0>, via Wikimedia Commons

Figure 21: Public Transit Connecting to New Jersey

Source: Nearmap, 2020

Figure 22: Bicycle Facilities Near Ben Franklin Bridge



Source: Nearmap, 2020

PLANNED TRANSPORTATION IMPROVEMENTS

PATCO FRANKLIN SQUARE STATION REOPENING

PATCO plans to remodel and reopen the former Franklin Square Station located on the Race Street side of the park. Figure 24 shows a conceptual rendering of a planned station entrance. The hope is that the project will spark economic development and growth in the surrounding area. The station is expected to reopen in summer 2023.

CAMDEN-PHILADELPHIA BUS RAPID TRANSIT (BRT)

A BRT system is part of a broader plan to expand a regional multimodal transportation network in adjacent Camden and Gloucester counties and across the Delaware River to the city of Philadelphia. Other elements of the network would include additions and adjustments to the PATCO Hi-Speed Line and Atlantic City Line and construction of the proposed Glassboro–Camden Line.

Figure 23: Franklin Square PATCO Station Concept

Source: DRPA, www.ridepatco.org/projects/franklin-square-station.html

Figure 24: Race Street Bike Lane Proposal

Source: DVRPC "Renewing Race Street," 2015

RACE STREET BIKE LANE

The City of Philadelphia plans to install a new protected bicycle lane along Race Street as part of a road diet, as illustrated in Figure 25. The proposed design eliminates one vehicle lane between 8th Street and 6th Street, creating space for a new parking-protected bike lane. A conventional bicycle lane will continue between 6th Street and 5th Street, which will create a safer path for bicyclists to access the bridge walkway.

CHAPTER 4

PREVIOUS STUDIES

A number of studies have been conducted over the past decade to examine possible improvements to the study area. This section summarizes a few key plans and proposals.

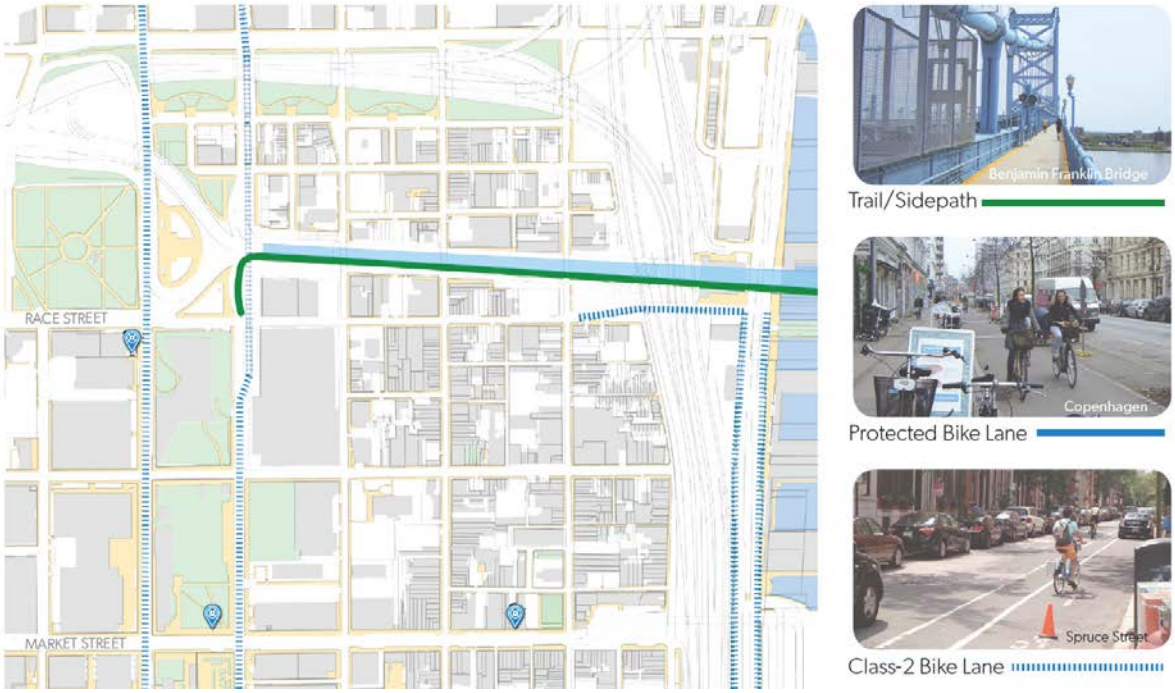
OLD CITY DISTRICT VISION 2026

The *Old City District Vision 2026* plan, published in 2016, cites the idea of a direct connection between the I-676 expressway ramp at 6th Street and the Bridge that Pennsylvania Horticultural Society has studied and suggests that the initial concepts will improve the pedestrian connection among Old City, Franklin Square, and the Ben Franklin Bridge while maintaining the highway traffic flow. The report also cites that the Philadelphia Streets Department applied for funding to implement a protected bike lane on the west side of 6th Street. The plan proposes to add a trail/side path on Race Street from 7th Street to 5th Street that leads to the pedestrian bridge entrance, as shown in Figure 26.

PENNSYLVANIA HORTICULTURAL SOCIETY (2015)

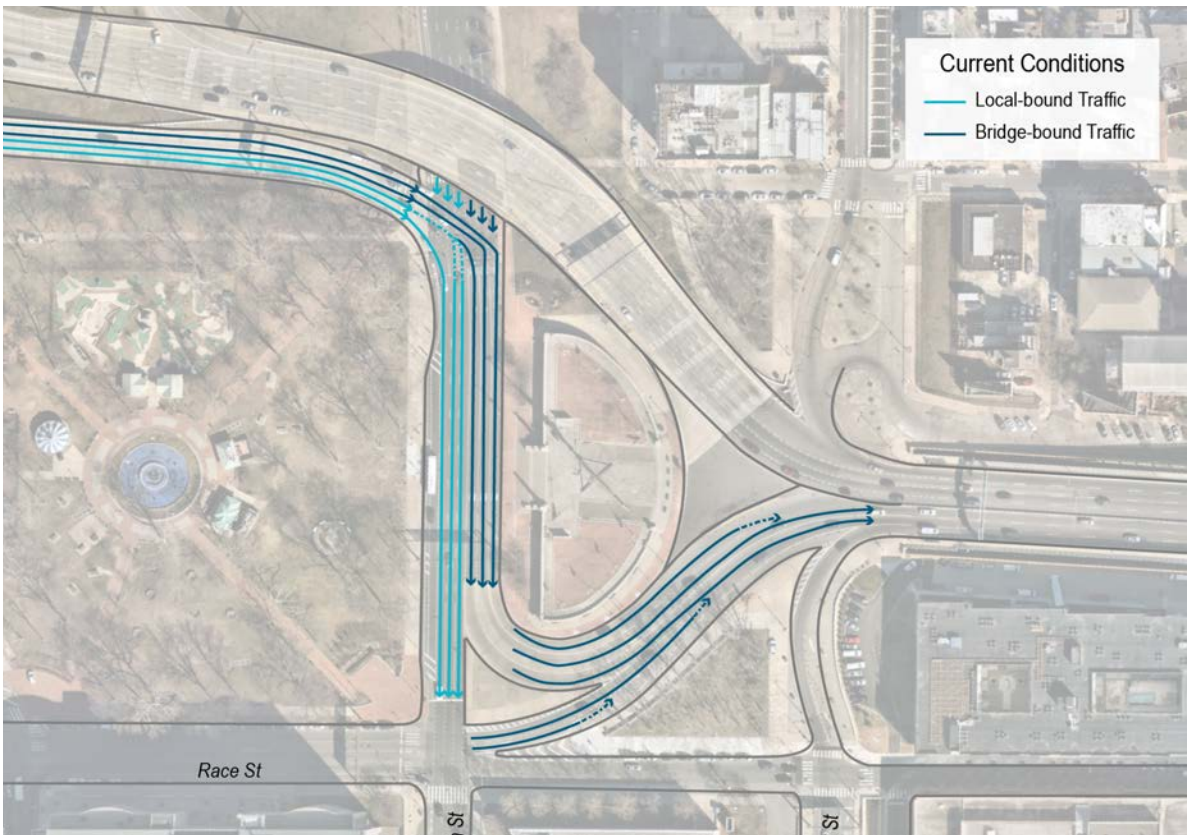
The Pennsylvania Horticultural Society (PHS) report proposes two improvement alternatives for the I-676 exit ramp. The first option adds two new pedestrian crosswalks that allow for access between Monument Plaza and Franklin Square. The second option proposes a "direct connection" from the intersection of 6th Street and the I-676 exit ramp to the Ben Franklin Bridge. The direct connection utilizes the unused space between the I-676 westbound roadway and Monument Plaza to build a ramp that allows bridge-bound traffic to travel directly onto the bridge. Local traffic coming from 6th Street would use the existing 6th Street ramp to access the bridge. Figure 27 shows the current configuration for reference, while Figures 28 and 29 illustrate the concepts from the PHS report.

Figure 25: Old City District Vision



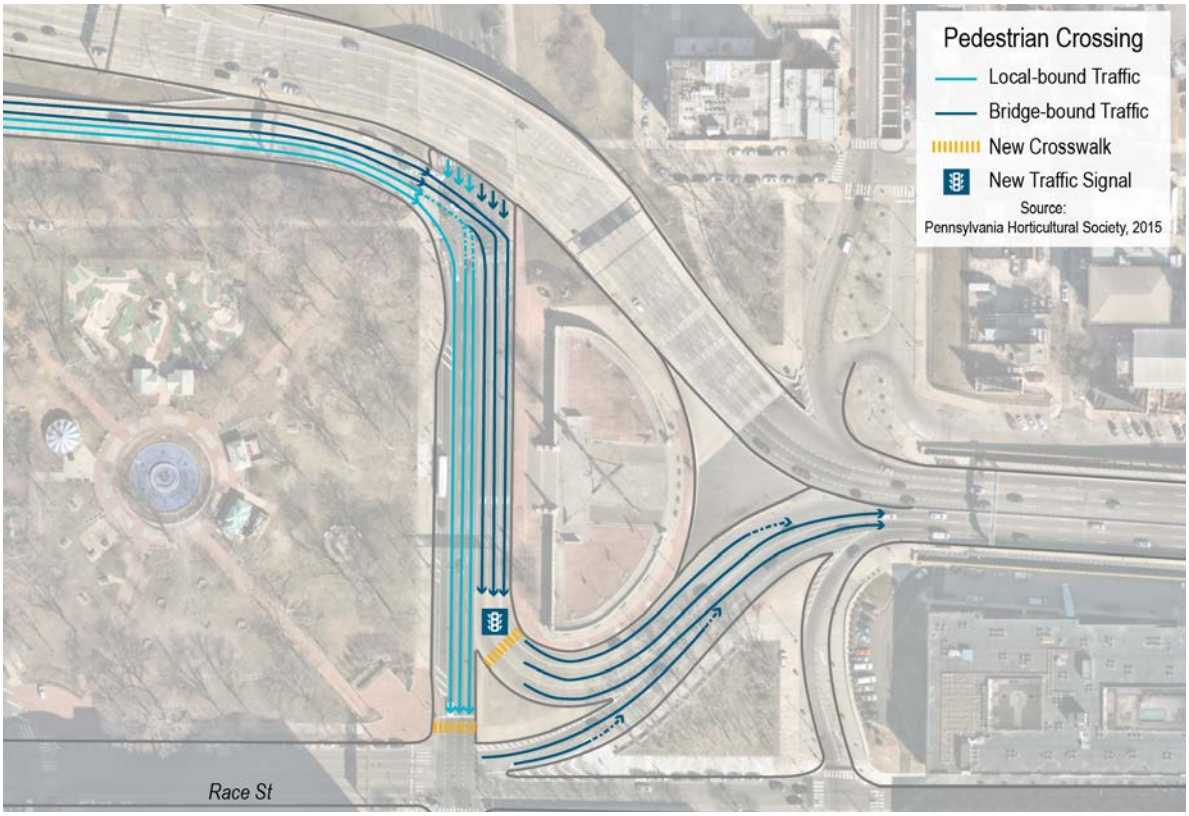
Source:: Old City District Vision 2026

Figure 26: Race Street & 6th Street Existing Conditions



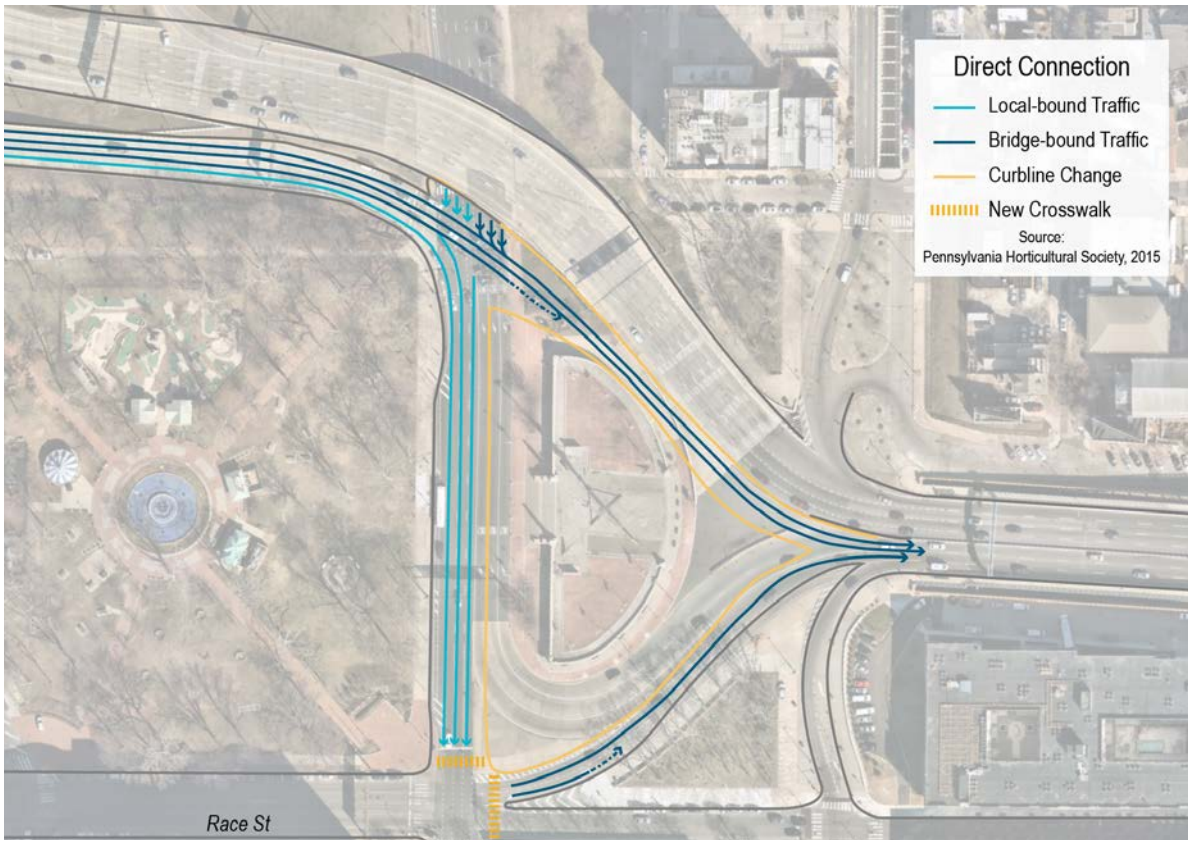
Source: DVRPC

Figure 27: PHS Pedestrian Crossing Concept



Source: DVRPC

Figure 28: PHS Street Level Direct Connection Concept



Source: DVRPC

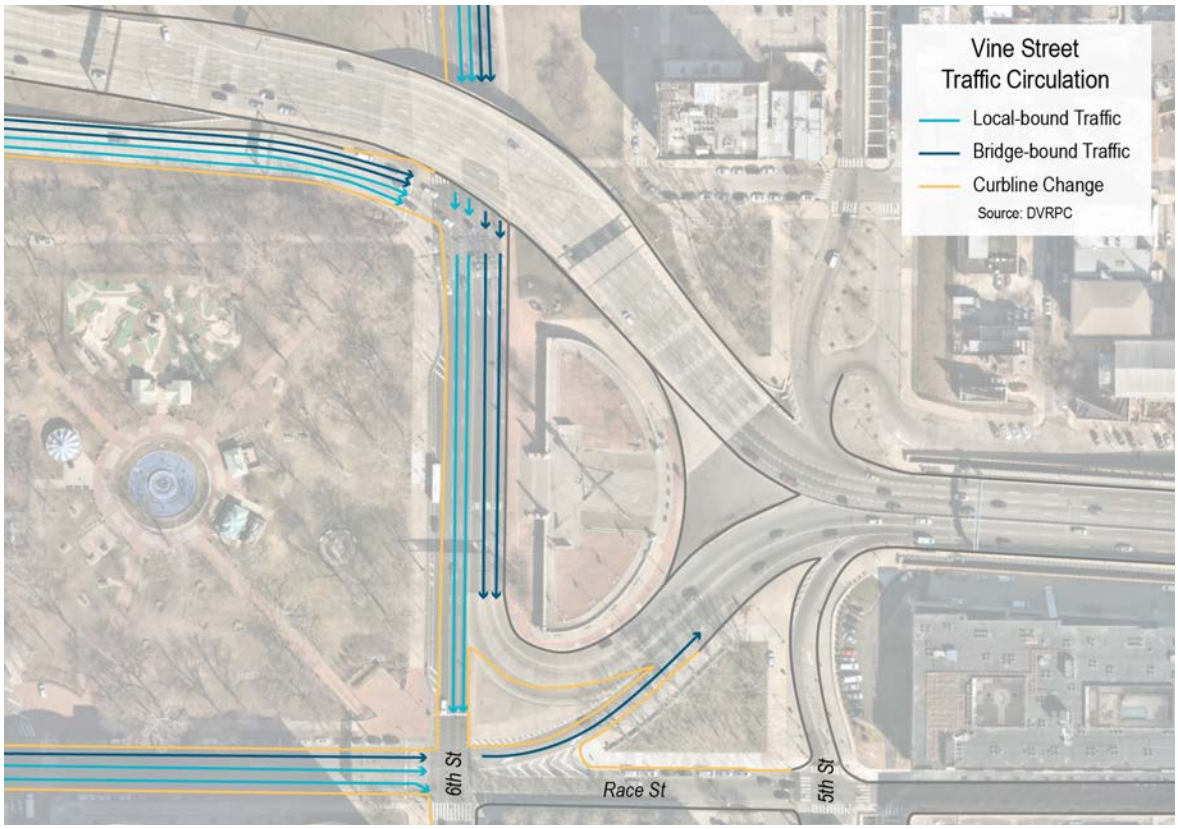
VINE STREET TRAFFIC CIRCULATION ANALYSIS – CHINATOWN NEIGHBORHOOD PLAN (2004)

The Vine Street Traffic Circulation Analysis, conducted in support of the 2004 *Chinatown Neighborhood Plan*, includes a series of recommendations for the Franklin Square area to mitigate some of the impacts of the Vine Street Expressway on the surrounding area. Some of these recommendations, shown in Figure 30, include:

- Tighten geometrics at the I-676 off-ramp and 6th Street intersection, reduce 6th Street to four lanes before the 6th Street ramp;
- Remove two lanes on Race Street and change the Race Street ramp into one lane approach;
- Reduce Franklin Street ramp to one lane and merge it with 6th Street right after the 6th & Callowhill intersection;
- Add sidewalks along the westside of 6th Street between two underpasses, improve the underpass conditions for pedestrians (murals, lighting, vendors, etc.).

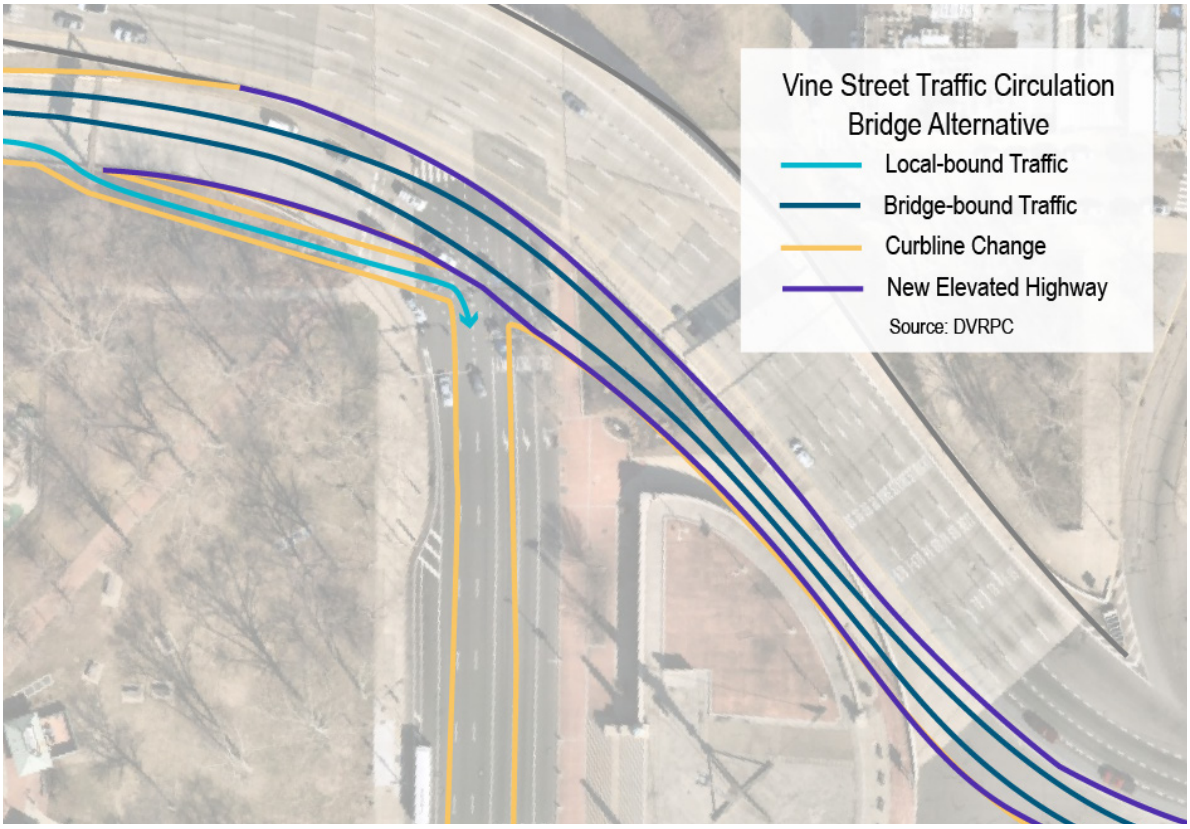
The overhead bridge concept was also explored as part of this analysis. This concept, illustrated in Figure 31, includes the complete separation of bridge-bound traffic from I-676 and the local street grid. This separation would be achieved with the construction of an overpass, allowing I-676 traffic to pass over 6th Street and Monument Plaza, connecting directly to the bridge. A new ramp would be constructed off of the overpass, allowing local traffic to exit to 6th Street. This concept would require a major reconstruction project, and would be challenged by historic and financial constraints.

Figure 29: Vine Street Traffic Circulation Analysis Recommendations



Source: DVRPC

Figure 30: Overhead Bridge Concept



Source: DVRPC

MCCORMICK TAYLOR 5TH STREET RAMP REALIGNMENT (2022 FOR DRPA)

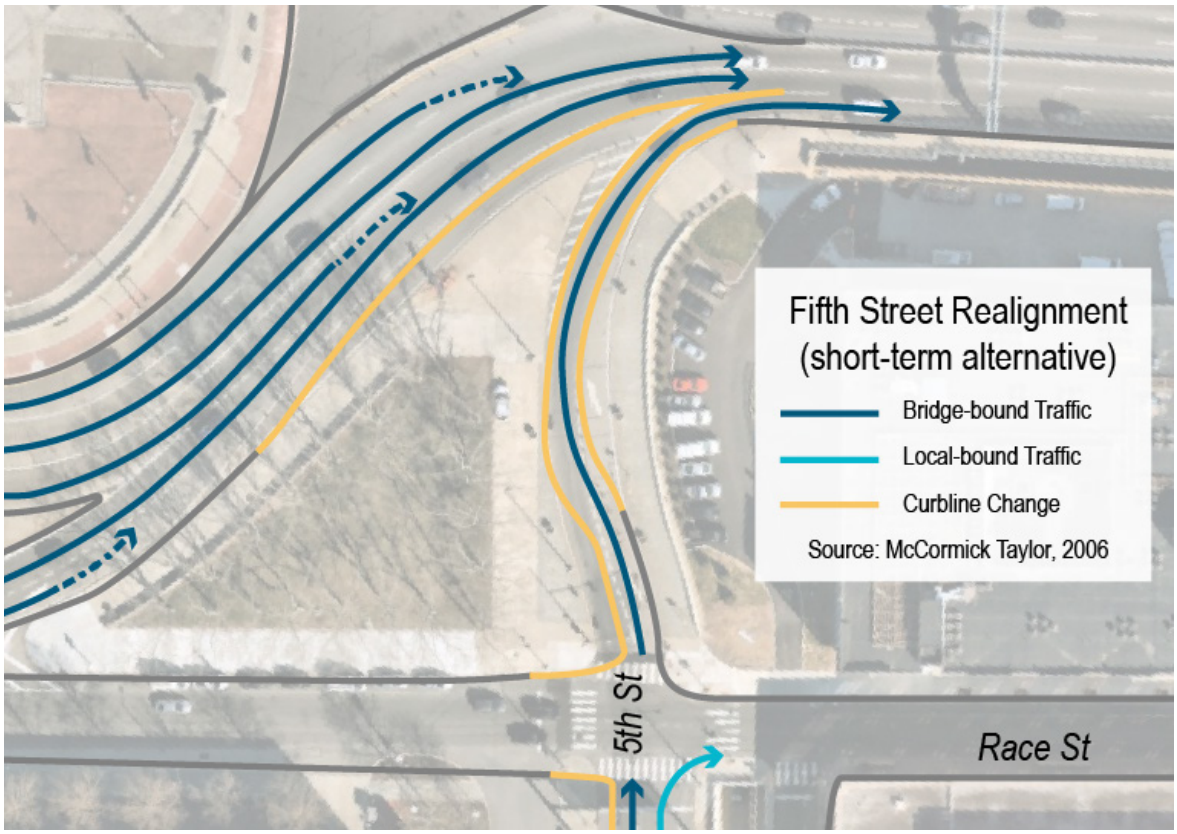
The McCormick Taylor study developed short-term and long-term recommendations for the 5th Street approach to the bridge. The short-term concept, illustrated in Figure 32, includes a slight realignment and narrowing of the 5th Street ramp. The long-term concept, shown in Figure 33, includes a more substantial realignment of 5th Street, providing an increased turning radius and greater separation from the actual bridge. The intersection is signal controlled, with the intent that operations be coordinated with the progression timing currently in place along Race Street. In order to maintain control of the realigned intersection, a mountable concrete median is proposed to separate the Race Street approach and vehicles circulating around Monument Plaza from 6th Street. It should be noted that this concept requires the replacement of the Wilson Building (currently used as a staging area for DRPA Police) and the relocation of the driveway to the adjacent parking lot.

BICYCLE COALITION OF GREATER PHILADELPHIA (2010)

The Bicycle Coalition report from 2010 focused on the pedestrian walkway to the bridge on 5th Street and presented the following recommendations, illustrated in Figure 34:

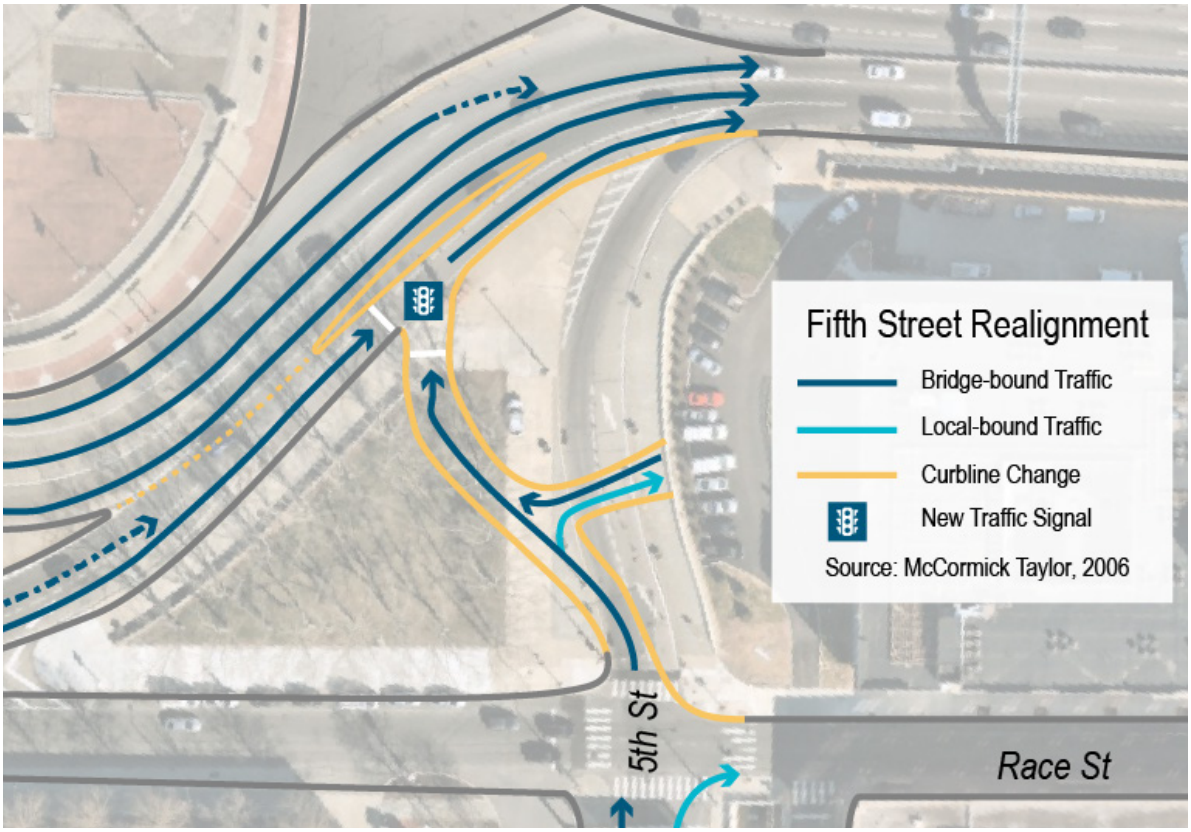
- Replace traffic cones with delineators
- Replace cobblestones on the pedestrian walkway and add two-way markings
- Add a bike lane on 5th Street approaching Race Street, add bike lane striping that leads to the pedestrian walkway on the curb

Figure 31: Short-Term McCormick Taylor 5th Street Ramp Realignment



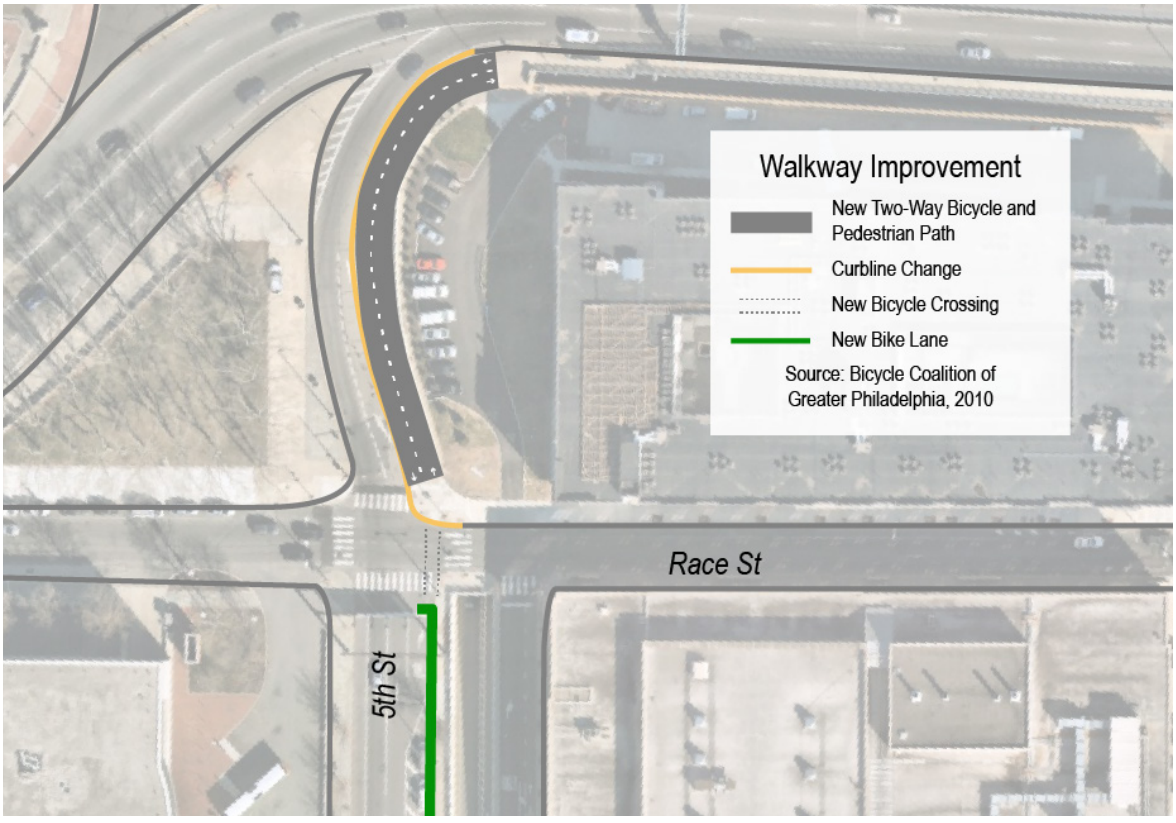
Source: DVRPC

Figure 32: Long-Term McCormick Taylor 5th Street Ramp Realignment



Source: DVRPC

Figure 33: BCGP Walkway Improvement Recommendations



Source: DVRPC

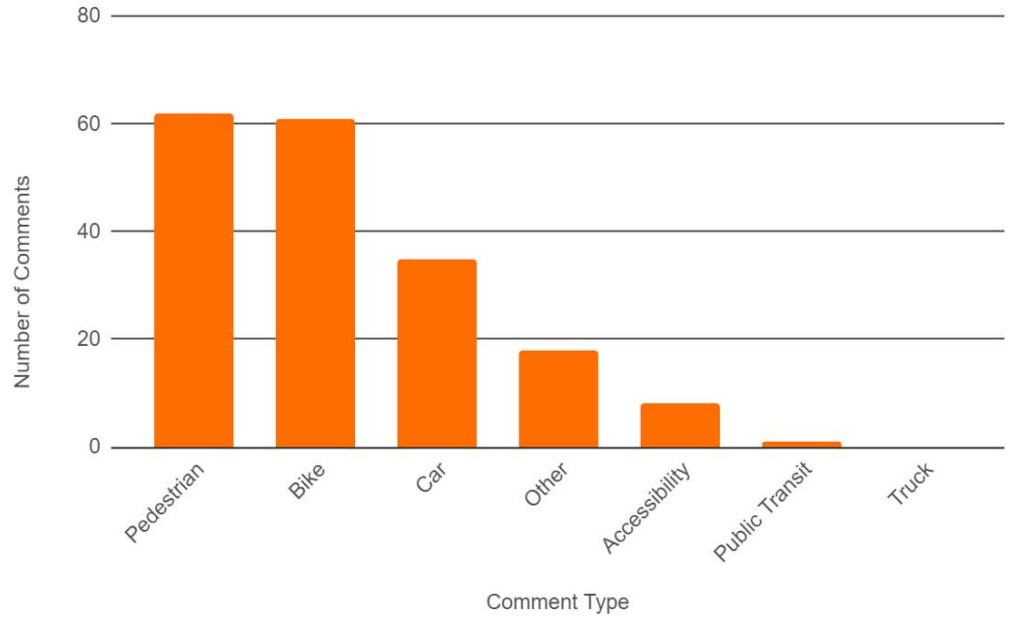
CHAPTER 5

ISSUE IDENTIFICATION

PUBLIC ENGAGEMENT

With input from the Steering Committee, the project team organized and facilitated a public engagement effort to collect input on mobility concerns from local residents or workers that frequent the study area. Due to social distancing requirements of the COVID-19 pandemic, the team developed a webmap allowing users to identify specific multimodal issues in the study area by dropping pins and making comments on the map. The project website included a short video demonstrating how to use the webmap. Participants were able to support comments made by others by "liking" them. Participants were also asked to fill out a brief survey to collect demographic information and provide optional feedback about the webmap functionality. The webmap and survey were live from November 3rd, 2020 to December 31st, 2020, during which time the project team received 187 comments focusing on a variety of issues, as shown in Figure 35.

Figure 34: Comments by Type

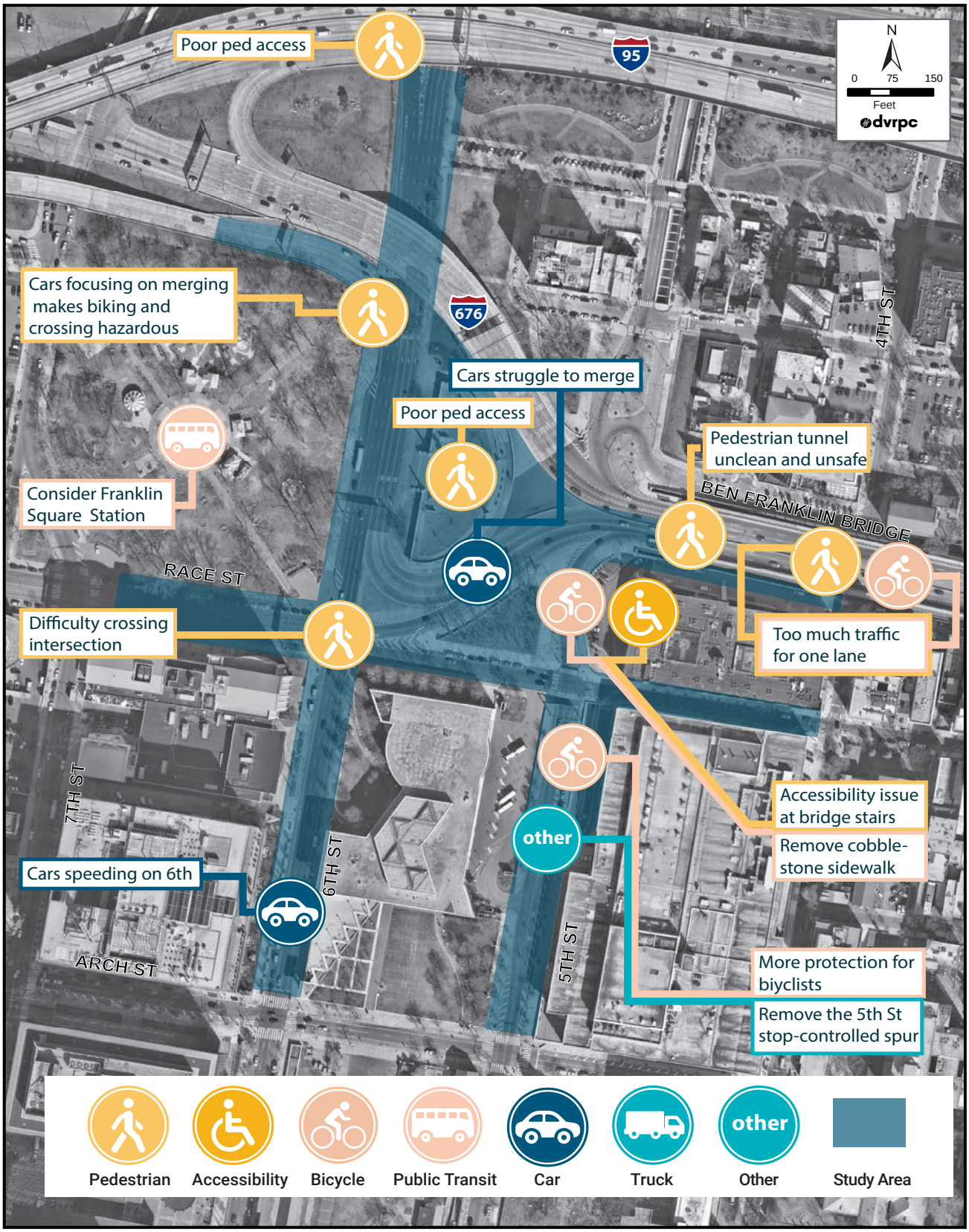


Source: DVRPC

SUMMARY OF COMMON CONCERNS

Several overarching concerns were identified during the public engagement effort. The most commonly identified concern for the entire study area was that it is difficult to navigate as a pedestrian or bicyclist due to vehicles speeding/merging, and a lack of protection and connectivity, summarized in Figure 36. Participants felt as though the area was extremely car-oriented with many of the comments requesting improvements that benefit non-vehicle users of the study area. For example, participants requested improvements such as protected bicycle facilities and increased signage to alert drivers to the presence of pedestrians.

Figure 35: Webmap Comment Summary: Full Study Area

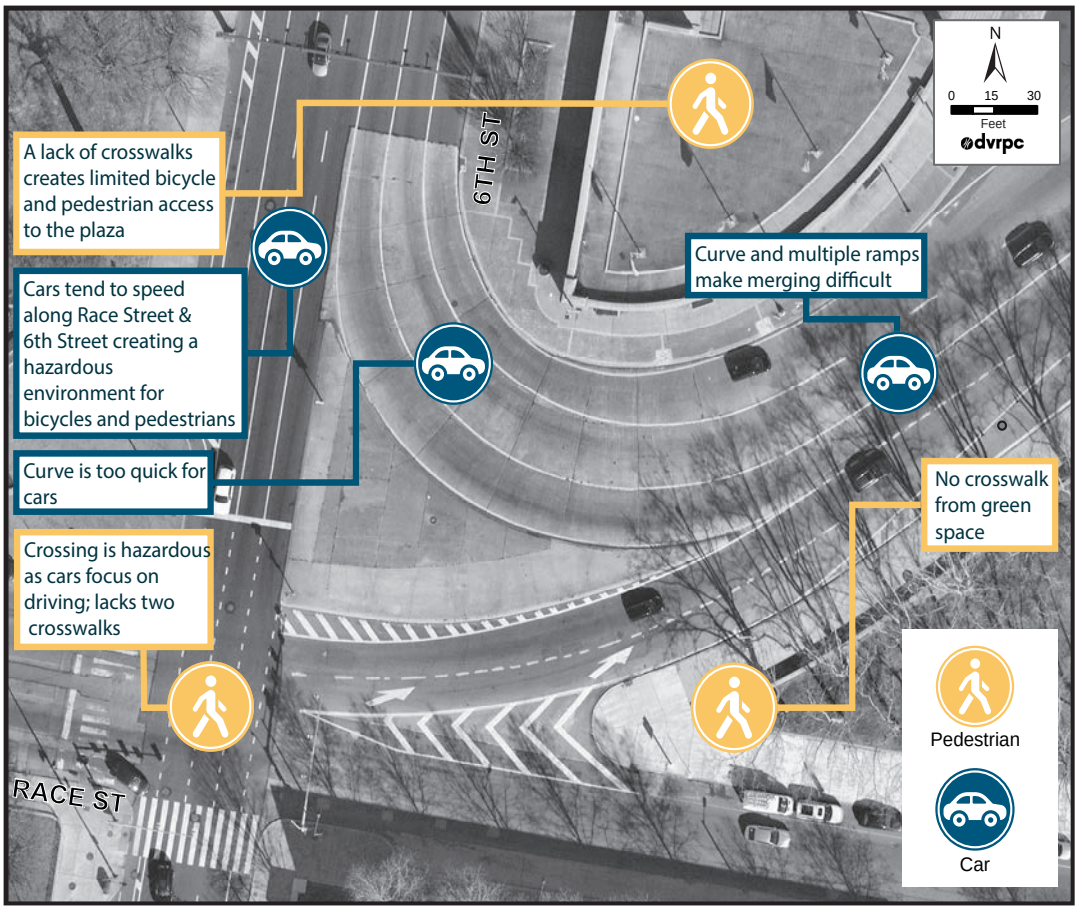


Source: DVRPC, Nearmap, 2020

By far the two most commonly identified problem areas were the intersections of 6th & Race Streets and 5th & Race Streets. These neighboring intersections are both impacted by bridge ramp traffic and received similar comments regarding a lack of bicycle and pedestrian safety (Figures 37, 38, & 39).

Participant comments highlighted the fact that the abundance of bridge entrances can be confusing to navigate as a driver. The combination of sharp turns and multiple merges create difficult driving conditions. Participants also stressed the lack of signage directing users of all modes. Some commenters even described cutting through neighboring residential complex driveways and going out of their way to safely access the bridge walkway or nearby green spaces.

Figure 36: Webmap Comment Summary: 6th Street and Race Street Ramps

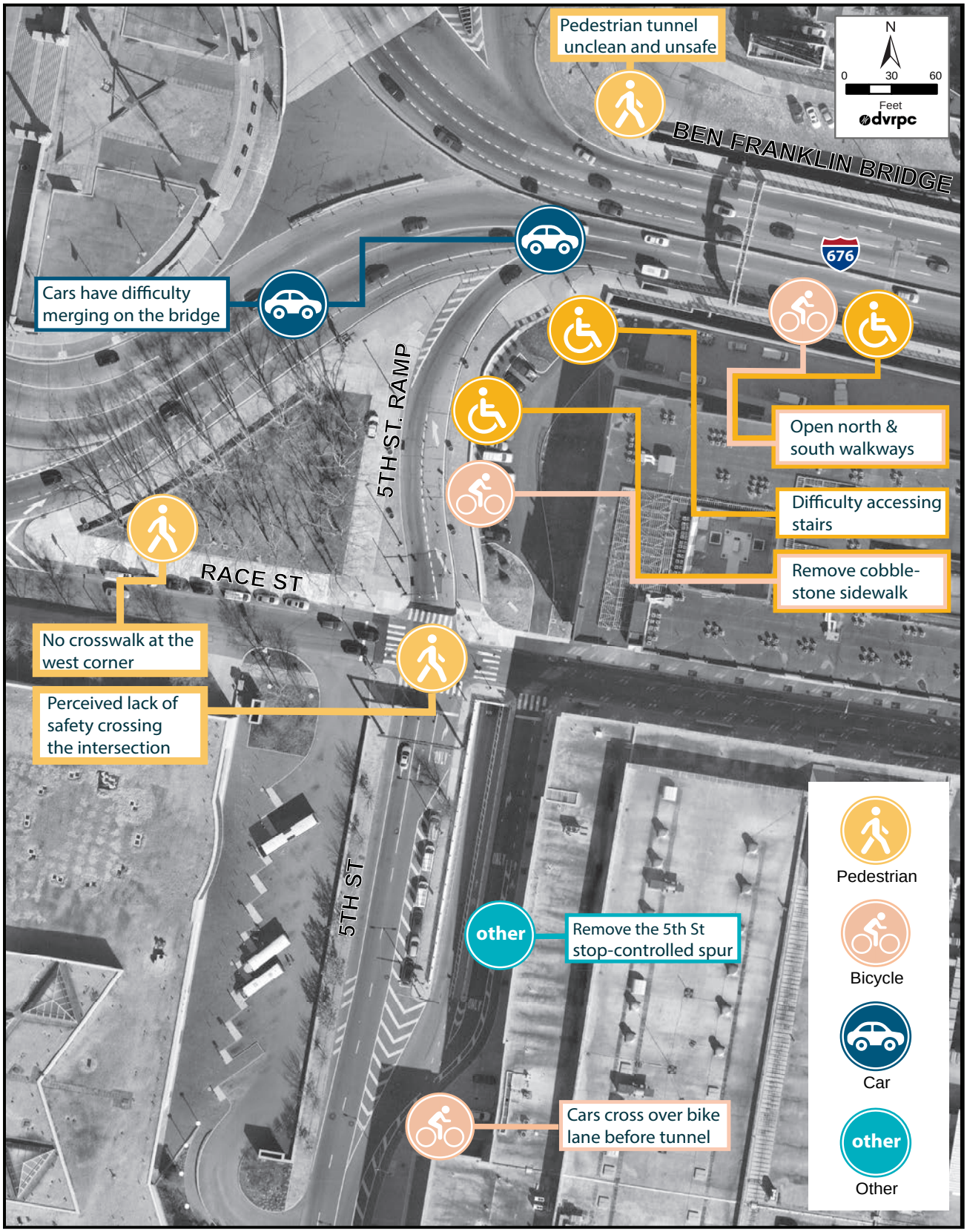


Source: DVRPC, Nearmap, 2020

Participants noted that the walkway is not open long enough for people to rely on it for work commutes, forcing them to drive. Many participants requested the opening of both the north and south walkways. By allowing users access to both walkways, bicycle and pedestrian traffic would be able to spread out, creating more space for social distancing as required at the time due to the COVID-19 pandemic.

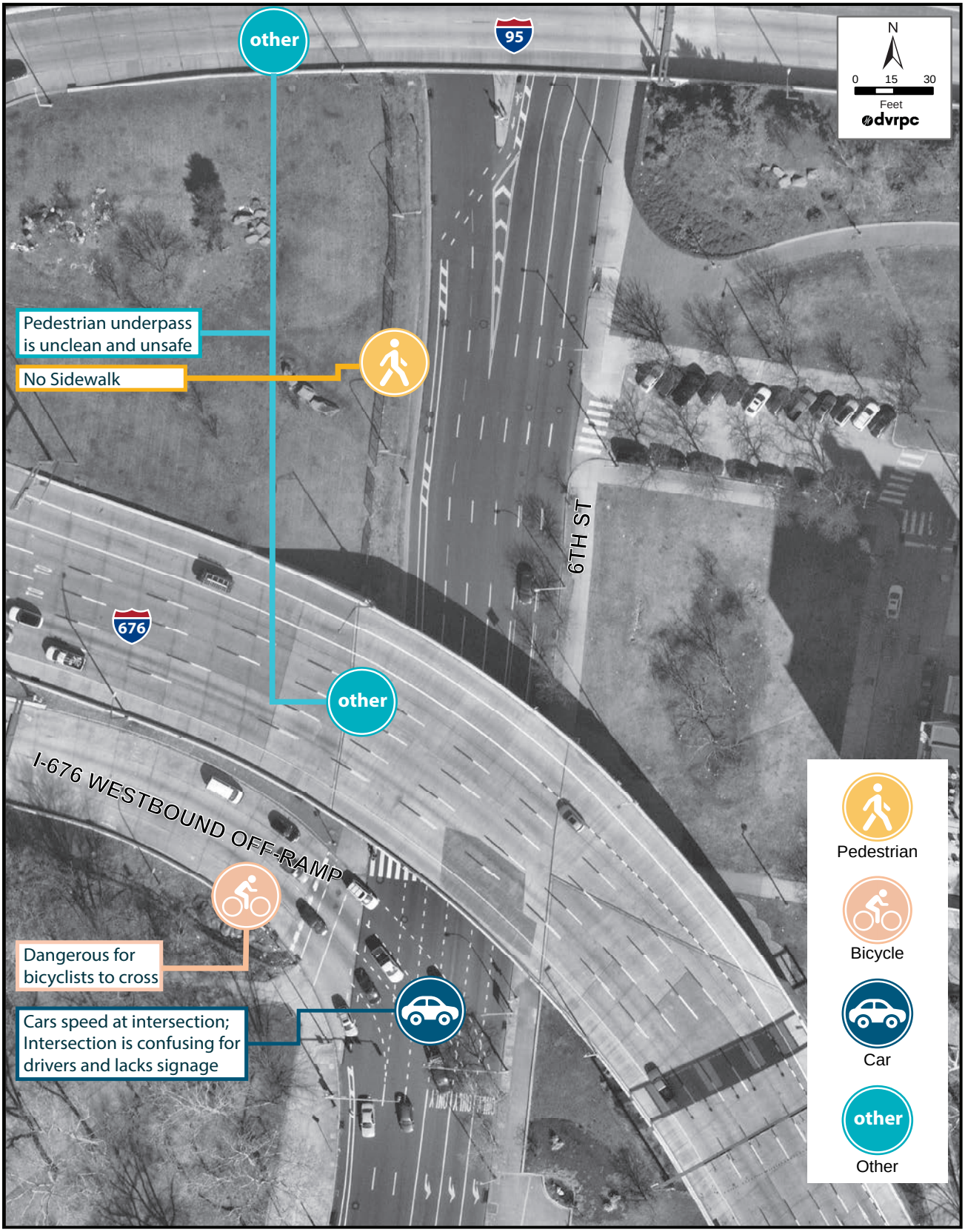
Comments in the survey further emphasized the idea that increased access to open space is a priority for the community. Participants cite difficult access, especially from the bridge walkway, as part of the reason why existing open spaces, such as Franklin Square and Monument Plaza are underutilized. Commenters also identified smaller open spaces within the study area that have the potential to be better utilized. One example of this is the green space sandwiched by the Race Street and 5th Street on-ramps, which has a wide sidewalk that currently leads nowhere. Separately, another commenter

Figure 37: Webmap Comment Summary: 5th Street Approach



Source: DVRPC, Nearmap, 2020

Figure 38: Webmap Comment Summary: 6th Street and I-676 Off-Ramp



Source: DVRPC, Nearmap, 2020

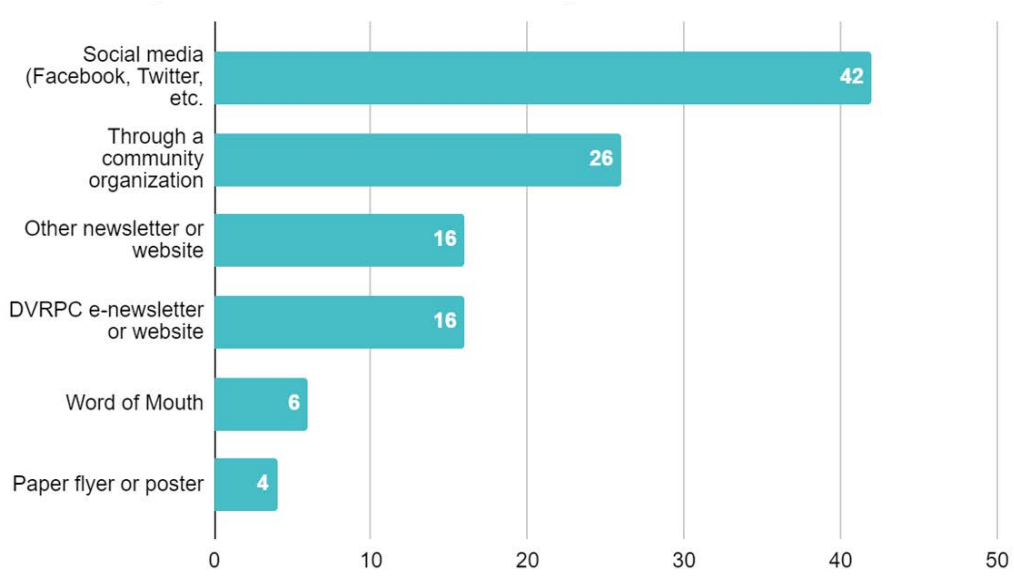
suggested that Monument Plaza be turned into a green space. This complements the most liked comments on the webmap, which asked that future plans consider the previously proposed PHS plan directly connecting I-676 with the bridge, eliminating the need for through traffic to interact with local roads. A more detailed summary of webmap comments is available in Appendix A.

DEMOGRAPHICS OF SURVEY PARTICIPANTS

Of the 187 webmap participants, 104 (or 56 percent) filled out the follow-up survey. The survey consisted of demographic questions to find out if participant demographics reflected that of area residents.

Although the webmap and survey were open to anyone, the project team targeted individuals that live or work within the Philadelphia neighborhoods and adjacent Camden neighborhoods that surround the study area. This was achieved through zip code targeted social media advertisements, the DVRPC newsletter, other newsletters, community groups, and traditional means such as flyers and postcards in order to engage with local residents. The highest proportion of survey respondents (38 percent) heard about the engagement opportunity via social media ads. Survey participants most often lived or worked in zip code 19106, which includes the study area. Others lived and worked throughout Center City Philadelphia.

Figure 39: Survey Participants Discovery Source



Source: DVRPC

The survey asked participants basic demographic questions regarding race, age, language, and ability. The survey did not cover topics of income level or gender, which is also commonly used to measure indicators of potential disadvantage.

In an effort to survey communities with limited English proficiency, the project team had the survey translated into both Chinese and Spanish. Compared to the collected 2018 American Community Survey (ACS) data and 2018 DVRPC Tract-level Indicators of Potential Disadvantage, survey participants had fewer English language limitations, fewer disabilities, and were less racially diverse than the population surrounding the study area (Figures 10-16). Out of the nearly 200 entries, only two replies were received in Chinese. There were no Spanish entries. Survey respondents were substantially less racially diverse than the surrounding census tracts. Learning from these survey results, the project team recommends additional community group outreach for any future public engagement efforts in this area.

CRASH ANALYSIS

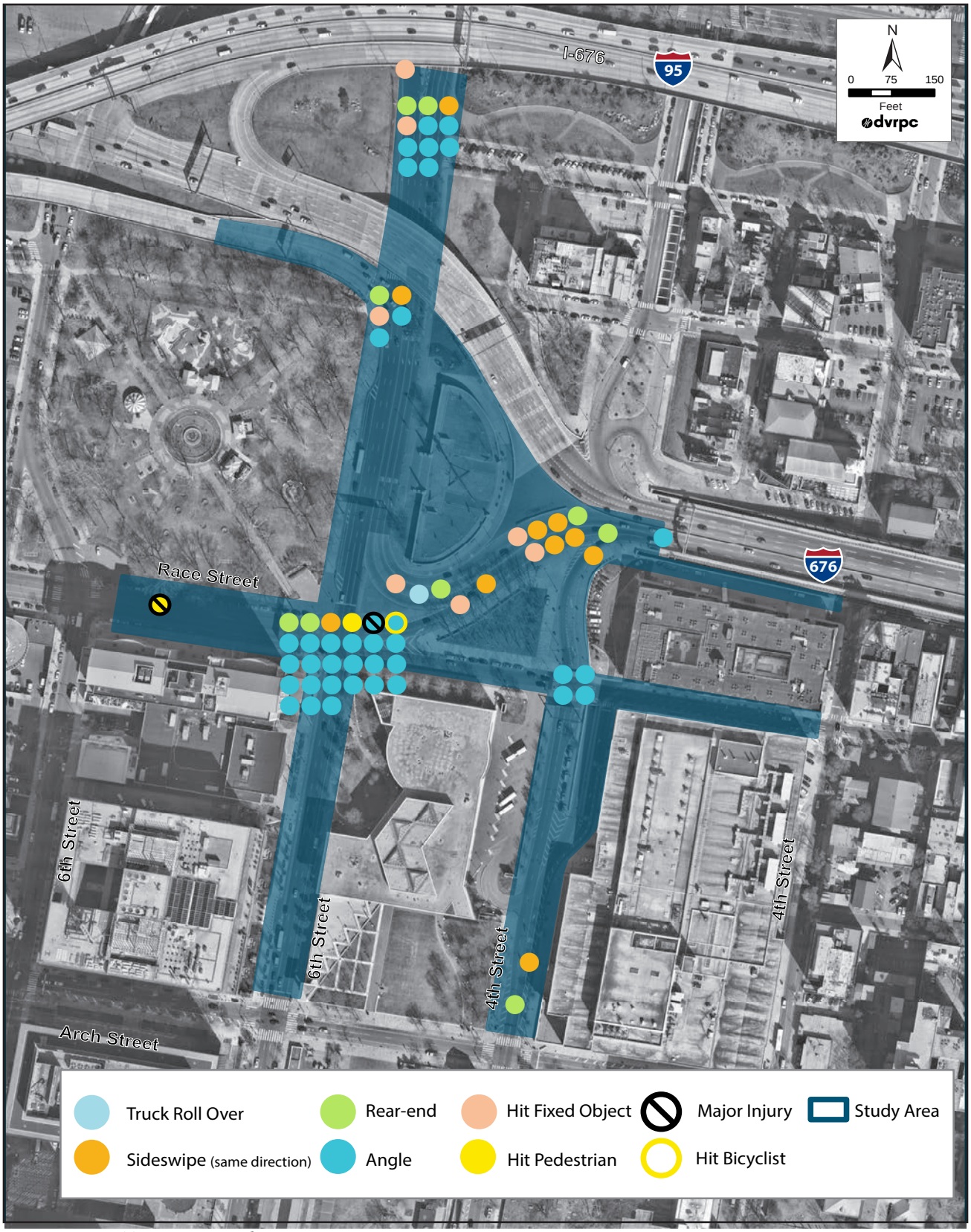
To supplement the issues identified through the public engagement effort, the project team conducted a crash analysis for the study area.

The approximate location of crashes reported in the study area over a five-year period from 2014 to 2018 are shown in Figure 41. The intersection with the largest number of reported crashes was 6th Street and Race Street. The majority of these were angle crashes, which were split fairly evenly between southbound and eastbound vehicles. One angle crash involved a hit bicyclist, and one resulted in a major injury. There was also one pedestrian hit at this intersection over the five-year period.

The second most crash-prone locations were the on-ramps to the Ben Franklin Bridge, particularly the 6th Street and Race Street on-ramps. Near the entrance to these two ramps, there were two hit fixed object crashes and one truck rollover. These crash types suggest that vehicles are navigating the turn from 6th Street to the bridge at speeds too high for the turning radius. Sideswipe crashes are more common further down the ramps, suggesting issues with merging vehicles.

Finally, a large number of crashes occurred where the two I-676 offramps intersect 6th Street. Five angle crashes occurred with vehicles exiting I-676 westbound hitting southbound vehicles on 6th Street, and additional angle, rear-end and hit fixed object crashes suggest that the geometry of this unsignalized merge could be improved.

Figure 40: Study Area Crash Summary (2014-2018)



Source: PennDOT 2014-2018 Crash Data, DVRPC, Nearmap, 2020

CHAPTER 6

RECONFIGURATION ALTERNATIVES

METHODOLOGY & ALTERNATIVE DEVELOPMENT

After analyzing the primary multimodal issues identified through public engagement, the project team conducted two exercises with the steering committee to inform the evaluation methodology. The first exercise asked committee members to brainstorm and rank criteria to evaluate potential reconfiguration alternatives based on the issues identified. The second exercise invited members to rank how well each of the previously proposed reconfiguration concepts addressed the project's overall goals and gave them the opportunity to propose new ideas.

The project team then consolidated concerns from the public engagement event and the steering committee exercises into 12 criteria points. Since valuable discussions among steering committee members prevented some from having the opportunity to rank criteria and vote on alternatives, a follow-up survey was sent to committee members to provide input on the final ranking of criteria by importance, as well as ranking of previously proposed alternatives. Based on survey responses, detailed in Appendix B, the steering committee placed the highest value on reconfiguration alternatives that would reduce pedestrian exposure to vehicles and would include roadway design features known to decrease vehicle speeding and/or crash risk or severity. Table 2 lists the final ranked evaluation criteria.

Table 2: Final Ranked Evaluation Criteria

RANK	CRITERIA	WEIGHTED AVERAGE
1	Reduces pedestrian exposure to vehicles while crossing.	4.59
2	Includes roadway design features known to decrease vehicle speeding and/or crash risk or severity.	4.47
3	Reduces the total number of conflict points in the study area (vehicle to vehicle, vehicle to pedestrian, vehicle to bike).	4.35
4	Addresses known vehicle safety issues related to geometry (e.g., sharp curves, sight lines).	4.18
5	Reduces pedestrian travel times between attractions and amenities (utilizing ADA-compliant sidewalk network).	4
6	Closes gaps in the bicycle network and/or increases the quality of existing bike facilities.	4
7	Reduces the total number of vehicle merging maneuvers.	3.88
8	Expands the footprint of park and open space facilities.	3.35
9	Reduces mixing between local and interstate traffic.	3.18
10	Improves queue lengths where existing queues spill back into upstream intersections.	2.82
11	Maintains or improves existing level of vehicle delay.	2.71
12	Achieves study objectives at a low cost.	2.41

The previously proposed street-level direct connection between I-676 and the Bridge was the most popular reconfiguration element, followed by the closing of the 5th Street channelized right turn lane. Table 3 lists the design elements in order of how well the steering committee believe they helped to address the multimodal goals for the study area.

Table 3: Final Ranked Design Elements

RANK	RECONFIGURATION ELEMENT	WEIGHTED AVERAGE
1	Direct connection (street level)	3.75
2	Close 5th Street channelized right turn lane	3.69
3	Reconfigure Franklin Street ramp and add signal	3.5
4	Signalized pedestrian crossing on 6th Street	3.44
5	Remove Race Street ramp	3.25
6	Direct connection (overhead bridge)	3.2
7	5th Street ramp realignment and signalization	3.13
8	Narrow 5th Street approaching the bridge	3.06
9	Make Franklin Street ramp bus-only	3
10	5th Street ramp lower-cost realignment	3
11	Signalize 5th Street channelized right turn lane	2.81
12	Narrow Franklin Street ramp and add stop control	2.75

The project team used the survey responses to develop three full study area alternatives. Since it was not feasible to evaluate every design element separately within the scope of this study, the team combined different elements for different parts of the study area to evaluate the proposed solution as a whole. Table 4 outlines which design elements were incorporated into each alternative. The following sections illustrate the alternatives in detail.

Table 4: Design Elements in Each Alternative

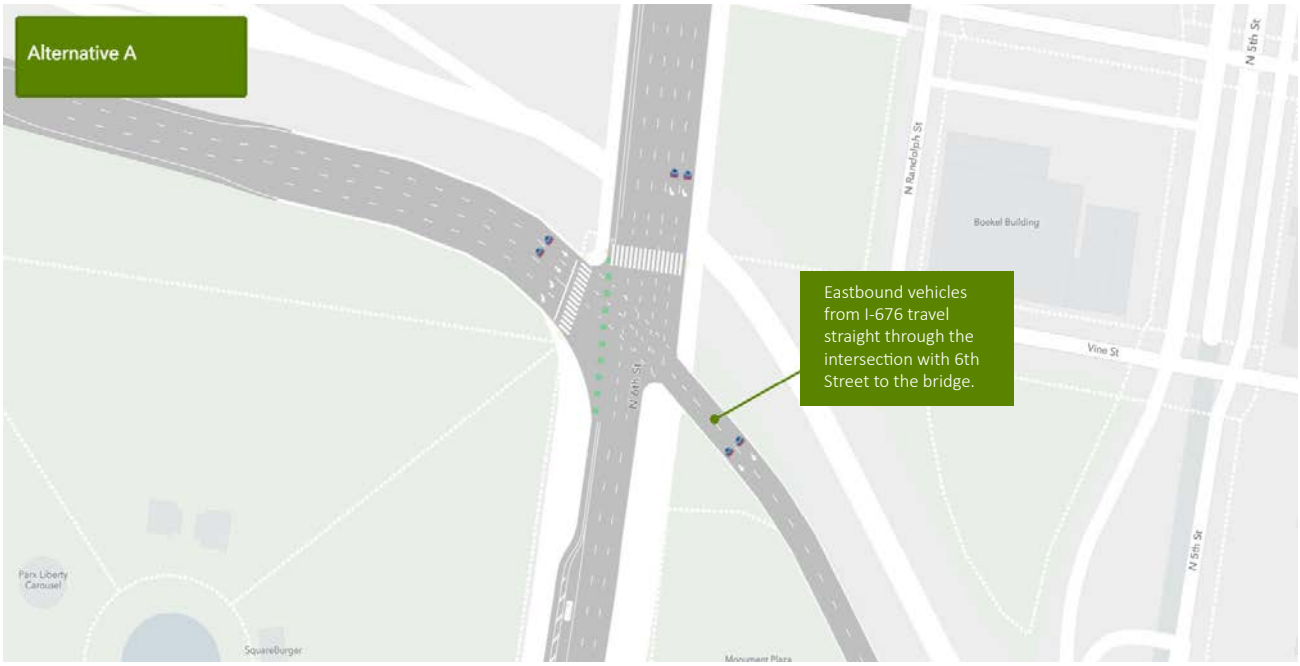
ELEMENT	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Direct connection (street level)	x		
Direct connection (overhead bridge)		x	
Eliminate 6th Street ramp	x		
Narrow 6th Street ramp and approach		x	
Add pedestrian-actuated signal to 6th Street ramp		x	x
Eliminate Race Street ramp			x
Narrow Race Street ramp and approach	x		
Narrow 5th Street ramp and approach	x	x	
5th Street ramp full realignment and signalization		x	
5th Street ramp lower-cost realignment (no signal)	x		
Signalize northbound right from 5th Street to Race Street		x	
Close 5th Street channelized lane			x
Realign Franklin Street ramp to square intersection operating with Callowhill		x	
Narrow Franklin Street ramp and add stop control	x		x
Restrict Franklin Street ramp to buses only			x

ALTERNATIVE A

Alternative A includes a street-level direct connection concept, previously studied by PHS. In this concept, two lanes from the existing I-676 off-ramp will turn right onto 6th Street, while the other two will continue straight onto a new ramp leading directly to the Ben Franklin Bridge. Southbound traffic on 6th Street will also use the new ramp to access the bridge. Construction of this new ramp would likely require modifying the Monument Plaza structure.

With the addition of the new on-ramp on the north side of Monument Plaza, the existing 6th Street on-ramp could be fully eliminated. This would allow for a reduction in the number of lanes on 6th Street between the ramp and Race Street, potentially expanding the footprint of Monument Plaza to the west and south.

Figure 41: Alternative A - I-676 Off-Ramp

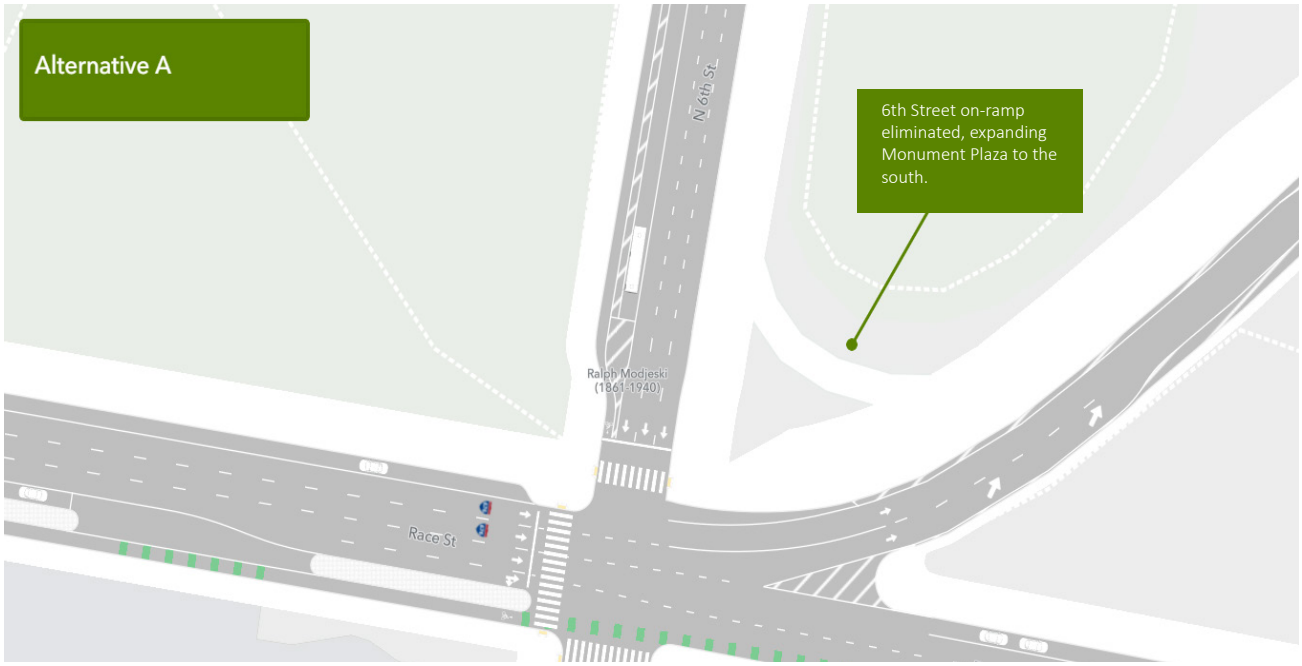


Concept created in Remix, 2021

The 5th Street bridge access ramp would be realigned according to the previously studied, short-term, lower-cost McCormick Taylor concept, improving the turning radius for large vehicles. This concept includes eliminating one receiving lane on the 5th Street ramp. Therefore, it would be logical to remove a travel lane on the 5th Street approach, south of Race Street. This, in turn, would create space for the addition of a parking-protected bicycle lane along 5th Street.

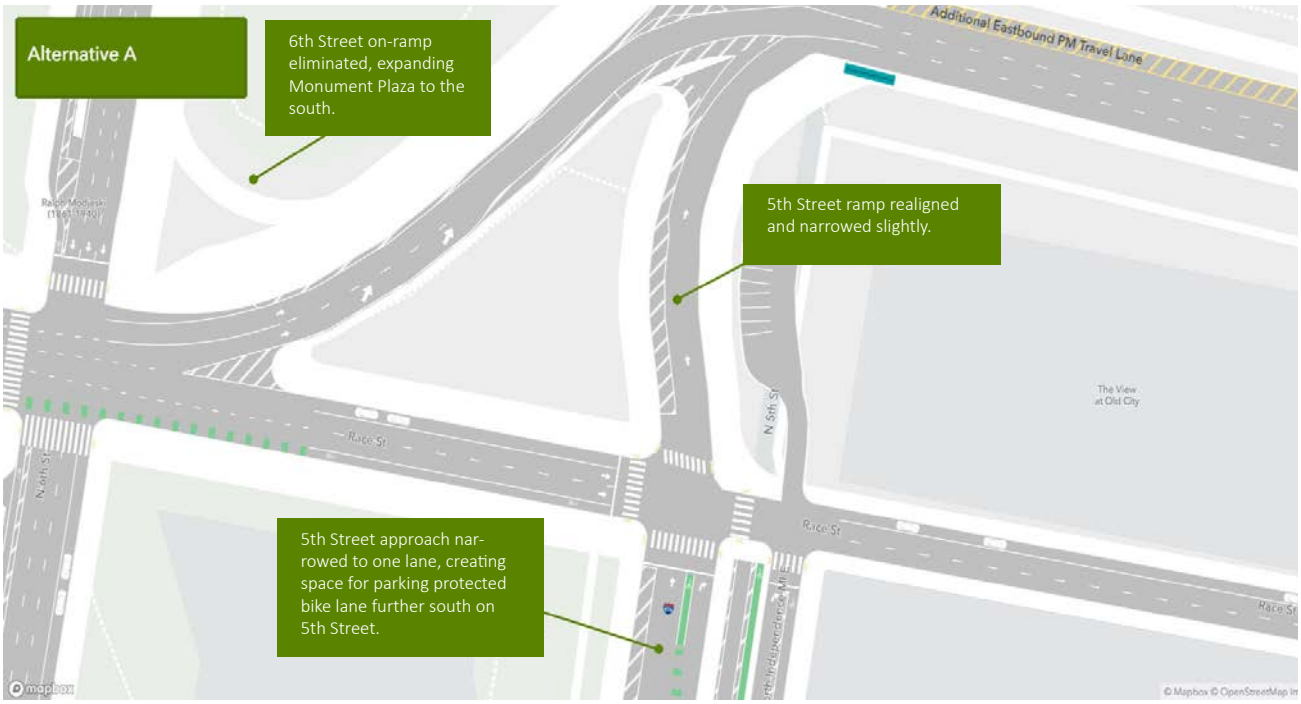
Finally, the Franklin Street ramp onto 6th Street (north of 676) would be narrowed to one lane. In an effort to address pedestrian safety issues, stop control would be added, along with a crosswalk on the ramp, and sidewalk on the west side of 6th Street.

Figure 42: Alternative A - 6th Street Approach



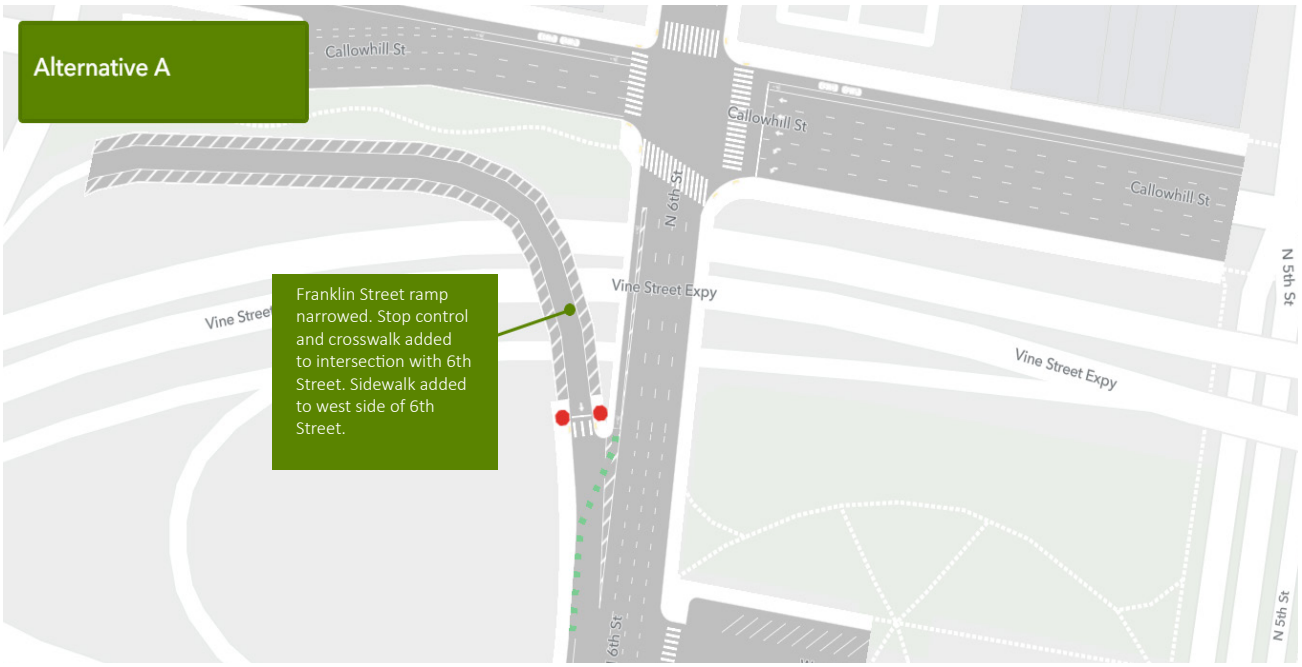
Concept created in Remix, 2021

Figure 43: Alternative A - 5th Street Approach



Concept created in Remix, 2021

Figure 44: Alternative A - Franklin Street Ramp

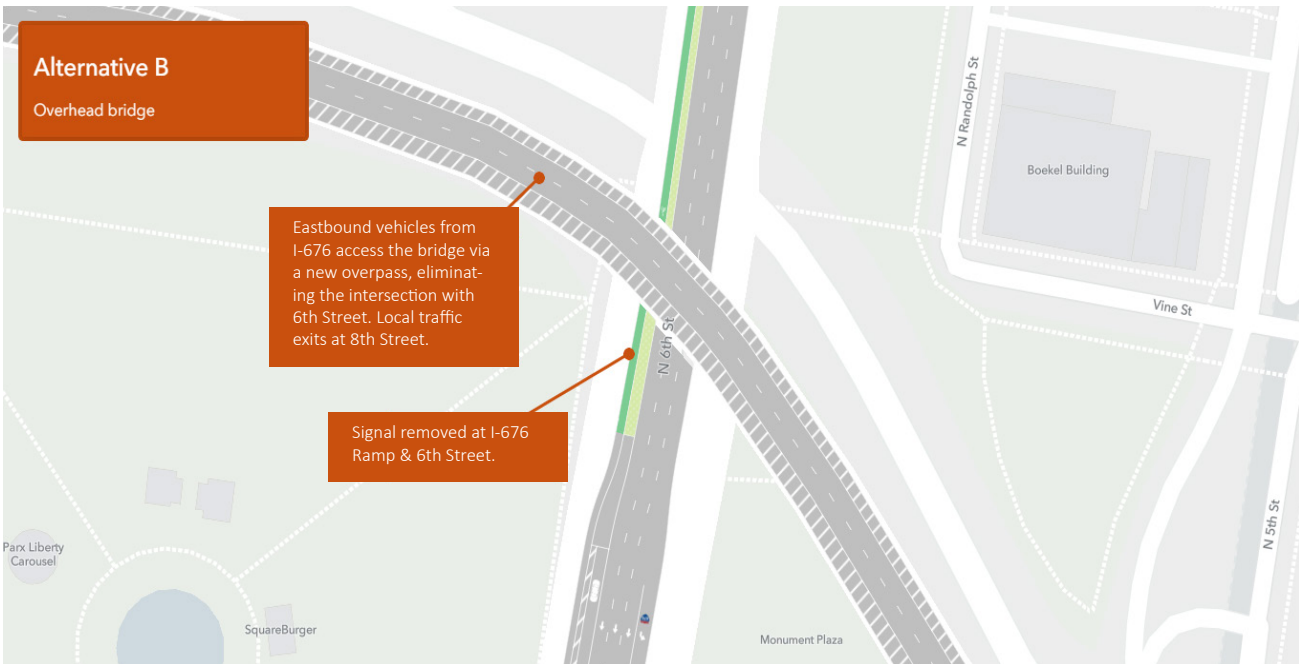


Concept created in Remix, 2021

ALTERNATIVE B

Alternative B includes an overhead connection from eastbound I-676 to the bridge, eliminating the need for bridge-bound vehicles to interact with the signalized street network. Eastbound I-676 traffic wishing to access the local street network would exit at 8th Street. The existing intersection and signal at 6th Street and the I-676 off-ramp would be eliminated. Building the overhead bridge would likely require modifying the Monument Plaza structure.

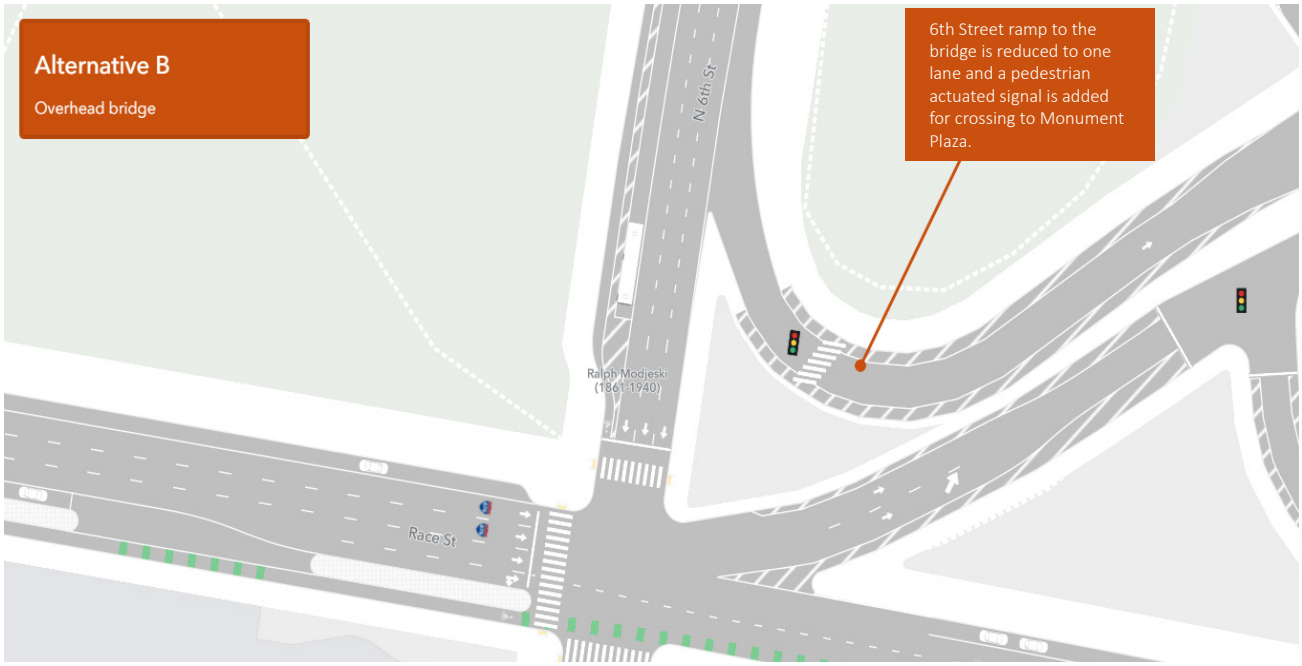
Figure 45: Alternative B - I-676 Off-Ramp



Concept created in Remix, 2021

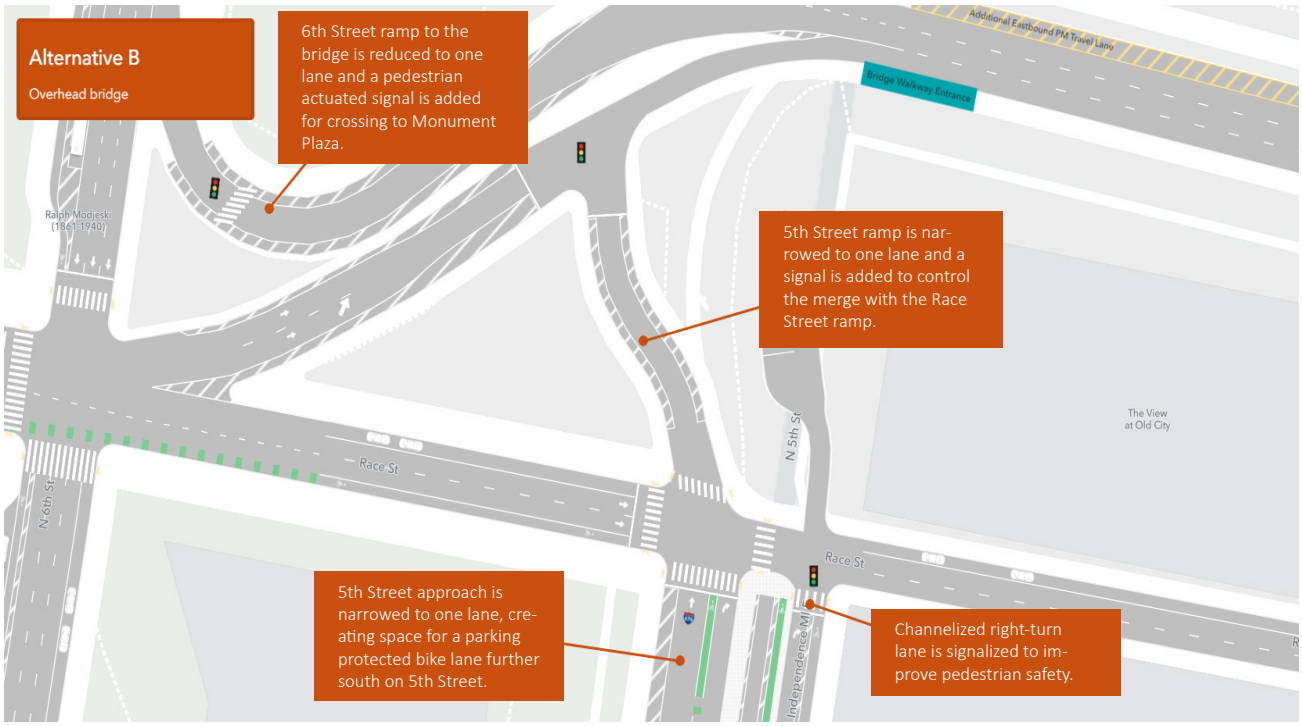
Bridge-bound traffic from 6th Street would still need to use the existing 6th Street on-ramp, but the lower volume would enable a narrowing of that ramp as well as the addition of a signal for pedestrians accessing Monument Plaza.

Figure 46: Alternative B - 6th Street Approach



Concept created in Remix, 2021

Figure 47: Alternative B - 5th Street Approach

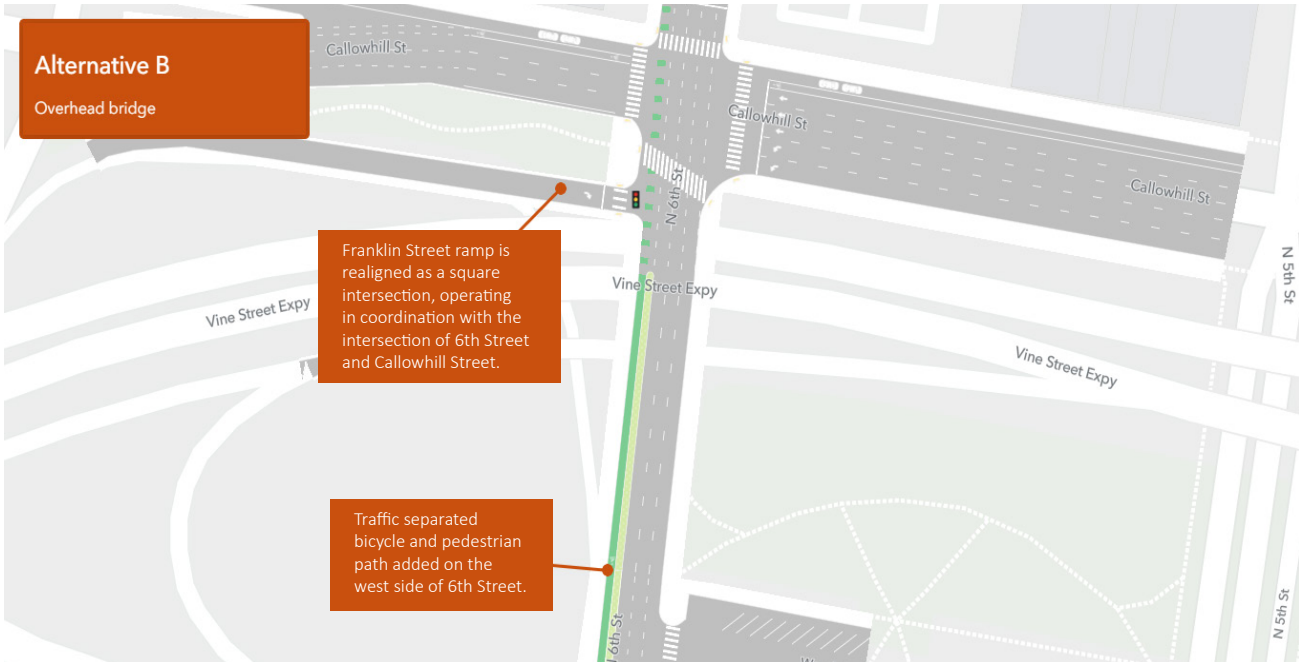


Concept created in Remix, 2021

The 5th Street ramp would be realigned according to the previously studied, long-term, higher-cost McCormick Taylor concept, further improving the turning radius for large vehicles and adding a signal where the 5th Street and Race Street ramps meet. This concept includes eliminating one receiving lane on the 5th Street ramp, allowing removal of a travel lane on the 5th Street approach. This, in turn, would allow the addition of a parking-protected bicycle lane along 5th Street. The channelized 5th Street right turn lane, currently stop-controlled, would be signalized to enhance pedestrian safety.

Finally, the Franklin Street ramp onto 6th Street (north of I-676) would be realigned as a square intersection operating in coordination with the intersection of 6th Street and Callowhill. A crosswalk would be added on the west side of the intersection. A traffic-separated bicycle and pedestrian path would be added to the west side of 6th Street between Callowhill and the I-676 overhead bridge, made possible by the lane reduction on 6th Street.

Figure 48: Alternative B - Franklin Street Ramp

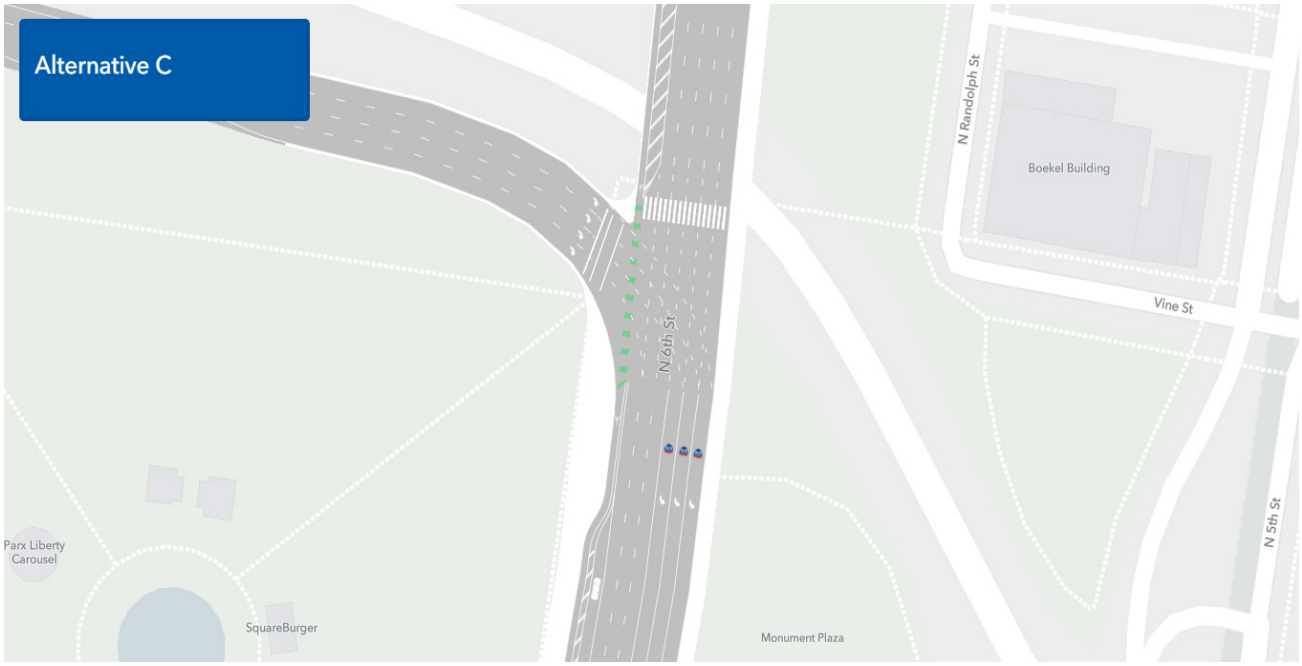


Concept created in Remix, 2021

ALTERNATIVE C

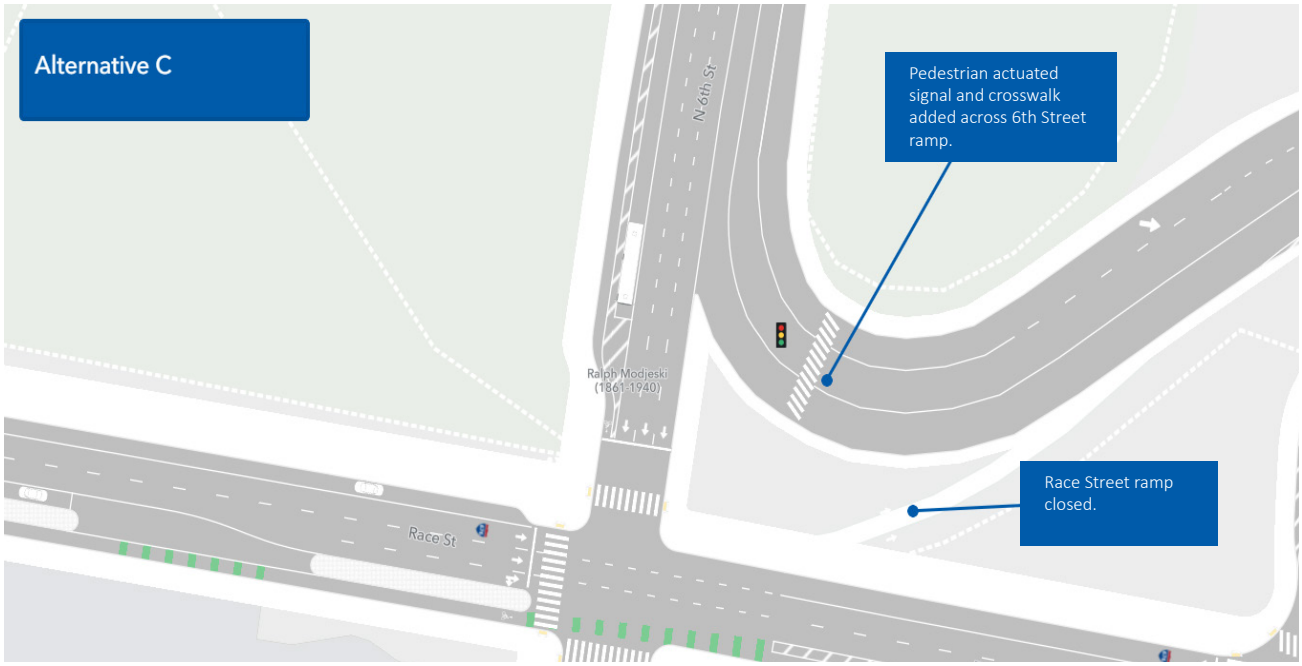
Alternative C does not include a major change to the flow of traffic from 6th Street and I-676 to the bridge. Instead, this alternative focuses on reducing merge points.

Figure 49: Alternative C - I-676 Off-Ramp



Concept created in Remix, 2021

Figure 50: Alternative C - 6th Street Approach

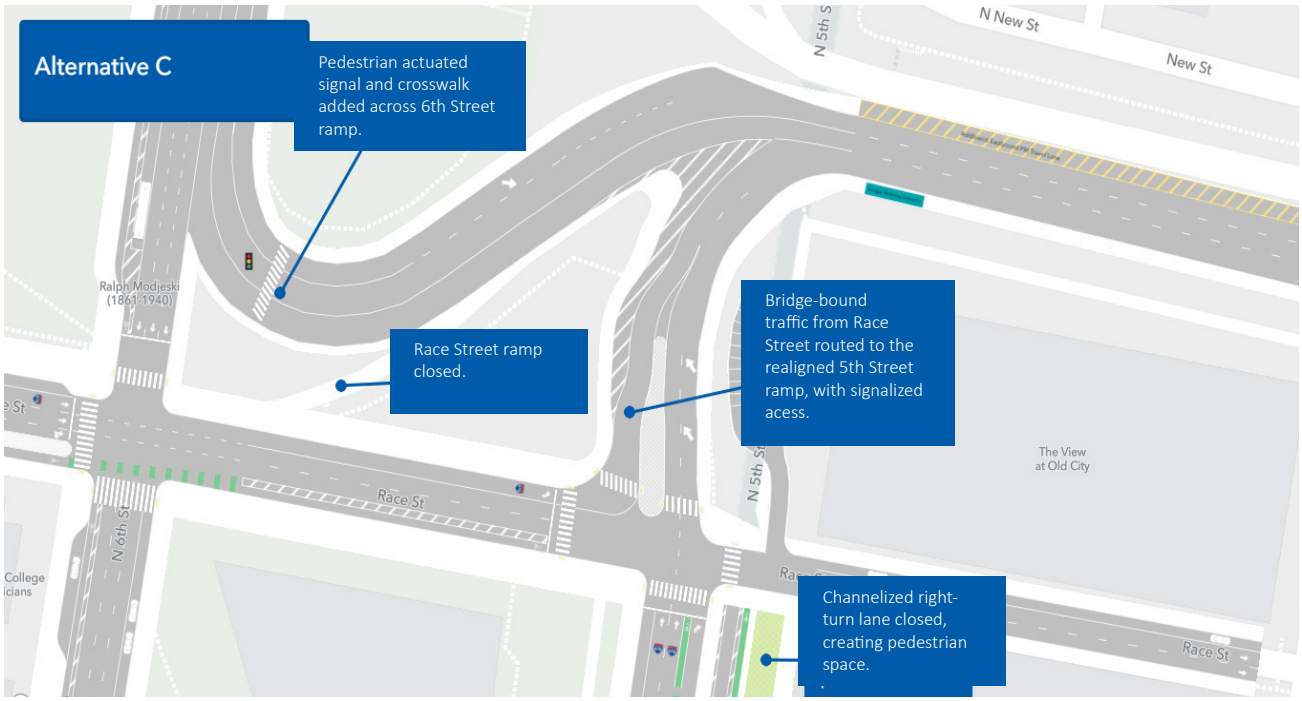


Concept created in Remix, 2021

The Race Street on-ramp would be eliminated and bridge-bound traffic along Race Street would be re-routed to the 5th Street on-ramp with signalized access. This may require widening Race Street between 6th and 5th as well as widening the 5th Street on-ramp to add a receiving lane. Additionally, a signal would be added to the 6th Street on-ramp, with an actuated pedestrian phase every cycle, to connect pedestrians to Monument Plaza. The 5th Street channelized right-turn lane would be closed to vehicle traffic creating a larger bicycle/pedestrian area.

Finally, the

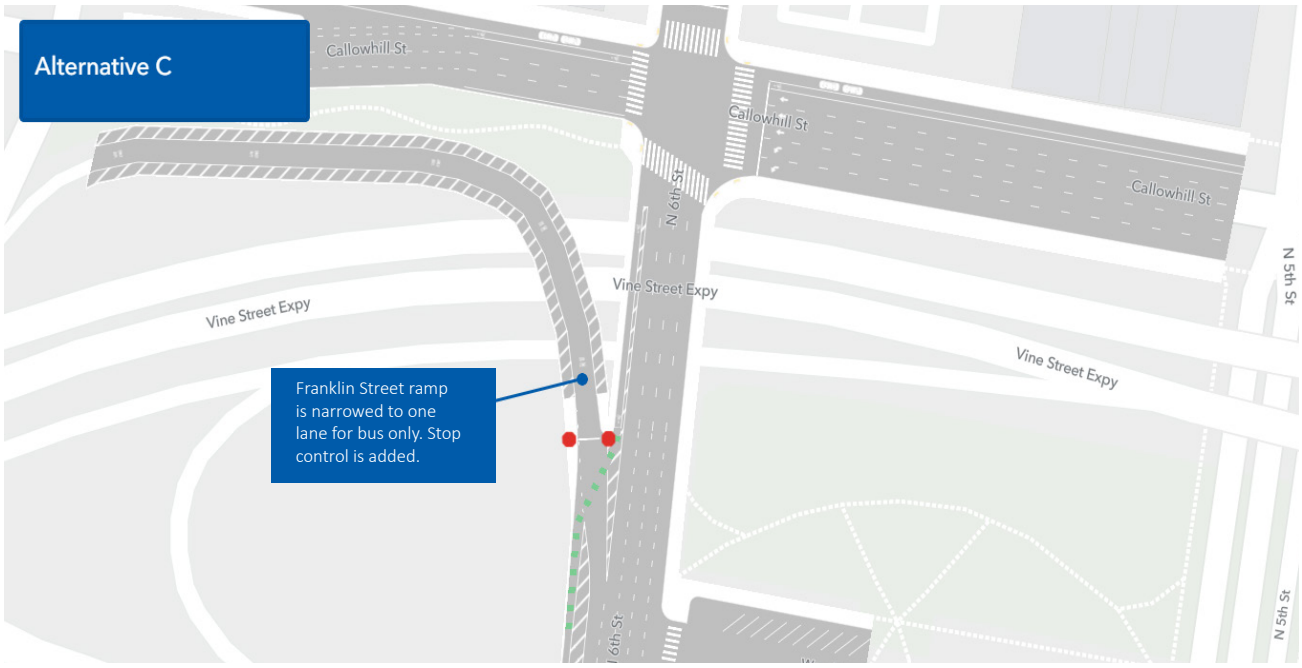
Figure 51: Alternative C - 5th Street Approach



Concept created in Remix, 2021

Franklin Street ramp would be narrowed to one lane and stop control would be added. The ramp would be restricted for use by buses only, drastically reducing the number of vehicles using the ramp.

Figure 52: Alternative C - Franklin Street Ramp



Concept created in Remix, 2021

OTHER ALTERNATIVES CONSIDERED

The three main alternatives were presented to the steering committee in June of 2021, along with the preliminary evaluation results. Discussions during the meeting led to the development of an additional alternative, combining a series of design elements aimed to provide the greatest possible pedestrian safety and connectivity throughout the study area.

The alternative included eliminating the Race Street ramp providing access via an expansion of the 5th Street ramp. Additionally, this alternative included a signalized crosswalk across the 6th Street ramp to provide pedestrian access to Monument Plaza.

Microsimulation modeling results showed that the volume of traffic accessing the bridge via the Race Street ramp is too large to be accommodated by the signal at 5th Street. Therefore, this alternative was not evaluated further using the rest of the criteria.

Additionally, stakeholders requested that the project team model the long-term McCormick Taylor 5th Street ramp realignment separately. This alignment includes a signal where the 5th Street and Race Street ramps meet.

Microsimulation results show that this alternative would cause queuing along the ramp and significantly increase delay at the intersection of 5th Street and Race Street. Future studies could analyze the potential impact of additional lanes along the 5th Street ramp in an attempt to mitigate this expected delay.

CHAPTER 7

ALTERNATIVE EVALUATION

This chapter details the methods used to evaluate each reconfiguration alternative. In most cases, numerous measurements were taken at various intersections throughout the study area to determine each alternative's score for that criteria. At least one example is provided for each criterion to illustrate the evaluation method.

Scores for each criterion were normalized according to how much they differed from the base condition (planned 2050 conditions).

1. REDUCES PEDESTRIAN EXPOSURE TO VEHICLES WHILE CROSSING

For the purpose of this study, pedestrian exposure to vehicles was evaluated based on the total length of crosswalks available in the design alternatives, as illustrated in Figure 54. Measurements are rounded and are for relative comparison purposes only. While adding new crosswalks increases pedestrian connectivity throughout the study area, it also increases pedestrian exposure to vehicles. The benefits of increased connectivity are captured in criterion 5.

Compared to the Base alternative, Alternative B would decrease pedestrian exposure to vehicles, while Alternatives A and C would increase it. Measurements are shown in Table 5.

Figure 53: Pedestrian Crossing Distance Measurement Example (Base, Alt C)

Concept created in Remix, 2021

Table 5: Pedestrian Crossing Measurements

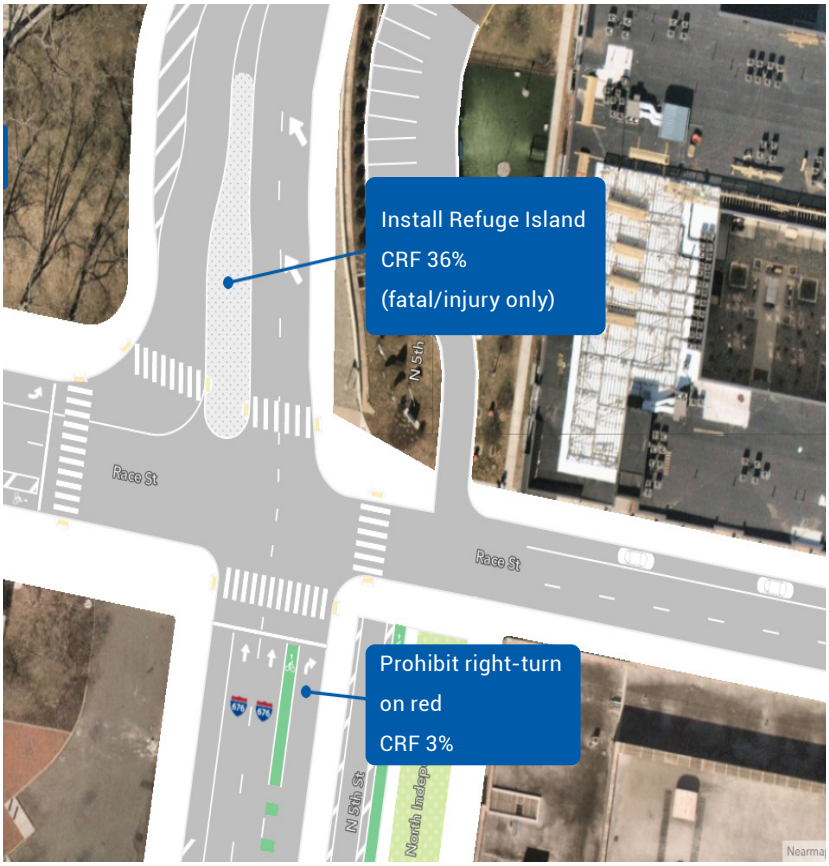
KEY INTERSECTIONS	CROSSING	BASE (FT)	ALT A (FT)	ALT B (FT)	ALT C (FT)
5th & Race Streets	West side crossing of Race @ 5th	40	40	40	45
	South side crossing of 5th @ Race	47	47	47	47
	North side crossing of 5th St ramp	35	35	35	60
	East side crossing of Race @ 5th	26	26	26	26
	Crossing of 5th St separated right @ Race	21	21	21	-
6th & Race Streets	West side crossing Race @ 6th	73	73	73	48
	South side crossing 6th @ Race	45	45	45	45
	North side crossing 6th @ Race	-	38	38	38
	Crossing 6th St ramp to Monument Plaza	-	-	33	55
6th Street and I-676 Off-Ramp	West side crossing ramp	55	55	-	55
	North side crossing 6th @ ramp	72	62	-	62
	East side crossing ramp	-	-	-	-
Total		*413*	*441*	*357*	*481*
Difference from Base		*0.00*	*-28*	*56*	*-68*
Normalized Score			**-0.50**	**1.00**	**-1.22**

2. INCLUDES ROADWAY DESIGN FEATURES KNOWN TO DECREASE CRASH RISK OR SEVERITY

The Federal Highway Administration publishes a list of Proven Safety Countermeasures comprised of roadway treatments and strategies that can be implemented to address crashes. Each countermeasure is associated with a Crash Reduction Factor, or CRF, which represents the percent reduction in crashes that could be expected after implementing the countermeasure. Alternatives were evaluated to determine which countermeasures are included and CRFs were applied to the total number of crashes at each study area intersection over the past five years.

Figure 55 shows an example of two countermeasures included in Alternative C, and how CRFs were applied at the intersection of 5th Street and Race Street. In the past five years, there were four crashes at this intersection. If the refuge island is added to the 5th Street ramp and the channelized right-turn lane from 5th Street to Race Street is closed, as proposed in Alternative C, crashes involving injuries or fatalities would be expected to be reduced by 36 percent and all crashes would be expected to be reduced by 3 percent. When considering all intersections, the countermeasures included in Alternative B would be expected to reduce crashes most significantly.

Figure 54: CRF Example (Alt C)



Concept created in Remix, 2021

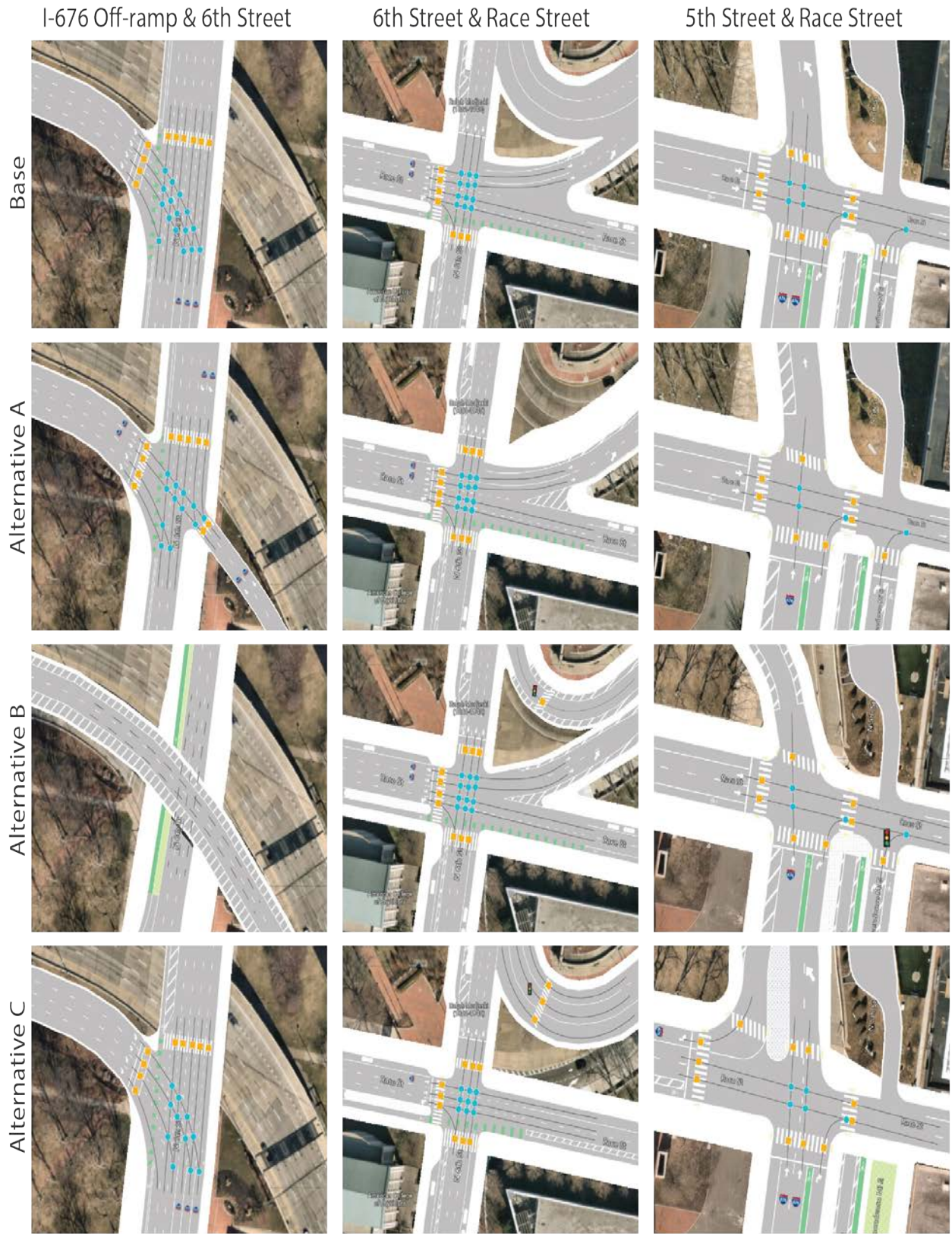
Table 6: CRFs by Alternative

INTERSECTION	ALL CRASHES	PEDESTRIAN CRASHES	ALT A	ALT B	ALT C
6th & Franklin	12	-	-	0.36	-
6th & 676 EB Off-Ramp	5	-	-	-	-
6th & Race	27	1	-	0.34	0.34
5th & Race	4	-	-	0.12	0.12
Total			-	*0.82*	*0.46*
Normalized			**-**	**1**	**0.56**

3. REDUCES THE TOTAL NUMBER OF CONFLICT POINTS IN THE STUDY AREA

Conflict diagrams were created for three interactions in each alternative, as shown in Figure 56. In the diagrams, orange squares represent pedestrian conflict points, while blue circles represent vehicle conflict points. The total number of vehicle and pedestrian conflicts were tallied to evaluate the number of conflict points in each alternative. Results are provided in Table 7. The overhead bridge in Alternative B, which essentially eliminates an entire intersection, is expected to reduce more conflict points than the other alternatives.

Figure 55: Conflict Diagrams



Concept created in Remix, 2021

Table 7: Conflict Point Totals

SCENARIO	BASE		ALTERNATIVE A		ALTERNATIVE B		ALTERNATIVE C	
Intersection	Vehicle	Ped	Vehicle	Ped	Vehicle	Ped	Vehicle	Ped
5th & Race	6	10	4	8	4	8	5	11
6th & Race	12	7	12	10	12	11	9	12
I-676 ramp & 6th	16	10	12	11	-	-	11	9
Sum	34	27	28	29	16	19	25	32
Total	*61*		*57*		*35*		*57*	
Difference from Base	-		*4*		*26*		*4*	
Normalized Score	-		**0.15**		**1**		**0.15**	

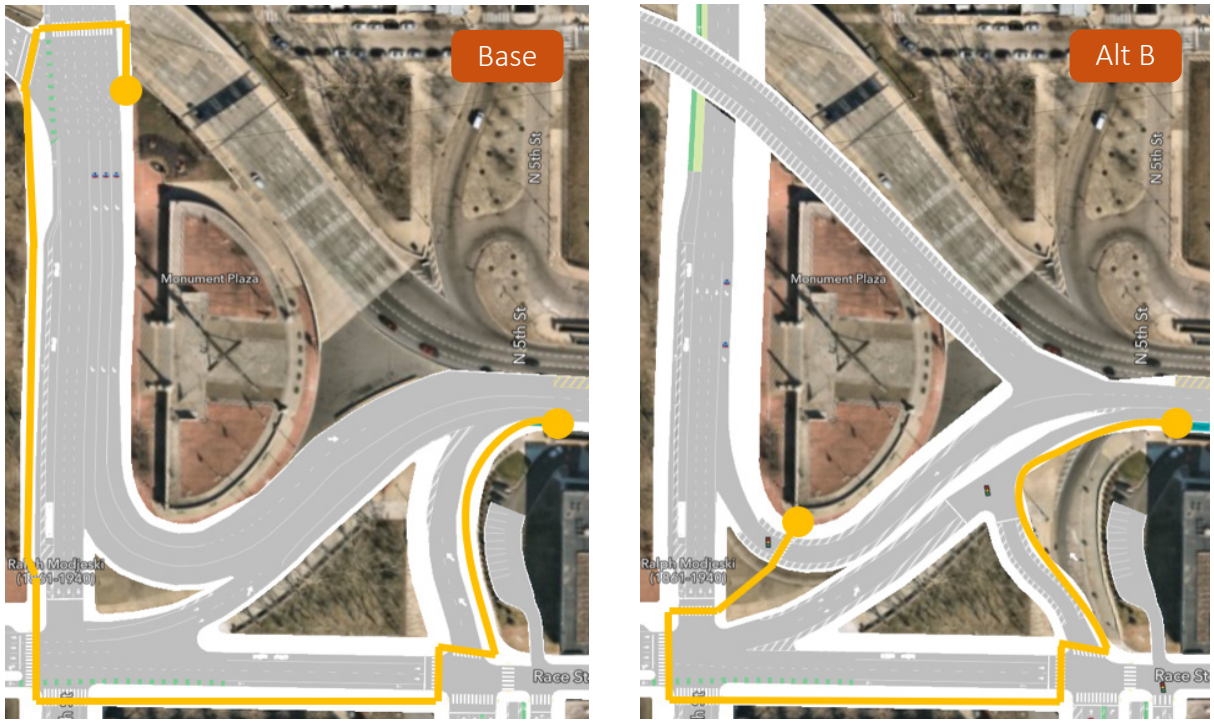
4. ADDRESSES KNOWN VEHICLE SAFETY ISSUES RELATED TO GEOMETRY

A list of potential geometric safety issues, especially those that present challenges for heavy vehicles such as trucks and buses, was developed for key intersections in the base condition. Alternatives were scored based on whether or not, or how much, they addressed these specific issues. Issues and scores are provided in Table 8 on the following page. While all alternatives are expected to address geometric safety issues, Alternative B is expected to address the most.

5. REDUCES ACCESSIBLE PEDESTRIAN TRAVEL TIMES BETWEEN ATTRACTIONS AND AMENITIES

Accessible pedestrian travel times were calculated by measuring the pedestrian distance between key attractions and destinations in the study area. Measured paths only crossed streets at crosswalks and where ADA ramps exist or are recommended. Figure 57 shows an example of a pedestrian path from the bridge pedestrian walkway entrance to Monument Plaza.

Figure 56: Pedestrian Travel Time Example (Base, Alt B)



Concept created in Remix, 2021

Table 8: Geometric Safety Issues by Alternative

KNOWN GEOMETRIC SAFETY ISSUES	BASE ISSUES	ALT A NOTES	ALT A SCORE	ALT B NOTES	ALT B SCORE	ALT C NOTES	ALT C SCORE
6th Street ramp curve	sharp curves; multiple merges with difficult sight lines	completely closes 6th Street ramp	1	ramp reduced from 3 lanes to 1; adds gore buffer; eases merge with Race/5th Street ramps; still a sharp curve (not ideal for heavy vehicles)	0.75	eliminates merge with Race Street ramp	0.25
5th Street ramp	sharp curves; difficult sight lines at merge onto bridge	realigned slightly; buffer added; one merge eliminated due to lane reduction	0.75	significantly realigned; buffer added; reduced to one lane; one merge eliminated due to lane reduction	1	realigned slightly, buffer added; sharp curve to access bridge from Race Street	0.5
Franklin Street approach	yield controlled merge with difficult sight lines; many lanes to cross to access bridge	lane reduction on-ramp creates space for buffer; stop control added, lane eliminated on 6th Street	0.65	Franklin Street ramp is realigned as a square intersection, operating in coordination with the intersection of 6th Street and Callowhill Street	1	lane reduction on-ramp creates space for buffer; stop control added, lane eliminated on 6th Street; bus only reduces interaction with other vehicles, but also restricts truck movements	0.75
Total			**2.4**		**2.75**		**1.5**
Normalized			**0.9**		**1.0**		**0.5**

The list of measured paths reflects desired connections identified in the first round of public engagement, including:

- NE corner of Franklin Square to Monument Plaza
- SE corner of Franklin Square to Monument Plaza
- SE corner of Franklin Square to bridge Pedestrian Walkway entrance
- Monument Plaza to bridge Pedestrian Walkway entrance
- Monument Plaza to 7th & Race Streets
- Monument Plaza to 4th & Race Streets
- Monument Plaza to 6th & Arch Streets
- Monument Plaza to 5th & Arch Streets
- Pedestrian Walkway entrance to North 6th Street & Callowhill Street

- Pedestrian Walkway entrance to South 6th Street & Arch Street
- Pedestrian Walkway entrance to 7th & Race Streets
- Pedestrian Walkway entrance to 4th & Race Streets
- Pedestrian Walkway entrance to 5th & Arch Streets

Table 9 shows the sum of all walking trip distances for each alternative. These measurements are for relative comparison purposes only. If any of the proposed alternatives are implemented in the future, actual dimensions will change based on engineering design. All three alternatives are expected to increase connectivity and reduce accessible pedestrian travel times, with Alternative A providing the most substantial improvements.

Table 9: Pedestrian Travel Time Totals

	BASE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Walking Trip Distance	16,221 ft	12,190 ft	13,621 ft	13,825 ft
Difference from Base		4,031 ft	2,600 ft	2,396 ft
Normalized Score		**1.00**	**0.65**	**0.59**

6. CLOSES GAPS IN THE BICYCLE NETWORK AND/OR INCREASES THE QUALITY OF EXISTING BIKE FACILITIES

The length of each type of bicycle facility was measured in each alternative. Facilities offering more protection for bicyclists were weighted more heavily. Sharrows do not currently exist in the study area and were not proposed in any of the alternatives. Each foot of conventional bike lanes was worth 2 points and buffered or protected bike lanes were worth 3 points. All roads within the study area are one way, so measurements were not duplicated to include opposite directions. Measurements are for relative comparison purposes only. If any of the proposed alternatives are implemented in the future, actual dimensions will change based on engineering design. Table 10 shows the total estimated number of feet for each type of bicycle facility in each alternative. Alternative B is expected to increase the length of protective bicycle facilities more than Alternatives A and C.

Table 10: Bicycle Facilities Distance

	BASE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Sharrows (ft) - x1	0	0	0	0
Conventional Bike Lane (ft) - x2	3,478	3,832	3,306	2,794
Buffered Bike Lane (ft) - x3	6,511.5	6,174	7,236	7,048.5
Weighted Total	*9,990*	*10,006*	*10,542*	*9,843*
Difference from Base		*17*	*553*	*-147*
Normalized Score		**0.03**	**1.00**	**-0.27**

7. REDUCES THE TOTAL NUMBER OF VEHICLE MERGING MANEUVERS

Vehicle merge points were tallied for each alternative and compared to the base condition, as shown in Table 11. For the purposes of this study, a merge was anywhere a vehicle travel lane ended, requiring drivers to yield and merge into the adjacent lane. Alternative B is expected to reduce the number of vehicle merging maneuvers more than Alternatives A and C.

Table 11: Vehicle Merges

	BASE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Number of Merges	5	3	2	3
Difference from Base	-	2	3	2
Normalized Score	**-**	**0.67**	**1**	**0.67**

8. EXPANDS THE FOOTPRINT OF PARK AND OPEN SPACE FACILITIES

The most substantial changes to park and open space in the proposed alternatives impact Monument Plaza. Lane and ramp closures in some alternatives provide additional space, while the construction of a new ramp reduces space. The footprint of Monument Plaza was estimated for each alternative and compared to the base condition. These measurements are rounded and are purely for relative comparison purposes. If any of the proposed alternatives are implemented in the future, actual dimensions would change based on engineering design. Table 12 shows the total estimated area of the Plaza. Alternative A is expected to increase the footprint of Monument Plaza most significantly.

Table 12: Relative Size of Monument Plaza

	BASE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Plaza Sq. Ft.	68,000	97,000	70,000	68,000
Difference from Base	-	29,000	2,000	-
Normalized Score	**-**	**1.00**	**0.07**	**0**

9. REDUCES MIXING BETWEEN LOCAL AND INTERSTATE TRAFFIC

In the base condition, bridge-bound traffic from I-676 mixes with local traffic from the intersection of 6th Street & the ramp, along 6th Street, to the 6th Street ramp to the bridge. Alternatives were scored based on whether or how much this mixing is reduced. In Alternative A, interstate traffic travels across 6th Street at street level, reducing mixing, but not eliminating it. Interstate traffic is completely separated from local traffic on the overhead bridge in Alternative B. Alternative C does not impact local and interstate traffic mixing. Scores are shown in Table 13.

Table 13: Interstate Traffic Mixing Score

	BASE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Mixing Score	0	0.5	1	0

10. IMPROVES QUEUE LENGTHS WHERE EXISTING QUEUES SPILL BACK INTO UPSTREAM INTERSECTIONS

The Ben Franklin Bridge attracts heavy traffic volumes, especially during the morning and evening peak hours. This creates delay and queuing on the local roadway network surrounding the eastbound access. One of the goals when potential alternatives were being developed was alleviating this delay. In order to assess the traffic impact of each alternative, microsimulation was performed under future scenarios.

Using DVRPC's regional model, future peak hour traffic volumes can be predicted in the study area without making changes to the existing eastbound access. These volumes were then input into a microsimulation to create the 2050 No-Action scenario. From this, the proposed alternatives can be

Figure 57: Queue Example

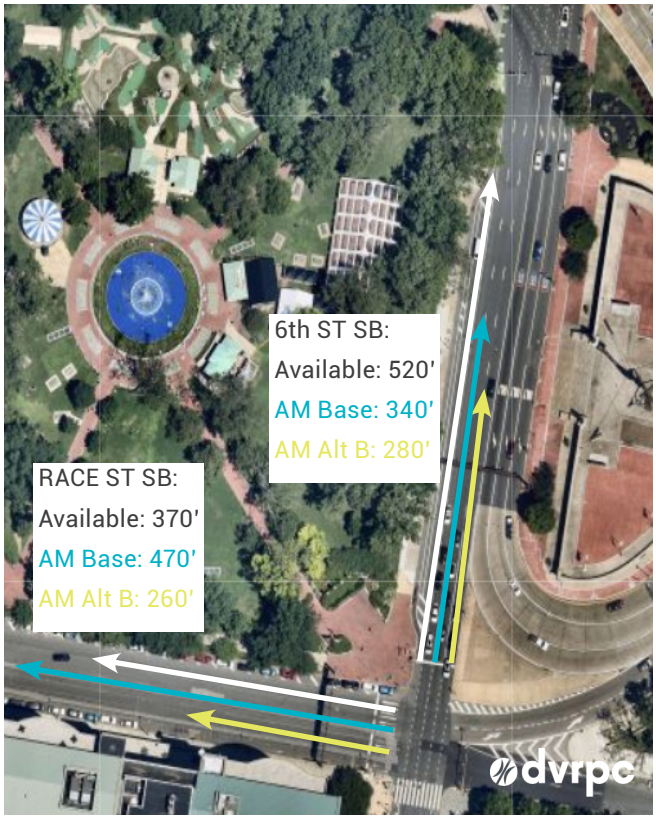
Source: Google, 2020

compared to assess their impact on local traffic.

The scenarios were compared using LOS, delay, and queue lengths at each intersection. Criterion 11 is based on queue length. Queues are measured as the length of vehicles stopped at an approach of an intersection.

The image in Figure 58 shows a queue along Race Street eastbound at its intersection with 6th Street. The project team calculated the maximum queue length for each peak hour at each approach of each study intersection. The image in Figure 59 shows the maximum queues during the AM peak hour at 6th and Race. The white arrows show the available amount of storage for each queue, or the distance from the stop bar to the next signal. During the AM peak hour in the 2050 base scenario, the maximum queue on Race Street extends beyond the available storage. In Alternative B, the maximum queues for both 6th street southbound and Race Street eastbound are reduced from the base. For each Alternative, the team calculated the maximum queues that exceeded the storage and totaled the excess length. Overall, Alternatives A and C had more excess queing than the base scenario and Alternative B had slightly less.

Figure 58: Queue Length Measurement Example



Source: DVRPC, Nearmap, 2021

11. MAINTAINS OR IMPROVES EXISTING LEVEL OF VEHICLE DELAY

WHAT LOS IS

Level of Service (LOS) is a transportation engineering method used to quantify motor vehicle traffic conditions. The Highway Capacity Manual uses letter grades, "A" through "F," to describe vehicle congestion and average delay by turning movement, intersection approach, or entire intersections, as outlined in Table 14.

Agencies often base transportation and development decisions on their impact on LOS, with the intention of maintaining or improving the quality of life for residents and users of the local road network. However, traditional LOS does not paint the entire picture of mobility.

Table 14: Levels of Service for Signalized and Unsignalized Intersections

LOS	SIGNALIZED INTERSECTIONS DELAY (SECONDS)	UNSIGNALIZED INTERSECTIONS DELAY (SECONDS)	INTERPRETATION
A	10	0 - 10	Predictable and stable flow
B	> 10 - 20	> 10 - 15	
C	> 20 - 35	> 15 - 25	
D	> 35 - 55	> 25 - 35	Predictable but approaching unstable
E	> 55 - 80	> 35 - 50	Unstable and unpredictable
F	> 80	> 50	

Source: Transportation Research Board 2010

WHAT LOS IS NOT

Although it uses letter grades, LOS results should not be read like a report card. The goal in traffic operations is not to achieve an LOS of A, but to create conditions that maintain stable traffic flow that is typically achieved within the LOS range of A to C. An entire network of intersections with LOS of A during peak hours often points to a system designed for more capacity than necessary.

THE BIGGER PICTURE

Focusing solely on LOS centers the conversation around vehicle congestion, without considering relationships and conflicts with other modes and skewing recommendations away from designs that create truly complete streets. Transportation improvement projects should prioritize the movement of people and goods, not just the movement of vehicles.

A variety of methods exist for calculating an LOS-like measure for other modes, such as bikes, pedestrians, and transit, and for calculating combined Multimodal LOS (MMLOS) measures. However, it is difficult to quantify the quality of service for non-motorized modes, since the comfort, convenience, and safety of walking, biking, and using transit is often more subjective. Many of these methods require copious amounts of data that may not be reliably available or are not trusted to result in an apples-to-apples comparison between modes. Therefore, LOS should be considered as an important part of a larger picture of mobility, as it is used here, as just one evaluative criterion among many.

LOS AND VEHICLE DELAY

In the 2050 No-Action scenario during the AM peak hour, the intersection of 6th Street & Callowhill Street operates at failing levels of service. During the PM peak hour, the same intersection fails along with the intersection of 7th Street & Race Street. The average peak hour network delay was compared across alternatives. Network delay is the amount of time the average vehicle spends on the study area network not moving at free flow speeds. Typically, one would expect vehicles to experience some delay while traveling in the network, whether they are stopped at a signalized intersection or slowing down to complete a turn.

In the 2050 no-action scenario, vehicles are forecast to experience an average of about five minutes and eight minutes of delay while in the network during the AM and PM peak hours, respectively.

The average network delay for each alternative during both peak hours is shown in Table 15. Both Alternatives A and C result in an increase in expected delay, while the network delay was maintained in Alternative B.

Table 15: Estimated Average Network Delay (min/vehicle)

	BASE		ALTERNATIVE A		ALTERNATIVE B		ALTERNATIVE C	
Peak Hour	AM	PM	AM	PM	AM	PM	AM	PM
Network Delay	4.71	7.93	6.95	9.25	4.71	7.88	5.85	10.17
Average	6.32		8.1		6.295		8.01	
Difference from Base	-		1.78		-0.03		1.69	
Normalized Score	-		**-1.00**		**0.01**		**-0.95**	

12. ACHIEVES STUDY OBJECTIVES AT A LOW COST

Finally, the criteria with lowest ranked importance, which may or may not be realistic, is cost. For the purposes of this study, cost is a very general financial estimate, relative to the estimated cost of the other alternatives.

The most costly improvement element considered was the overhead access to the bridge via I-676, featured in Alternative B. While this would significantly decrease delay and enhance safety along 6th Street, it would involve expanding the overpass.

Another costly element analyzed was the direct access to the bridge at the intersection of the I-676 off-ramp and 6th Street, featured in Alternative A. This would include constructing a new ramp to the bridge and demolishing the existing 6th Street ramp.

Overall, the scenario with the lowest anticipated financial cost is Alternative C and the scenario with the highest financial anticipated cost is Alternative B. It is important to note that this financial cost estimate does not consider the social cost, or potential negative impacts to the surrounding community. Future studies should include additional community engagement efforts to provide a more thorough overall cost estimate.

CHAPTER 8

CONCLUSIONS AND NEXT STEPS

EVALUATION SUMMARY

Each alternative was evaluated using the 12 criteria described in Chapter 7. Table 16 summarizes the results by providing a relative comparison to the 2050 base/no-action alternative. Blue cells represent criteria where the alternative is forecast to perform more favorably than the no-action alternative, while orange cells represent criteria where the alternative is forecast to perform worse. The darker the color, the greater the difference from the no-action alternative. As evident by the cooler versus warmer colors in Table 16, Alternative B is forecast to greatly out-perform the other alternatives, including the no-action base alternative, with respect to the evaluation criteria selected and ranked by the steering committee.

Table 16: Evaluation Summary

EVALUATION CRITERIA	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
DESCRIPTION	STREET-LEVEL DIRECT CONNECTION	OVERHEAD BRIDGE	PEDESTRIAN CONNECTIONS
Reduces pedestrian exposure to vehicles while crossing.			
Includes roadway design features known to decrease crash risk or severity.			
Reduces the total number of conflict points in the study area.			
Addresses known vehicle safety issues related to geometry.			
Reduces accessible pedestrian travel times between attractions and amenities.			
Closes gaps in the bicycle network and/or increases the quality of existing bike facilities.			
Reduces the total number of vehicle merging maneuvers.			
Expands the footprint of park and open space facilities.			
Reduces mixing between local and interstate traffic.			
Improves queue lengths where existing queues spill back into upstream intersections.			
Maintains or improves existing level of vehicle delay.			
Achieves study objectives at a low cost.			

Worst	Worse	Same	Better	Best

NEXT STEPS

While the evaluation determined that Alternative B would help meet the most multimodal objectives identified by the steering committee, it is also estimated to be the most expensive alternative. This alternative also presents the most complexity and challenges to implement, as the ramps and roadways are controlled in different parts by PennDOT, the City of Philadelphia, and DRPA, as shown in Figure 19 on page 16. For a reconfiguration project of this magnitude and complexity to move forward, a broad group of these stakeholders, plus others, would need to work together to conduct an engineering study, identify the impact to cultural resources, determine feasibility and cost, and secure funding, which often takes many years even with broad community and political support.

As funding from the 2021 *Infrastructure Investment and Jobs Act* becomes available, stakeholders could pursue funding to advance some of the improvements explored in this study. In the near term, stakeholders can look towards smaller scale improvements suggested during the public engagement effort. The following improvements are also in line with the priorities identified by the steering committee:

- Improve pedestrian scale lighting along 6th Street under I-676 and in the 5th Street Bike/Ped tunnel;
- Remove cobblestones and replace sidewalk leading to Pedestrian Walkway;
- Implement speed reduction measures on all bridge approaches, including 6th, 5th, and Race Streets, to improve safety for pedestrians and bicyclists;
- Where appropriate, install intersection bumpouts to shorten pedestrian crossing distances; and
- Improve wayfinding signage for pedestrians and bicyclists traveling to the Pedestrian Walkway, Franklin Square, transit, and nearby historical amenities.

APPENDICES

A: PUBLIC ENGAGEMENT WEBMAP COMMENTS
B: STEERING COMMITTEE SURVEY RESULTS
C: MICROSIMULATION RESULTS

APPENDIX A

PUBLIC ENGAGEMENT WEBMAP COMMENTS

Table A-1: Issue Identification Comments from Public Engagement Webmap

TOPIC AREA	LOCATION	COMMENT
Pedestrian & Bicycle Safety	6th & Race	Bicyclists and pedestrians have difficulties crossing this intersection due to vehicle speeding, short intersection timing, long crossing distances and limited view of the traffic signal; Vehicle turning conflicts with bicyclists and pedestrians.
	6th & Race	No crosswalks at west and south.
	6th	Bicyclists use the sidewalk because cars park in the bike lane.
	6th	No sidewalk north of the I-676 off-ramp.
	5th St Tunnel Entrance	Potential hazard for bicyclists as cars turns right through the entrance of the slip street bike lane. Many ask for its removal.
	I-676 Ramp	Cars speed off of ramp, endangering pedestrian, bicyclists, users with different abilities, and other drivers.
	5th & Race	Pedestrians struggle to safely navigate this intersection because of speeding one-way traffic.
Bridge Access Points	6th & Race	No efficient and safe route from 6th and Race to the bridge.
	5th Ramp	Cobblestones on pedestrian path to the bridge walkway poses a bicycle and accessibility issue. Cars speed down the ramp leaving no space for bicyclists.
Wayfinding & Signage	6th & Race; 5th & Race	No clear signage indicating how cars, bicyclists and pedestrians can navigate to the bridge.
	5th	"Better signage for vehicles to navigate between Arch and Race Street would mitigate the number of vehicles abruptly changing lanes so that they don't enter the bridge."
Vehicle Merging Issue	5th, 6th, & Race Ramps	Cars struggle to merge on all bridge ramps.

TOPIC AREA	LOCATION	COMMENT
Access to Open Space & Walkway	Various	Participants would like less significant parks and green spaces (and other vacant, unused spaces like under the bridge) be better utilized and more accessible.
	Franklin Square	More direct and safe access from bridge walkway to park.
	Franklin Square	Commenters asked that when the Franklin Square PATCO Station opens that safe pedestrian connections are made between it and the bridge.
	Monument Plaza	There is no crosswalk to access to the plaza through 6th and Race and nowhere to sit at the plaza. One comment suggested turning it into a green space.
	Bridge walkway	Commenters asked that bridge walkway hours be extended and to open both the north and south walkways.
Tunnel & Underpass	5th	Bicyclists feel unsafe using the 5th Street Tunnel to pass the bridge with a lack of separation from cars.
	Pedestrian Tunnel	The tunnel is unclean, under lit, and has homeless encampment. Pedestrians exiting the tunnel are left disoriented and unable to navigate the area because much of the area is dominated by bridge vehicle traffic.
	I-676 Ramps	Underpass is unclean, under lit, and has homeless encampments. Comments cite aggressive panhandling.
Outside of Study Area	7th & Race	Drivers are confused merging at the forked entrance, which creates a dangerous environment for bike-ped users. Comments suggest removing one entrance.
	WB 5th Street Off-Ramp	This car-dominated area has too many lanes and ramps creating a hazardous environment for drivers and bike-ped users. Drivers have issues navigating such a sharp turn. Cars come off the ramp too quickly leading them to break abruptly and crash. The area also lacks bridge navigation signage.

Table A-2: Engagement Tool Functionality Feedback

TOPIC AREA	COMMENT
User Friendly	Combine the webmap, survey, website and video into one interface rather than having the user click through numerous links.
	Provide an option for users to access a street view of the site within the interface and clearer labeling on the webmap since most people are not familiar with the study area.
	While some users found the video informative and helpful in understanding the interface, others noted that the video was lengthy.
Tech	The ARCGIS interface glitched for some users, especially users who attempted to use the webmap on a mobile device.
Visibility	Commenters found it difficult to navigate the platform as user comments filled up the study area. Additionally, taking down the comments in batches makes it difficult to accurately gauge the overall consensus of the comments as well as live-count the comments. Some survey comments suggested allowing users different/filtered views where other comments are available.
	In addition to liking comments, one user suggested that comments are allowed to be upvoted in order to reduce repeat comments.
Readability	One commenter found categorizing issue types by fringe to be too much like planner jargon. The general public would be more receptive to comments categorized in a means they would relate.

APPENDIX B

STEERING COMMITTEE SURVEY RESULTS

Table B-1: Evaluation Criteria Ranking Results

IMPORTANCE	VERY LOW (1)	LOW (2)	MEDIUM (3)	HIGH (4)	VERY HIGH (5)	WEIGHTED AVERAGE
Reduces pedestrian exposure to vehicles while crossing.	0	0	0	7	10	4.59
Includes roadway design features known to decrease vehicle speeding and/or crash risk or severity.	0	0	2	5	10	4.47
Reduces the total number of conflict points in the study area (vehicle to vehicle, vehicle to pedestrian, vehicle to bike).	0	0	2	7	8	4.35
Addresses known vehicle safety issues related to geometry (e.g., sharp curves, sight lines).	0	1	2	7	7	4.18
Reduces pedestrian travel times between attractions and amenities (utilizing ADA-compliant sidewalk network).	1	1	2	6	7	4
Closes gaps in the bicycle network and/or increases the quality of existing bike facilities.	0	1	5	4	7	4
Reduces the total number of vehicle merging maneuvers.	0	1	3	10	3	3.88
Preferred by the public.	0	2	2	10	3	3.82
Supports the safe and efficient movement of heavy vehicles (buses and trucks).	0	1	7	7	2	3.59
Expands the footprint of park and open space facilities.	1	4	3	6	3	3.35
Reduces mixing between local and interstate traffic.	1	2	8	5	1	3.18
Improves queue lengths where existing queues spill back into upstream intersections.	2	3	8	4	0	2.82
Maintains or improves existing level of vehicle delay.	3	4	6	3	1	2.71
Achieves study objectives at a low cost.	2	7	7	1	0	2.41

Table B-2: Design Element Ranking Results

LEVEL OF INTEREST	VERY LOW (1)	LOW (2)	MEDIUM (3)	HIGH (4)	VERY HIGH (5)	WEIGHTED AVERAGE
Direct Connection (street level)	2	2	1	4	7	3.75
Close 5th Street channelized right turn lane	2	1	2	6	5	3.69
Reconfigure Franklin Street ramp as a signalized	1	2	5	4	4	3.5
Signalized pedestrian crossing on 6th Street	1	1	6	6	2	3.44
Remove Race Street ramp	1	3	6	3	3	3.25
Direct Connection (overhead bridge)	4	1	2	4	4	3.2
5th Street ramp realignment and signalization	3	0	7	4	2	3.13
Narrow 5th Street approaching the bridge	2	2	7	3	2	3.06
Make Franklin Street ramp bus only	3	3	3	5	2	3
5th Street ramp lower-cost realign-ment	1	3	7	5	0	3
Signalize 5th Street channelized right turn lane	2	3	7	4	0	2.81
Narrow Franklin Street ramp and add stop control	3	3	6	3	1	2.75

APPENDIX C

MICROSIMULATION RESULTS

Table C-1: 2050 No-Action Base Alternative LOS Results

	AM PEAK		PM PEAK	
INTERSECTION	DELAY (S)	LOS	DELAY (S)	LOS
7th Street & Race Street	40.9	D	123.4	F
6th Street & Callowhill Street	134.8	F	130.3	F
6th Street & Vine Street Exp Ramp	22.7	C	73.8	E
6th Street & 676 EB On-Ramp	5.5	A	9.1	A
6th Street & Race Street	51.4	D	62.9	E
6th Street & Arch Street	12.7	B	13.9	B
5th Street & Race Street	8.7	A	20.9	C
5th Street & Arch Street	21.3	C	25	C
4th Street & Race Street	23	C	15.1	C

Table C-2: Alternative A LOS Results

	AM PEAK			PM PEAK		
INTERSECTION	DELAY (S)	LOS	CHANGE (S)	DELAY (S)	LOS	CHANGE (S)
7th Street & Race Street	24	C	-16.9	58.4	E	-65
6th Street & Callowhill Street	172	F	37.2	172.7	F	42.4
6th Street & Vine Street Exp Ramp	131.7	F	109	118.5	F	44.7
6th Street & 676 EB On-Ramp	2	A	-3.5	16.9	B	7.8
6th Street & Race Street	19.5	B	-31.9	25.2	C	-37.7
6th Street & Arch Street	10.7	B	-2	15	B	1.1
5th Street & Race Street	11.4	B	2.7	18.7	B	-2.2
5th Street & Arch Street	56	E	34.7	70.6	E	45.6
4th Street & Race Street	23	C	0	24	C	8.9

Table C-3: Alternative B LOS Results

	AM PEAK			PM PEAK		
INTERSECTION	DELAY (S)	LOS	CHANGE (S)	DELAY (S)	LOS	CHANGE (S)
7th Street & Race Street	23.7	C	-17.2	151.3	F	27.9
6th Street & Callowhill Street	109.2	F	-25.6	89.5	F	-40.8
6th Street & Vine Street Exp Ramp	28.8	C	6.1	1.9	A	-71.9
6th Street & 676 EB On-Ramp	5.4	A	-0.1	14.2	B	5.1
6th Street & Race Street	21.9	C	-29.5	69.4	E	6.5
6th Street & Arch Street	11.4	B	-1.3	12.8	B	-1.1
5th Street & Race Street	16.1	B	7.4	23.7	C	2.8
5th Street & Arch Street	58.5	E	37.2	74.4	E	49.4
4th Street & Race Street	22.5	C	-0.5	23.4	C	8.3

Table C-4: Alternative C LOS Results

	AM PEAK			PM PEAK		
INTERSECTION	DELAY (S)	LOS	CHANGE (S)	DELAY (S)	LOS	CHANGE (S)
7th Street & Race Street	57.4	E	16.5	157.5	F	34.1
6th Street & Callowhill Street	133.7	F	-1.1	169.3	F	39
6th Street & Vine Street Exp Ramp	183.5	F	160.8	222.2	F	148.4
6th Street & 676 EB On-Ramp	48.1	D	42.6	47.6	D	38.5
6th Street & Race Street	73.9	E	22.5	85.4	F	22.5
6th Street & Arch Street	13.5	B	0.8	14.5	B	0.6
5th Street & Race Street	38	D	29.3	75.4	E	54.5
5th Street & Arch Street	21.4	C	0.1	65.2	E	40.2
4th Street & Race Street	19.6	B	-3.4	19	B	3.9

BEN FRANKLIN BRIDGE EASTBOUND ACCESS

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Ben Franklin Bridge, reconfiguration, multimodal access, Philadelphia, Franklin Square, Monument Plaza, public engagement

Abstract
The eastbound entrance to the Ben Franklin Bridge is surrounded by attractions and amenities for pedestrians, bicyclists, and transit riders. A newly completed ADA-compliant ramp on the Camden side of the bridge has improved accessibility for pedestrians and bicyclists of all ages and abilities to access the bridge. However, heavy traffic and a roadway design that is primarily vehicle-oriented continue to pose a barrier to multimodal bridge access on the Philadelphia side. The purpose of this study was to explore alternatives for roadway reconfiguration as well as other streetscape improvements to provide multimodal connections between Franklin Square Park, Monument Plaza, the bicycle and pedestrian bridge path, and upcoming or proposed facilities such as the Franklin Square PATCO station and Race Street bike lane.

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