

Walnut Street (from Front Street to 12th Street)

Overview

This corridor is approximately three-quarters of a mile long, providing one-way travel northbound on the east side of downtown Wilmington. The full length of corridor evaluated is maintained by DeIDOT. Land use along the corridor is mixed, with predominantly commercial and institutional uses throughout and residential uses concentrated at the northern end. On-street parking and loading/drop-off areas are intermittent through the corridor, with residential street parking in the north. Several schools and churches have building frontage and entrances along Walnut Street. Bus transit currently exists through this corridor, with approximately 10 routes using the southern end, but only one route serving the northern end at 12th Street. A significant roadway reconfiguration project is underway at the corridor's southern end, from Front Street to approximately 3rd Street.

According to DeIDOT's Vehicle Volume Summary website (https://www.deldot.gov/Publications/manuals/traffic_counts/index.shtml), average daily traffic volumes range from approximately 16,000 to 26,000 vehicles through this corridor; heavier traffic is concentrated around weekday morning and evening peak periods, with lower volumes outside of those times. Further study will need to be conducted to confirm the traffic implications of any of the concepts shown. The overall corridor map is shown on page 31.

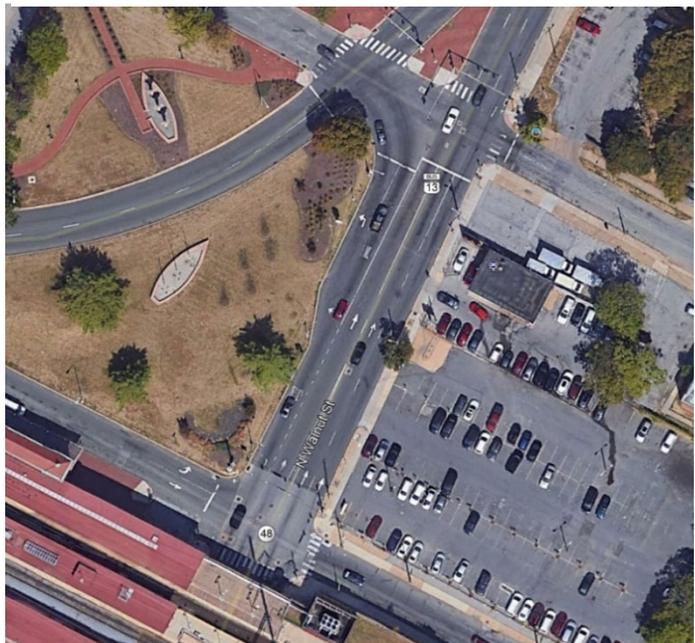
Corridor Concepts

Segment A: Front Street to 2nd Street

Walnut Street from Front Street to 2nd Street currently has three travel lanes and two left-turn lanes (shown in Figure 5). Construction is underway to modify the intersection of MLK Jr. Boulevard/Front Street with Walnut Street. Both the existing and under-construction typical sections are shown on page 32, along with an alternate buffered bike lane concept that could be implemented with slight modifications to the configuration under construction.

Option 1, shown on page 32, is for a buffered bike lane, which would require narrowing of the existing travel lanes.

FIGURE 5: EXISTING ROADWAY CONFIGURATION, WALNUT STREET SEGMENT A



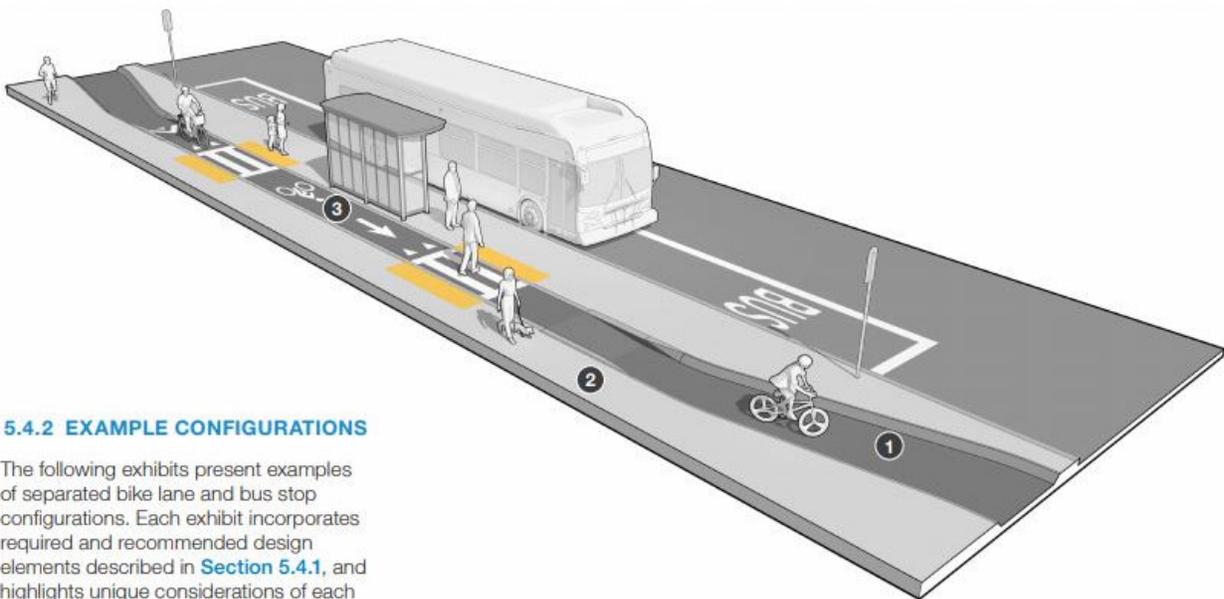
Segment B: 2nd Street to 4th Street

The current configuration of this segment consists of three 13-foot travel lanes with sidewalks on each side. To the left of the three travel lanes, two additional lanes merge from the MLK Jr. Boulevard “sweep,” eventually becoming a left-turn lane and an additional through lane approaching 4th Street. Modifications to the Walnut Street and MLK Jr. Boulevard intersections will impact part of this segment. The existing configuration is shown on page 33.

Concepts for this segment are shown on page 33; both include narrowing travel lanes to accommodate the proposed bicycle facilities.

A bus stop located along this segment would need to be factored into any modifications. The floating bus stop concept shown in Figure 6 offers an example of how a configuration might work with Option 1. The constrained bus stop shown in Figure 7 offers an idea for integrating transit and bicycle facilities under Option 2.

FIGURE 6: FLOATING BUS STOP EXAMPLE (MASSDOT SEPARATED BIKE LANE PLANNING AND DESIGN GUIDE)



5.4.2 EXAMPLE CONFIGURATIONS

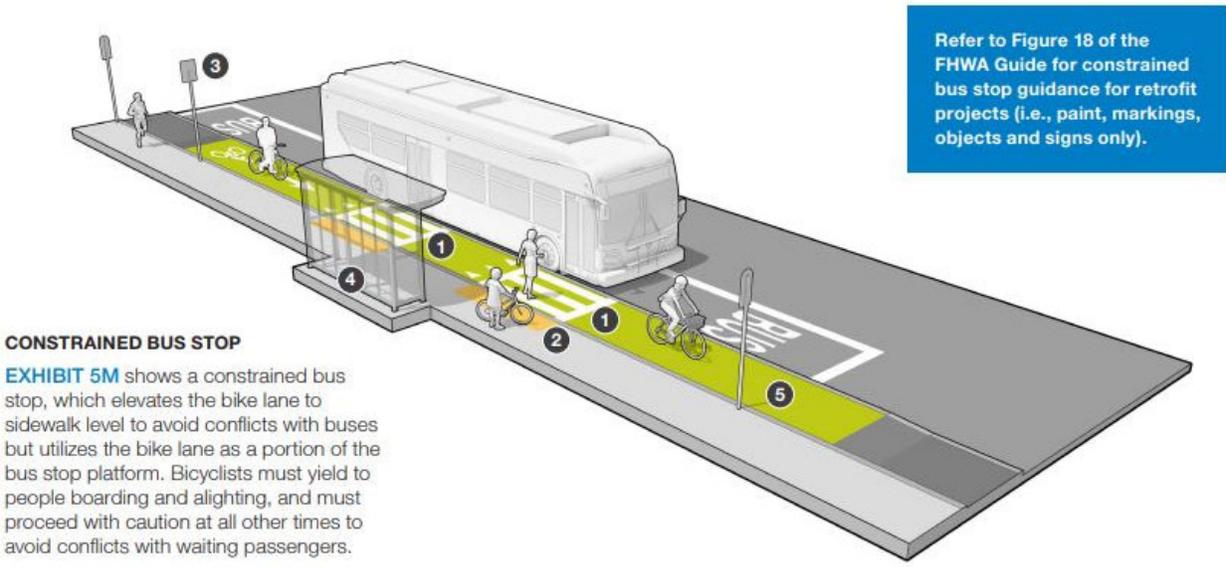
The following exhibits present examples of separated bike lane and bus stop configurations. Each exhibit incorporates required and recommended design elements described in [Section 5.4.1](#), and highlights unique considerations of each configuration.

FLOATING BUS STOP (MID-BLOCK)

EXHIBIT 5I shows a raised separated bike lane alongside a mid-block floating bus stop. This is a typical curbside stop located between parked motor vehicles, which minimizes traffic impacts by requiring the bus driver to pull into and out of the stop.

- Where street buffer is less than 8 ft., taper the bike lane to create space for the bus stop. **1**
- Maintain an appropriate sidewalk width, which is typically wider than the minimum pedestrian access route. **2**
- Consider railing or planters to channelize pedestrian access to and from busy bus stops.
- Narrow the bike lane along the bus stop to maintain an accessible sidewalk and bus stop in constrained areas. Where narrowed to 4 ft. (less than 5 ft. requires a design exception), elevate the bike lane to sidewalk level to minimize pedal strike risks on curbs. In the case of two-way facilities, a minimum width of 8 ft. should be used. **3**

FIGURE 7: CONSTRAINED BUS STOP EXAMPLE (*MASSDOT SEPARATED BIKE LANE PLANNING AND DESIGN GUIDE*)



Refer to Figure 18 of the FHWA Guide for constrained bus stop guidance for retrofit projects (i.e., paint, markings, objects and signs only).

CONSTRAINED BUS STOP

EXHIBIT 5M shows a constrained bus stop, which elevates the bike lane to sidewalk level to avoid conflicts with buses but utilizes the bike lane as a portion of the bus stop platform. Bicyclists must yield to people boarding and alighting, and must proceed with caution at all other times to avoid conflicts with waiting passengers.

Constrained bus stops should only be considered when the introduction of a floating bus stop would do one of the following:

- Create non-compliant elements of the public right-of-way according to the most recent accessibility standards.
- Narrow the sidewalk below an appropriate width given pedestrian volumes and context of the built environment.
- Narrow the bike lane below 4 ft. along the bus stop (less than 5 ft. requires a design exception).

Constrained bus stops require additional considerations:

- Place crosswalks with blended transitions at the boarding and alighting area and the rear door clear zone to align with bus doors. Coordinate with the local transit agency to identify vehicle type(s) anticipated to serve the stop. ①
- Provide combined bike lane and sidewalk width equal to at least 8 ft. to qualify as an accessible boarding and alighting area. ②
- Place DO NOT PASS WHEN BUS IS STOPPED sign in advance of the first pedestrian crossing a bicyclist approaches (i.e., the rear door clear zone). ③
- When included, place shelter and/or bench at the back of the sidewalk. ④
- Consider optional colored pavement within the constrained bike lane. ⑤

Segment C: 4th Street to 8th Street

The current configuration in this segment is three travel lanes plus a peak period travel / parking lane and a left-turn lane. Surrounding land uses through this segment are predominantly government and other institutions. The existing configuration is shown on page 34.

Two concepts for this segment have been developed. Both require removal of the peak period travel / off-peak period parking lane.

Option 1, shown on page 34, including a bike lane with a 5-foot buffer, does not retain any parking through the segment and does not require space outside the existing curb.

Option 2, shown on page 35, includes a parking-protected bike lane and would require extending the curb into the existing landscaped buffer on the west side of the street.

Segment D: 8th Street to 9th Street

This segment is currently composed of four 11.5-foot travel lanes, with the eastern curbside lane available for official government use/parking (shown on page 36).

The concept for addition of bicycle facilities is shown on page 36 and includes narrowing of travel lanes and removal of one travel lane, leaving space within the existing street for a parking-protected bike lane.

Segment E: 9th Street to 12th Street

This segment is made up of three travel lanes and a parking/drop-off lane on the east side, shown on page 37. Land use on the west side of the street is business/institutional and residential/mixed use on the east side.

The proposed concept for this segment is shown on page 37 and includes a parking-protected bike lane adjacent to the eastern sidewalk. This option would require removal of one travel lane.

WALNUT STREET CORRIDOR

KEY ISSUES

- AADT ranges from ~26,000 at Front Street, to ~16,000 at 12th Street; repurposing a travel lane or reducing widths through the corridor seems plausible
- Numerous adjacent land uses likely have unique needs (churches, government facilities, commercial/business, etc.)
- Reconstruction of intersections from Front to 3rd Street will likely be complete by 2020
- Parking/dropoff intermittent through corridor
- Residential uses toward north end; on-street parking likely important to adjacent property owners
- Transit on Walnut Street is commuter focused; heaviest in peak hours; 10+ bus routes on this corridor (only DART route 3 at 12th Street)



SEGMENTS

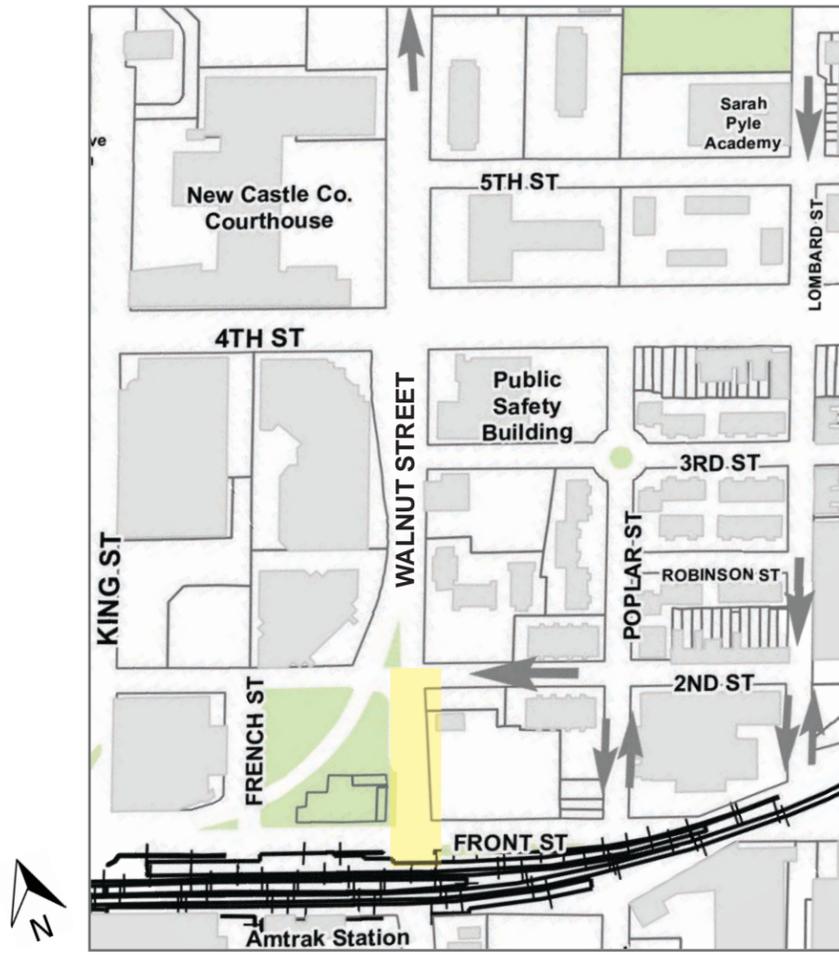
- A FRONT STREET TO 2ND STREET**
59' roadway width; three travel lanes and two left-turn lanes
- B 2ND STREET TO 4TH STREET**
39' roadway width; three travel lanes; one flex park/dropoff; bus stop; turn lanes/median and wide ROW approaching 4th Street
- C 4TH STREET TO 8TH STREET**
52' roadway width; three travel lanes; one flex park/dropoff
- D 8TH STREET TO 9TH STREET**
46' roadway width; four travel lanes; bus stop; underutilized ROW space
- E 9TH STREET TO 12TH STREET**
40' roadway width; three travel lanes; time specified parking and residential land use; bus stop; underutilized ROW space

LEGEND

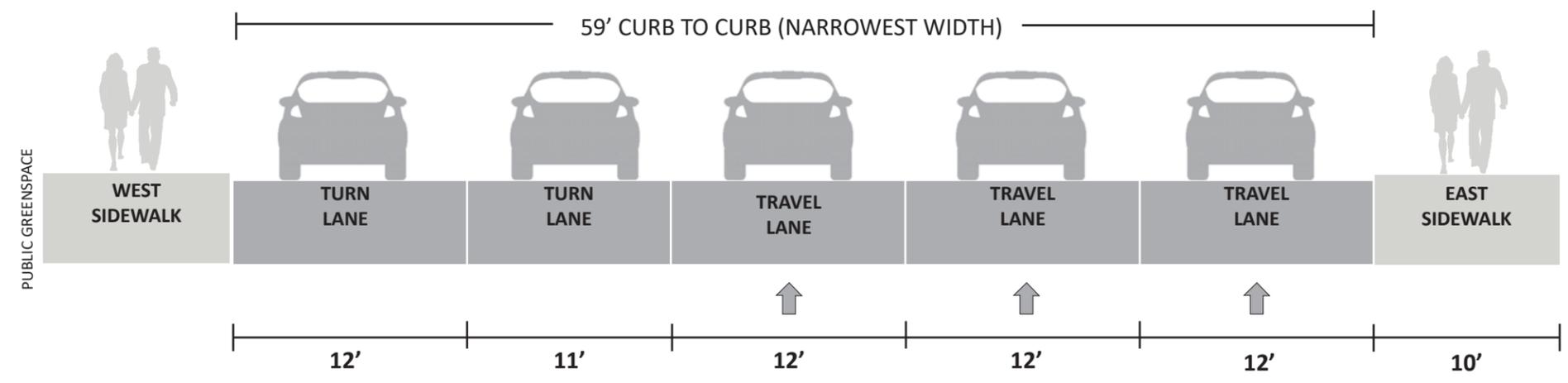
	EXISTING	PLANNED	PROPOSED
BIKE LANE			
PROTECTED/BUFFERED LANE	<i>None</i>		
BIKE-FRIENDLY STREET			
OFF-ROAD TRAIL			



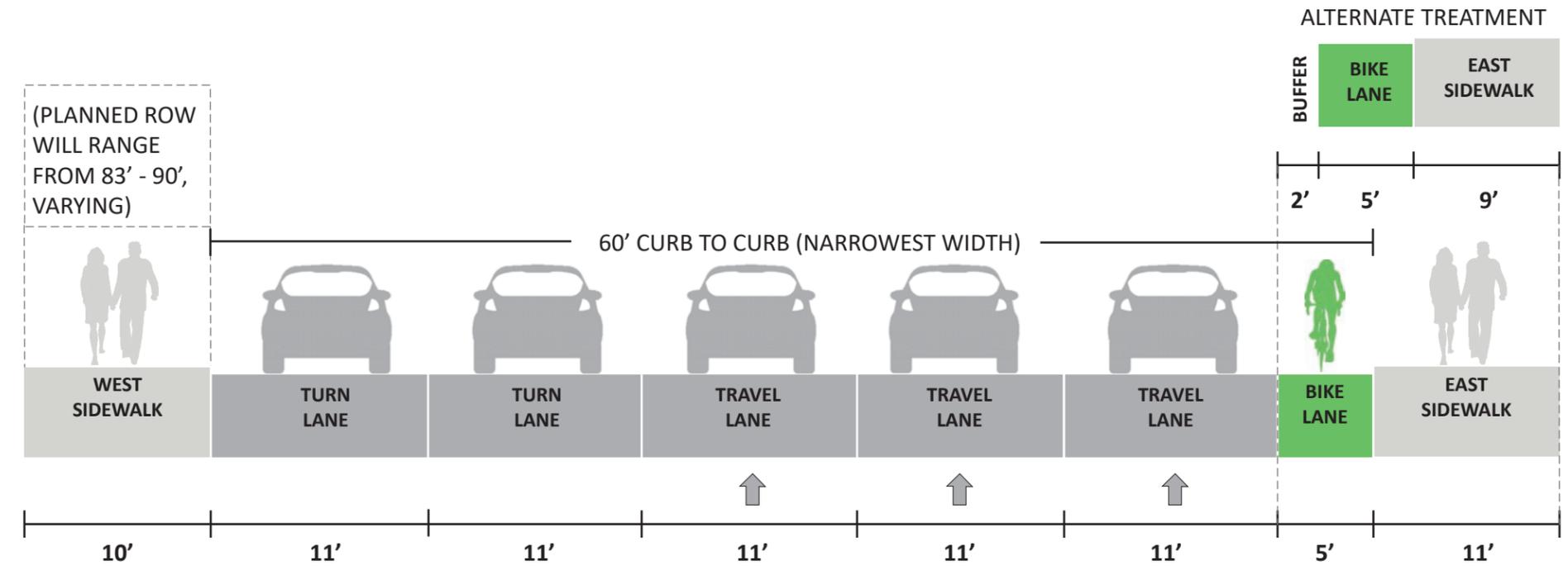
WALNUT STREET CORRIDOR | SEGMENT A - FRONT STREET TO 2ND STREET



EXISTING

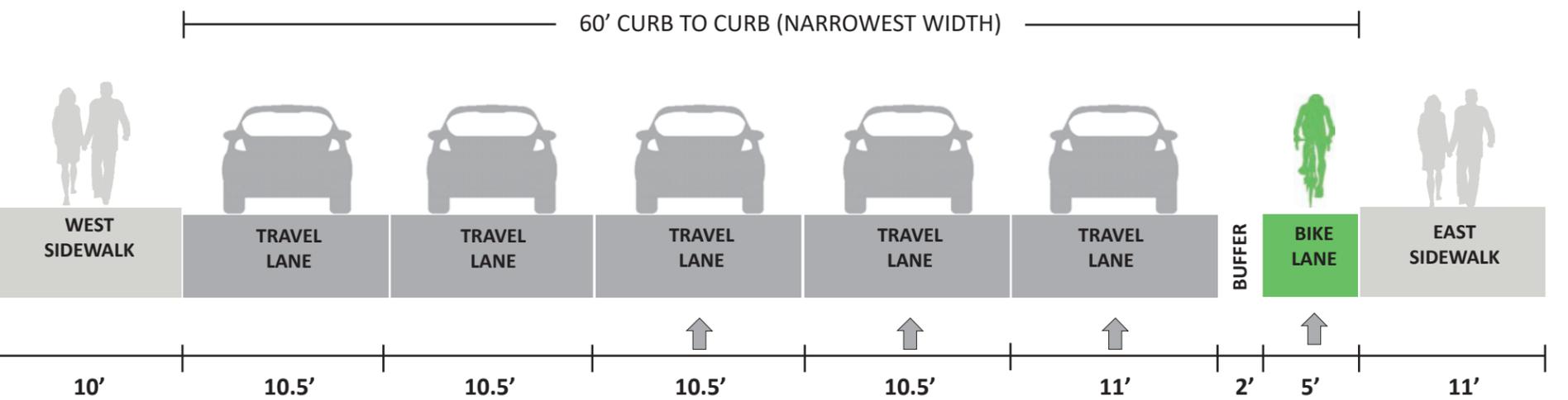


IN PROGRESS*



*After planned modifications (likely complete by 2020)

OPTION 1*

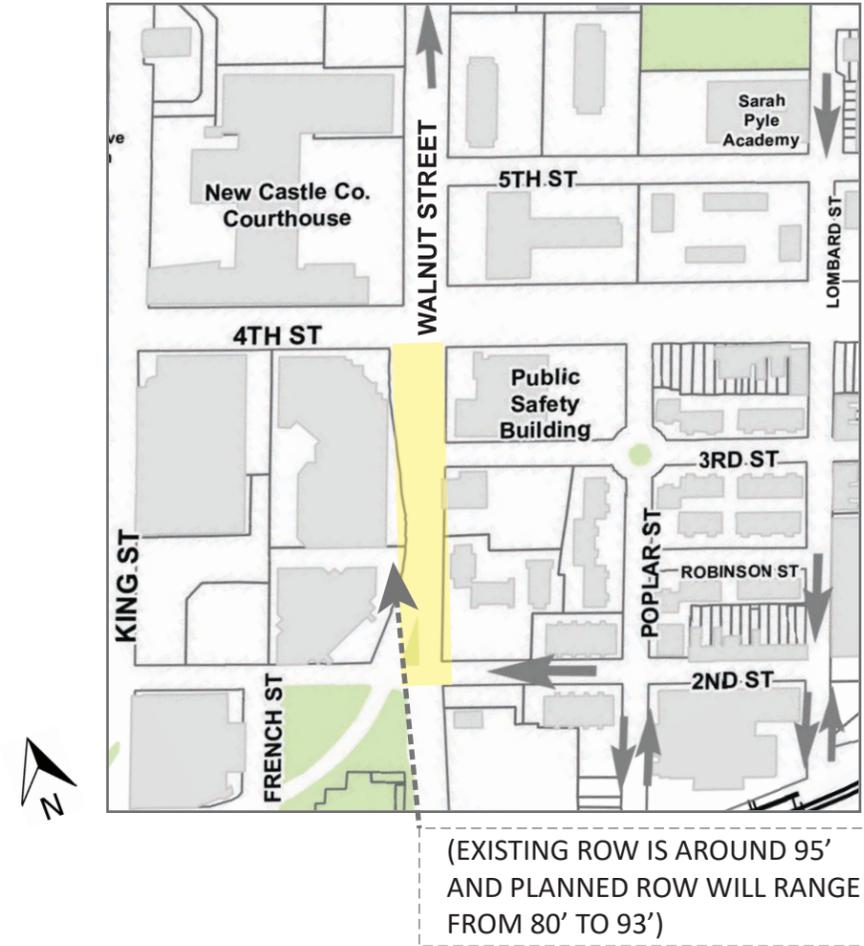


*After planned modifications complete - Reduce width of travel lanes to accommodate buffer.

ANTICIPATED IMPACT (RELATIVE TO EXISTING)

	IMPACT TO SIDEWALK / CURB	ADDITIONAL STREETSCAPE AMENITIES	REMOVAL OF PARKING	PROTECTED BICYCLE FACILITY	TRAVEL LANE REMOVAL
IN PROGRESS	NO	NO	NA	NO	NO
OPTION 1	NO	NO	NA	NO	NO

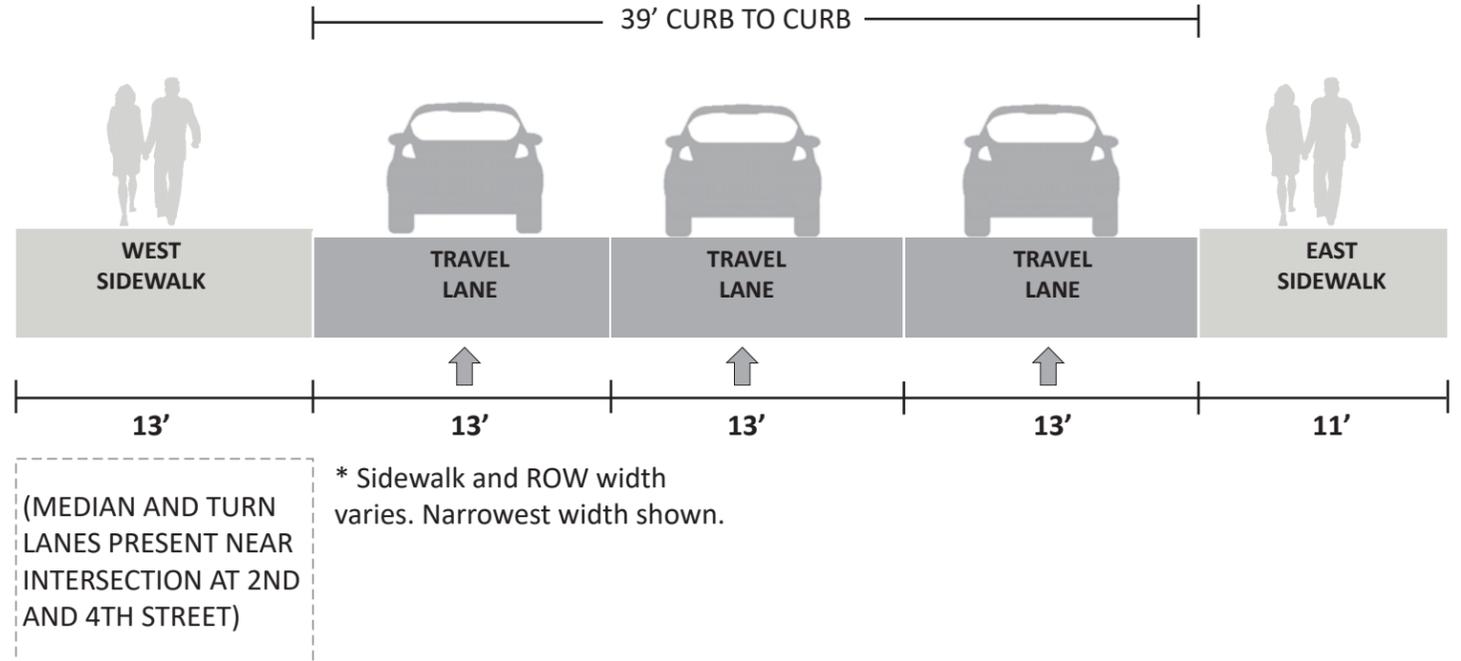
WALNUT STREET CORRIDOR | SEGMENT B - 2ND STREET TO 4TH STREET



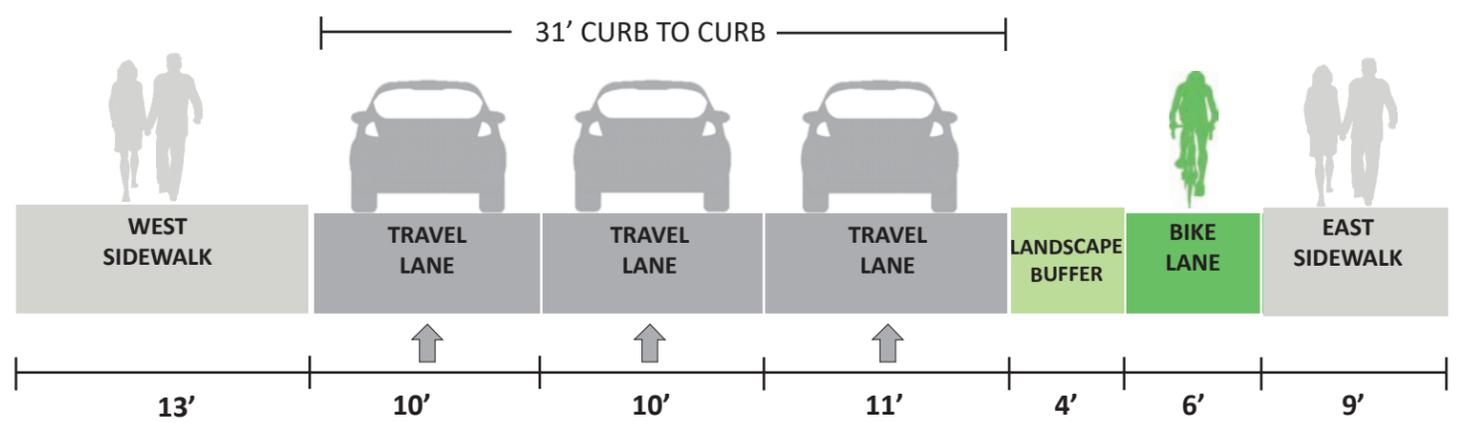
ANTICIPATED IMPACT (RELATIVE TO EXISTING)

	IMPACT TO SIDEWALK / CURB	ADDITIONAL STREETSCAPE AMENITIES	REMOVAL OF PARKING	PROTECTED BICYCLE FACILITY	TRAVEL LANE REMOVAL
OPTION 1	YES	YES	NA	YES	NO
OPTION 2	NO	NO	NA	NO	NO

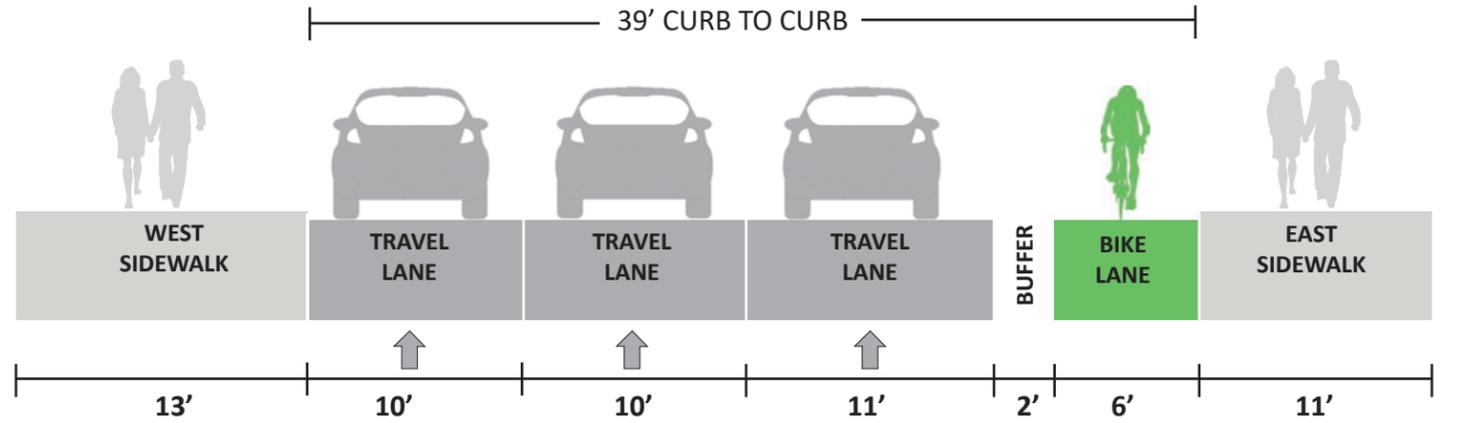
EXISTING*



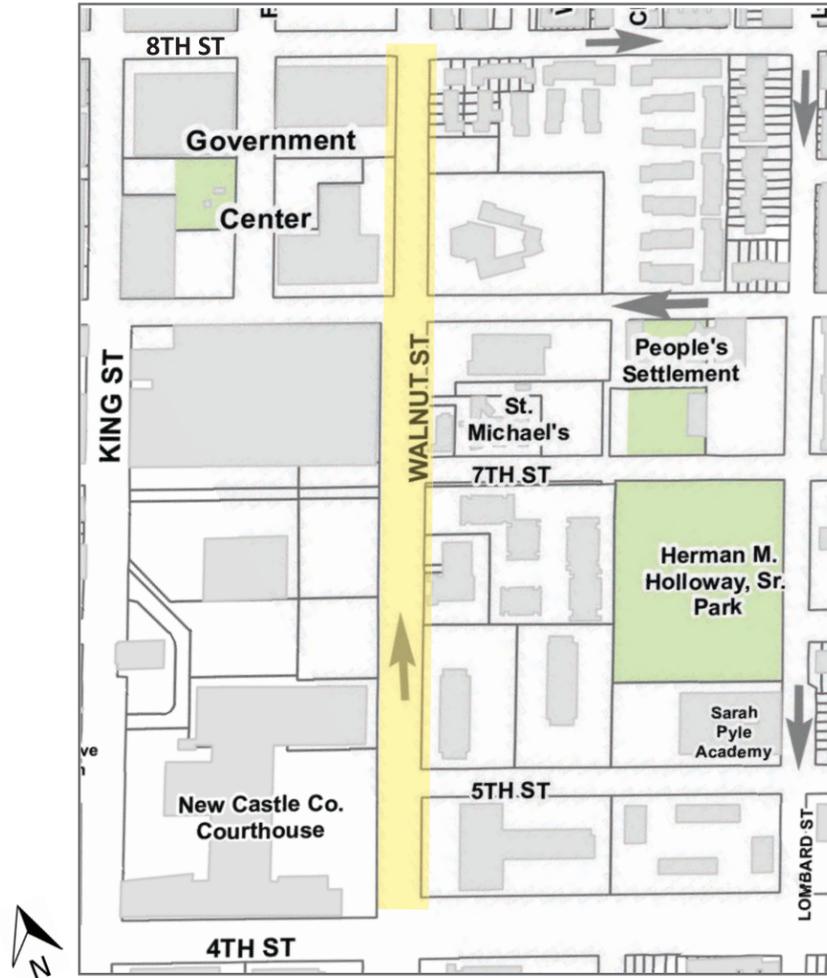
OPTION 1



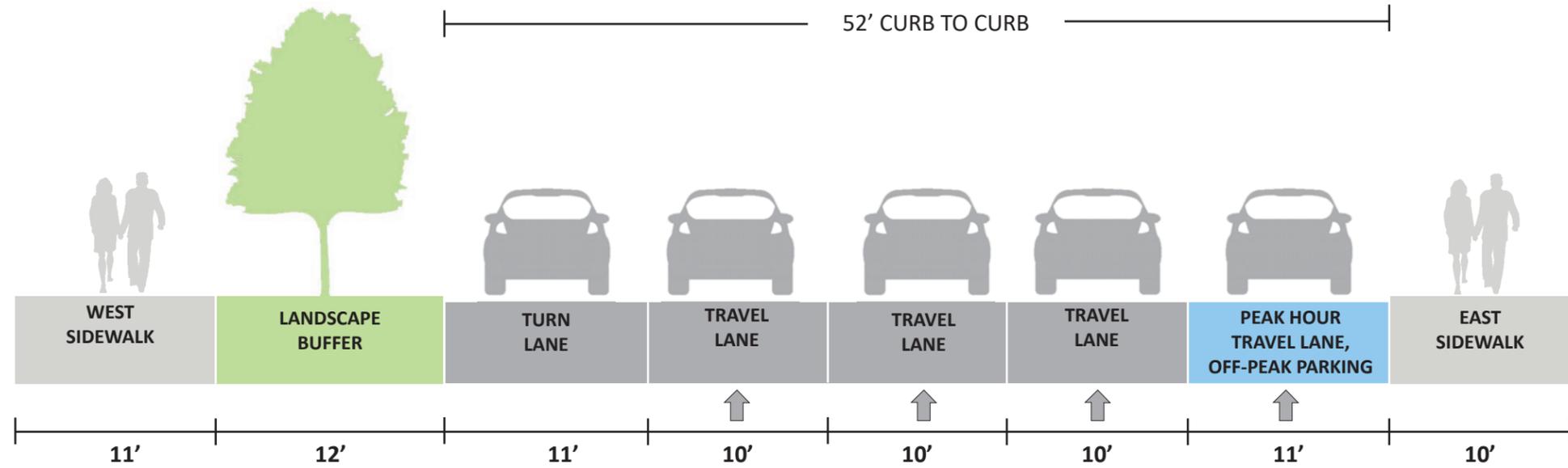
OPTION 2



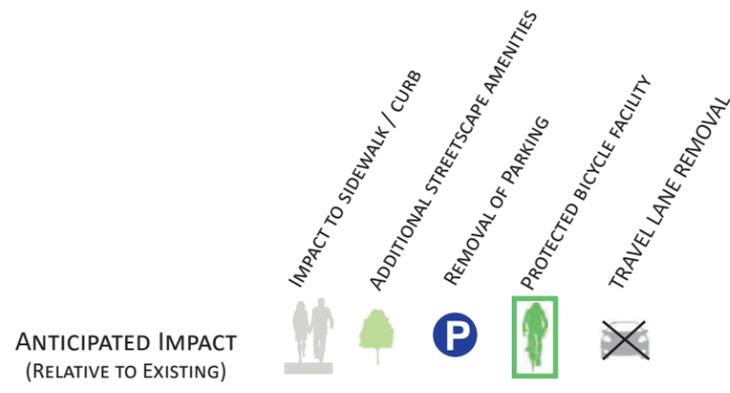
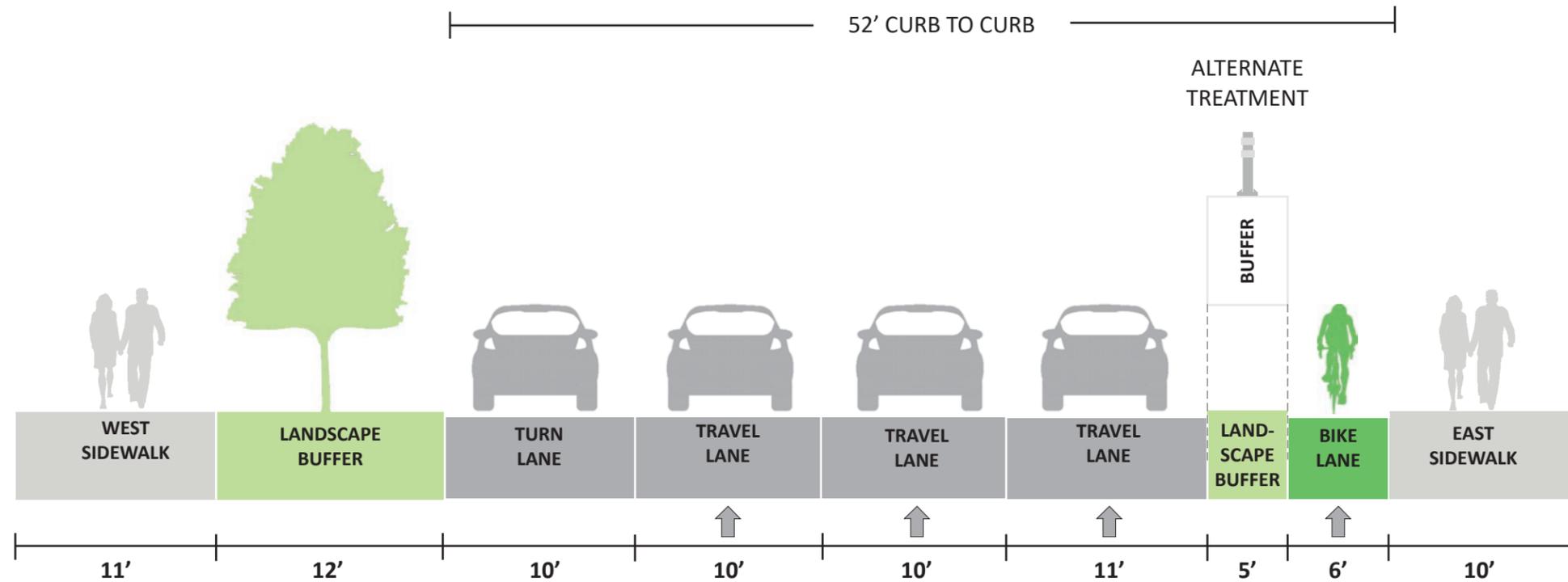
WALNUT STREET CORRIDOR | SEGMENT C - 4TH STREET TO 8TH STREET



EXISTING



OPTION 1

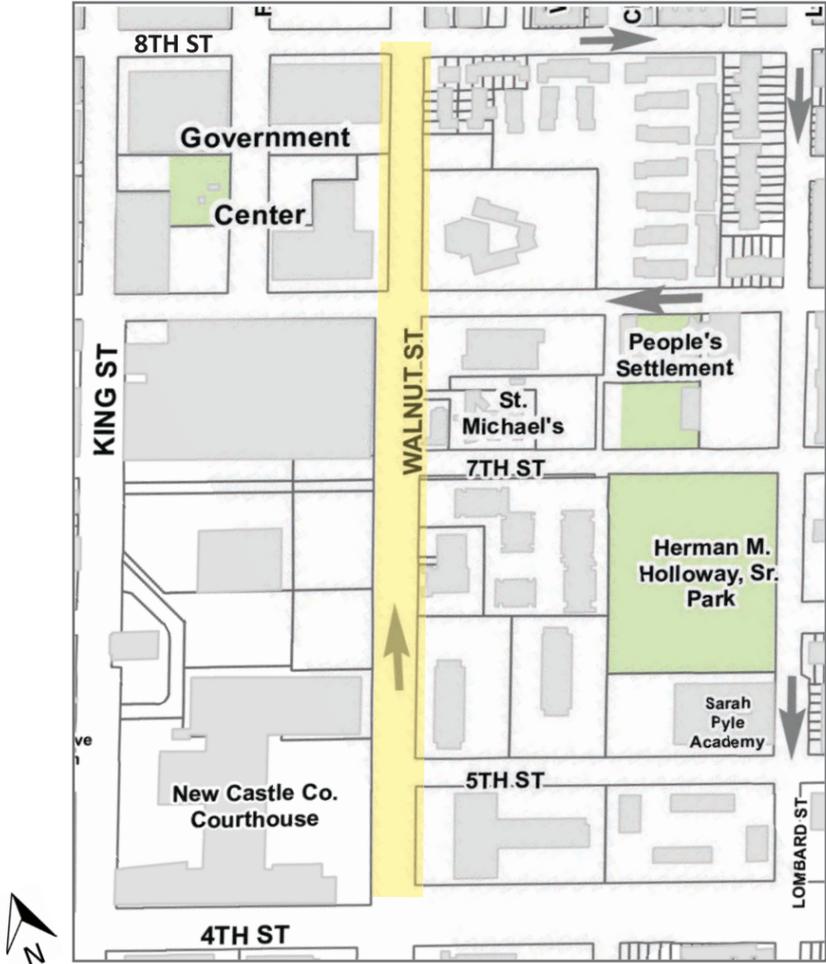


OPTION 1 NO YES YES* YES YES*

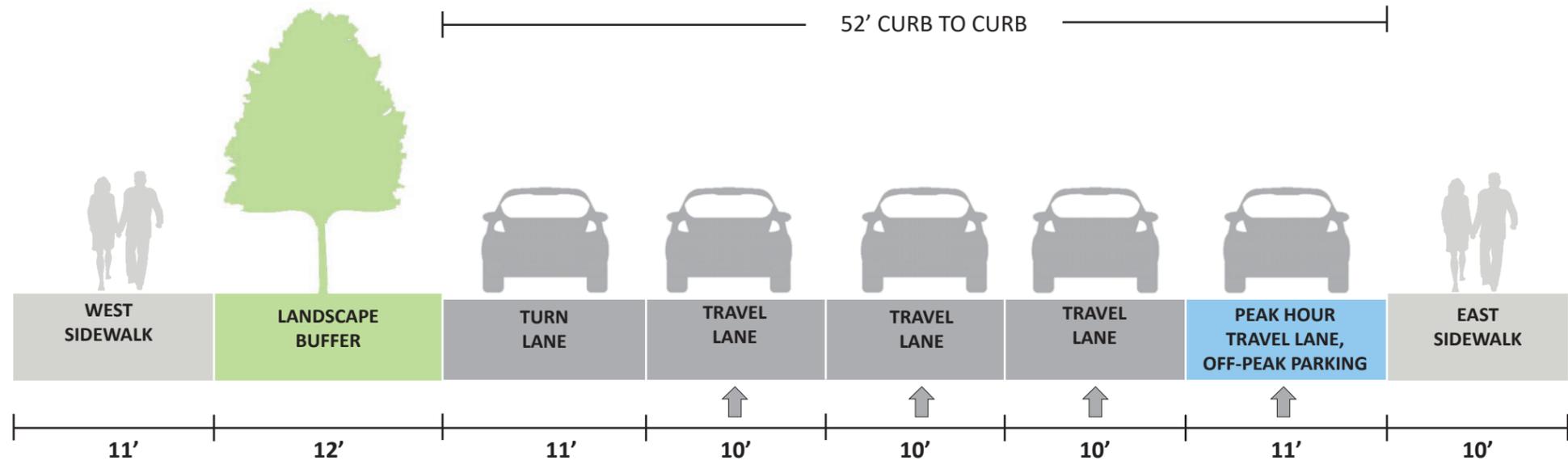
*Removal of peak hour travel lane, off-peak parking

-Two-stage turn recommended for travel from northbound Walnut to westbound 8th Street.

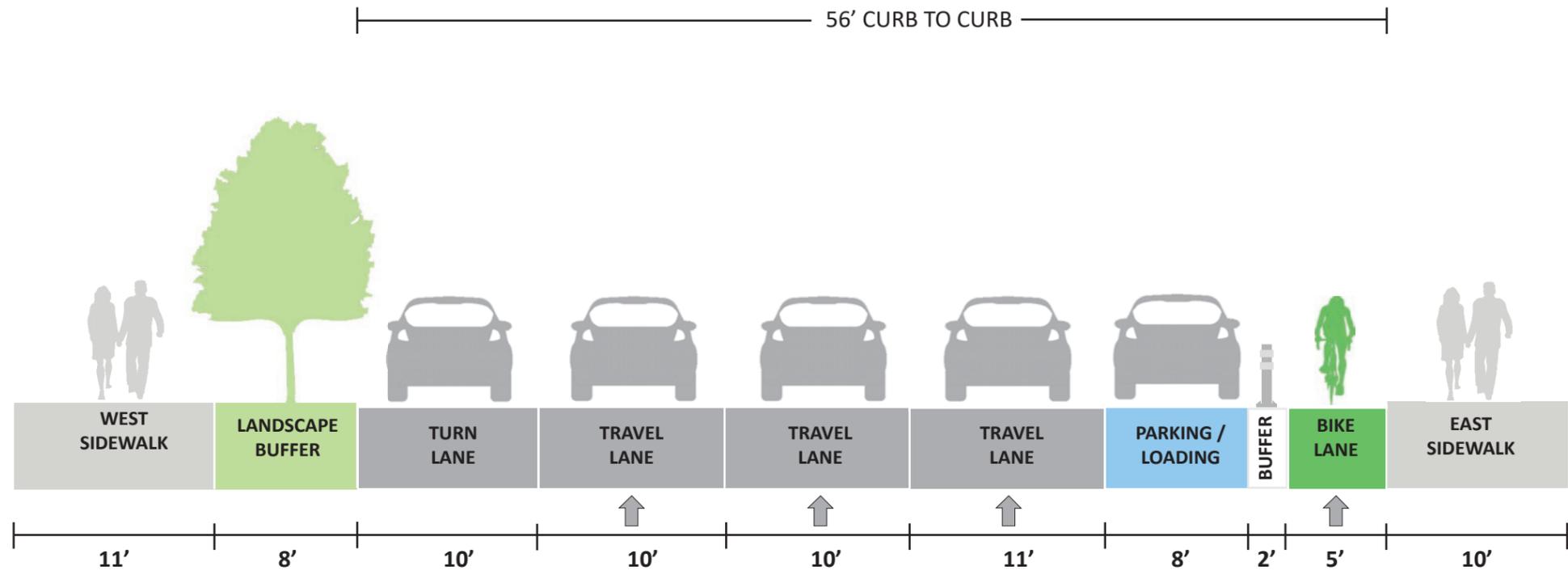
WALNUT STREET CORRIDOR | SEGMENT C - 4TH STREET TO 8TH STREET



EXISTING



OPTION 2*



ANTICIPATED IMPACT (RELATIVE TO EXISTING)

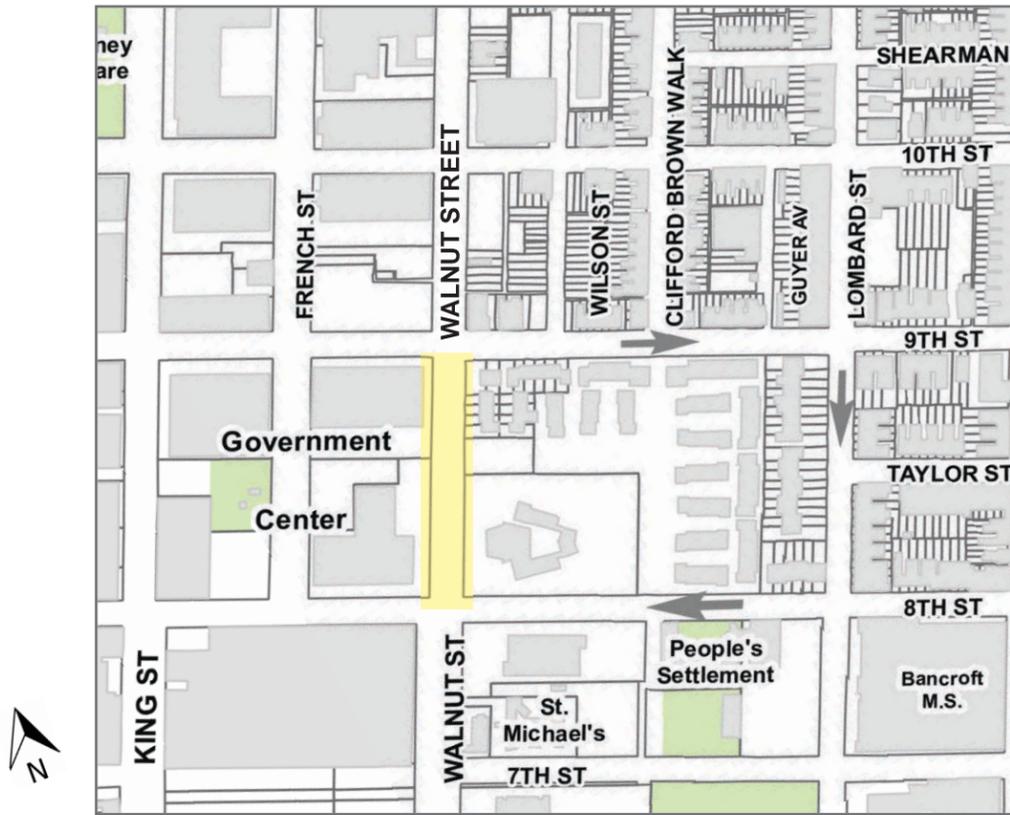
	IMPACT TO SIDEWALK / CURB	ADDITIONAL STREETSCAPE AMENITIES	REMOVAL OF PARKING	PROTECTED BICYCLE FACILITY	TRAVEL LANE REMOVAL
OPTION 1	YES	NO	NO	YES	YES*

*Removal of peak hour travel lane, off-peak parking

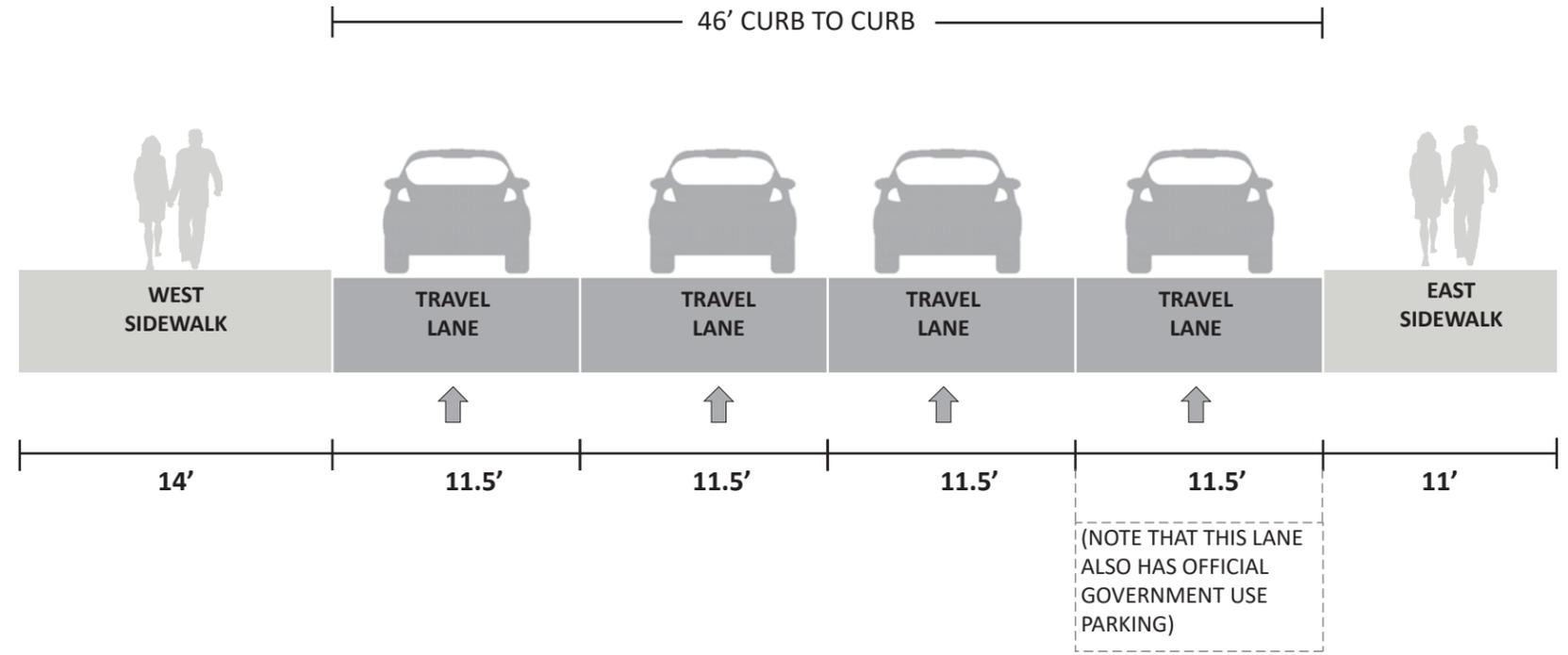
- Two-stage turn recommended for travel from northbound Walnut to westbound 8th Street.

*Alternative treatment: preserve existing width of landscape buffer and removal of travel lane

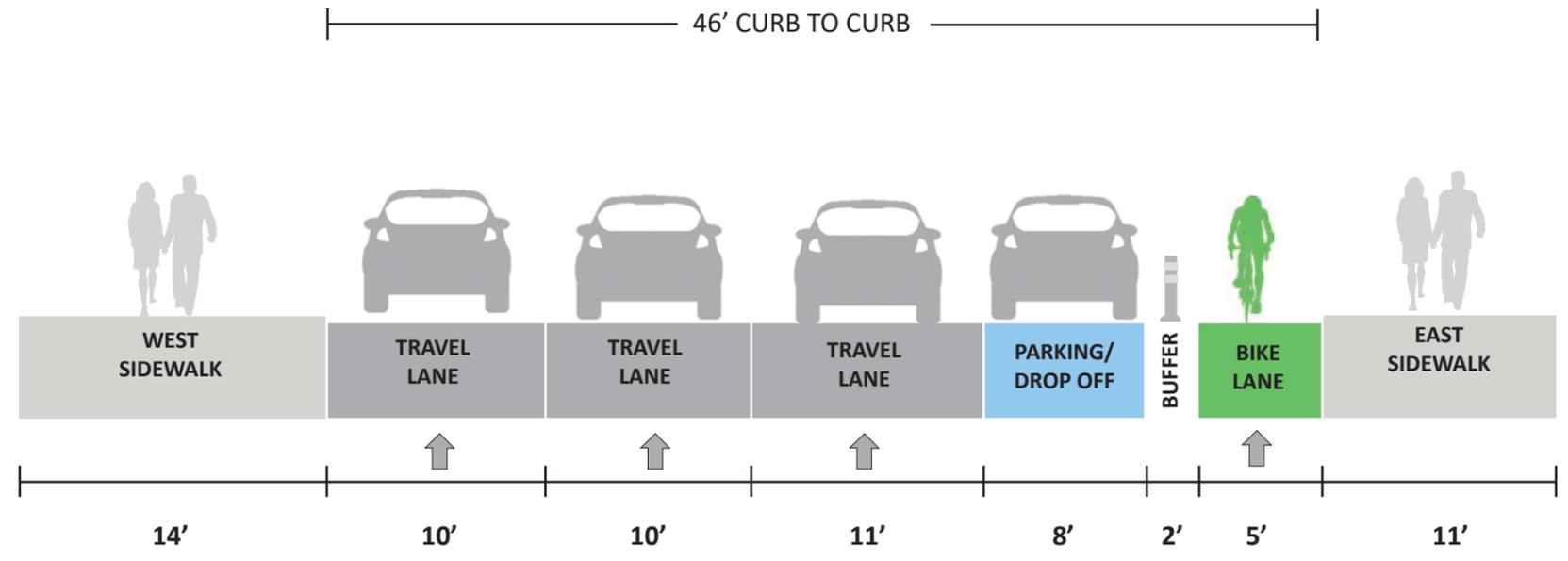
WALNUT STREET CORRIDOR | SEGMENT D - 8TH STREET TO 9TH STREET



EXISTING



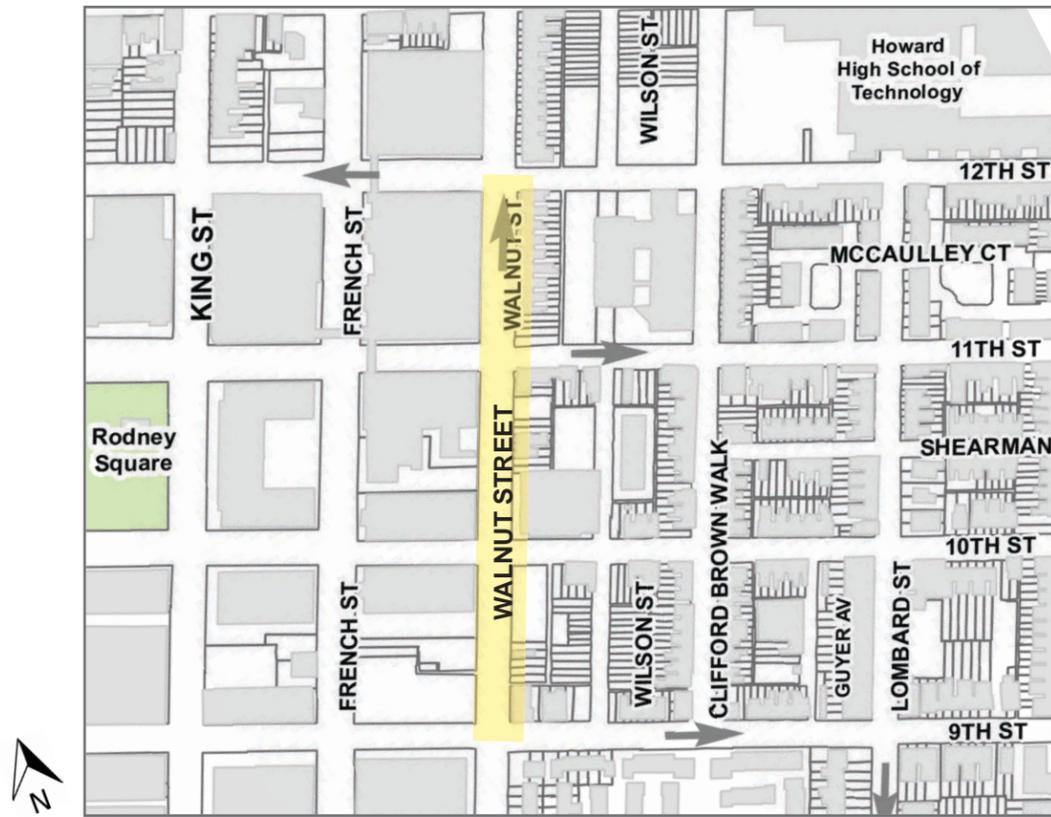
OPTION 1



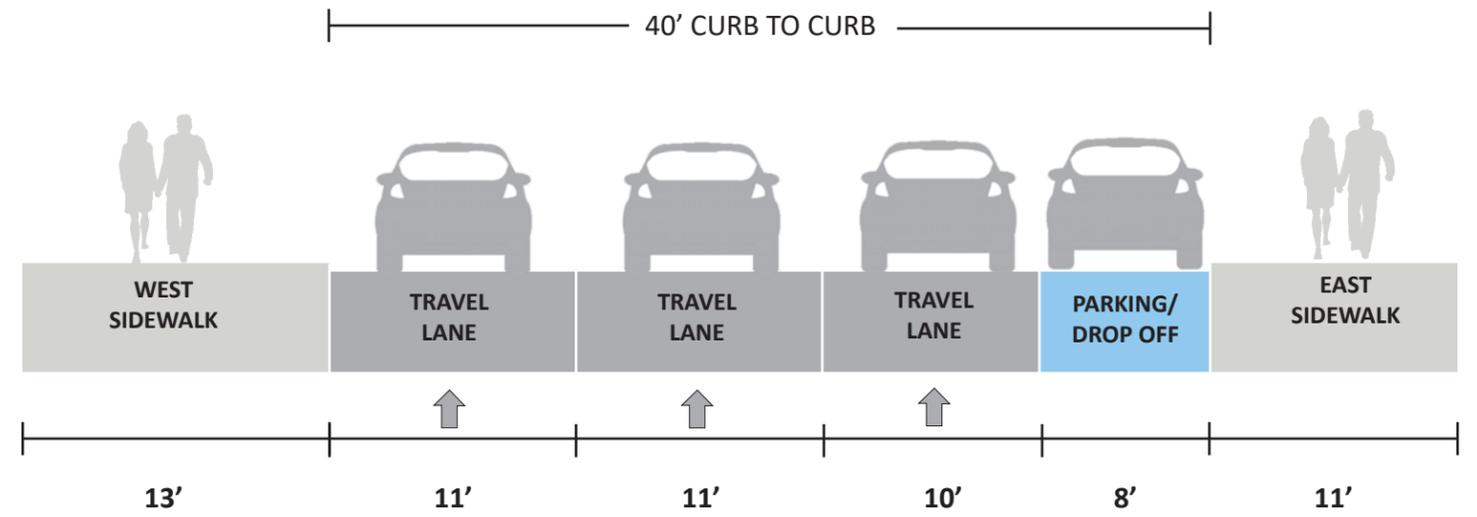
ANTICIPATED IMPACT (RELATIVE TO EXISTING)	IMPACT TO SIDEWALK / CURB	ADDITIONAL STREETSCAPE AMENITIES	REMOVAL OF PARKING	PROTECTED BICYCLE FACILITY	TRAVEL LANE REMOVAL
OPTION 1	NO	NO	NO	YES	YES*

*Removal of peak hour travel lane, off-peak parking

WALNUT STREET CORRIDOR | SEGMENT E - 9TH STREET TO 12TH STREET



EXISTING

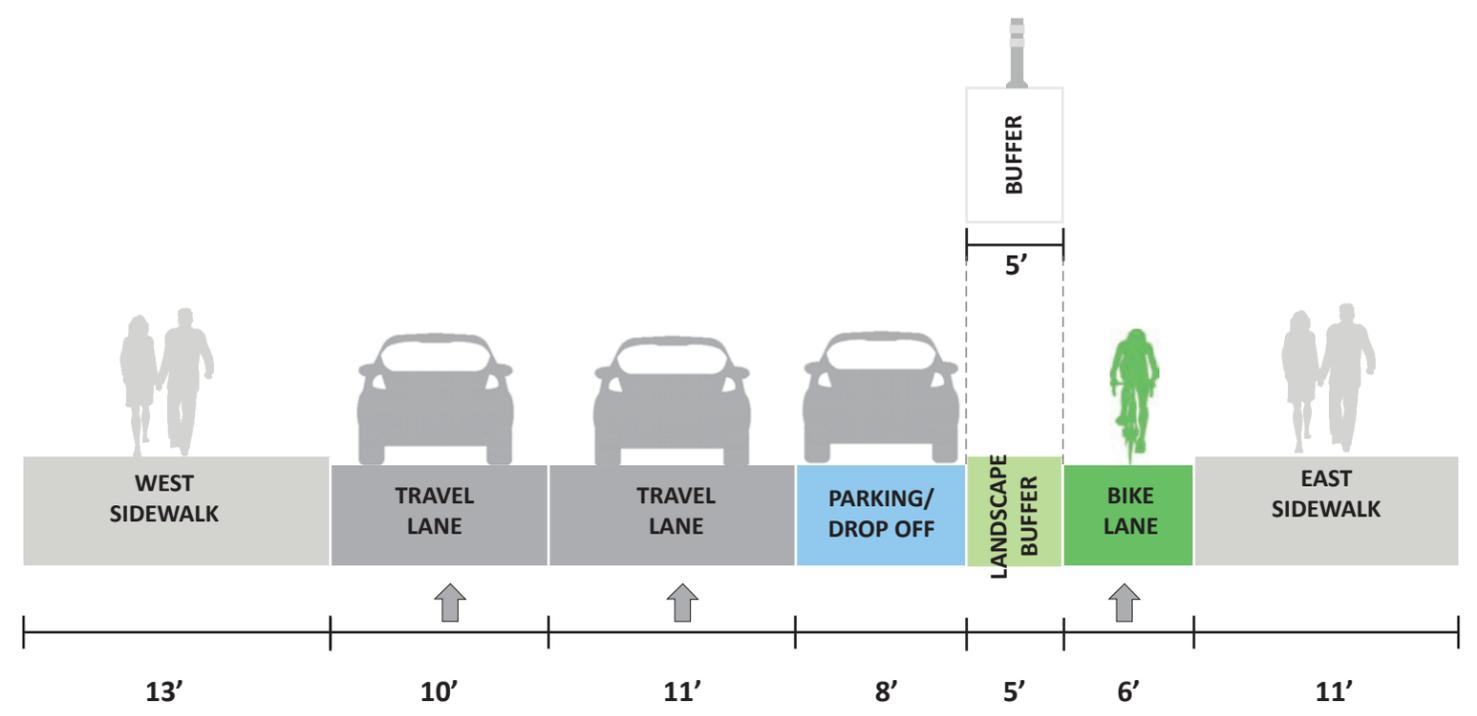


ANTICIPATED IMPACT (RELATIVE TO EXISTING)

OPTION 1	IMPACT TO SIDEWALK / CURB	ADDITIONAL STREETSCAPE AMENITIES	REMOVAL OF PARKING	PROTECTED BICYCLE FACILITY	TRAVEL LANE REMOVAL
OPTION 1	NO	NO	NO	YES	YES

OPTION 1

ALTERNATE TREATMENT



12th Street (from Walnut Street to Delaware Avenue)

Overview

This corridor is located along the northeast side of downtown Wilmington, between the Midtown Brandywine and Trinity Vicinity neighborhoods. It is approximately three-quarters of a mile long, with one-way traffic flow heading west/northwest. The length of corridor evaluated is a DelDOT maintained street. Land use along the corridor is mixed, with predominantly commercial and institutional uses. On-street parking and loading/drop-off areas are intermittent through the corridor, though few buildings have entrances directly onto 12th Street. Bus transit exists through this corridor, though there are only three stops along its length. Portions of this corridor nearest I-95 were considered in the *Wilmington Downtown Circulation Study* (2011) and general recommendations were made for accommodation of pedestrians and bicyclists. However, heavier traffic in this corridor occurs during weekday morning and evening peak periods, especially near the intersection with I-95, which will likely present the greatest constraints. Further study will need to be conducted to confirm the traffic implications of these concepts. The overall corridor map is shown on page 41.

Corridor Concepts

Segment A: Walnut Street to Bassett Street

This segment has three westbound travel lanes with one peak hour travel lane/drop-off lane on the north side. The surrounding area has parking garages and other on-street parking on nearby streets, which may suggest removal of parking on the corridor may be merited with further study and buy-in from stakeholders. The existing configuration is depicted on page 42.

Two options have been developed for this segment, which would maintain on-street parking. Option 1 reduces travel lane widths and places a 6-foot bike lane between the northernmost travel lane and parking. Option 2 reduces travel lane widths and creates a parking-protected bike lane. A third option (called Option 1, Phase 2) would be a protected bike lane with a landscaped buffer. This option would likely be more challenging to implement, requiring reduction in travel lane widths and parking removal. All options are shown on page 42.

Segment B: Bassett Street to Orange Street

Public transit uses this segment of the corridor and there is a bus stop near the corner of 12th Street and Orange Street. The street has three westbound travel lanes with one peak hour travel lane/drop-off lane on the north side. The existing configuration is shown on page 43.

Two concepts that would accommodate bicycles and buses are shown on page 43. Both would involve movement of the curb and narrowing of the travel lanes. Option 1 is composed of a buffered bike lane between the northernmost travel lane and a bus stop pull off. Option 2 places a bus stop adjacent to the northernmost travel lane, with a bike lane provided between the bus stop and sidewalk.

Segment C: Orange Street to Washington Street

This segment has three westbound travel lanes with one peak hour travel lane/drop-off lane on the north side, which is the same as segments A and B. The existing configuration is shown on page 44.

Two options have been developed for this segment, which would maintain on-street parking. Option 1 reduces travel lane widths and places a 6-foot bike lane between the northernmost travel lane and parking. Option 2 reduces travel lane widths and creates a parking-protected bike lane. A third option would be a bike lane between the northernmost travel lane and extension of the sidewalk for street furniture, landscaping, or stormwater management elements from at least West Street to Washington Street. This option would require reduction in travel lane widths and parking removal, but would provide enhancements for adjacent businesses and residential neighborhoods and could enhance the overall character and aesthetics of this area. All options are shown on page 44.

Segment D: Washington Street to Jefferson Street

This short segment is adjacent to the Central YMCA surface parking lot on the south and the Wilmington Hospital parking garage on the north. The street has four travel lanes totaling 45 feet between curbs. A well-used bus shelter is located on the north side next to the garage.

The proposed concept for this segment would require narrowing of travel lanes and removal of one lane. The sidewalk space would be widened to 14 feet to serve as a shared use trail, serving two-way bicycle travel as well as people walking. The transit shelter would be moved curbside. This configuration is shown on page 45 and would need to be coordinated with segment E for continuity and connectivity.

Segment E: Jefferson Street to Adams Street

Beyond Jefferson Street, the roadway continues as four travel lanes, as in segment D. No transit stops exist in this segment. The existing configuration is shown on page 46.

Two concepts, which would require movement of the curb, have been developed for this segment. They are shown on page 46.

Option 1 would maintain four travel lanes and place a westbound bike lane between a solid barrier (similar to what is currently located adjacent to the sidewalk through this segment) and the sidewalk. This option would require relocating utilities.

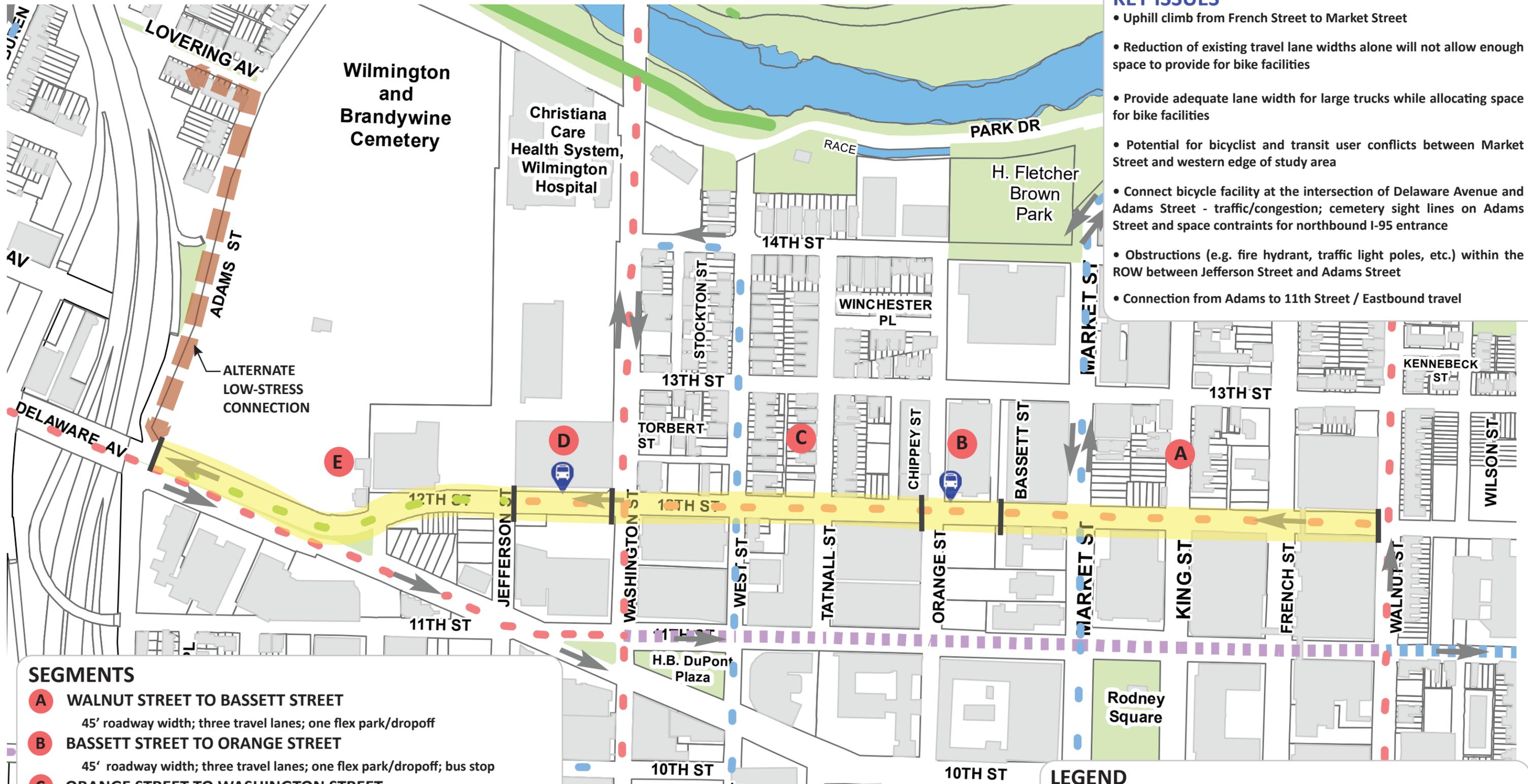
Option 2 would transform the sidewalk on the north side into a shared use trail, serving two-way bicycle travel as well as people walking. This option would require removal of one travel lane and relocation of utilities. Figure 8 illustrates how this facility could look.

For either option, a two-way bicycle facility along Adams Street heading north to Lovering Avenue could be considered to connect with the Pennsylvania/Delaware corridor concepts presented earlier in this document.

FIGURE 8: EXISTING (TOP) AND PROPOSED (BOTTOM) CONFIGURATION FOR BICYCLE FACILITY ON 12TH STREET, SEGMENT E, AT ADAMS STREET LOOKING EAST



12TH STREET CORRIDOR



- ### KEY ISSUES
- Uphill climb from French Street to Market Street
 - Reduction of existing travel lane widths alone will not allow enough space to provide for bike facilities
 - Provide adequate lane width for large trucks while allocating space for bike facilities
 - Potential for bicyclist and transit user conflicts between Market Street and western edge of study area
 - Connect bicycle facility at the intersection of Delaware Avenue and Adams Street - traffic/congestion; cemetery sight lines on Adams Street and space constraints for northbound I-95 entrance
 - Obstructions (e.g. fire hydrant, traffic light poles, etc.) within the ROW between Jefferson Street and Adams Street
 - Connection from Adams to 11th Street / Eastbound travel

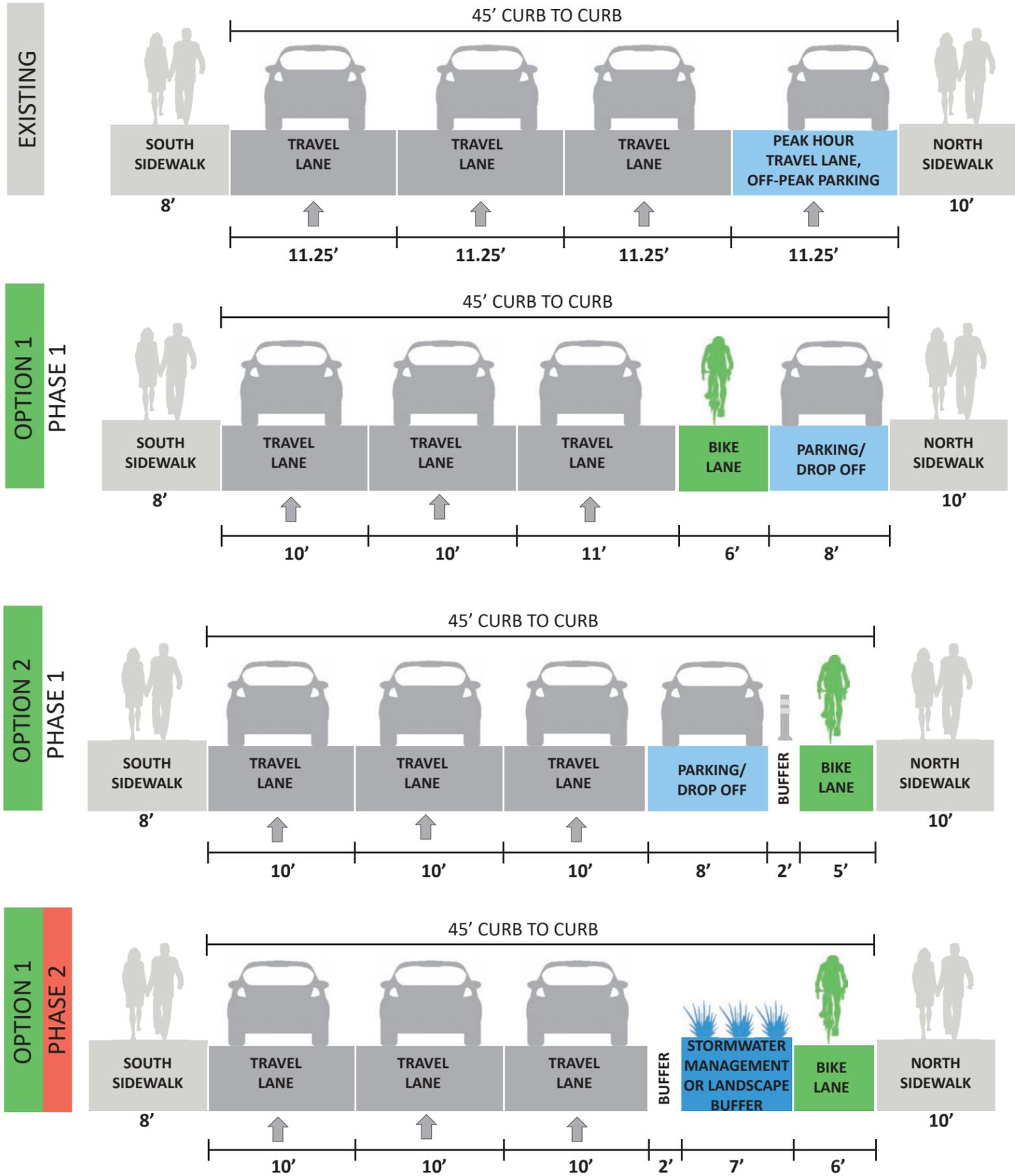
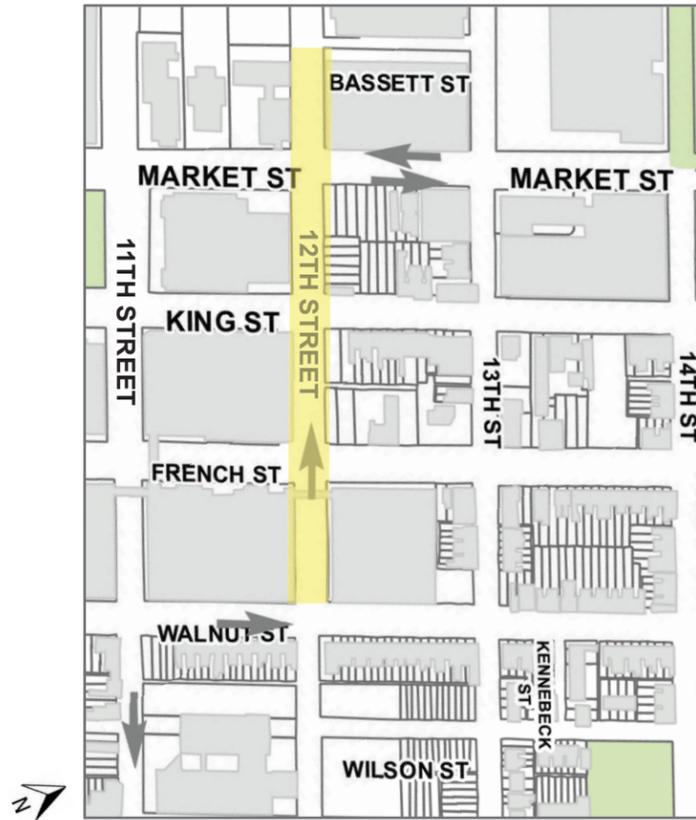
SEGMENTS

- A** WALNUT STREET TO BASSETT STREET
45' roadway width; three travel lanes; one flex park/dropoff
- B** BASSETT STREET TO ORANGE STREET
45' roadway width; three travel lanes; one flex park/dropoff; bus stop
- C** ORANGE STREET TO WASHINGTON STREET
45' roadway width; three travel lanes; one flex park/dropoff
- D** WASHINGTON STREET TO JEFFERSON STREET
45' roadway width; four travel lanes; bus stop
- E** JEFFERSON STREET TO ADAMS STREET
45' roadway width; four travel lanes

LEGEND

	EXISTING	PLANNED	PROPOSED
BIKE LANE			
PROTECTED/BUFFERED LANE	None		
BIKE-FRIENDLY STREET			
OFF-ROAD TRAIL			

12TH STREET CORRIDOR | SEGMENT A - WALNUT STREET TO BASSETT STREET

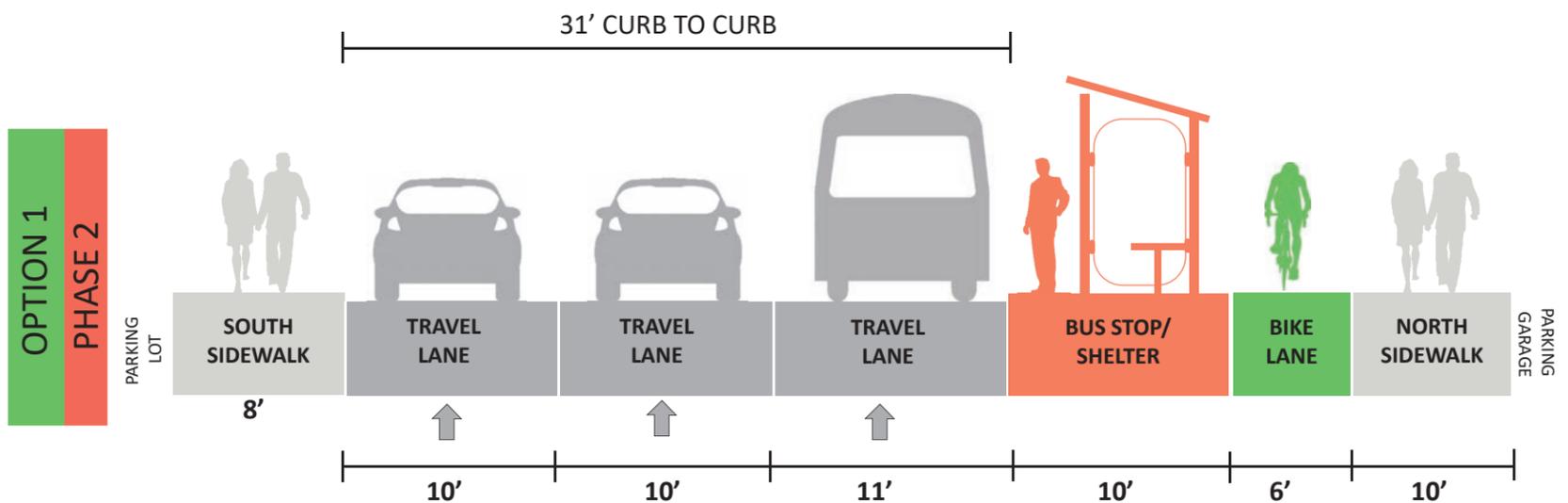
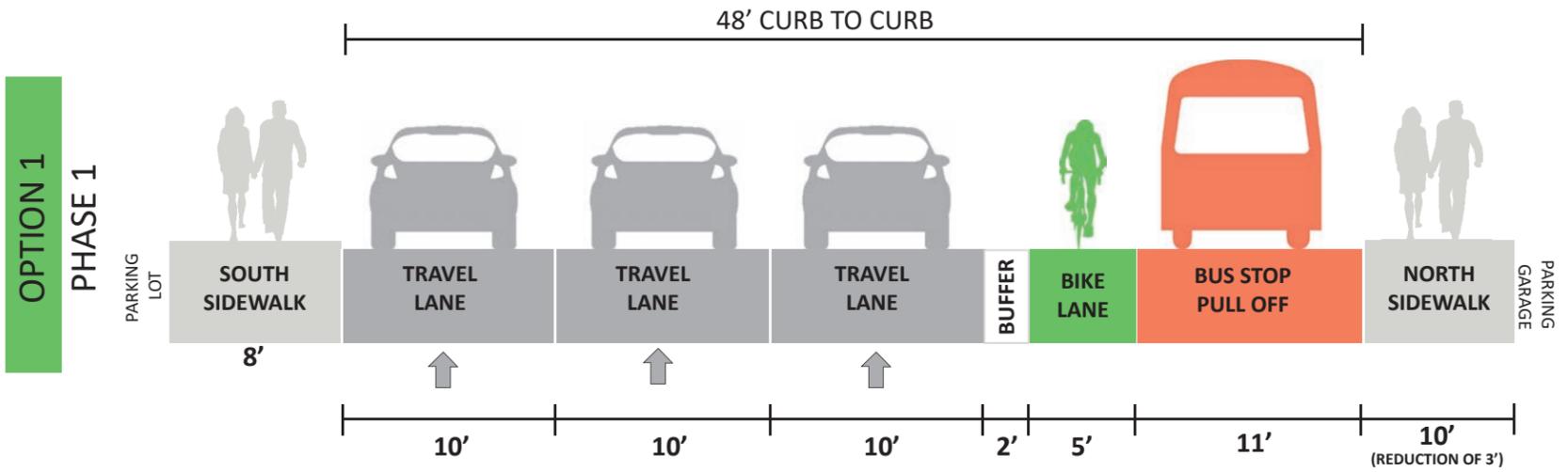
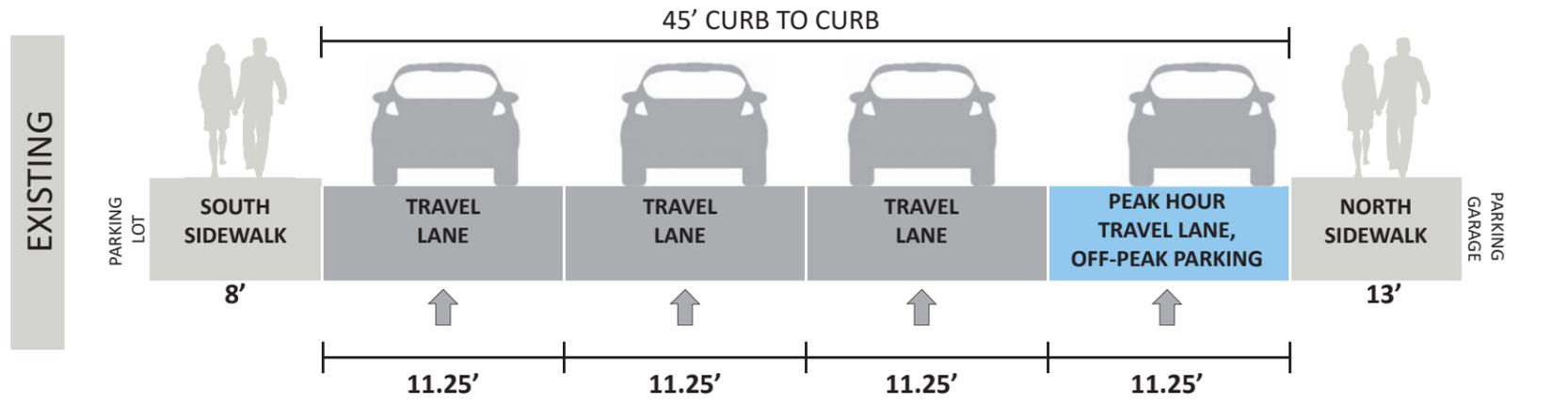
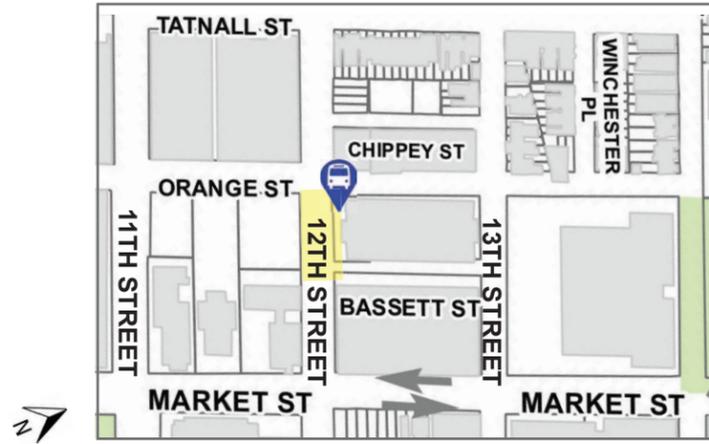


ANTICIPATED IMPACT (RELATIVE TO EXISTING)

	IMPACT TO SIDEWALK / CURB	ADDITIONAL STREETSCAPE AMENITIES	REMOVAL OF PARKING	PROTECTED BICYCLE FACILITY	TRAVEL LANE REMOVAL
PHASE 1, OPTION 1	NO	NO	NO	NO	YES*
PHASE 1, OPTION 2	NO	NO	NO	YES	YES*
PHASE 2, OPTION 1	NO	YES	YES*	YES	YES*

*Removal of peak hour travel lane, off-peak parking

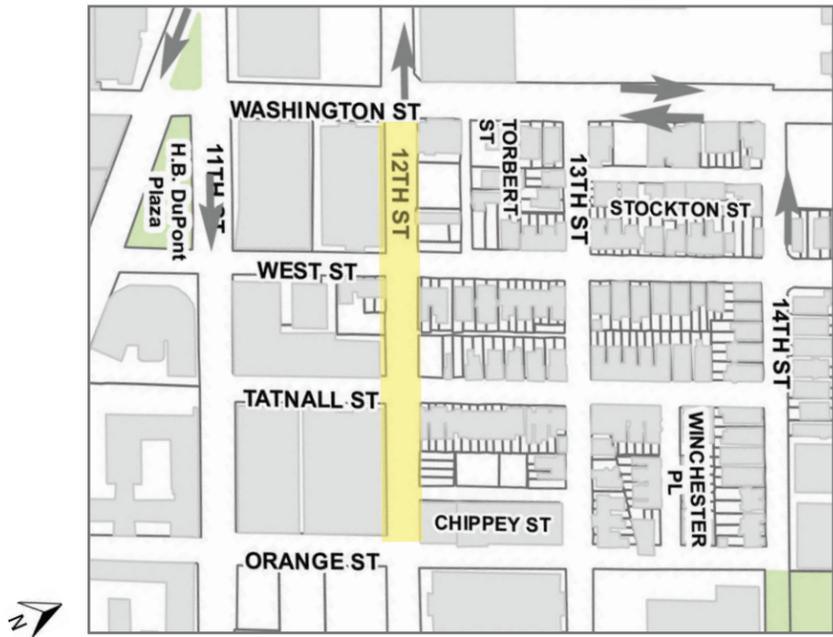
12TH STREET CORRIDOR | SEGMENT B - BASSETT STREET TO ORANGE STREET - BUS STOP AREA



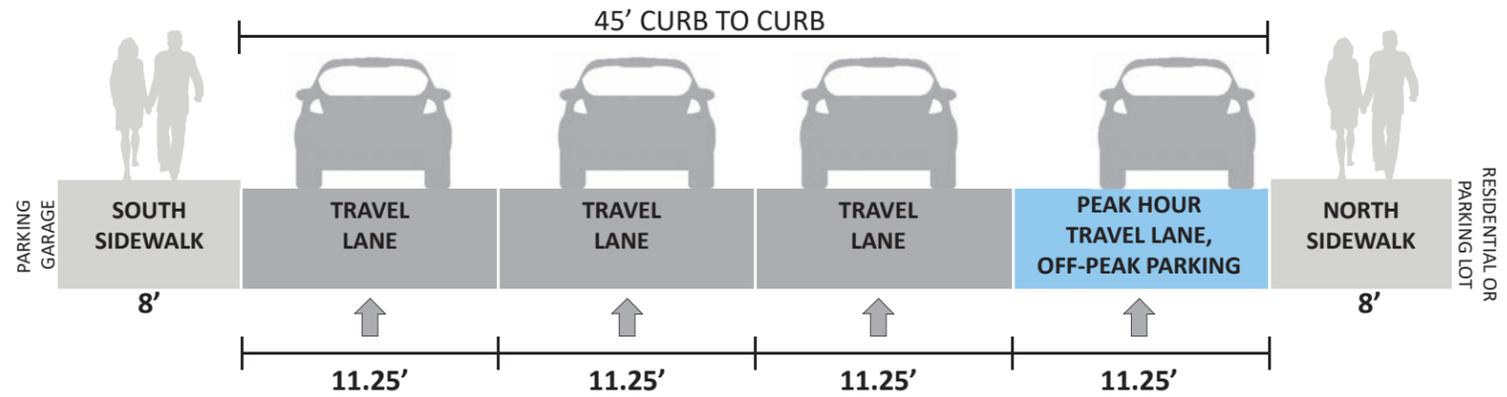
PHASE 1, OPTION 1	YES	NO	YES*	NO	YES*
PHASE 2, OPTION 1	YES	YES	YES*	YES	YES*

*Removal of peak hour travel lane, off-peak parking

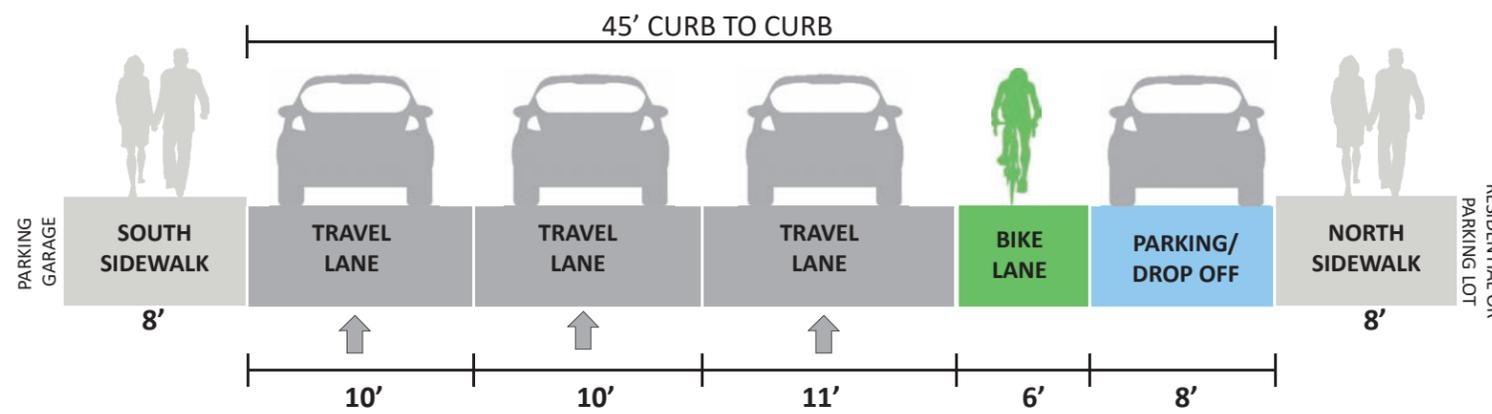
12TH STREET CORRIDOR | SEGMENT C - ORANGE STREET TO WASHINGTON STREET



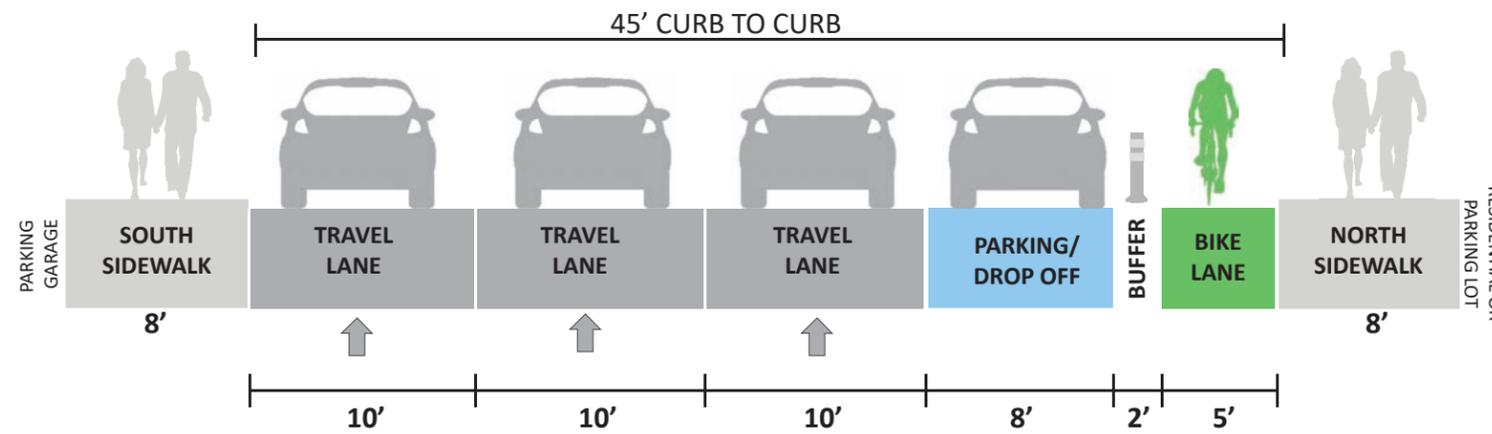
EXISTING



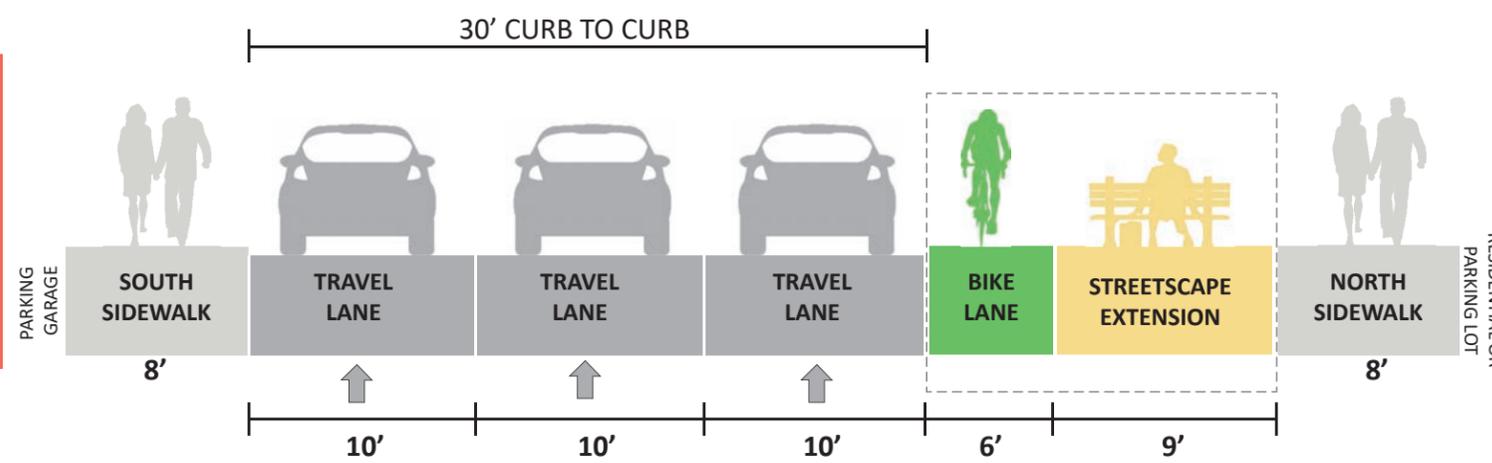
OPTION 1
PHASE 1



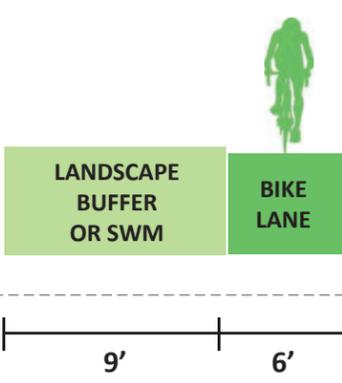
OPTION 2
PHASE 1



OPTION 1
PHASE 2



ALTERNATE TREATMENT



ANTICIPATED IMPACT (RELATIVE TO EXISTING)

- IMPACT TO SIDEWALK / CURB
- ADDITIONAL STREETSCAPE AMENITIES
- REMOVAL OF PARKING
- PROTECTED BICYCLE FACILITY
- TRAVEL LANE REMOVAL

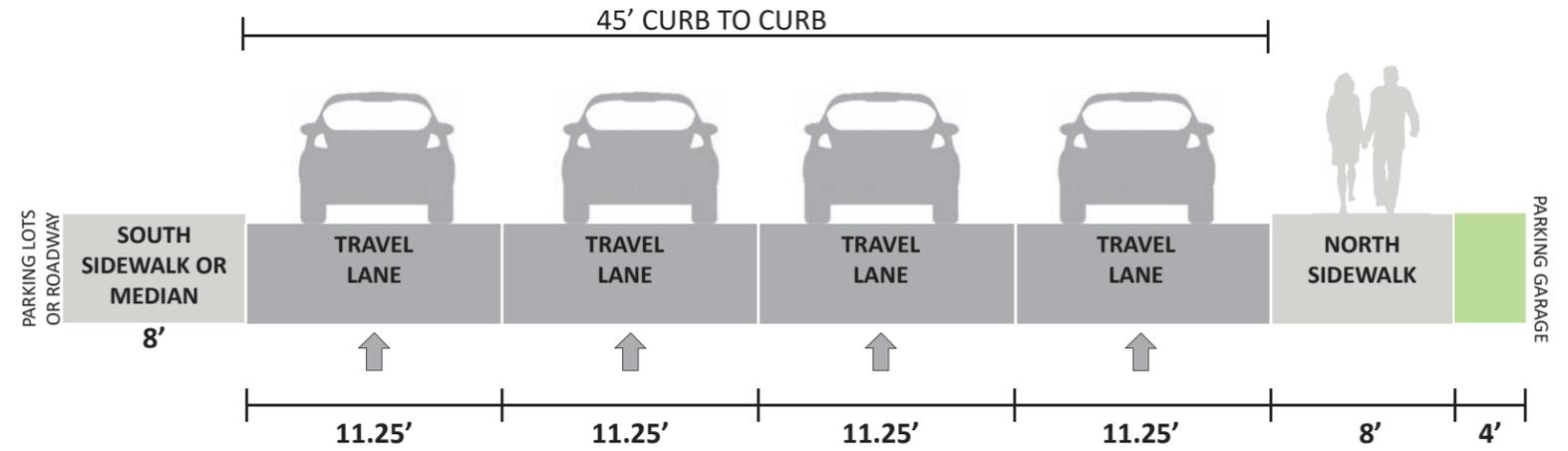
PHASE 1, OPTION 1	NO	NO	NO	NO	YES*
PHASE 1, OPTION 2	NO	NO	NO	YES	YES*
PHASE 2, OPTION 1	YES	YES	YES*	YES	YES*

*Removal of peak hour travel lane, off-peak parking

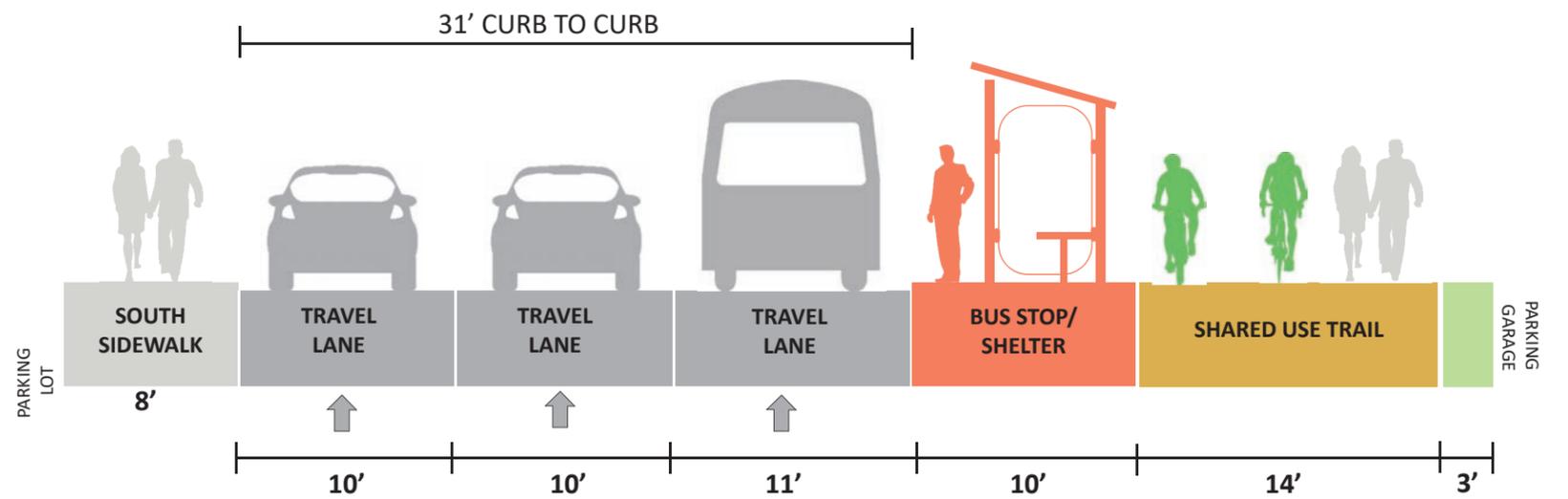
12TH STREET CORRIDOR | SEGMENT D - WASHINGTON STREET TO JEFFERSON STREET



EXISTING

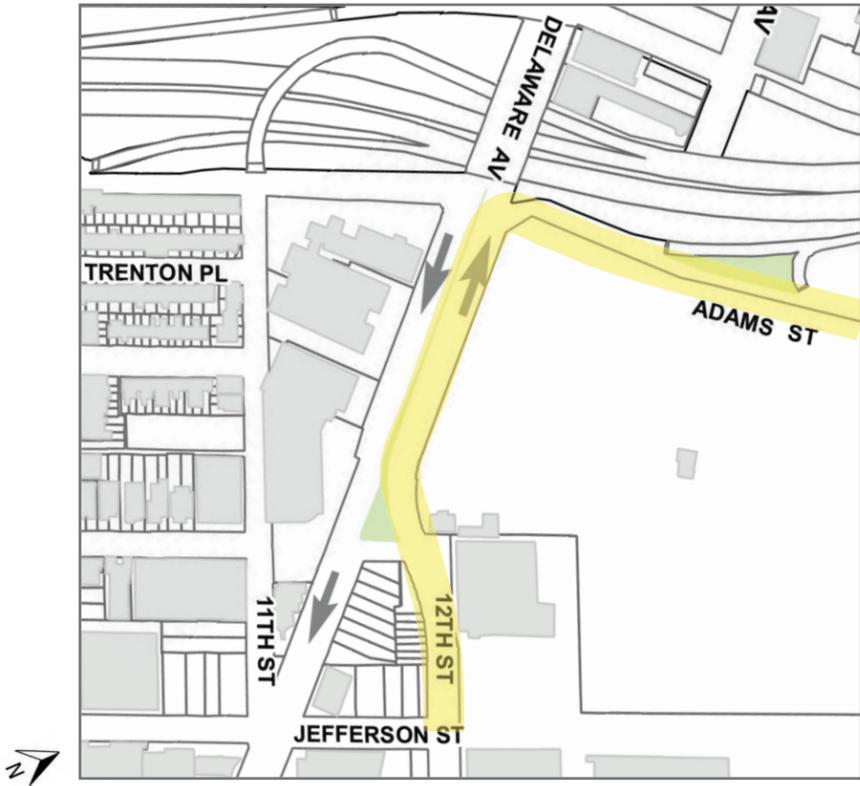


OPTION 1

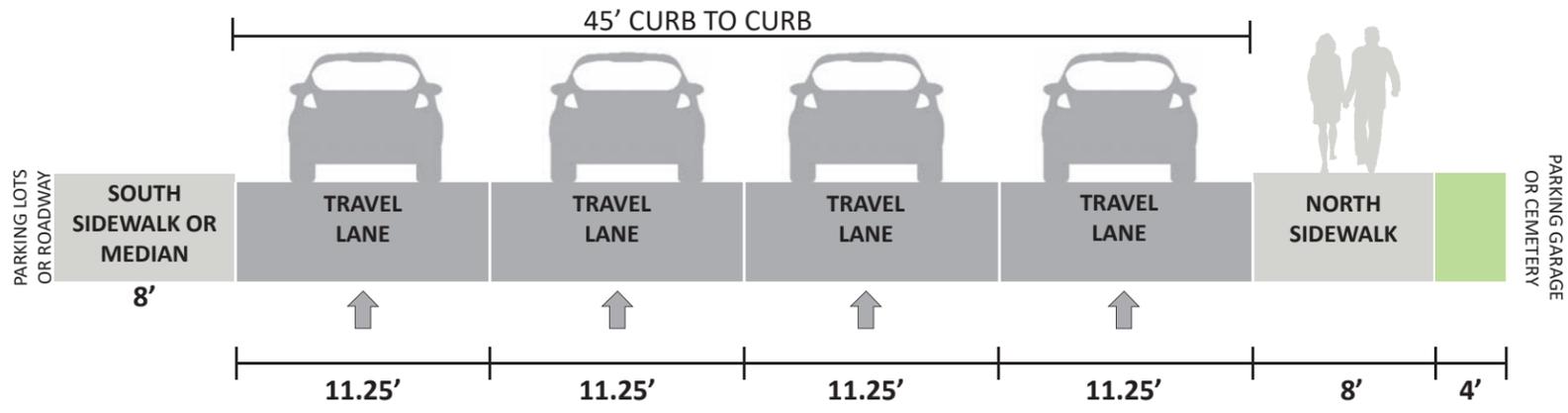


ANTICIPATED IMPACT (RELATIVE TO EXISTING)	IMPACT TO SIDEWALK / CURB					ADDITIONAL STREETSCAPE AMENITIES				
	IMPACT TO SIDEWALK / CURB	ADDITIONAL STREETSCAPE AMENITIES	REMOVAL OF PARKING	PROTECTED BICYCLE FACILITY	TRAVEL LANE REMOVAL	REMOVAL OF PARKING	PROTECTED BICYCLE FACILITY	TRAVEL LANE REMOVAL	ADDITIONAL STREETSCAPE AMENITIES	IMPACT TO SIDEWALK / CURB
OPTION 1	YES	YES	NA	YES	YES					

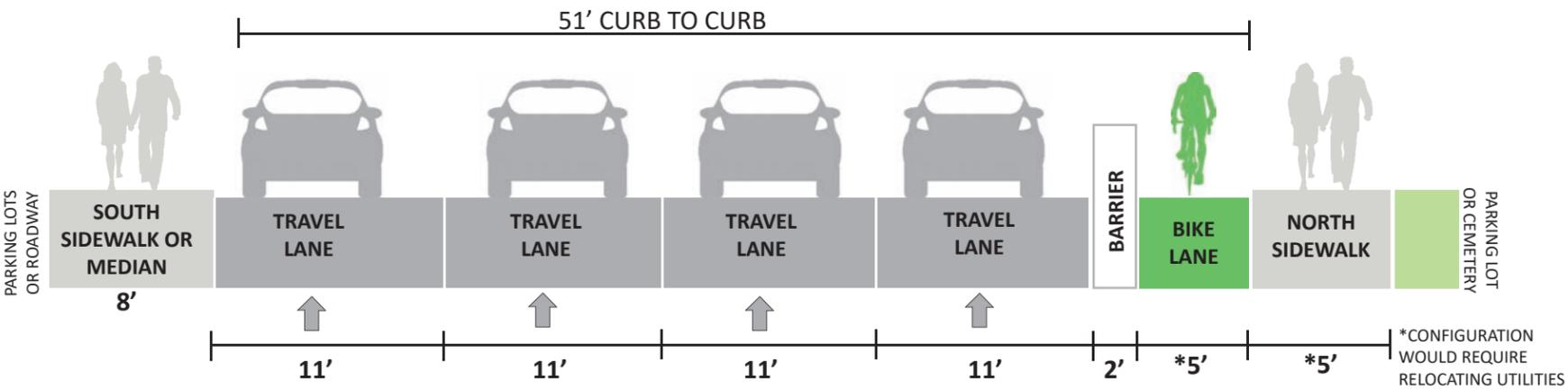
12TH STREET CORRIDOR | SEGMENT E - JEFFERSON STREET TO ADAMS STREET



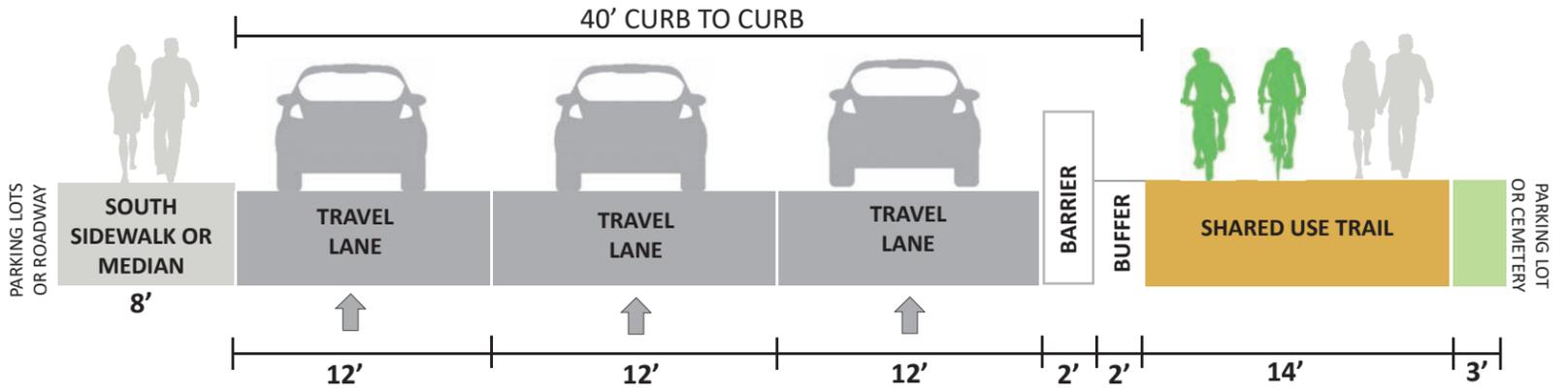
EXISTING



OPTION 1



OPTION 2



ANTICIPATED IMPACT (RELATIVE TO EXISTING)

	IMPACT TO SIDEWALK / CURB	ADDITIONAL STREETSCAPE AMENITIES	REMOVAL OF PARKING	PROTECTED BICYCLE FACILITY	TRAVEL LANE REMOVAL
OPTION 1	YES	NO	NO	YES	NO
OPTION 2	YES	NO	NO	YES	YES

4th Street

(from Walnut Street to Greenhill Avenue)

Overview

This corridor is nearly two miles long and connects the northwestern part of the city to the downtown and east side. The full length of corridor evaluated is maintained by DeIDOT. Land use along the corridor is mixed, with residential uses predominating, especially toward the west end. The portion of the corridor in the central business district is predominantly commercial and institutional. There are several schools, churches and assisted living facilities that need to be considered.

Topography along the corridor generally rises heading northwest, with grades in excess of 8 percent in some blocks. On-street parking is located through most of the corridor. The corridor currently serves three transit routes (4, 5, and 15) and has been under consideration for additional transit. The portion of the corridor between Union Street and Walnut Street is currently being evaluated by DeIDOT for safety improvements. The findings of that study will be useful for proceeding with development of concepts for bicycle facilities through this corridor, and any further design would require additional traffic analysis and coordination. Physical space, frequent intersections, and traffic volumes are likely to limit options for providing low-stress bicycle facilities throughout this corridor. The overall corridor map is shown on page 51.

Corridor Concepts

Segment A: Walnut Street to King Street

Currently, four 11.5-foot travel lanes (two westbound and two eastbound) comprise this segment, totaling 46 feet between curbs. There are four driveways and one transit stop in this segment. The existing configuration is shown on page 52.

Two concepts for bicycle facilities through this segment have been developed; both include narrowing and removal of one travel lane. These concepts are shown on page 52. Option 1 incorporates a buffered bike lane on each side of the street. Option 2 includes a parking/drop-off lane on the south side and bike lanes on each side of the street. This option would require movement of the curb.

A third option would be to incorporate a raised bike lane into the north sidewalk (see Option 2 for Segment B, page 53, and the description on following pages). This option would require special treatments at bus stops, such as a raised bike lane/bus stop in the eastbound direction and a clearly marked mixing zone in the westbound direction to minimize potential conflict between bicyclists and transit riders boarding and exiting the bus.

If further study suggests that segments A and B too constrained to accommodate bicycle facilities with the 4th Street right of way, an alternative may be routing along 5th Street and through the Justice Center superblock.

Segment B: King Street to Market Street

This segment of 4th Street has two travel lanes in each direction and one parking/drop-off lane with a total curb-to-curb width of 51 feet. There is a parking lot entrance for a restaurant on the south side of the street. On the north side is a vehicle delivery/utility entrance for the building at the corner of 4th

Street and King Street and on-street parking near Market Street. Any option would be contingent upon coordination with these adjacent uses. The existing configuration is shown on page 53.

Two concepts were developed for this segment and are shown on page 53. Option 1 reduces motor vehicle travel to one lane in each direction with a center turn lane and preserves the parking/drop-off zone. Bicycles are accommodated with a 5-foot eastbound bike lane and a westbound parking-protected bike lane. The north curb would need to be moved for this configuration.

Option 2 maintains four travel lanes with only slight narrowing but does not retain the parking/drop-off zone. Curbs on both sides of the street would need to be moved to accommodate the raised bike lane in the westbound direction and the buffered bike lane in the eastbound direction. Sidewalks on both sides would be narrowed.

Segment C: Market Street to Adams Street

This segment is composed of two travel lanes in each direction with parking/drop-off zones on each side, totaling 60 feet between curbs. The street grade presents a significant uphill climb westbound between Tatnall Street and West Street and eastbound between Monroe Street and Washington Street. Residential land uses predominate along with some commercial uses through this segment. Therefore, on-street parking is likely to be important to maintain. The existing configuration is shown on page 54.

The concept developed for this segment maintains parking/drop-off lanes, but reduces travel lanes to a single lane in each direction with a center turn lane. Parking-protected bike lanes are located on each side of the street. This option is shown on page 54.

A constrained bus stop, which is illustrated in Figure 7 on page 29 (under the Walnut Street corridor) may be effective for this segment.

Segment D: Adams Street to Jackson Street

This segment passes under I-95 and includes two travel lanes in each direction and a left turn lane for westbound travel at Jackson Street. This segment must accommodate traffic entering and exiting the interstate, which will pose a constraint on lane reductions and influence the level of traffic stress experienced by bicyclists. The existing configuration is shown on page 55.

The proposed concept for this segment, shown on page 55, includes buffered bicycle facilities in both directions and would require moving curb and narrowing the north sidewalk. Travel lanes would remain in the same configuration with all lanes narrowed. The south sidewalk would be moved behind the bridge column onto a parcel owned by the State of Delaware, which would be contingent upon coordination and agreement with the State. An example of how this concept might look is shown in Figure 9.

FIGURE 9: EXISTING (TOP) AND PROPOSED (BOTTOM) CONCEPT FOR BICYCLE FACILITIES ON 4TH STREET, SEGMENT D (ADAMS STREET TO JACKSON STREET)



Segment E: Jackson Street to Union Street

This segment currently consists of two travel lanes in each direction with parking/drop-off zones on each side. The total width of the roadway is 57 feet. Surrounding land uses are primarily residential and commercial. The street grade presents a significant uphill climb westbound between Jackson Street and Broom Street. Transit stops are located throughout this segment. The existing configuration is shown on page 56.

Two options have been developed for this segment; both require reduction of travel lanes, but neither require movement of the curb. The options are shown on page 56. Option 1 reduces vehicular travel to one lane in each direction with a center turn lane. The parking/drop-off zone would be retained on the westbound side as part of a parking-protected bicycle facility and eastbound bicyclists would use a buffered bike lane. Option 2 reduces vehicular travel to one lane in each direction with parking-protected bike lanes on each side of the street.

Segment F: Union Street to B&O/CSX Railroad Bridge

This segment currently consists of two travel lanes in each direction, totaling 50 feet between curbs. Some sections of 4th St from Union Street to the railroad bridge allow parking on both sides, which can ultimately constrain traffic to a single lane of travel in each direction. Adjacent land use through this segment is predominantly residential. St. Thomas the Apostle Church and the Lorelton assisted living facility both have frontage on 4th Street. Woodlawn Park is located adjacent to the railroad bridge on the north side of the street. These uses are likely to have parking and access needs, which should be considered further in further feasibility study and design of bicycle facilities. The existing configuration is shown on page 57.

The two options developed for this segment are shown on page 57. Both would have curb impacts and would require removal of travel lanes. Option 1 reduces vehicular travel to one lane in each direction with parking/drop-off zone on both sides. Bicycle travel in both directions would be accommodated by a shared use path on the north side of the street adjacent to the park. Option 2 reduces vehicular travel to one lane in each direction with a center turn lane. A parking-protected bike lane would be located in the eastbound direction and a buffered bike lane would serve westbound travel.

Segment G: B&O/CSX Railroad Bridge to Greenhill Avenue

This segment currently consists of two travel lanes in each direction and parking on both sides, totaling 56 feet between curbs. The street grade presents a significant uphill climb eastbound between Webb Street to the railroad bridge. The existing configuration is shown on page 58.

The concept developed for this segment is shown on page 58. It would require removal of a vehicular travel lane in each direction. Bike lanes in each direction would be parking-protected. Integration of transit stops would need to be coordinated and a floating or constrained bus stop (see Figures 6 and 7) might be considered.

4TH STREET CORRIDOR

LEGEND

	EXISTING	PLANNED	PROPOSED
BIKE LANE			
PROTECTED/BUFFERED LANE	None		
BIKE-FRIENDLY STREET			
OFF-ROAD TRAIL			

SEGMENTS

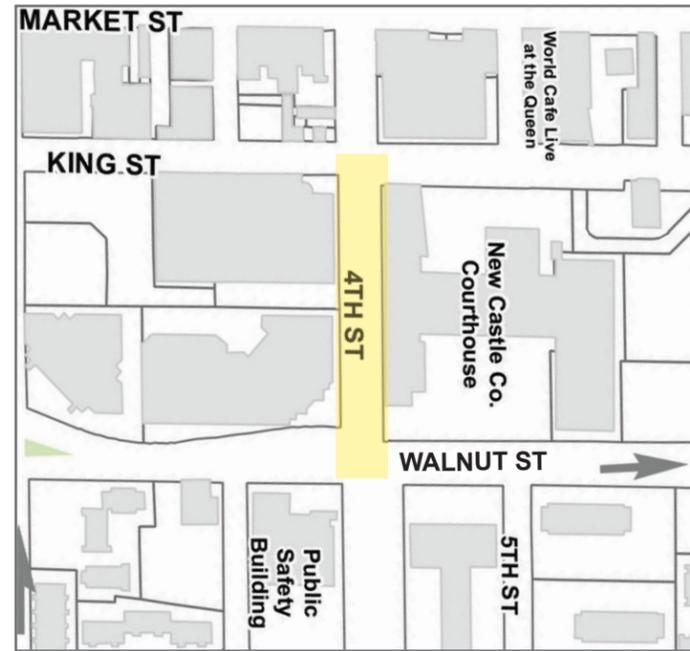
- A WALNUT STREET TO KING STREET**
46' roadway width; four travel lanes (two in each direction); bus stops
- B KING STREET TO MARKET STREET**
51' roadway width; four travel lanes (two in each direction); single parking/drop-off lane
- C MARKET STREET TO ADAMS STREET**
60' roadway width; four travel lanes; two parking/drop-off lanes; bus stops
- D ADAMS STREET TO JACKSON STREET**
56.5' roadway width; four travel lanes and center turn lane
- E JACKSON STREET TO UNION STREET**
57' roadway width; four travel lanes; two parking/drop-off lanes; bus stops
- F UNION STREET TO B&O RAILROAD BRIDGE**
50' roadway width; four travel lanes; bus stops; 5' "shoulders" on each side
- G B&O RAILROAD BRIDGE TO GREENHILL AVENUE**
56' roadway width; four travel lanes; two parking/drop-off lanes; bus stops



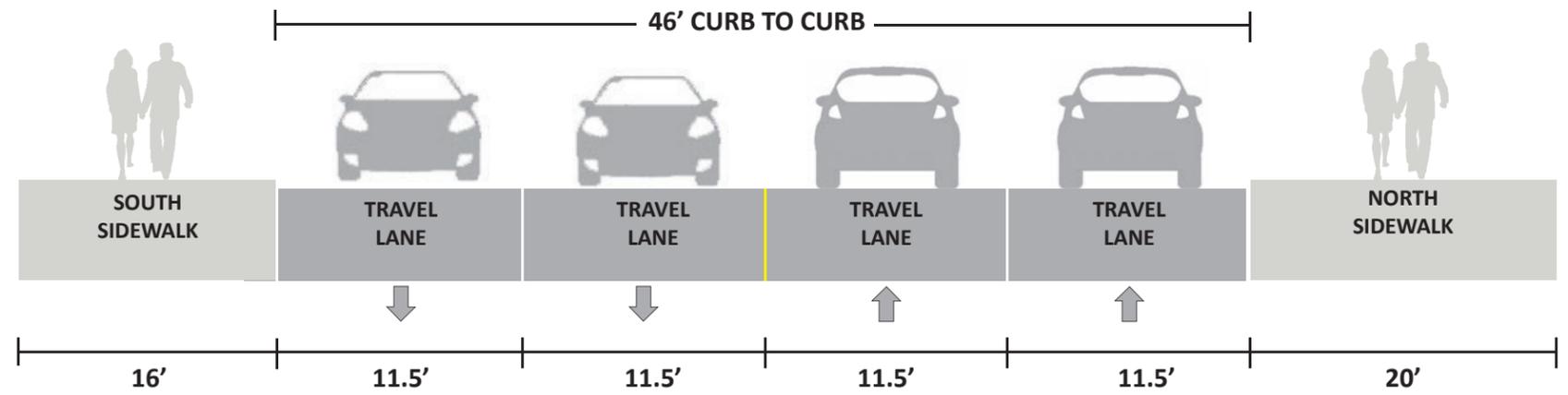
KEY ISSUES

- Under consideration - possible transit corridor; need to accommodate separated bicycle lanes with appropriate interactions with the current bus stops and shelters (3 routes currently travel through the corridor)
- Traffic volumes range widely (~8,000 near Union to ~15,000 AADT nearer to downtown); motor vehicle capacity needs are expected to be greater in the area near I-95
- Commercial and institutional land uses throughout the corridor -- need parking and drop-off/delivery zones
- Residential uses, especially west of Jackson Street, will likely find parking/drop-off access to be important
- Sidewalk space in front of homes is generally quite constrained
- Frequent intersections due to short blocks in many segments pose challenges to create low-stress bicycle facilities

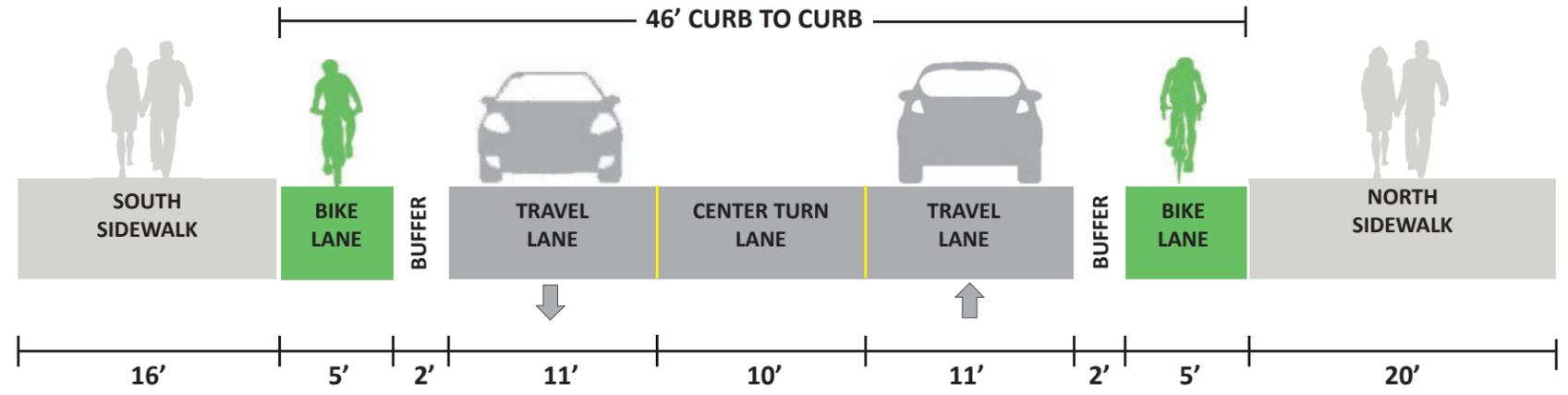
4TH STREET CORRIDOR | SEGMENT A - WALNUT STREET TO KING STREET



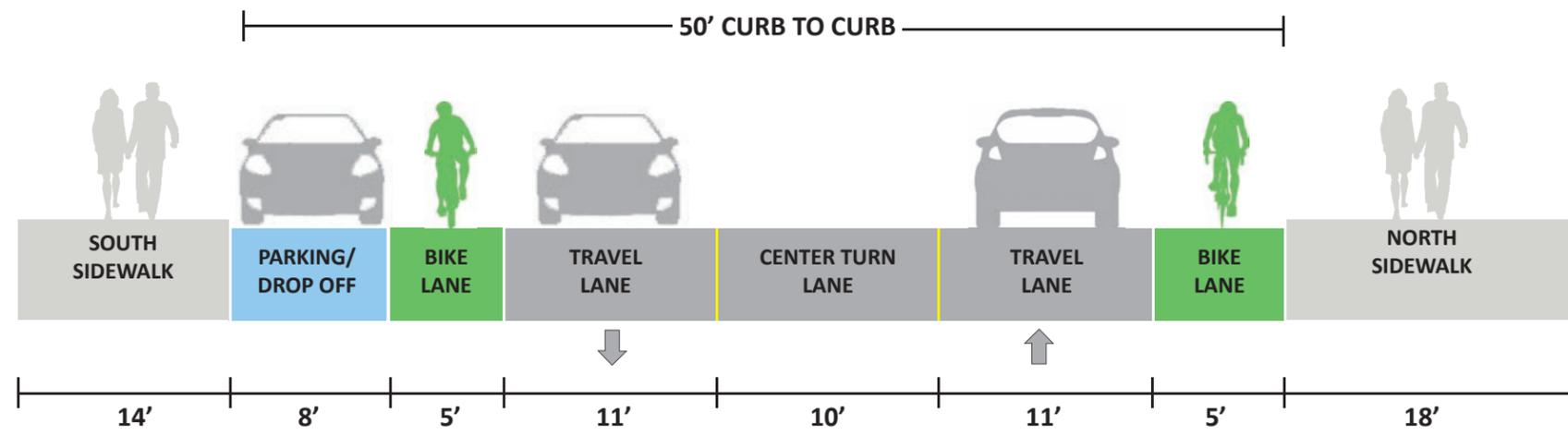
EXISTING



OPTION 1



OPTION 2



ANTICIPATED IMPACT (RELATIVE TO EXISTING)

	IMPACT TO SIDEWALK / CURB	ADDITIONAL STREETSCAPE AMENITIES	REMOVAL OF PARKING	PROTECTED BICYCLE FACILITY	TRAVEL LANE REMOVAL
OPTION 1	NO	NO	NA	NO	YES
OPTION 2	YES	NO	NA	NO	YES

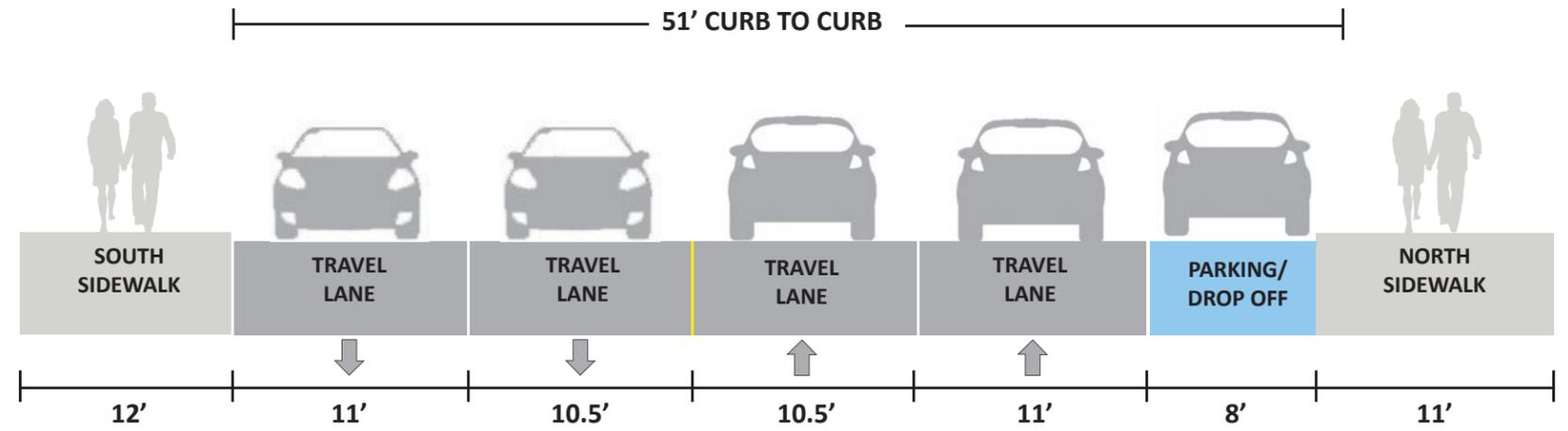
4TH STREET CORRIDOR | SEGMENT B - KING STREET TO MARKET STREET



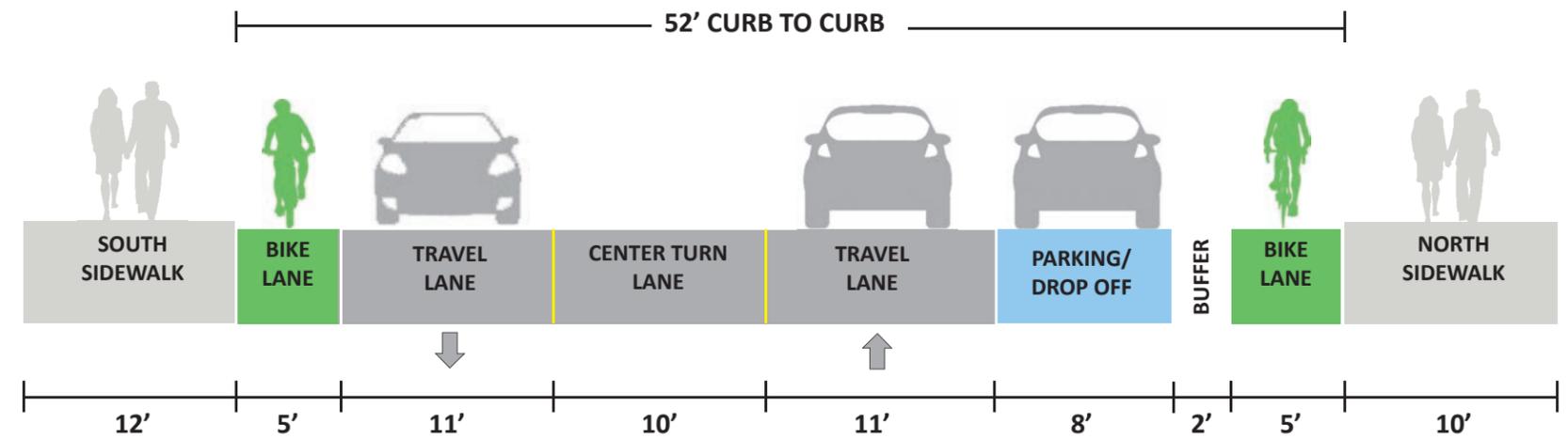
ANTICIPATED IMPACT (RELATIVE TO EXISTING)

	IMPACT TO SIDEWALK / CURB	ADDITIONAL STREETSCAPE AMENITIES	REMOVAL OF PARKING	PROTECTED BICYCLE FACILITY	TRAVEL LANE REMOVAL
OPTION 1	YES	NO	NO	HALF	YES
OPTION 2	YES	YES	YES	HALF	NO

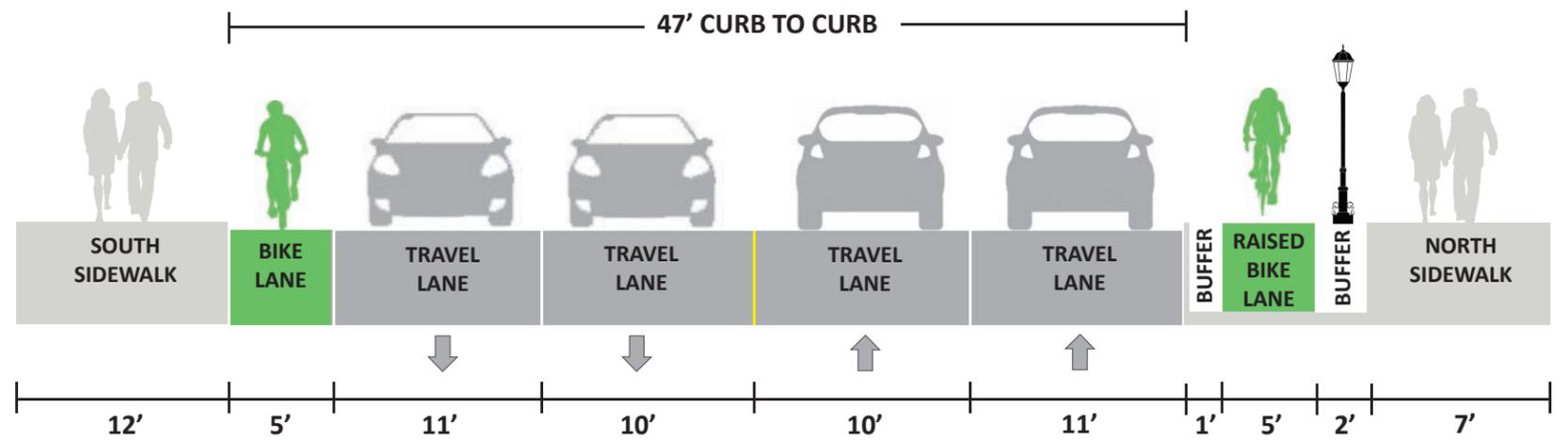
EXISTING



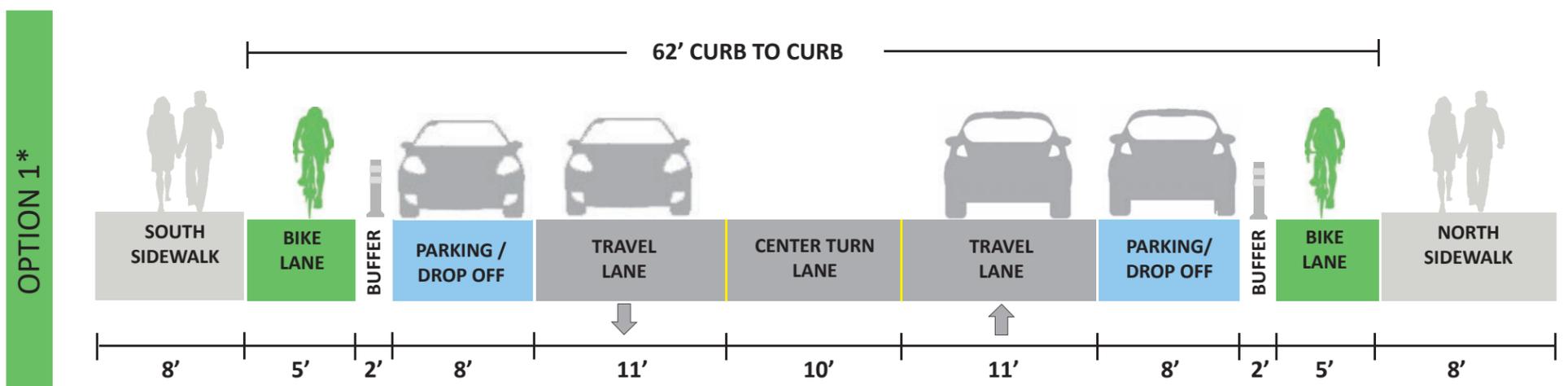
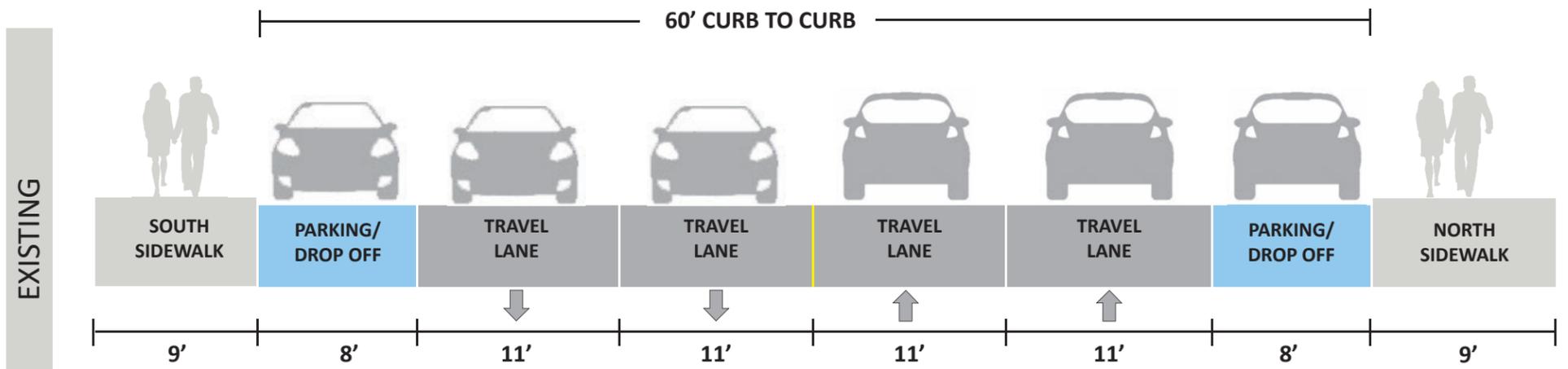
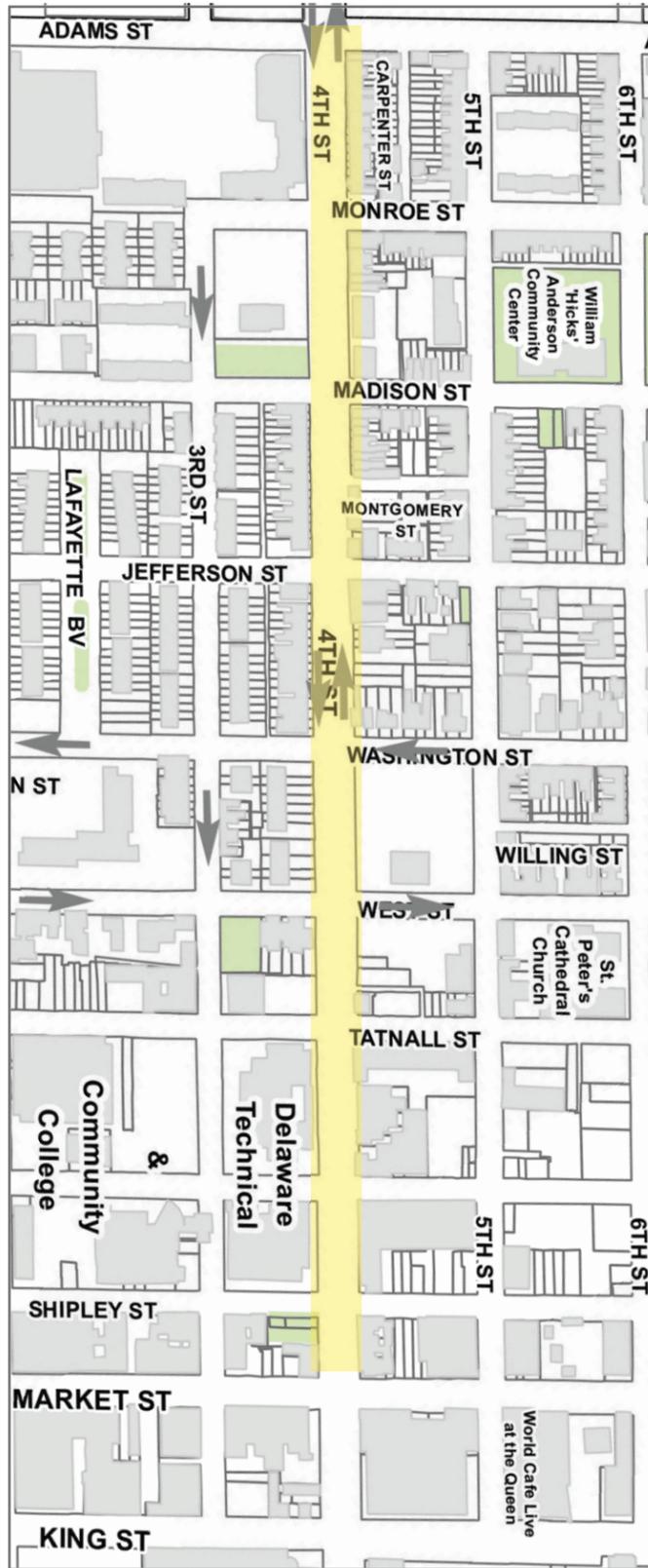
OPTION 1



OPTION 2



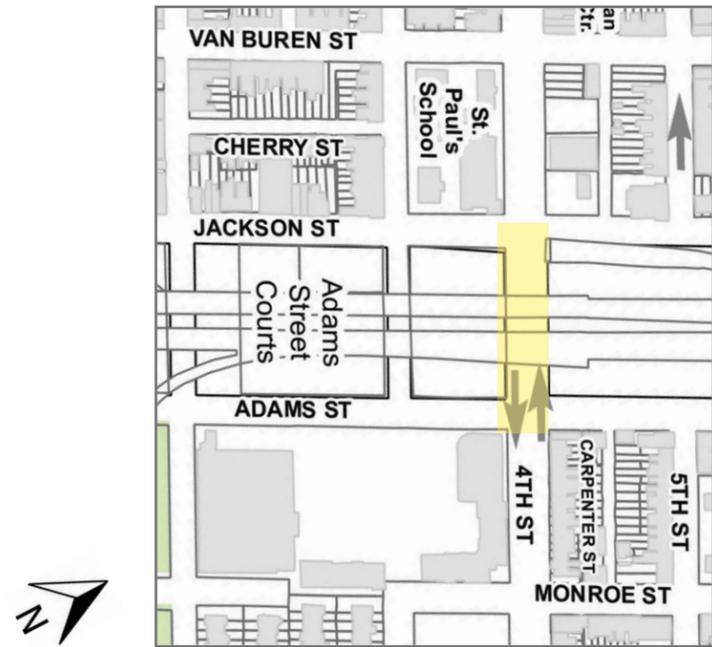
4TH STREET CORRIDOR | SEGMENT C - MARKET STREET TO ADAMS STREET



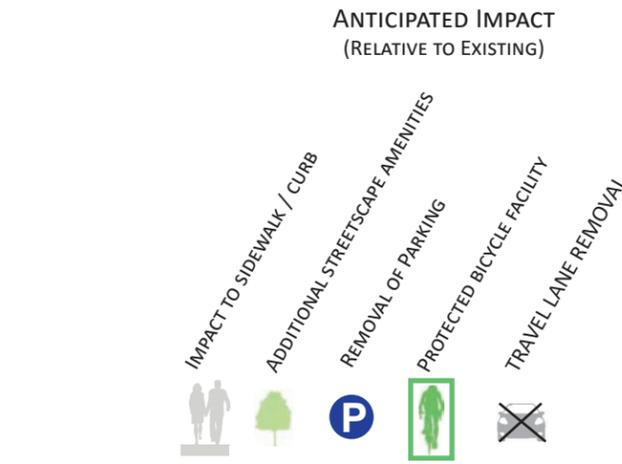
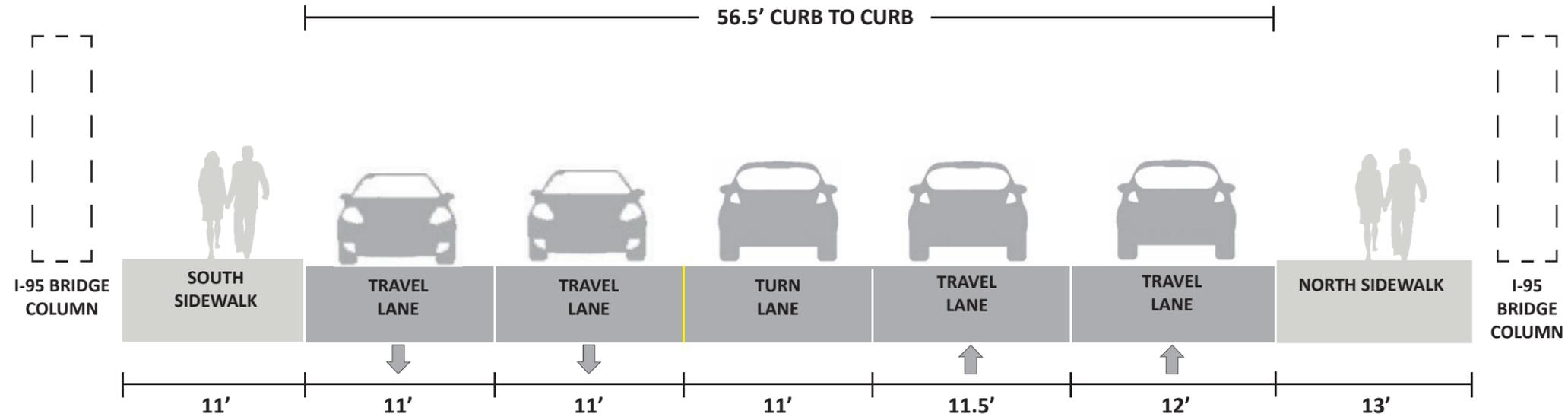
* Sidewalk space through this segment is limited; it may be preferable to narrow the buffer and travel lanes by 6" rather than relocate curbs and reduce sidewalk width.

ANTICIPATED IMPACT (RELATIVE TO EXISTING)	OPTION 1				
	YES	NO	NO	YES	YES
IMPACT TO SIDEWALK / CURB	YES	NO	NO	YES	YES
ADDITIONAL STREETSCAPE AMENITIES	YES	NO	NO	YES	YES
REMOVAL OF PARKING	YES	NO	NO	YES	YES
PROTECTED BICYCLE FACILITY	YES	NO	NO	YES	YES
TRAVEL LANE REMOVAL	YES	NO	NO	YES	YES

4TH STREET CORRIDOR | SEGMENT D - ADAMS STREET TO JACKSON STREET



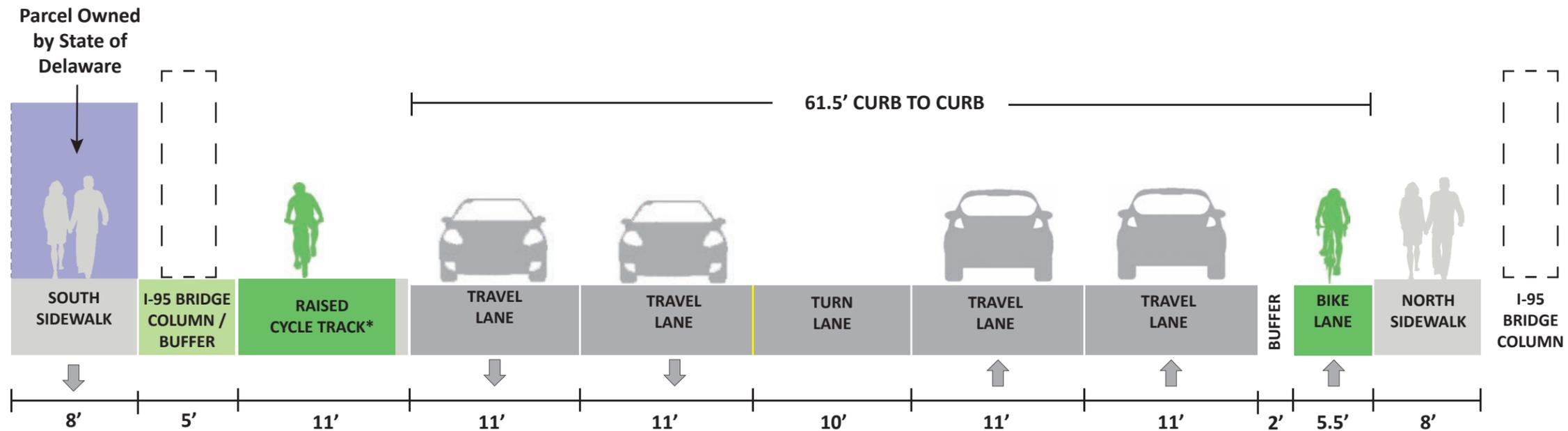
EXISTING



OPTION 1	YES	NO	NA	HALF	NO
IMPACT TO SIDEWALK / CURB					
ADDITIONAL STREETSCAPE AMENITIES					
REMOVAL OF PARKING					
PROTECTED BICYCLE FACILITY					
TRAVEL LANE REMOVAL					

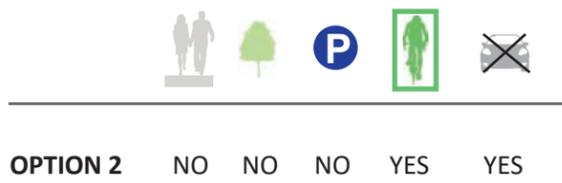
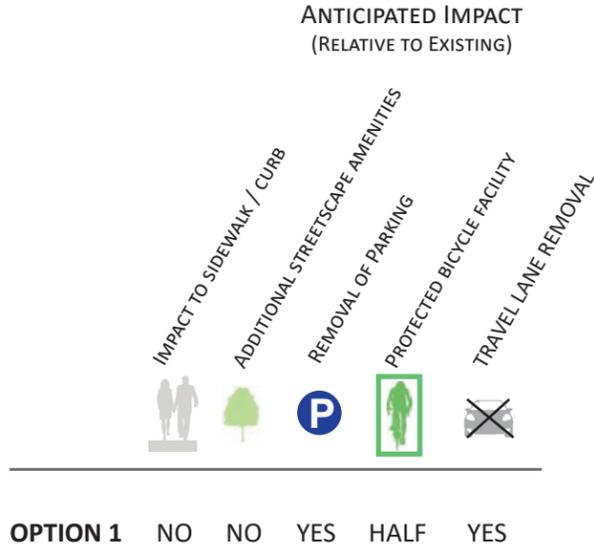
Note: Would require land acquisition or easement

OPTION 1

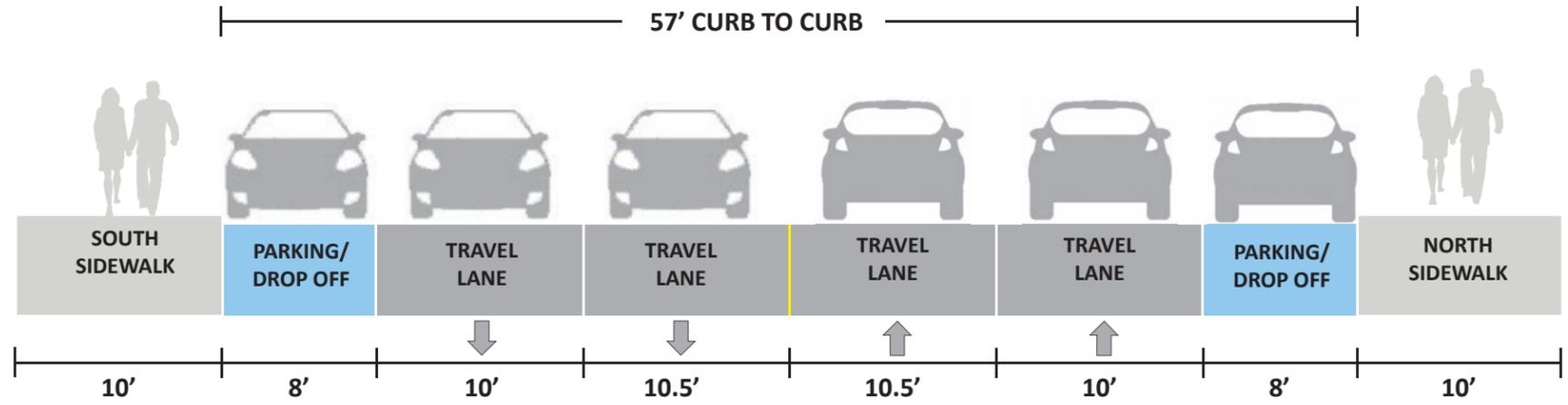


*This cycle track is wider than necessary, but a sidewalk and cycle track will not fit side-by-side between the curb and bridge column

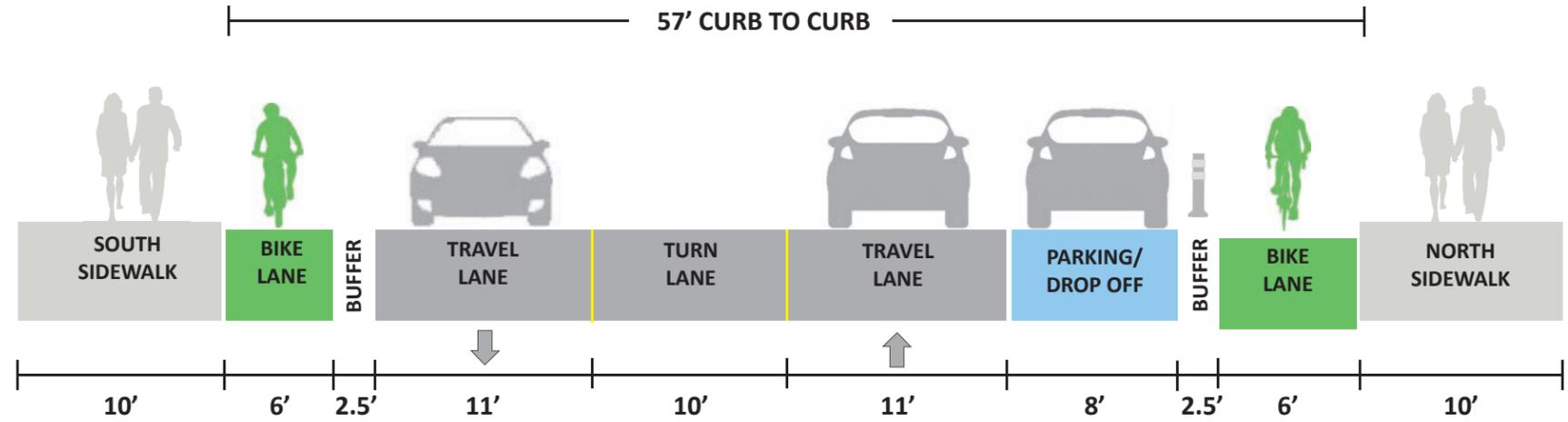
4TH STREET CORRIDOR | SEGMENT E - JACKSON STREET TO UNION STREET



EXISTING

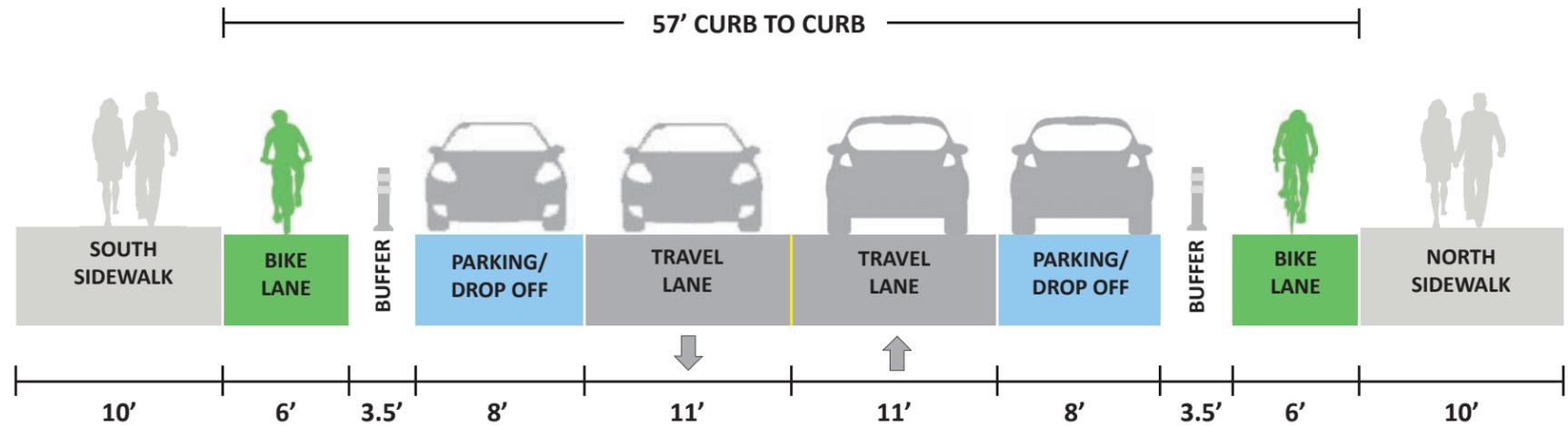


OPTION 1*



*Would require coordination with DTC and adjustments to locate bus stops so lane shifts are minimized.

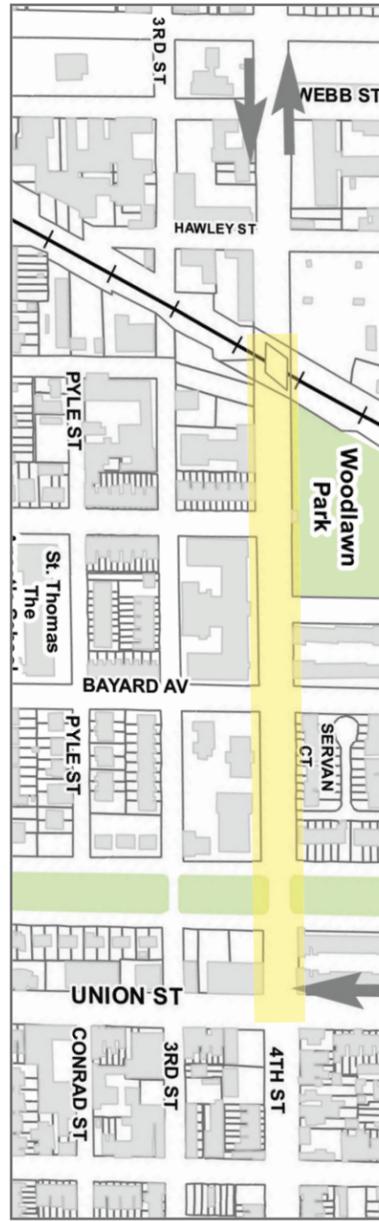
OPTION 2**



**Bike lane could be a raised cycle track, with buffer also adjacent to sidewalk, serving to extend social space for adjacent property.

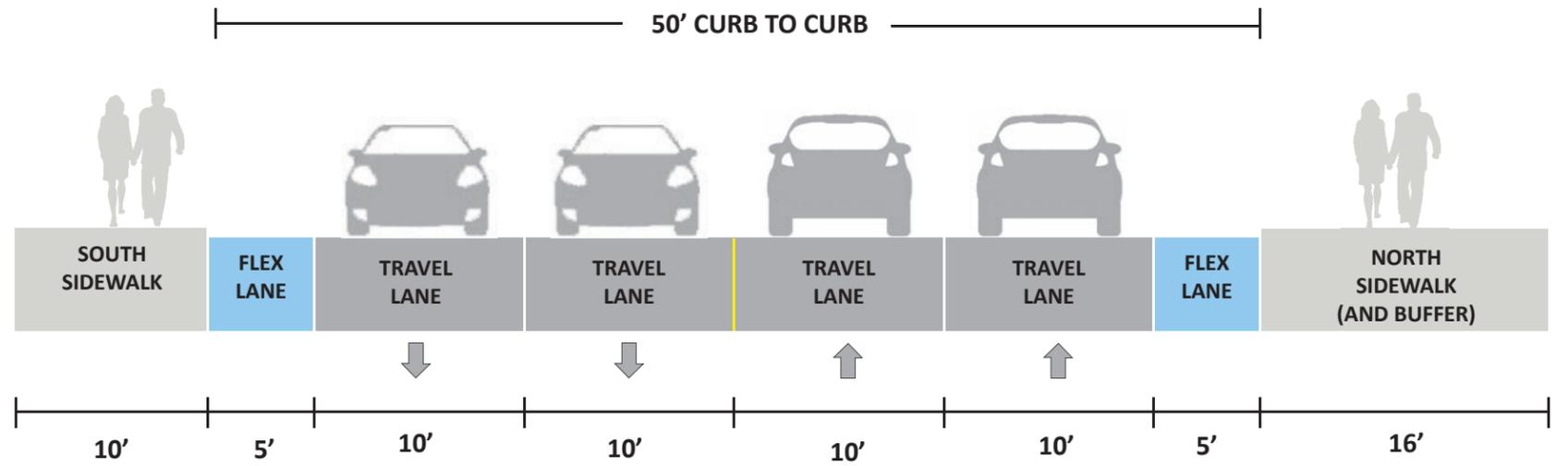


4TH STREET CORRIDOR | SEGMENT F - UNION STREET TO B&O RAILROAD BRIDGE

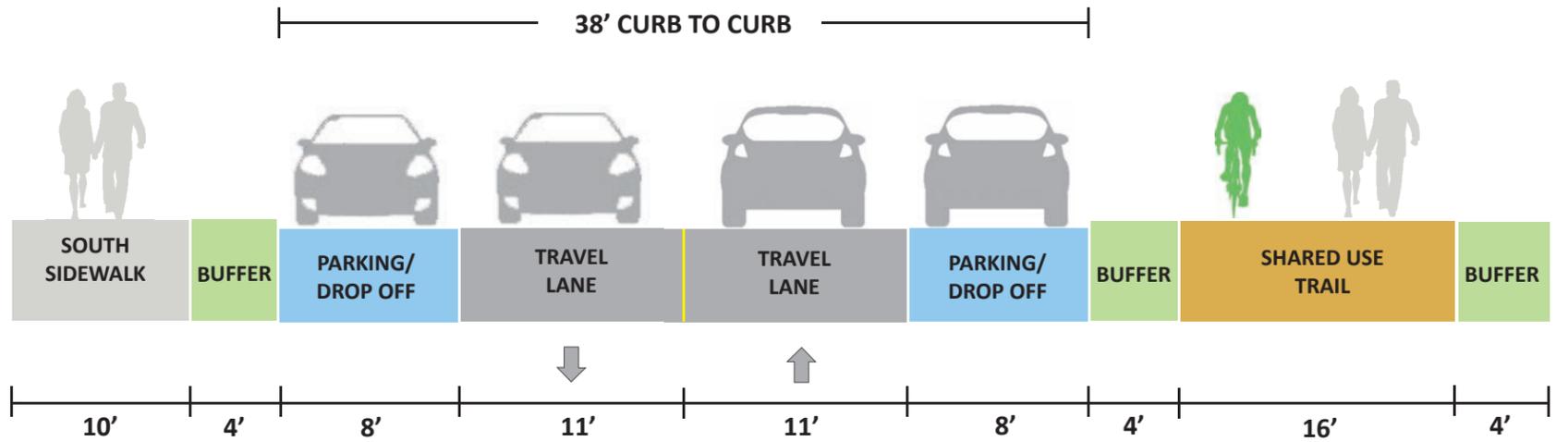


ANTICIPATED IMPACT (RELATIVE TO EXISTING)					
IMPACT TO SIDEWALK / CURB	YES	YES	NA	YES	YES
ADDITIONAL STREETSCAPE AMENITIES	YES	NO	NA	HALF	YES
REMOVAL OF PARKING	YES	NO	NA	HALF	YES
PROTECTED BICYCLE FACILITY	YES	NO	NA	HALF	YES
TRAVEL LANE REMOVAL	YES	NO	NA	HALF	YES

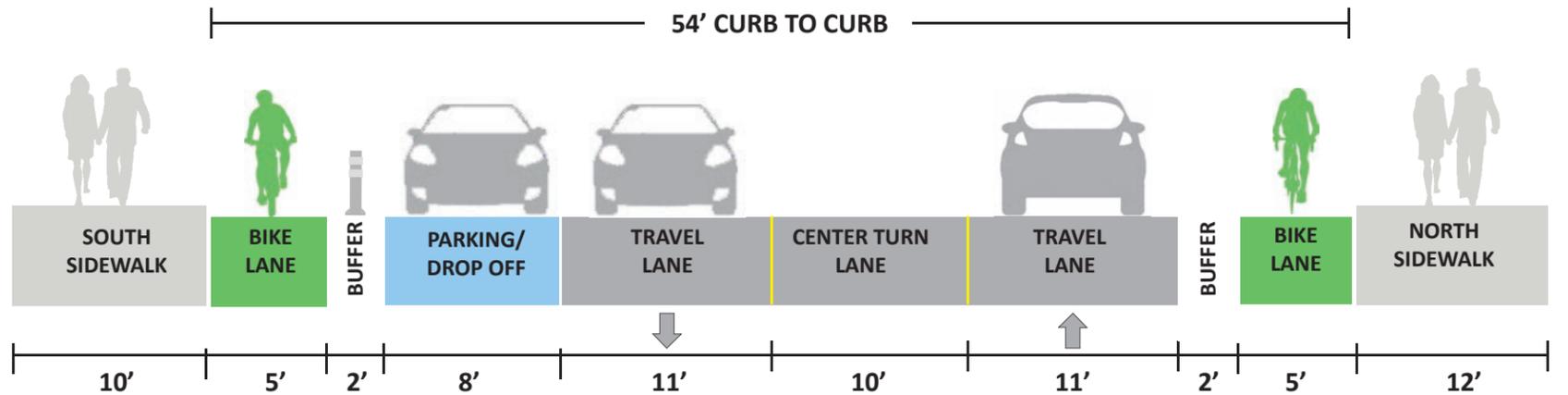
EXISTING



OPTION 1



OPTION 2*



*Parking shown on south side of street, but the desired location may vary between blocks based on factors such as bus stops, adjacent land use, grade, etc.

4TH STREET CORRIDOR | SEGMENT G - B&O RAILROAD BRIDGE TO GREENHILL AVENUE

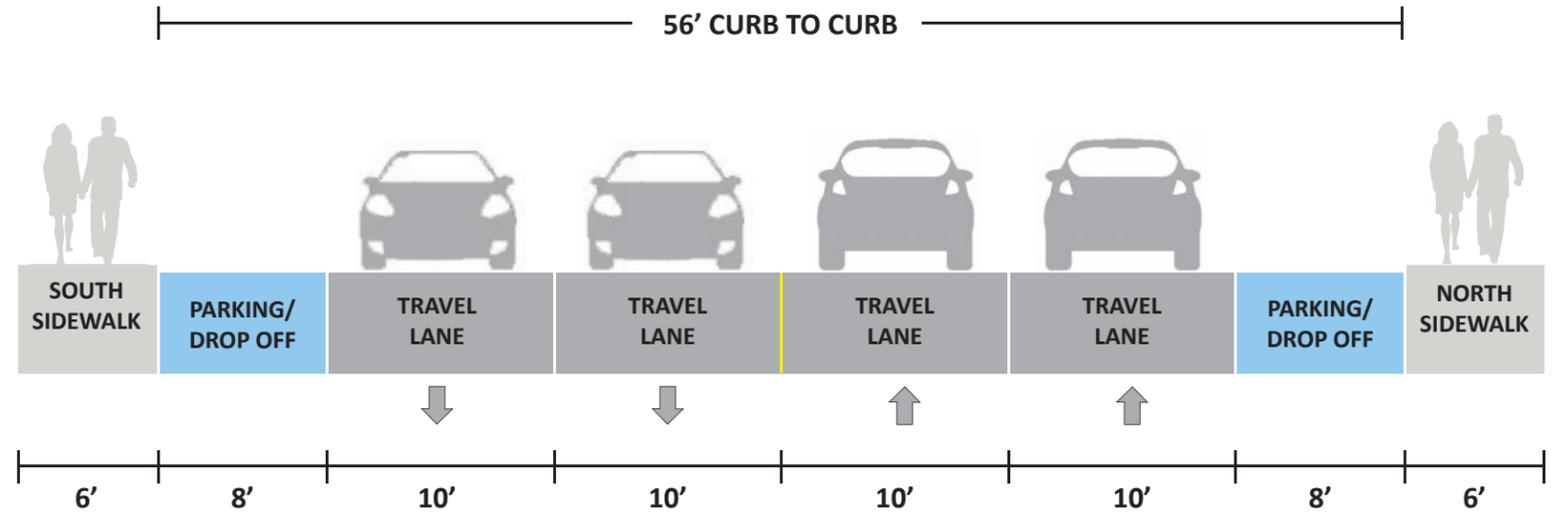


ANTICIPATED IMPACT
(RELATIVE TO EXISTING)



OPTION 1 NO NO NO YES YES

EXISTING



OPTION 1

