City of Madison

DEPARTMENT OF

TRANSPORTATION

Wilson Street Corridor Plan

Interim Recommendation - Draft

April 5, 2019

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Introduction and Background

1.1 Introduction

The Wilson Street study area includes the stretch of roadway between the Blair/Williamson/John Nolen intersection to the Broom Street intersection. The study area also includes a two-block segment of Broom Street, from the Broom/Wilson intersection across John Nolen Drive, connecting to the lakeshore bicycle path (see Figure 1.1-1). John Nolen Drive, Williamson, Blair, Wilson Street intersection were part of a different study, and therefore not included in this Wilson Street study That being said, the results of this corridor study could influence some design characteristics of that intersection.

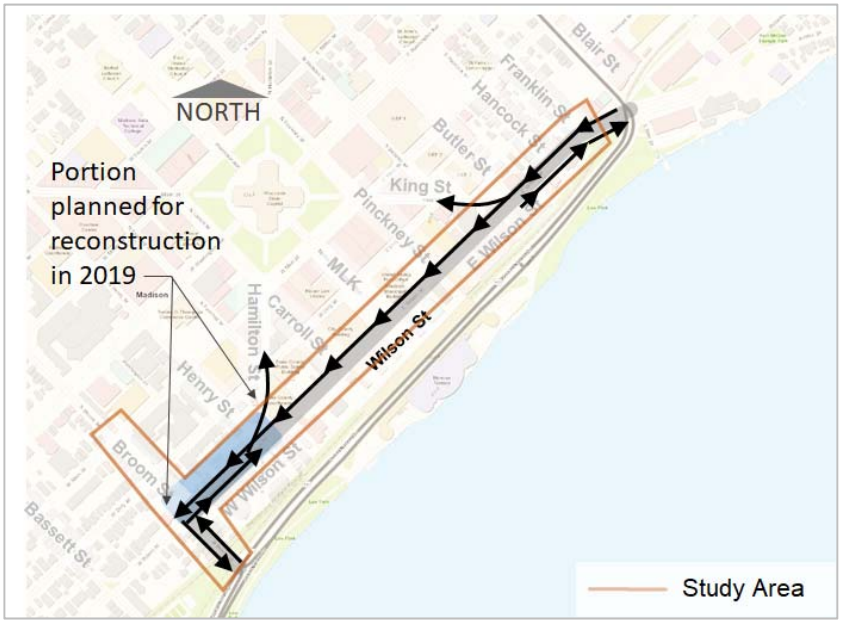


Figure 1.1-1 Study corridor location

The Wilson Street corridor represents a logical connection between the University area, John Nolen Drive and Lake Monona. A concurrent Wilson Street corridor study is evaluating the Broom Street/Wilson Street intersection and its connection to John Nolen Drive.

The 300 Block of Wilson Street will be reconstructed in 2019 between Broom Street and Henry Street, in order to replace aging pavement, improve stormwater drainage facilities in the area and replace a 4-inch water main (installed in 1882) that has experienced chronic water main breaks. The new water main will be 8 inches in diameter.

The purpose of this planning study is to look at the entirety of the Wilson Street corridor, in order to develop a plan that will provide a vision for all segments of Wilson Street. This planning approach will ensure that the reconstruction of the 300 block is compatible with the recommendations for the other segments, which will be reconstructed in different time periods over the next several years. A public engagement process was used to help provide the planning context of the whole corridor - including traffic patterns, bicycle facility needs, pedestrian circulation issues, transit use and parking/loading needs.

1.1 Project Goals

The goals for the Wilson Street Corridor Plan were established and refined at a November 8, 2018 public meeting with residents and other stakeholders. The goals serve as a guide to help develop and evaluate street design alternatives. Table 2.0 summarizes these goals.

Goal	Discussion
Provide safety for all modes of transportation	Any improvements should maintain or improve safety for all modes – pedestrians, bicyclists, transit users and motorists.
Provide comfortable bike connection to downtown area from south, west and east	Overall, the City has a very good bicycle network. However, good connections to downtown from all directions (including the Capital City Trail/lakeshore bike path), especially for cyclists of all ages and abilities is lacking.
Satisfy parking and loading needs	On-street parking in the corridor is heavily utilized by residents, people conducting business downtown and persons with physical disabilities. Loading zones are particularly important for adjacent businesses and government buildings.
Preserve a healthy tree canopy and terraces	Trees and terraces are important for aesthetics and livability. Tree canopy is also mentioned in the Sustainability plan.
Maintain viable, pleasant living area	Numerous condominium and apartment residents live directly on Wilson Street and utilize sidewalks and pedestrian crossings to access downtown land uses.
Provide pleasing entrance to downtown	Eastbound Wilson Street is the primary corridor for visitors accessing the downtown area and the Capitol Square (via John Nolen Drive)
Provide for efficient and ordered motor vehicle operations	There are a high number of crashes at the Wilson/Broom Street intersection, mainly angle crashes and those involving left turns.
Provide safe and comfortable pedestrian crossings	High pedestrian volumes exist on Wilson Street both along and crossing the corridor due to the high densities and mix of uses.
Preserve existing infrastructure investments	The 100 and 200 blocks of West Wilson Street (between Henry Street and Martin Luther King, Jr. Boulevard) was reconstructed in 2018. To the extent possible, an alternative should complement the existing investment, and not require modifications to the recently reconstructed section.
Provide corridor vision for Wilson Street	Though some portions of Wilson Street are programmed to be reconstructed within the next 2-3 years, it may be many years before other portions of the corridor are reconstructed. Having a corridor plan will help provide a corridor vision for the City to build toward over time.
Maintain or improve public transit service	Metro has about 375 buses traveling along Wilson Street during the week.

1.3 Analysis Segments

For purposes of evaluating the functionality and existing conditions of Wilson Street, the corridor was broken into three primary segments. Looking west-to-east, Segment A runs from Broom Street to Henry Street. Segment B runs between Henry Street and Butler Street. Segment C runs from Butler Street to Franklin Street (see Figure 1.3-1)

Figure 1.3-1 Analysis Segments

Segment A includes only the 300 block of Wilson Street, which operates as two-way traffic, one lane westbound and two lanes eastbound. There are no marked bicycle lanes along Segment A. In Segment B, Wilson Street operates as a one-way street, westbound, with two travel lanes. Parking and loading zones are located on both sides of the street in Segment B. Segment C operates as two-way traffic, with two lanes in each direction. Parking and loading are permitted on each side of the street in most locations along of Segment C. A marked on-street bike lane is present only on a very short section of westbound Segment C.

1.4 Traffic

A. Motor vehicle

Wilson Street is classified as a minor arterial from Broom Street to Hamilton Street. The one-way section from Hamilton Street to King Street is classified as a collector. The section from King Street to Blair Street is classified as a minor arterial.

When compared to counts collected in 1976, the traffic volumes along the corridor have changed very little in the last 40 years. (See Figure 1.4-1)Segment A currently carries up to 7,800 average daily traffic (ADT), Segment B carries between roughly 6,500-7,500 ADT, and Segment C handles about 12,000 ADT. Traffic signals are located at intersections of Wilson Street and Blair Street, King/Butler Streets, Henry/Hamilton Streets and at Broom Street. The west and east segments carry about 50 percent more than the middle segment.

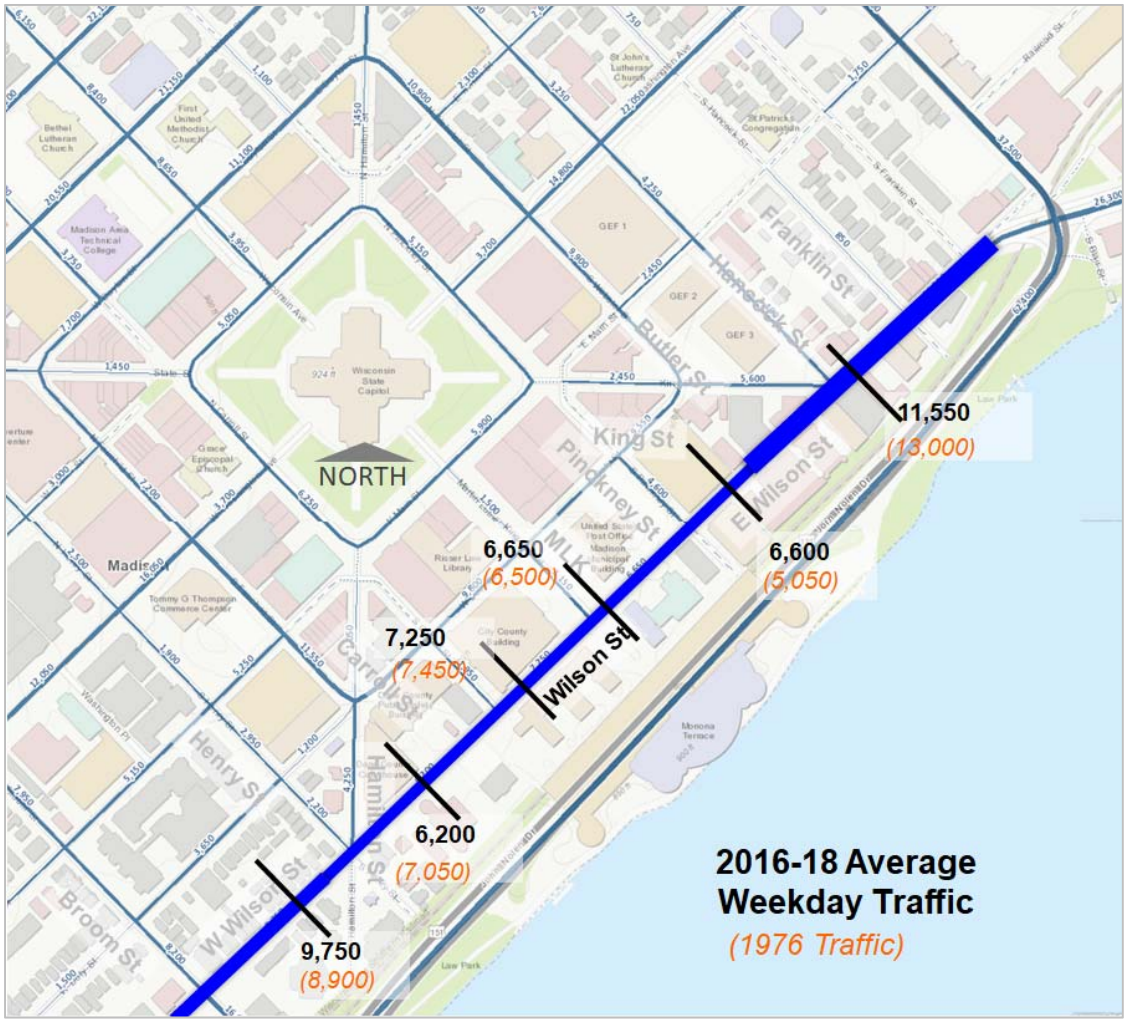


Figure 1.4-1 Traffic Volumes

Figure 1.4-2 illustrates crashes at intersections along the corridor. In particular, the Broom/Wilson intersection has 39 crashes in the five-year period between 2013 and 2017, and these crashes resulted in 31 injuries. The vast majority of these crashes were angle crashes or those that involved left turns from westbound Wilson Street to southbound Broom Street.

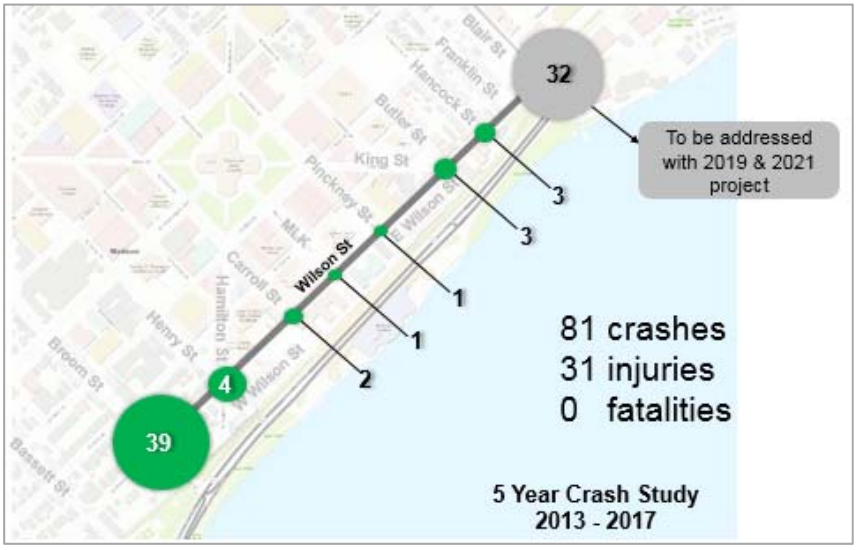


Figure 1.4-2 Crashes

B. Transit

Metro Transit provides about 375 fixed-route bus trips along Wilson Street on weekdays and weekends, carrying passenger from all parts of the City. Segment A carries routes 1, 11, 12, 19 and 38. Routes 3, 4, 38, 56 and 57 utilize Segment B. Bus routes 3, 4, 7 and 38 travel on Segment C. During peak travel periods, about 12 bus trips per hour are using Wilson Street, while off-peak service is about one-third of that frequency (see Figure 1.4-3).

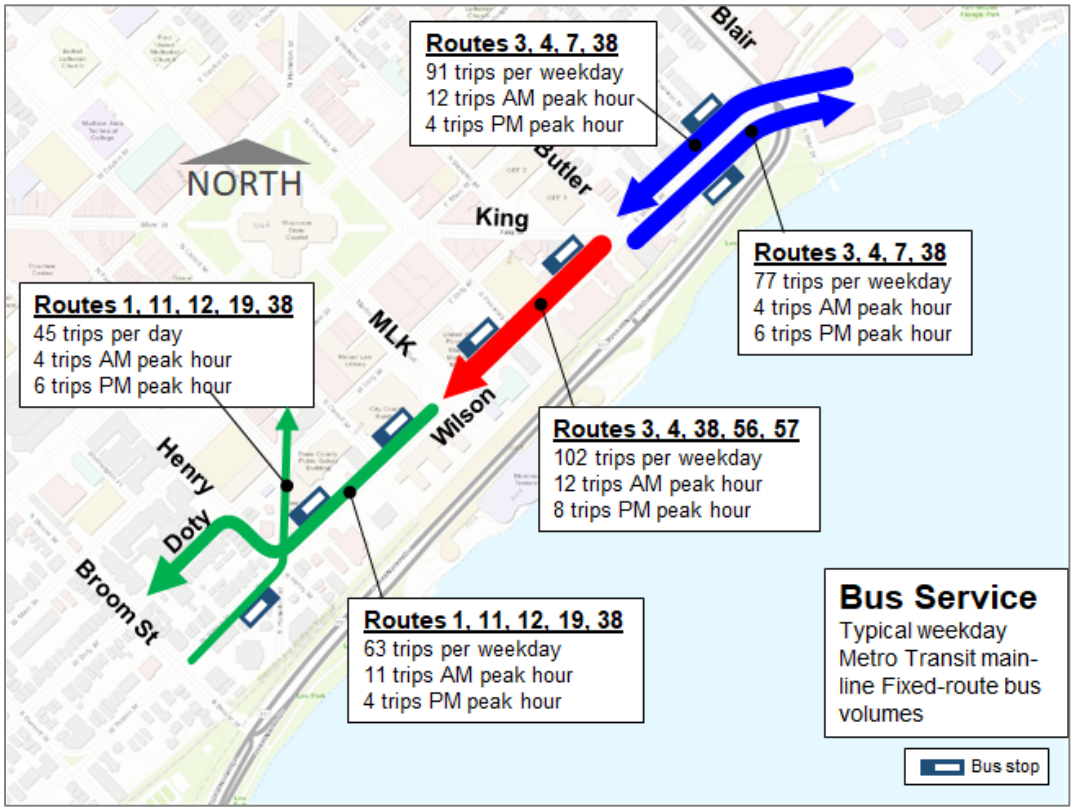


Figure 1.4-3 Transit Frequency

C. Bicycle

In the 2015 Bicycle Transportation Plan (Madison Area Transportation Planning Board) and in Madison's 2016 Transportation Plan (Madison in Motion) Wilson Street is classified as a secondary on-street bike route, from Broom to Pinckney, and a primary on-street bike route, from Pinkney to Blair. (See Figure 1.4-4). Wilson Street parallels Doty Street – which is not classified in the plan, and Main Street – which is classified as a primary on-street route.

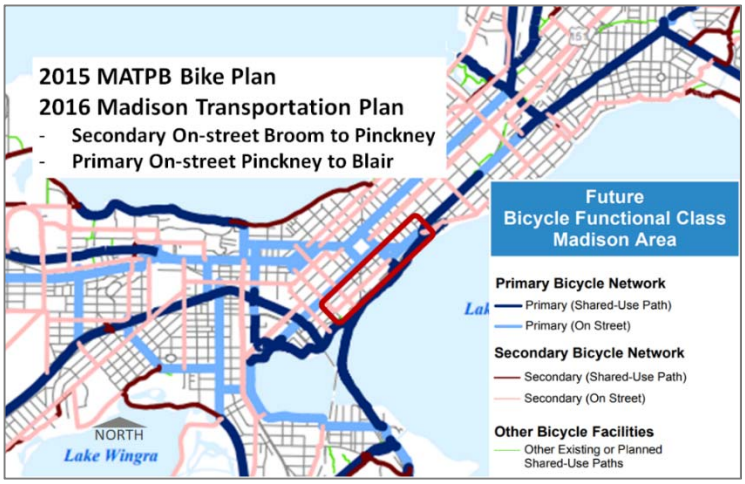


Figure 1.4-4 Wilson Street Bike Classifications

These same plans recommend new and/or improved on-street accommodations for Wilson Street and Broom Street (Figure 1.4-5). Anecdotally, many citizens attending public meetings indicated that without a strong and low-stress connection from the south, the bike connection from the Capital City trail to the Capitol was particularly poor.

Madison's 2018 Imagine Madison Comprehensive Plan essentially echo's the recommendations from these two plans by calling for planned on-street facilities. (Figure 1.4-6)

In 2018, the Madison Area Transportation Board performed a low-stress analysis of bicycle networks in the Madison area. Past research indicated American cyclists have varying levels of tolerance for traffic stress, such as perceived danger and other stressors (e.g., noise, exhaust fumes) associated with riding close to motor traffic. This analysis classified Wilson and Broom Streets as being moderate to high stress. The accompanying report identifies both Wilson Street and Broom Street as barriers (High Level of Traffic Stress - See Figure 1.4-7). The connection to the Capital City Trail, which parallels John Nolen Drive, is particularly problematic.

Figure 1.4-5 MATPB and Madison in Motion Bike Plan Recommendations

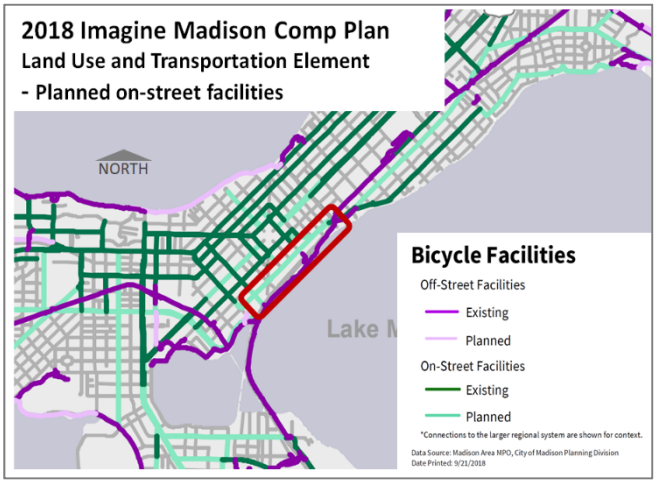


Figure 1.4-6 Imagine Madison Recommendations

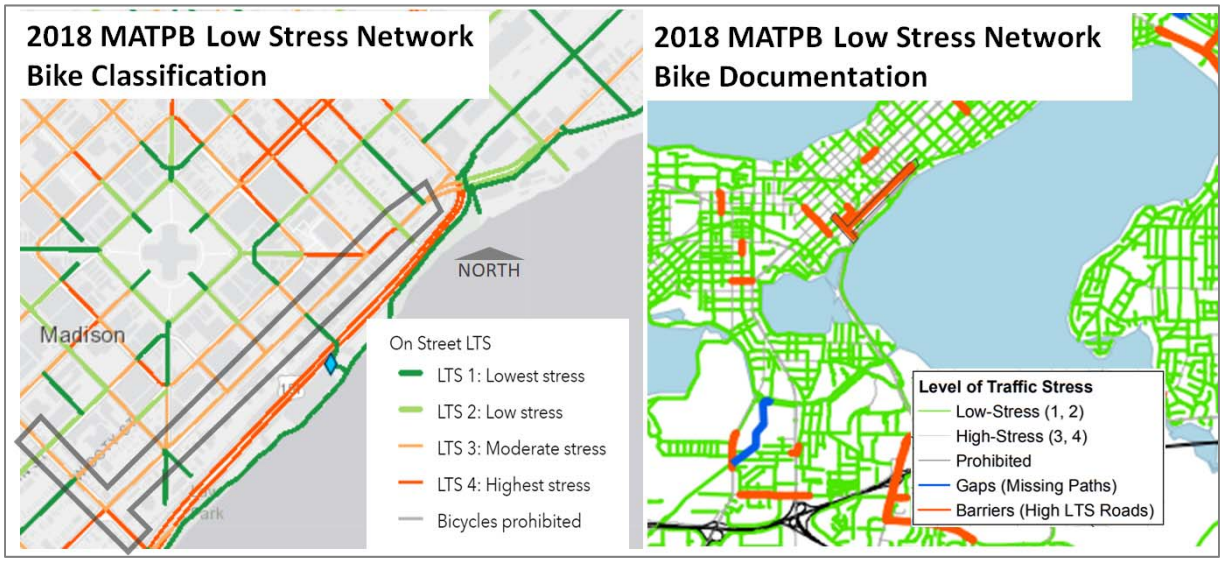


Figure 1.4-7 MATPB Low Stress Network Classifications

D. Pedestrians

Though sidewalks and marked crosswalks exist along the corridor, complaints were received about both the substandard facilities, and vehicles failing to yield to pedestrians. The crosswalk at Wilson and Broom (where a channelized right turn lane funnels traffic eastbound on Wilson) has been cited as a crossing challenge. Motorists often travel at high speeds in that area and do not look for pedestrians. The crossing volumes are particularly high near Martin Luther King Jr Blvd. Employees parking at the Monona Terrace cross Wilson St to access employment centers. Event attendees at the Monona Terrace also use this crossing to access the Capitol square. Due to construction associated with Judge Doyle Square, such as the north-side sidewalk closure, pedestrian crossings have increased. For example, anyone traveling to Martin Luther King Jr Blvd from the Government East Parking Garage, is required to cross South Wilson Street twice in order to reach their destination. Figure 1.4-8 illustrates the combined pedestrian crossing volumes during the morning and evening peak hours at MLK Jr. Blvd. A lower pedestrian volume intersection is Wilson Street at Broom Street, shown in Figure 1.4-9. Pedestrian counts at other intersections fall between these two extremes.

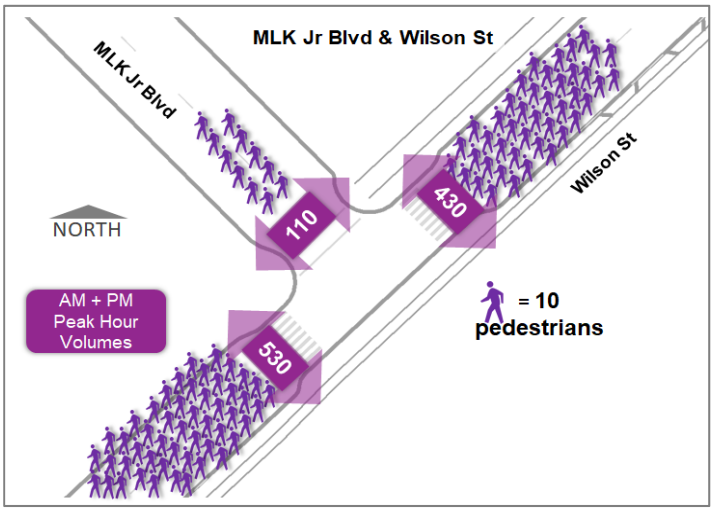


Figure 1.4-8 Peak Hour Pedestrian Crossing Volumes at MLK Jr Blvd

E. Parking and Loading

Parking along the Wilson Street corridor is metered. A four-day parking occupancy study found that Wilson Street on-street parking was used heavily on the 3 blocks between Henry and Butler Streets, but much less so along Segment C (Butler to Franklin). While parking is important, there are several public parking garages near or on Wilson Street. Discussions with businesses along the corridor indicate that loading zones are particularly important for their operations and are well used. These loading zones serve areas by the Essen Haus, Hilton, and near Paisons. Additionally, there is a loading zone near the City County Building that is used frequently for disabled loading. Figure 1.4-10 illustrates the parking occupancy on Wilson Street. Figure 1.4-11 shows a photograph of a loading zone on the corridor.

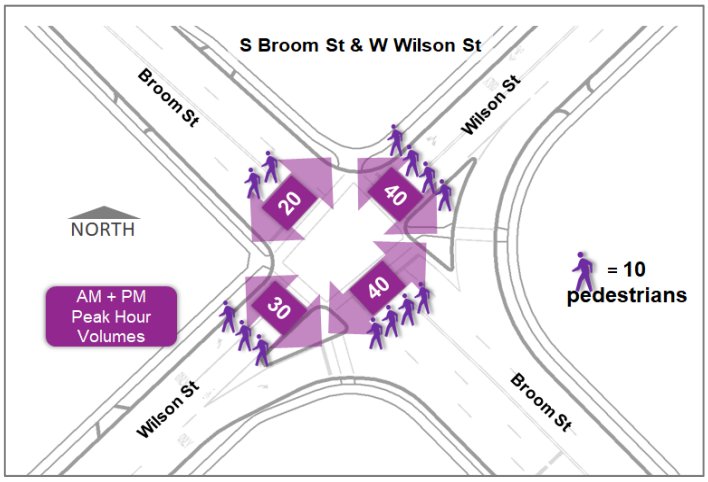


Figure 1.4-9 Peak Hour Pedestrian Crossing Volumes at Wilson and Broom

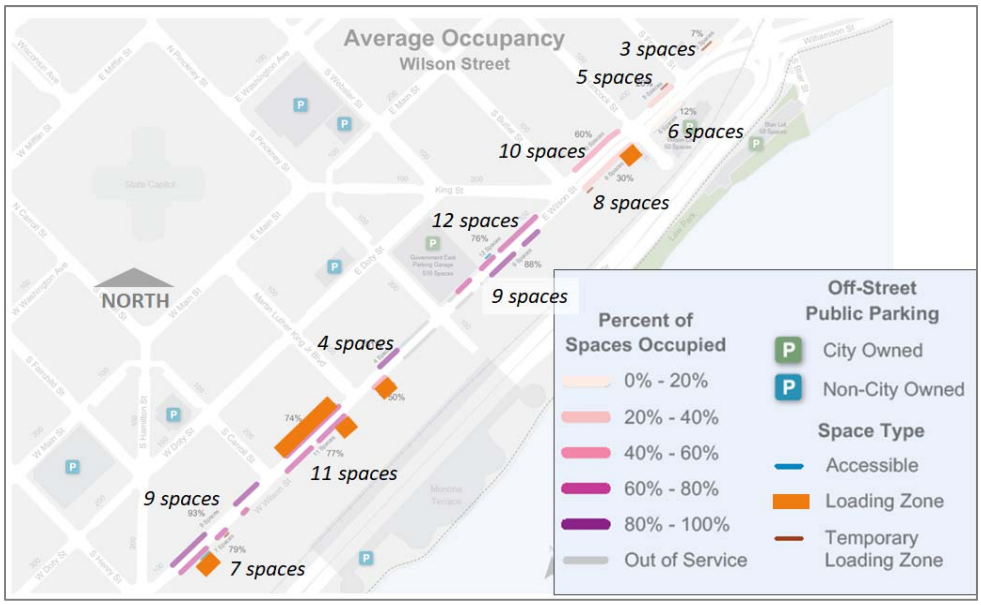


Figure 1.4-10 Parking occupancy and loading zones

Figure 1.4-11 Loading zone near the Hilton Hotel

Numerous Wilson Street intersections currently accommodate heavy pedestrian crossing volumes, illustrating the importance of Wilson Street as a pedestrian-oriented corridor. Appendix 1, shows the pedestrian crossings at various intersections along Wilson Street.

1.5 Timing

While the 300 block of Wilson Street is planned for reconstruction in 2019, construction on the corridor is likely to extend into the next decade. The construction of Judge Doyle Square, the proposed hotel at the current Government East garage, and planned apartment projects, are all likely to require traffic control east of Martin Luther King Jr. Blvd. for at least the next five years. This corridor plan seeks to develop a long term vision for the corridor, yet acknowledges full implementation of the recommended concept is unlikely to occur prior to 2024.

Section 2
Alternatives

2.1 Factors Influencing Alternatives

There are several factors that either create restraints, or may keep an alternative from satisfying key Goals and Objectives. The following paragraphs address them by intersection from west to east.

A. Broom Street

The first block of Broom Street is constrained by a retaining wall on the west side, and utility poles and a potential historic property on the east side. Additionally, the Broom Street/John Nolen Drive is a congested intersection, requiring a dual right turn leading towards the intersection, and two northbound lanes to receive John Nolen Drive's eastbound dual left turn lane. These constraints, combined with current state law (Act 59) that prevents using eminent domain for new bike and pedestrian facilities means that all uses, pedestrian and motor vehicle, must fit within the current right of way. Figure 2.1-1 illustrates these constraints.

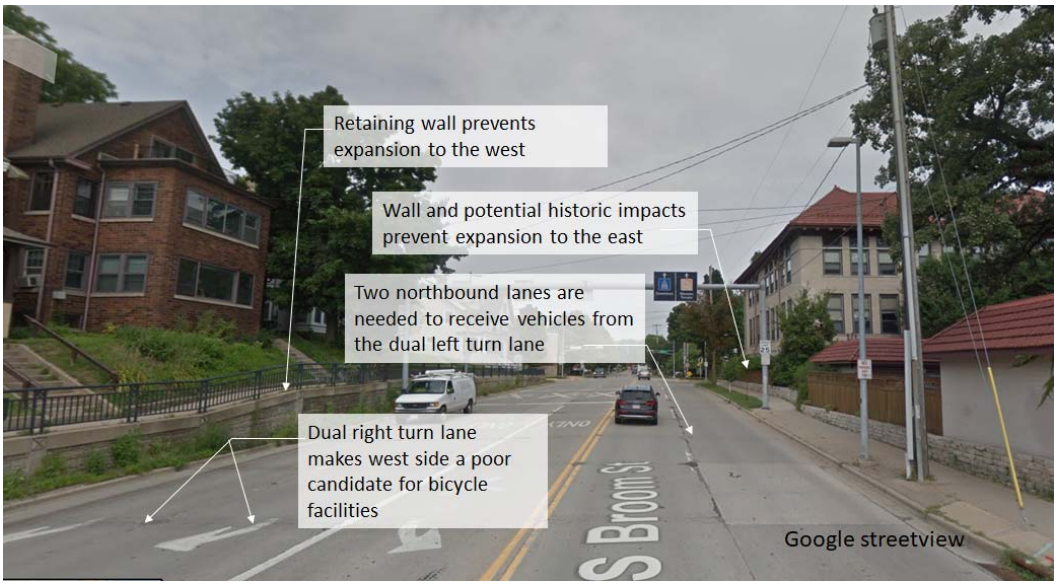


Figure 2.1-1 Broom Street Constraints

B. Broom Street and Wilson Street Intersection

Currently there are two eastbound lanes on Wilson Street. However, the signal at Broom and Wilson never feeds more than one travel lane towards eastbound Wilson Street at a time. Therefore, two lanes are not needed to carry eastbound traffic.
The signal cycle allows westbound lefts and eastbound through movements to operate at the same time. This concurrent operation, which is

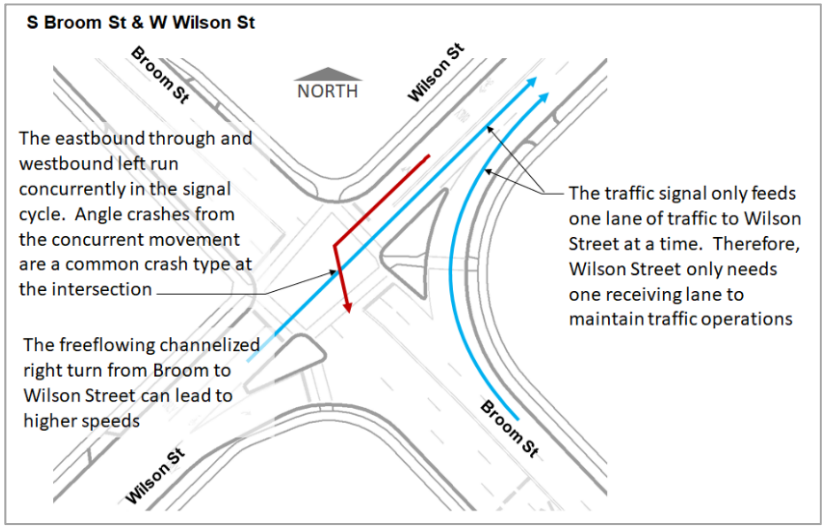


Figure 2.1-2 Broom and Wilson Street Intersection

common on most signal sequences, improves signal efficiency. But the two movements occurring simultaneously allows one of the more common crash types, angle crashes between the eastbound through and westbound left movements, to occur at the intersection. The channelized right turn lane for northbound to eastbound movements contributes to higher speeds in the eastbound direction on Wilson Street.

C. Wilson, Henry, and Hamilton Street Intersection

The Wilson, Henry, and Hamilton Street Intersection serves as an entrance to the downtown for vehicles coming from the south. The signal must service 6 approach legs, instead of the typical 4 approach legs. Therefore, it must allocate phase time efficiently to avoid congestion. The study modeled the intersection using different lane configurations. The modeling indicated that in order to avoid excessive queuing, there must be two eastbound left turn lanes feeding Hamilton instead of just two. Figure 2.1-3 illustrates the difference in queuing between one and two left turn lanes. Although only one eastbound lane is needed on Wilson between Broom and Henry Street, by the time Wilson St reaches Henry Street, two left turn lanes are needed.

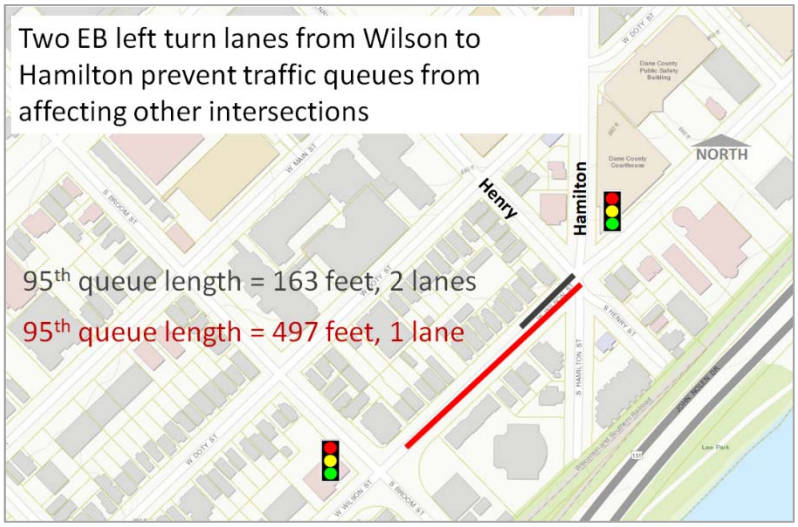


Figure 2.1-3 Left Turn Queuing at Wilson, Henry, and Hamilton St Intersection

D. Wilson Street and MLK Jr Blvd. Intersection

Currently the Wilson Street intersection with MLK Jr Blvd. is stop controlled with two westbound travel lanes. The study modeled this intersection with different lane configurations. As mentioned, there are a large number of pedestrians crossing at this intersection, particularly during the morning and evening rush hours. Figure 2.1-4 illustrates the queuing for both one and two approaches at this intersection. It illustrates that if only one approach is provided, queuing is likely to extend into adjacent intersections and influence their operations. Some have advocated for a signal at this location. A signal could be provided, but at this pedestrian oriented intersection, signal compliance by pedestrians might be limited.

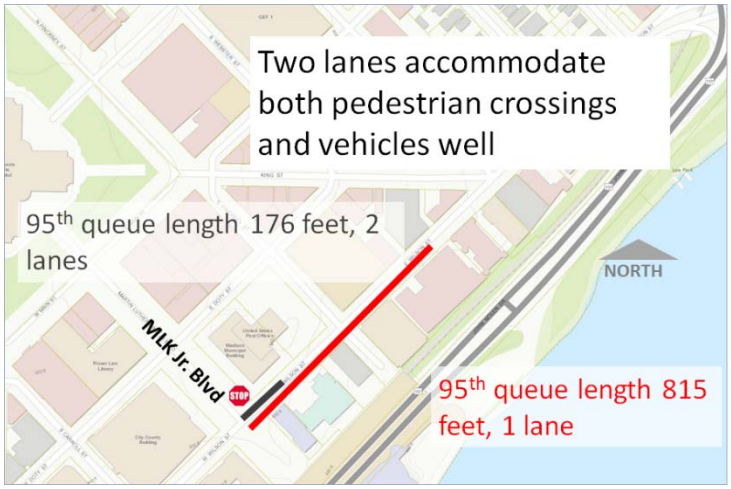


Figure 2.1-4 Wilson Street and MLK Jr Blvd Queuing

E. Grades Approaching the Square

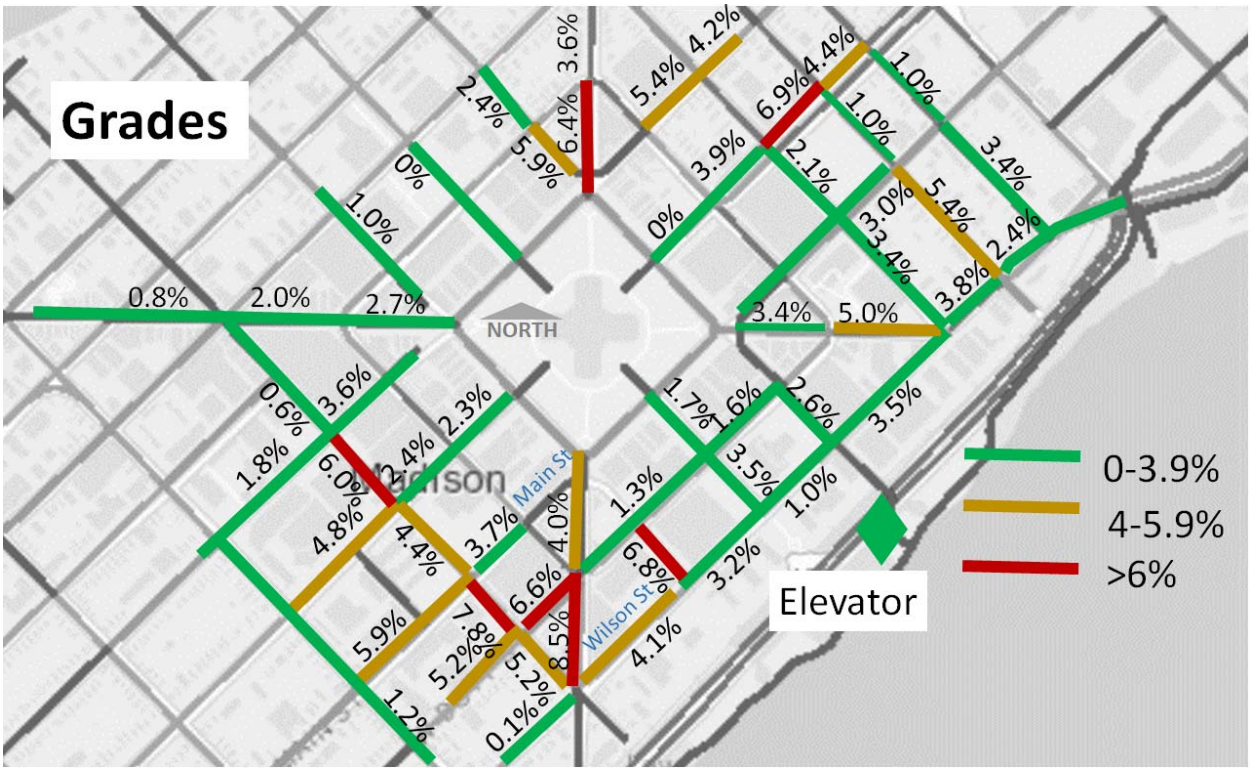


Figure 2.1-5 Street grades approaching the square

Grades of a street approaching the square are particularly important to cyclist. A less advanced cyclists or those carrying a load on their bicycles (eg parents with trailer) prefer shallower grades to steeper grades. Electric bikes are not yet legal in Wisconsin. While legalization is imminent, costs may limit the wide spread use of them for many years. Figure 2.1-5 illustrates grades approaching the square. While Main Street is the primary bike route from the south and southwest, grades on Main Street approach 5.9 percent. Conversely, Wilson is a secondary bike route, yet grades are just slightly over 4 percent. This difference of about two percent has caused some public participants to state that Wilson is a more appropriate street to direct bike traffic. While Wilson Street's maximum grade is about 4 percent, the northbound grade on Hamilton is 8.5 percent, quite steep for cyclist of most experience levels. The Capital City trail does have a bike elevator on the east end, which allows cyclist to access the square without traveling up a grade. However, the elevator is limited by size and speed, and some meeting attendees have mentioned security concerns when using it late at night.

F. All Ages and Abilities Bicycling Network

Since the preparation of the 2015 MATPB Bike Plan, and the 2016 Madison in Motion Transportation Plan, designing bikeways for All Ages and Abilities has gained attention nationally. At Wilson Street public meetings, some participants also referenced "All Ages and Abilities" facilities. Advocated by national organizations like the National Association of City Transportation Officials (NACTO) and the Federal Highway Administration (FHWA), the goal of "All Ages and Abilities" is to provide safe and comfortable bike facilities for the "interested but concerned" bike rider. These potential riders have

concerns riding in traffic with high volumes and or travel speed. All Ages and Abilities facilities address this concern by constructing protected or separated facilities. An example of an on-street protected bike facility that meets this criteria is the protected bike lane, a lane separated from traffic by parked cars, in Minneapolis shown on the right. The People for Bikes organization indicate that by 2016, protected bike lanes had been implemented in 34 states, in 82 cities such as Minneapolis, Chicago, and Indianapolis. Figure 2.1-6 shows an example of a protected bike lane in Minneapolis MN. Figure 2.1-7 compares protected bikeways in Minneapolis and Madison. Shared use paths are considered protected bikeways. While Madison has an extensive network of shared use paths, it is lacking in protected bikeways that lead into the central business district. Currently Madison does not have a protected bikeway plan.

Figure 1.1-6 Minneapolis Star Tribune - Bikers use a protected bike lane on 1st Avenue North

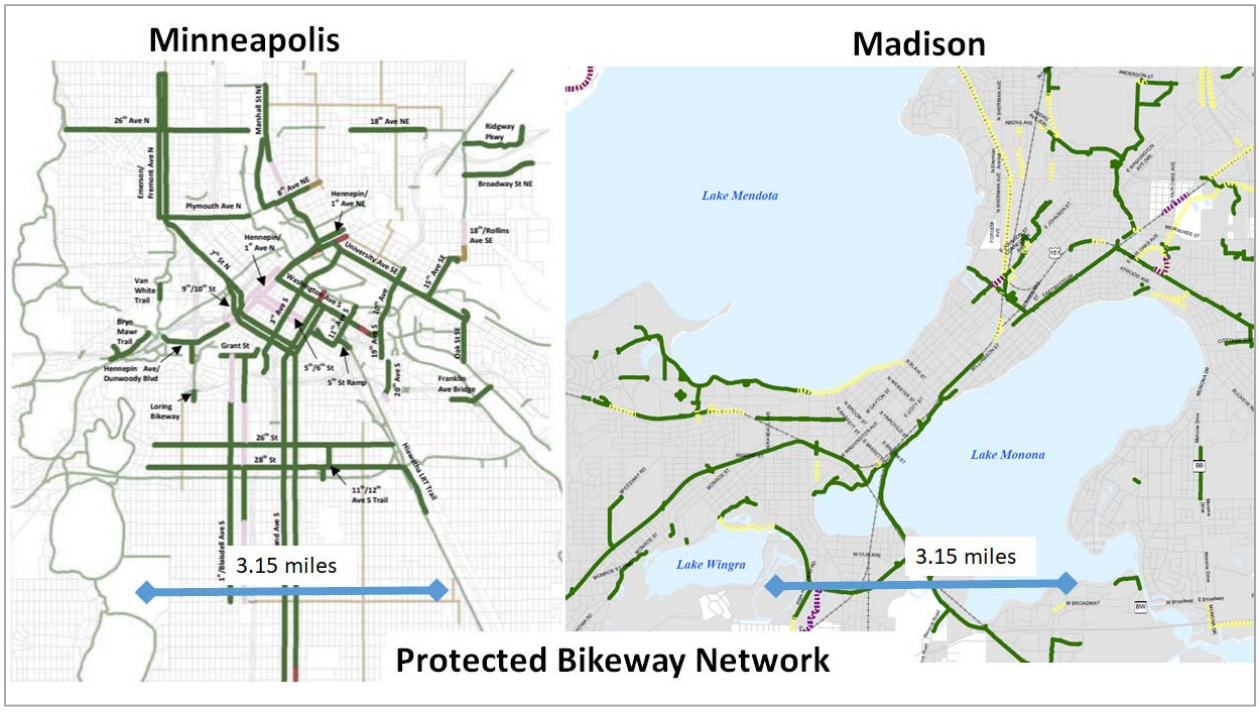


Figure 1.1-7 Comparison of Protected Bikeway Networks.

For Wilson Street, there are various levels of bike accommodations, ranging from minimal to no accommodations, to a fully protected bikeway network. The following bullets summarize the levels.

1. No accommodations – Essentially what exists now in Segments A and B.
2. On-street bike lanes – This would provide bike lanes in both directions in Segment A, a bike lane in the west bound direction in Segment B, and bike lanes in Segment C.
3. On-street bike lanes with contra-flow bike lane – This would provide bike lanes in both directions in Segments A, B, and C.

4. Protected bike lanes – This would provide physically separated bike lanes in Segments A, B, and C. The separation could occur using delineators, parked motor vehicles, or curbing.

2.2 Alternatives Presented at December 6, 2018 Public Information Meeting

Section 2.1 lays out the traffic parameters for the corridor. Additionally, because of the limited terraces and established tree canopy, moving the curb faces in the 300 block of Wilson is challenging and does not accomplish many of the stated objectives. Consequentially, most alternatives arrange parking and bike accommodations differently. The following paragraphs summarize alternatives presented at the public involvement meetings.

Initial Wilson Street alternatives (for Segments A, B and C) were presented at a public meeting on December 6, 2018. Based on comments received at that meeting, the alternatives were further refined and presented at a public meeting on February 18, 2019. The following summarize the alternatives presented at these meetings. See Appendix A for cross sections.

A. Alternative 1

Segment A – Broom Street to Henry Street
Alternative 1 keeps the lane configuration as is currently, with two general purpose travel lanes eastbound and one lane westbound. The westbound lane is marked as a shared bicycle/general purpose lane (also referred to as a "sharrow"). Generally sharrows are used on streets with lower traffic volumes (eg <2000 vpd) than what currently exists in Segment A, which has close to 9,000 vpd. At 16 feet, the current westbound lane is wider than typical street lane widths, which are 10 to 12 feet in an urban setting.

Segment B – Henry Street to Butler Street
In Segment B, Alternative 1 keeps the lane and parking/loading configuration as it is today. Segment B operates as one-way westbound, with parking and loading allowed on both sides. No bike accommodations are provided.

Segment C – Henry Street to Blair Street
Alternative 1 maintains the current configuration. Segment C currently has two general purpose travel lanes in each direction, and parking/loading on both sides (with some restrictions for bus stops, sight lines, etc.). Bike lanes are provided in both directions.

Figure 2.2-1 schematically illustrates the parking and biking accommodations associated with Alternative 1. Typical sections are shown in Appendix A.

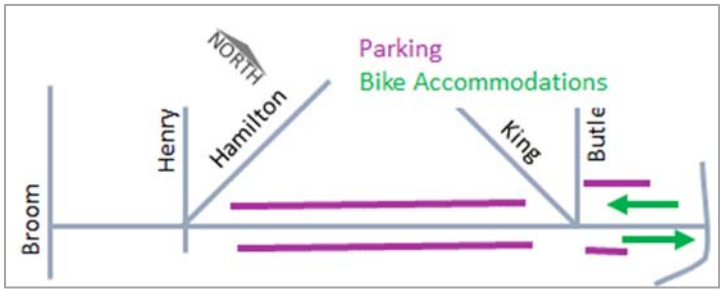


Figure 2.2-1 Alternative 1 Schematic

B. Alternative 2

Segment A – Broom Street to Henry Street
Alternative 2 reduces the number of eastbound general purpose lanes from two to one, and adds striped bicycle lanes in both eastbound and westbound directions. Traffic modeling showed that about 200 feet of the eastbound approach to the Henry/Hamilton intersection would likely need to be two general purpose lanes. To accommodate these two lanes, it is preferred to convert about 2 to 3 feet of

terrace to provide a continuous bike lane. It is possible to allow eastbound cyclists to share the lane with motor vehicles with a sharrow as an alternate solution. However, this would mix cyclists traveling 5 to 10 mph up the Hamilton hill with motor vehicles, traveling 15 to 25 mph. Figure 2.2-2 illustrates the two configurations.

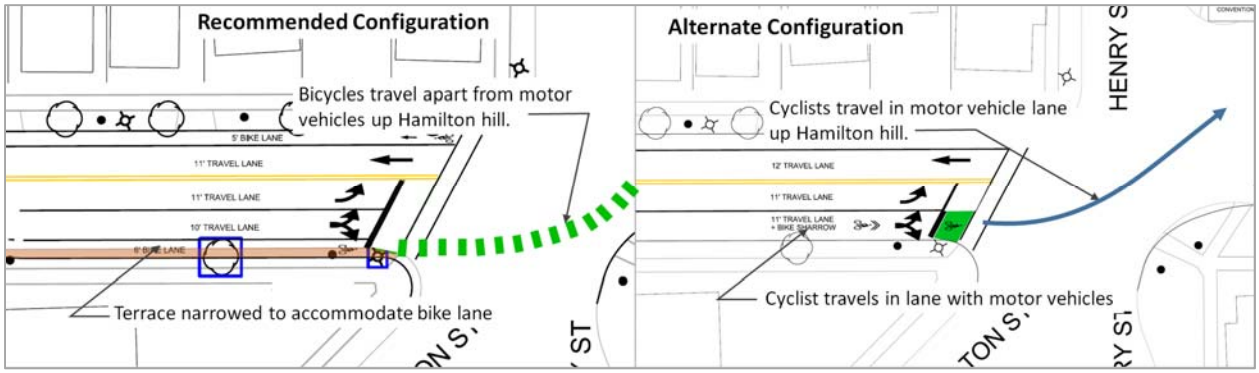


Figure 2.2-2 Alternative 2 Wilson/Hamilton intersection configuration options

Segment B – Henry Street to Butler Street

Alternative 2 removes parking and loading on the south side of Wilson Street and adds a buffered contra-flow bike lane on that side. Parking and loading is maintained on the north side of the street, as are the two one-way general purpose travel lanes westbound. For westbound bicycles, the travel lane adjacent to the parking loading would be labeled as a shared bike/motor vehicle lane.

Figure 3.2-3 Example of Contra Flow Bike Lane with Parking

Segment C – Henry Street to Blair Street

Under Alternative 2, striped bicycle lanes are added for both eastbound and westbound cyclists. This is accomplished by slightly narrowing the vehicular lanes, as well as narrowing the current three-foot median. Parking and loading would remain on both sides of Wilson Street.

Figure 2.2-4 schematically illustrates Alternative 2.

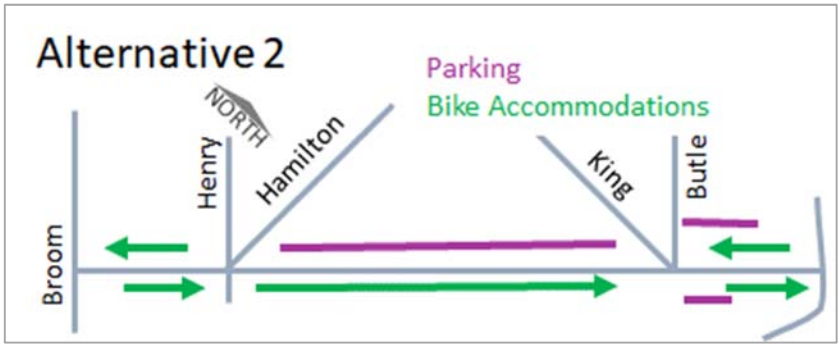


Figure 2.2-4 Alternative 2 Schematic

C. <u>Alternative 3 – Eastbound Bike Lane, Parking Removed</u>

Segment A – Broom Street to Henry Street

Alternative 3 adds a striped eastbound bike lane, yet continues to have a westbound shared bicycle/general purpose lane. Under this scenario, the westbound lane is reduced from 16 to 13 feet. The shared bike/traffic lane in the westbound direction is preferable to a shared bike/traffic lane in the east bound direction. The grade in the westbound direction allows cyclists to approach speeds similar to motor vehicles. Eastbound, two general purpose lanes remain (as is the current condition).

Segment B – Henry Street to Butler Street

Alternative 3 creates two distinct options for different parts of Segment B. For the length of Segment B, a buffered contra-flow bike lane is provided on the south side of Wilson Street. Parking and loading would be maintained on the south side for the entirety of Segment B. Between Pinckney St and Henry St, parking and loading would be removed from the north side of the street, and two one-way general purpose travel lanes would continue westbound. However, from Butler Street to Pinckney Street, parking and loading would remain on both sides of the street, but only one auto travel lane would remain westbound. Like Alternative 2, the westbound travel lane on the north side of the corridor would be labeled as a shared bike/motor vehicle lane.

Segment C – Henry Street to Blair Street

Under Alternative 3, buffered bicycle lanes are added for both eastbound and westbound cyclists. As with Alternative 2, narrowing the vehicular lanes and the median help add the space needed for bike lanes. However, in order to create the needed space for the buffers, parking is removed on the south side of the street.

Figure 2.2-5 schematically illustrates Alternative 3.

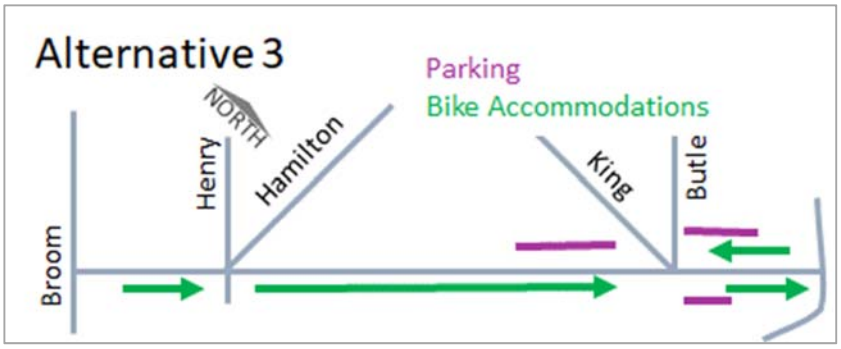


Figure 2.2-5 Alternative 3 Schematic

D. Alternative 4 – Bus Lane

Alternative 4 would have the same configurations in Segments A and C as either Alternatives 1, 2 or 3. Yet in Segment B instead of a contra bicycle lane in Segment B, a contra flow bus lane is provided. This alternative would remove parking and loading from the south side of Wilson Street, so as to add the shared bus/bike lane, operating contra-flow to the general purpose vehicular traffic traveling one-way westbound. Parking and loading would remain on the north-side of the street, as would two, one-way general purpose vehicle lanes. For westbound bicycles, the travel lane adjacent to the parking loading would be labeled as a shared bike/motor vehicle lane. Figure 2.2-6 provides a typical section illustrating this configuration.

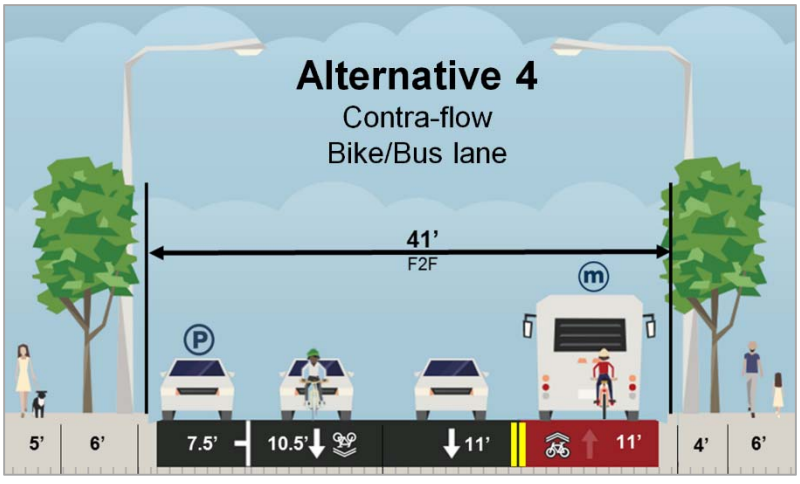


Figure 2.2-6 Alternative 4 in Segment B

E. Broom Street

At the Public Information Meetings (PIM), one of the most vocal concerns expressed by participants was the difficult and unsafe connectivity for pedestrians and bicyclists from the Capital City Path to the intersection of Broom and Wilson Streets. The crossing of John Nolen Drive was deemed especially unsafe and uncomfortable, as the crossing under current conditions must be done in three separate stages.

At the Broom/John Nolen intersection, green paint markings for the crossing of John Nolen Drive would be used to enhance visibility (Figure 2.2-7).

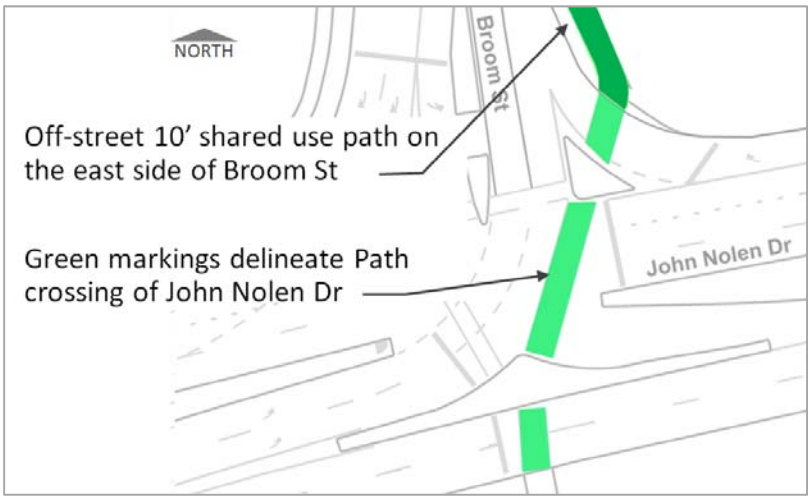


Figure 2.2-7 Bicycle crossing of John Nolen Drive

Once John Nolen Drive has been crossed, Broom Street's current travel lanes could be slightly narrowed to create an additional five feet within the right-of-way. Then, a 10-foot raised shared-use path would be created on the east side of Broom Street (using the current 5-foot sidewalk). This new shared-use path would be marked for use by bicycles and pedestrians. (Figure 2.2-8)

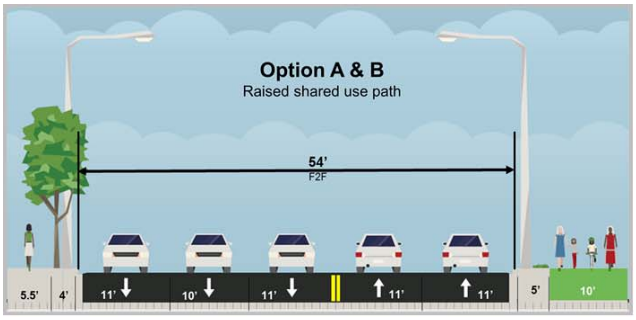


Figure 2.2-8 Example typical section on Broom Street, providing raised shared use path on east side.

At the Broom Street/Wilson Street intersection, the channelized right turn (northbound Broom onto eastbound Wilson) could be eliminated, and that right turn movement would be controlled by the traffic signal. An alternate treatment would be installing a table top pedestrian crossing within the channelized right turn to reduce travel speeds.

North of Wilson Street, the raised shared use path could be continued north on Broom to Doty, either by combining it with the sidewalk – which would remove about three trees. Or by removing one northbound travel lane.

North of Doty, Broom Street pavement is in relatively good condition. The shared use path could be extended to Main Street as a two-way bike path at street grade. This would require removing about 6 parking spaces on northbound Broom Street between Doty and Main Street.

If extended all the way to Main Street, this shared use path would function as a separated bikeway that connects the Capital City Path to the Main Street Bicycle Blvd.

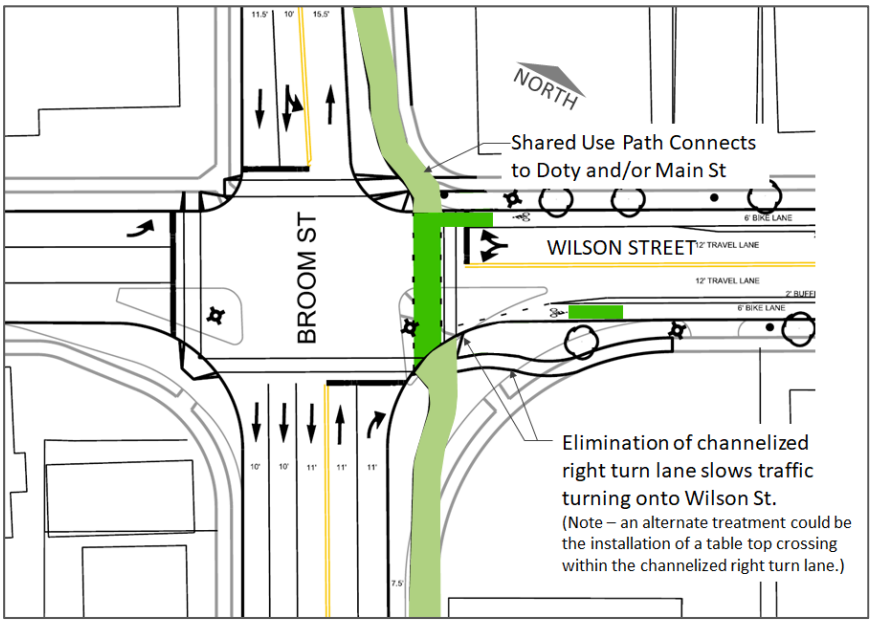


Figure 2.2-9 Wilson-Broom Street intersection with shared use path

With the Broom Street accommodations there are essentially four options:

A. No shared use sidepath. There would continue to not be a connection between John Nolen Drive and the streets that Broom Street serves.
B. Shared use sidepath (raised) from John Nolen Drive to Wilson Street only. An on-street northbound bike lane would travel north from Wilson Street.
C. Shared use sidepath (raised) from John Nolen Drive to Doty Street only. An on-street northbound bike lane would travel north from Doty Street.
D. Shared use sidepath (raised) from John Nolen Drive to Doty Street, and street grade shared use sidepath from Doty St to Main St.

These options are illustrated in Figure 2.2-10.

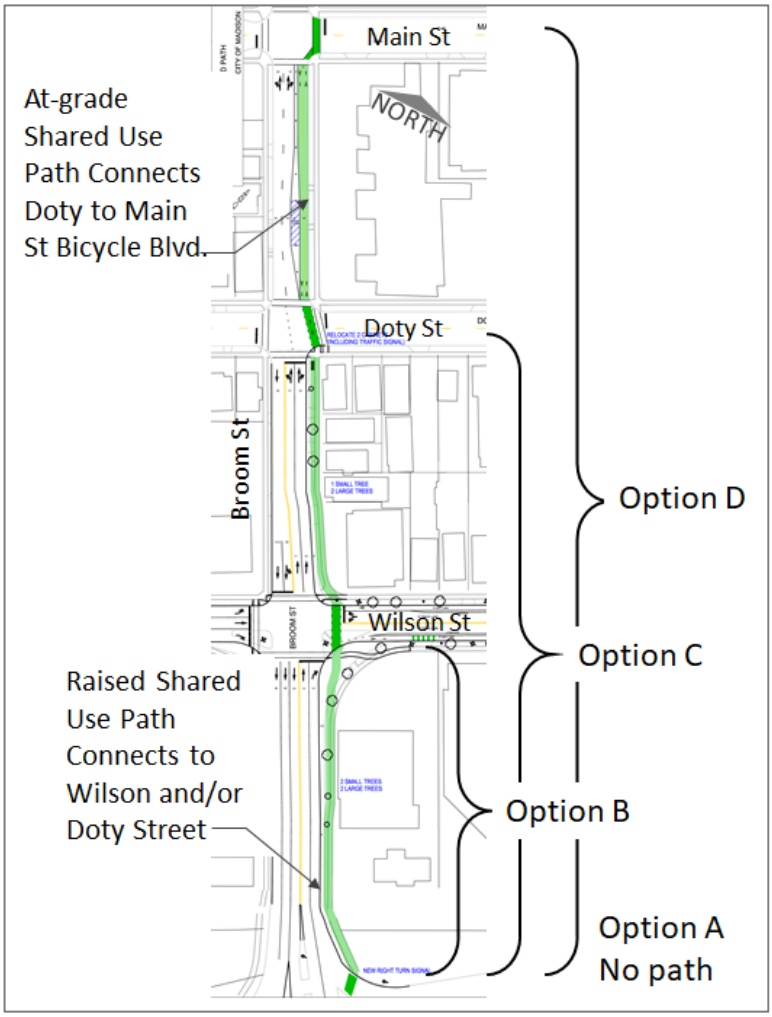


Figure 2.2-10 Extension of shared use path to Wilson, Doty and/or Main Street

F. Intersection Improvements Along Wilson Street

Intersection improvements will be made as part of any alternative that is selected. Pedestrian improvements could include a raised, pavement "table top" at Martin Luther King Jr. Blvd, which will likely be reconstructed in the coming years. Continental crosswalks and bulb outs that shorten pedestrian crossings will also be considered.

2.3 Alternatives Presented at February 18, 2019 PIM

After reviewing comments from the public, meeting attendees and staff, three additional alternatives (with a few sub-alternatives) were developed and presented at the February 18 PIM. Some of the suggestions requested evaluation of a protected bike lane alternative. Additionally, some mentioned the possibility of using peak hour parking restrictions to meet both parking and motor vehicle needs.

The study team re-used number schemes for the February 28 meeting, which if used in this report would cause confusion. Consequently, the alternatives are renumbered for this report and then referenced February 28, 2019 meeting.

A. Alternative 5 (Alt 1 in Feb 28, 2019 Mtg) – Bike Lanes with Traffic

Segment A – Broom Street to Henry Street
Buffered Bike Lane - Alternative 5 adds buffered bicycle lanes in each direction on this block. This option is similar to the option presented at the December 6 PIM as Alternative 2 (also described above.) This option reduces the number of eastbound general purpose lanes from two to one, narrows the remaining two travel lanes and adds the buffered bicycle lanes in both eastbound and westbound directions. As noted, traffic modeling showed that about 200 feet of the approach to the Henry/Hamilton intersection would likely need to be two general purpose lanes, to accommodate the large inbound turning volumes and not create long queues. In this case, additional terrace would be needed to keep the buffered bicycle lane all the way to the intersection.

Segment B – Henry Street to Butler Street
Alternative 5 for Segment B adds a striped bicycle lane in the westbound direction only. This Alternative also maintains parking and loading on both sides of the street. It also keeps both travel lanes one-way westbound, but slightly narrows them.

Segment C – Henry Street to Blair Street
Alternative 5 for Segment C is the option presented on December 6 as Alternatives 2, where striped bicycle lanes are added for both eastbound and westbound cyclists. This is accomplished by slightly narrowing the vehicular lanes, as well as narrowing the current three-foot median. Parking and loading would remain on both sides of Wilson Street.

In summary, Alternative 5 (Alt 1 at Feb 28 Mtg) adds bicycle lanes in all 3 Segments, some buffered and some simply striped. The only exception is for eastbound cyclists in Segment B, where no bicycle facility is provided in the eastbound direction. Figure 2.3-1 schematically illustrates this alternative.

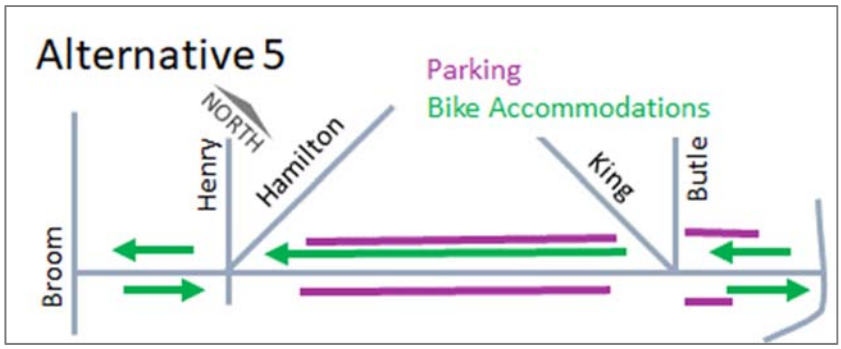


Figure 2.3-1 Alternative 5 Schematic (Alt 1 in Feb 28 Mtg)

Alternative 6 and 6A (Alt 2 and 2A in Feb 28, 2019 Mtg) – Contra flow Bike Lane

Alternative 6 (including Alt. 5A) considers various designs for a contra-flow bicycle lane along Segment B. Segments A and C are the same as described as Alternative 1.

Segment A – Broom Street to Henry
Buffered Bike Lane - Alternative 6 adds buffered bicycle lanes in each direction on this block, similar to Alternatives 2 and 5.

Segment B – Henry Street to Butler Street
Alternative 6 includes a couple of options for adding a buffered bike lane in the eastbound direction along Segment B, in addition to a striped bike lane for westbound cyclists. Alternative 2 also shows a different design for peak period travel (both a.m. and p.m. peak periods) and off-peak times.

Peak Period (Alt. 6)
Alternative 6 provides a contra-flow bicycle lane adjacent to the westbound travel lane. During peak periods, when motor vehicle traffic demands are highest, two one-way westbound travel lanes are maintained. Under this option, parking and loading on the north side of Wilson Street would be restricted during these peak periods and a striped bike lane would be operational along the north side of the corridor. This is the current operation of Doty Street (between Hamilton St and Pinckney St) during the p.m. peak period.

On the south side of the corridor, parking and loading would be maintained throughout the entire day. In addition, adjacent to the south side parking and loading a buffered contra-flow bike lane would be added. Two sub-options for this peak period design on the south side would be the location of the parking and loading and the buffered contra-flow bike lane with respect to the curb face. One option could have parking at the curb and the bike lane next to traffic. Or, the contra-flow bicycle lane could be located next to the curb and the parking and loading next to traffic. One benefit of this sub-option is that bicyclists would be "protected" by parked vehicles, and would not be riding directly adjacent to traffic. However, one drawback may be reduced visibility for bikes, by motorists accessing side streets or driveways.

Off-Peak Period (Alt. 6)
During off-peak times, on the north side of the corridor, parking and loading would be allowed and the striped bicycle lane would travel adjacent to traffic. This is called a "floating bike lane" and exists on Doty St one block to the north. (See Figure 2.3-2) This option reduces general purpose travel lanes from two to one, one-way westbound, during off-peak times.

The south side of the corridor, off-peak configuration would be the same as the peak periods, as described above - parking and loading maintained throughout the day with a buffered contra-flow bike lane added.

Alt 6A Protected Contra-Flow Bike Lane**.** For Alternative 6A, the east bound bike lane is protected by using the parking on the south side of Wilson as a barrier.

Figure 2.3-2 Floating bike lane on Doty Street. Location of bike lane varies with parking restrictions.

For portions of Segment B (between Henry and Carroll, as well as between Pinckney and Butler), Alternative 6 and 6A remove parking on both sides of the street at these locations. Two one-way westbound travel lanes are maintained and eastbound and westbound bike lanes are added.

Figure 2.3-3 illustrates the typical sections associated with Alternatives 6 and 6A.

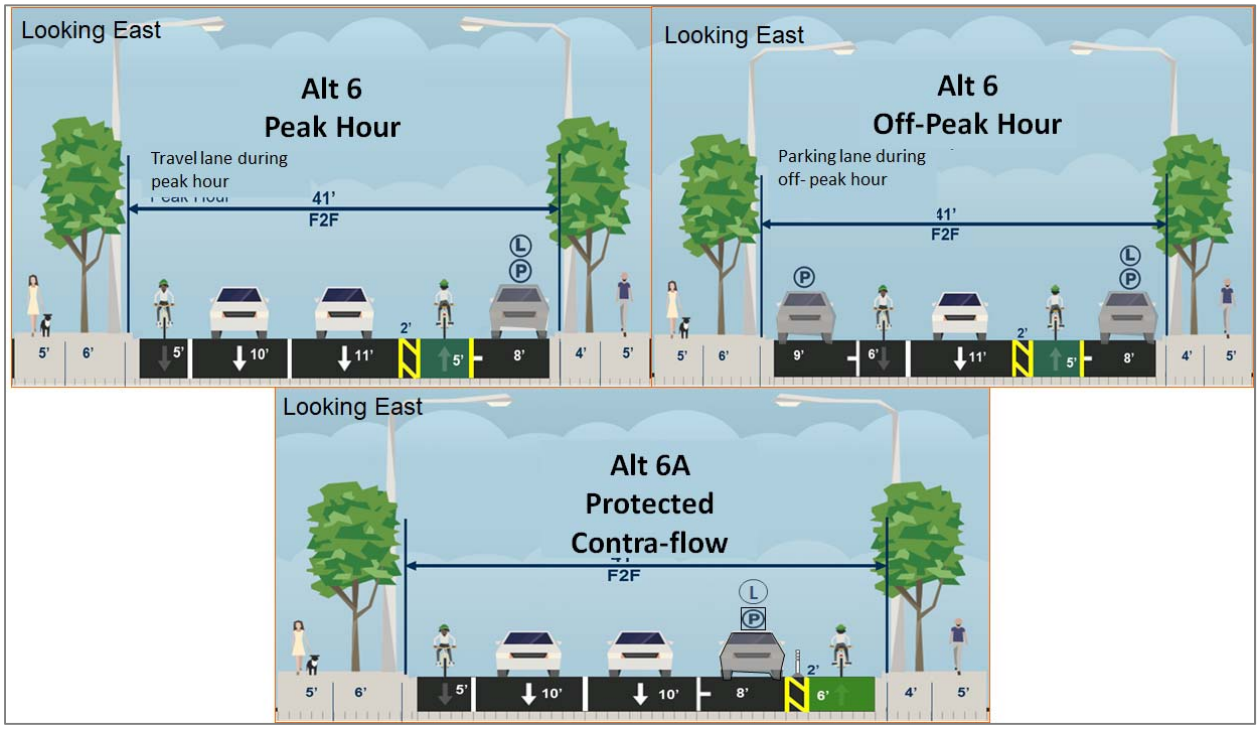


Figure 2.3-3 Alternative 6 and 6A Segment B Typical Segments

Segment C – Henry Street to Blair Street
Alternative 6 for Segment C is the same as in Alternative 5, where striped bicycle lanes are added for both eastbound and westbound cyclists. This is accomplished by slightly narrowing the vehicular lanes, as well as narrowing the current three-foot median. Parking and loading would remain on both sides of Wilson Street.

Figure 2.3-4 schematically illustrates Alternatives 6 and 6A.

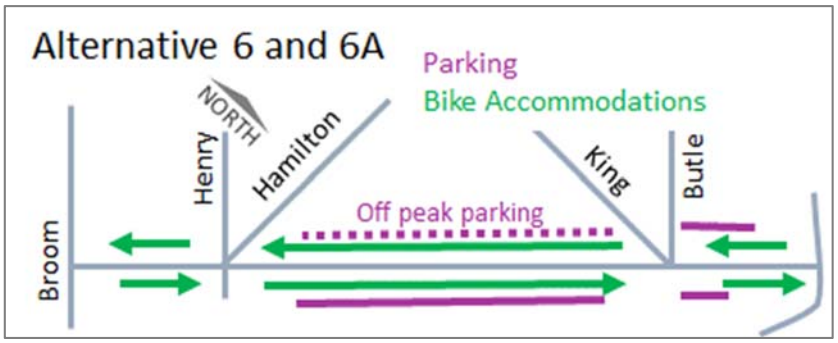


Figure 2.3-4 Alternative 6 Schematic

<u>Alternative 7 (Alt 3 in Feb 28, 2019 Mtg) – Separated Cycle Track</u>

Segment A – Broom Street to Henry
Separated Cycle Track - For Segment A (300 block of Wilson Street), a separated (buffered) cycle track would be installed. This would be a continuation of the raised shared-use path discussed above for Broom Street.

Figure 2.3-5 Example of Two-way Cycle Track in Boise Idaho

This option reduces the number of eastbound general purpose lanes from two to one, and adds a 10-foot buffered two-way cycle track along the south side of Wilson Street (adjacent to the curb). As noted, traffic modeling showed about 200 feet of the approach to the Henry/Hamilton intersection would likely need to be two eastbound lanes feeding into Hamilton Street, to avoid long queues. Some portion of the terrace will be needed to accommodate two lanes for about 200 feet.

Segment B – Henry Street to Butler Street
Separated Cycle Track - For Segment B, Alternative 3 considers a different design for peak period travel (both a.m. and p.m. peak periods) and off-peak times. For all times of the day, a 10-foot two-way cycle track would be added to the south side of the street, adjacent to the curb. Also throughout the day, parking and loading would be maintained on the south side, but located in between the westbound traffic lane and the cycle track. (See Figure 2.3-6)

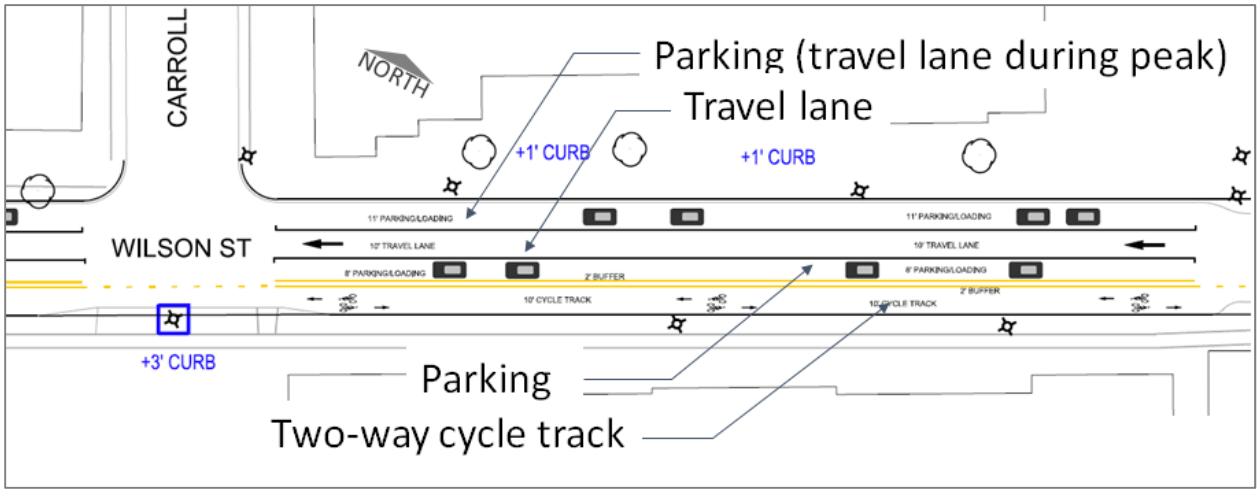


Figure 2.3-6 Illustration of Two-way Cycle Track in Segment B

During peak periods, parking would be removed on the north side of the street, and two one-way westbound travel lanes would be in operation. During off-peak periods, parking and loading would be restored on the north side of the street and Wilson Street would only have one lane for westbound vehicular traffic.

Having a two-way cycle track can present sight distance challenges for same direction cyclists and vehicles entering driveways. Figure 2.3-7 illustrates this problem. For this reason, FHWA and Massachusetts guidance recommend restricting parking near driveways. For Wilson Street, most driveways exist west of Carroll and East of Pinckney. Restricting parking in these sections would eliminate about 16 parking spaces on the south side. The loading zones that serve the businesses near the Hilton would remain. Some effort would be made to preserve a loading zone for Paisons. Figure 2.3-8 illustrates where parking would be eliminated with Alternative 7.

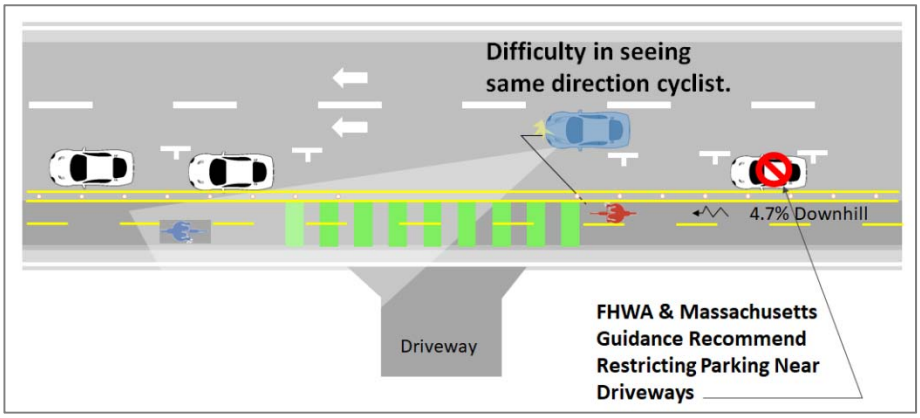


Figure 2.3-7 Sight distance challenges at driveways with two-way cycle track

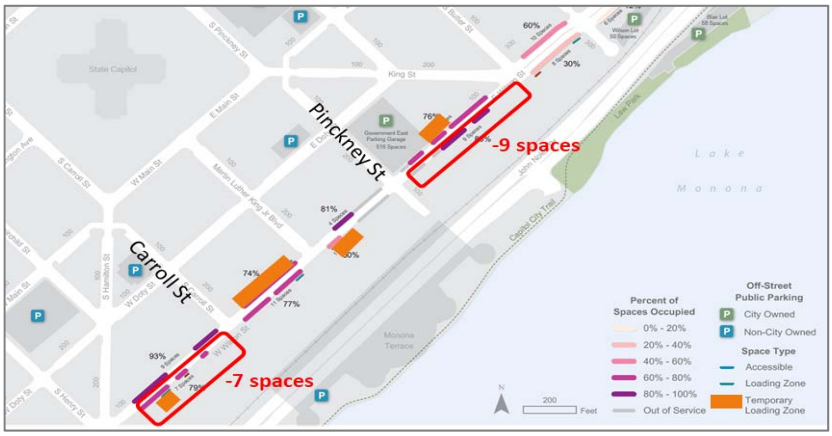


Figure 2.3-8 Parking eliminated with two-way protected cycle track

Segment C – Henry Street to Blair Street

Separated Cycle Track - For Segment C, Alternative 3 removes all parking and loading on the south side of the street and adds a 10-foot two-way cycle track.

Parking would be maintained on the north side of the street, two traffic lanes are maintained in each direction and the median would remain.

Figure 2.3-9 schematically illustrates Alternative 7, while Appendix A show street configurations.

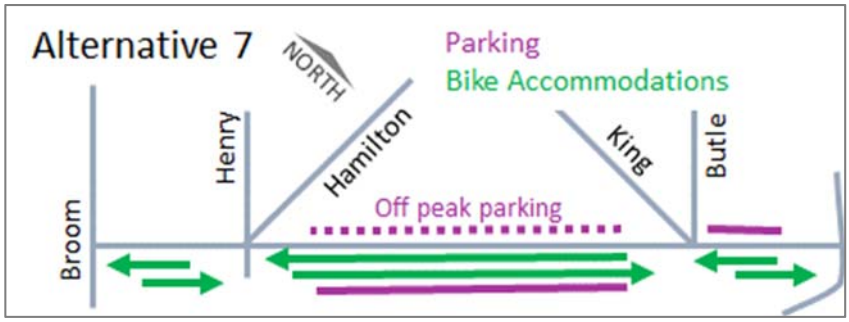


Figure 2.3-9 Alternative 7 – two-way protected cycle track

Section 3
Interim Recommendation

3.1 Current Decision

As of March 2019, there is not a full consensus on a Wilson Street corridor plan. Comments at PIM's tend to favor Alternative 7 (Two-way separated cycle track). While some residents express reservations about accommodating cyclists on Wilson Street.

Due to construction associated with Judge Doyle Square, as well as curb modifications that would need to occur in the 100 and 200 blocks of Wilson Street, it is not possible to implement a full corridor plan in 2019.

Since it is possible to develop a curb line for the 300 block that would work for multiple alternatives, the pending decision at this time is for the 300 block of Wilson, which is planned for reconstruction in 2019. This has many advantages:

- It would allow construction to occur on the 300 block, addressing the deteriorating water lines.
- It would allow more time for public discussion and meetings regarding the full corridor plan.
- It could improve bike and pedestrian conditions in the near-term, even without a full corridor plan being implemented.

For these reasons, this section makes a recommendation that can be constructed in the near term, with the understanding that the full corridor planning process will continue.

3.2 300 Block of Wilson Street

DOT staff recommend reconstructing the 300 block of Wilson Street with the curbs in the same location except for the east 200 feet, where the street would be widened by 3 feet. The study further recommends that in the interim, there be one eastbound and one westbound motor vehicle lane, with buffered bike lanes in both directions. The easterly 200 feet would be widened to accommodate two, left turning lanes onto Hamilton St, which would require the removal of one tree. Reasons for this recommendation include the following:

- Adding on-street bike accommodations is consistent with recommendations from the 2015 MATPB Bicycle Plan, 2016 Madison in Motion Transportation Plan, and 2018 Imagine Madison Comprehensive Plan.
- Adding on-street bike accommodations addresses the barrier highlighted in the 2018 MATPB Low Stress Network Plan.
- With the exception of the removal of one tree, keeping the curbs in their existing location maintains the existing tree canopy for this block.
- This curb configuration would work with Alternatives 5, 6 or 7. (See Figure 3.2-1)

Figure 3.2-2 illustrates the 200 feet where the terrace would need to be narrowed.

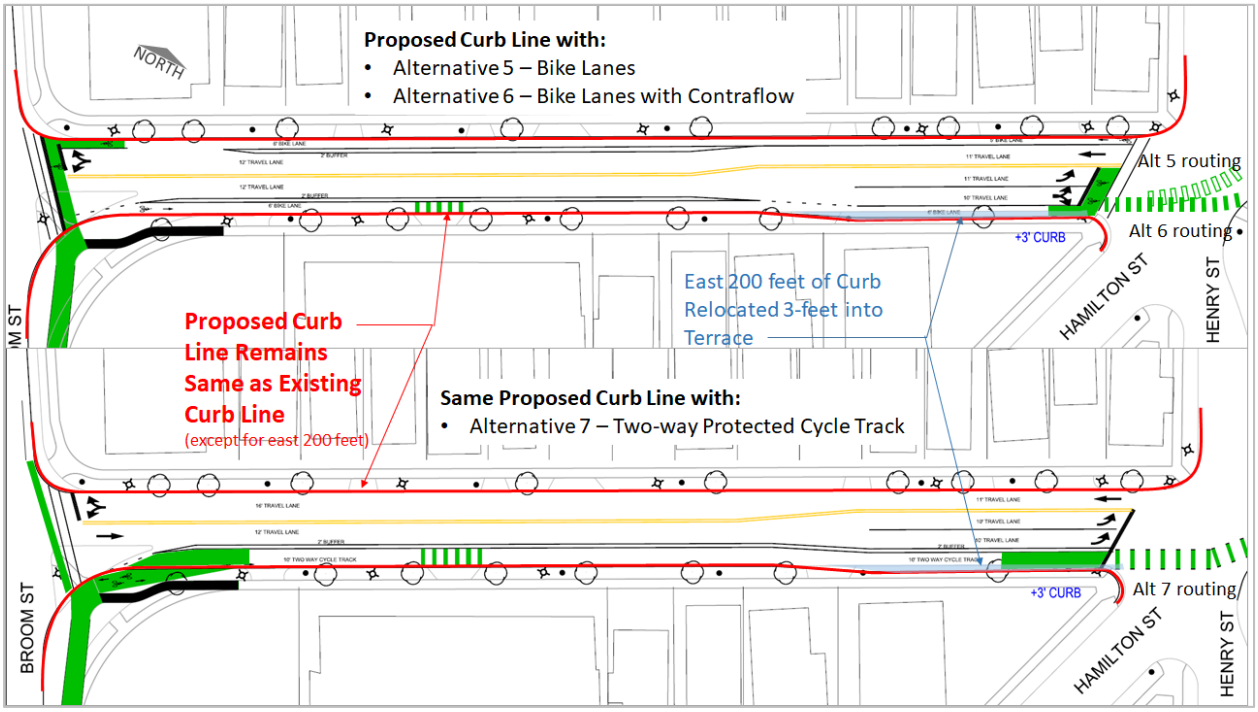


Figure 3.2-1 Curb line with Alternatives 5, 6, and 7

Alternate Configuration:

There is an alternate configuration of the Hamilton Street intersection that does not require narrowing of the terrace. It requires that cyclist share the motor vehicle travel lane and is illustrated in Figure 3.2-3.

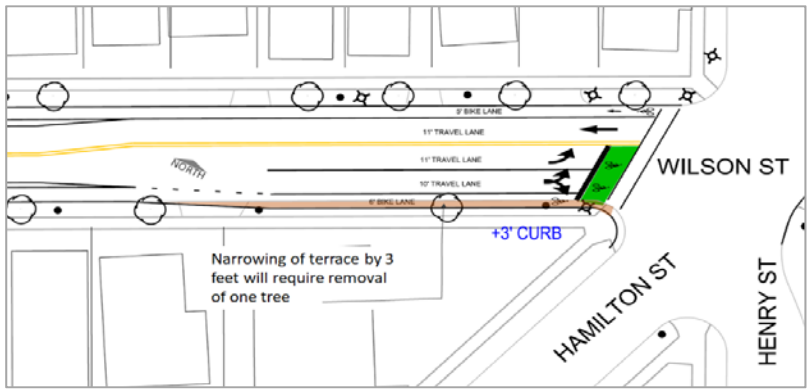


Figure 3.2-2 Terrace narrowing at Hamilton St intersection

This configuration:

- Provides a less favorable bicycle approach for Alternatives 5 and 6.
- Precludes construction of Alternative 7 unless the curb line is reconstructed.
- Mixes slow moving bicycle traffic traveling up the Hamilton hill with motor vehicle

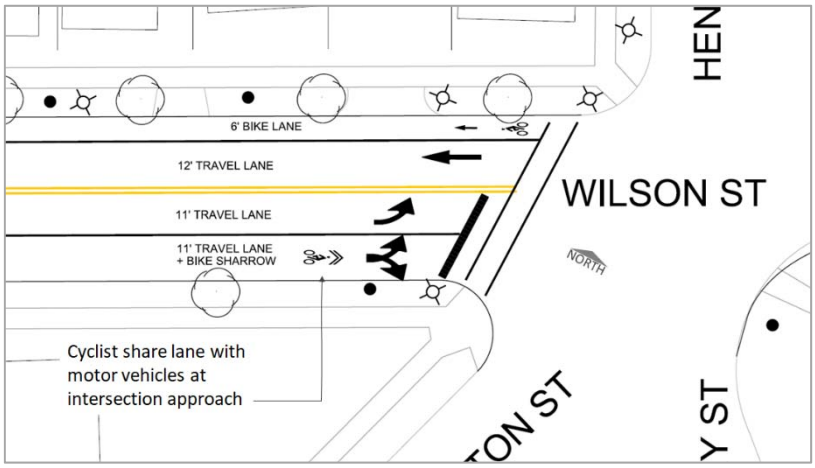


Figure 3.2-3 Alternate Hamilton Street intersection configuration

traffic. (See Figure 3.2-4)

- Does not require the removal of one tree.

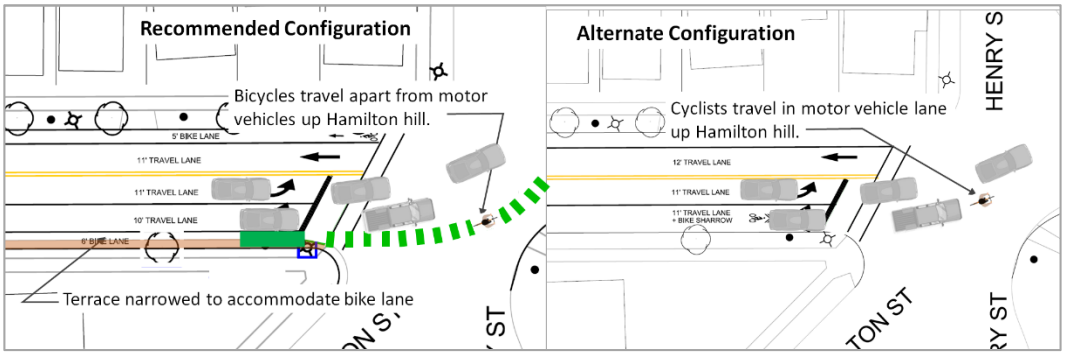


Figure 3.2-4 Comparison of configurations at Hamilton St intersection

3.3 Broom Street

At the Broom/John Nolen intersection, the study recommends enhancing the prominence of the crossing using green paint markings (Figure 3.3-1).

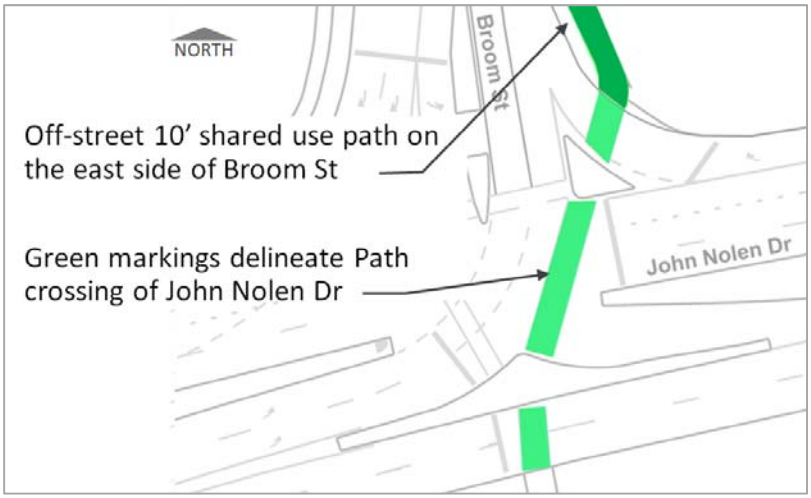


Figure 3.3-1 Bicycle crossing of John Nolen Drive

DOT staff further recommend narrowing Broom Street's current travel lanes to create an additional 5 feet within the right-of-way. A 10-foot raised shared-use path should be created on the east side of Broom Street (using the current 5-foot sidewalk). This new shared-use path would be marked for use by bicycles and pedestrians. (Figure 3.3-2) The shared use path from John Nolen Drive addresses a critical bicycle connection need that is currently being served by a narrow sidewalk.

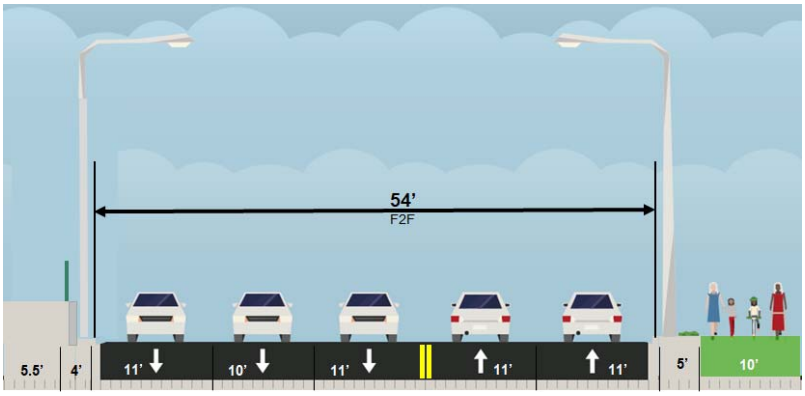


Figure 3.3-2 Proposed Broom Street shared use side path

North of Wilson Street, DOT staff recommend continuing the raised shared use path to Doty Street. This will require narrowing the lanes and may require removing two mature trees. (Note that these trees may be preserved by removing one northbound travel lane. Traffic modeling indicates that providing only one northbound travel lane between Wilson Street and Doty Street will increase the delay of the signalized intersection of Broom Street and Doty Street by 12 seconds to a total intersection delay of 25 seconds. Queue length for one northbound lane in this

section the will increase the 95th percentile by 210 feet to 310 feet, almost the entire length of the block between Wilson Street and Doty Street during peak hours.)

North of Doty Street, the pavement on Broom Street is in good condition. Therefore the shared use path would become an at-grade two-way cycle track to the Main Street bicycle boulevard. The existing sidewalk would remain in this block, however about 6 parking spaces would be removed. To implement the cycle track for this block, a floating bus stop is recommended.

Reasons for this recommendation include the following:

- The raised two-way shared use path provides a critical connection to the Capital City Trail. Currently many cyclists travel on the sidewalk to accomplish this movement.
- On street accommodations are recommended for Broom Street in the Madison in Motion Transportation Plan as well as the Imagine Madison Comprehensive Plan.
- The shared use path provides an excellent bicycle connection for three separate streets accessing the square.
- Bike accommodations on both Bassett Street and Broom Street provide a connection to the University which is currently lacking.

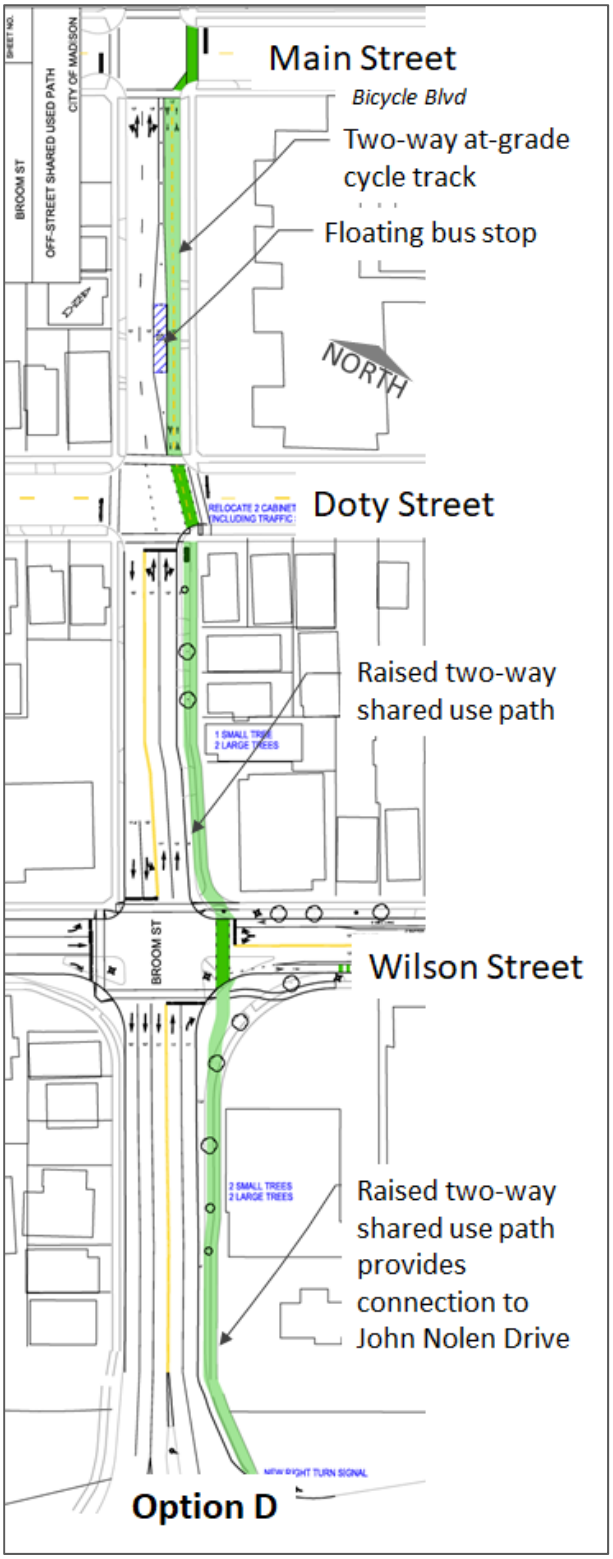


Figure 3.3-3 Recommended Broom Street bike accommodations – Option D

An alternate Broom Street configuration is show in Figure 3.3-4. With this arrangement, a raised two-way shared use path is provided between John Nolen Drive and Wilson Street. North of Wilson Street, there would be a northbound buffered bike lane to Doty Street. North of Doty Street, the northbound bike lane would continue as a protected bike lane. In the block between Doty Street and Main Street, about six parking spaces would be eliminated and the bus stop would need to be converted to a floating bus stop. This one-way northbound bike accommodation system would complement the southbound protected bike lane proposed for Bassett Street, creating a couplet. This provides a good alternative to the recommendation, yet does not provide the same level of accessibility to the square. Cyclists coming from the square on Doty and Main Street, would need to cross Broom Street to get to southbound Bassett Street, travel on Bassett Street and West Wilson, cross Broom Street again, to get to the Capital City trail by the lake. This creates somewhat more indirection, which is why it is considered an alternate configuration, rather than DOT's recommended configuration.

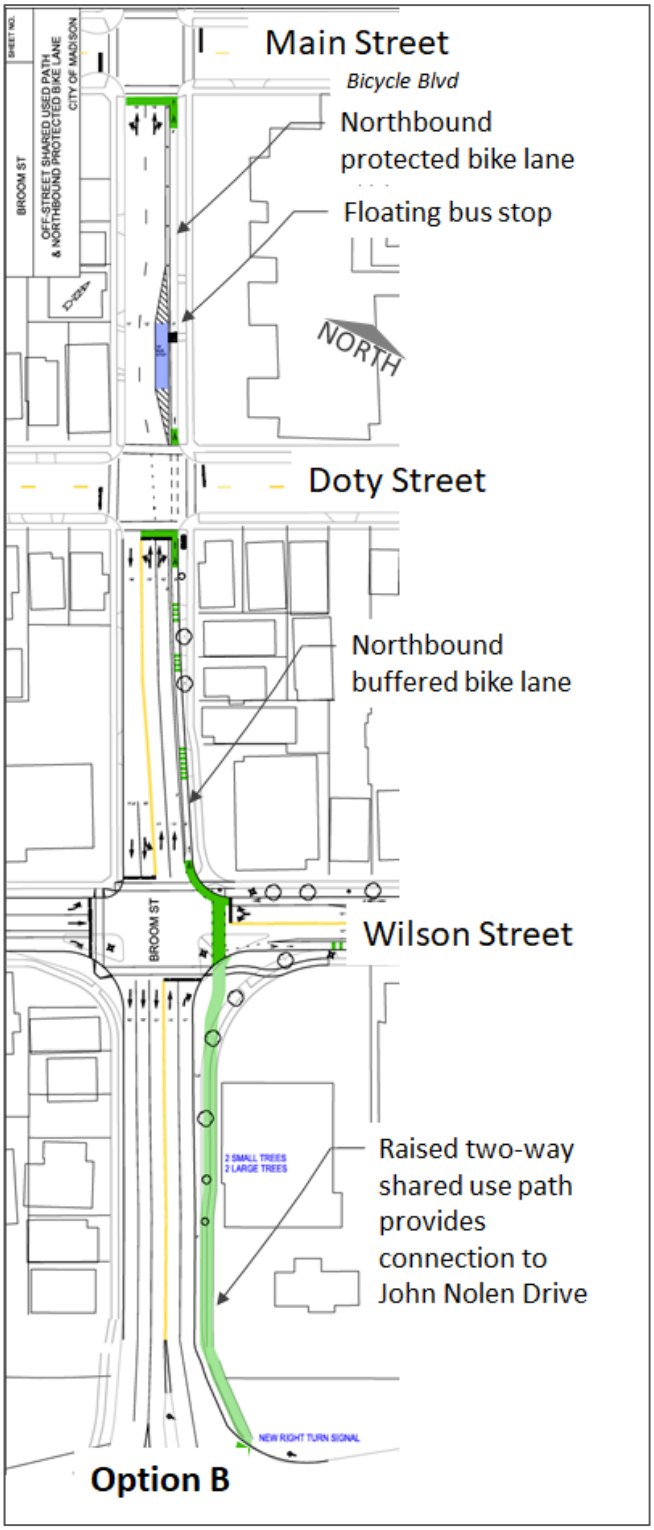


Figure 3.3-3 Alternate Broom Street bike accommodations – Option B.

3.4 Broom Street – Wilson Street Intersection

At the Broom Street/Wilson Street intersection, DOT staff recommend eliminating the channelized right turn (northbound Broom onto eastbound Wilson). The right turn movement would be controlled by the traffic signal. This will reduce travel speeds on eastbound Wilson Street and reduce the crossing distance for northbound/southbound pedestrians. One alternate treatment would be to install a table top pedestrian crossing within the channelized right turn to control speeds.

Appropriate bike box markings will direct cyclists to the northbound bike lane as well as the two-way shared cycle track. Figure 3.4-1 illustrates the recommended improvements.

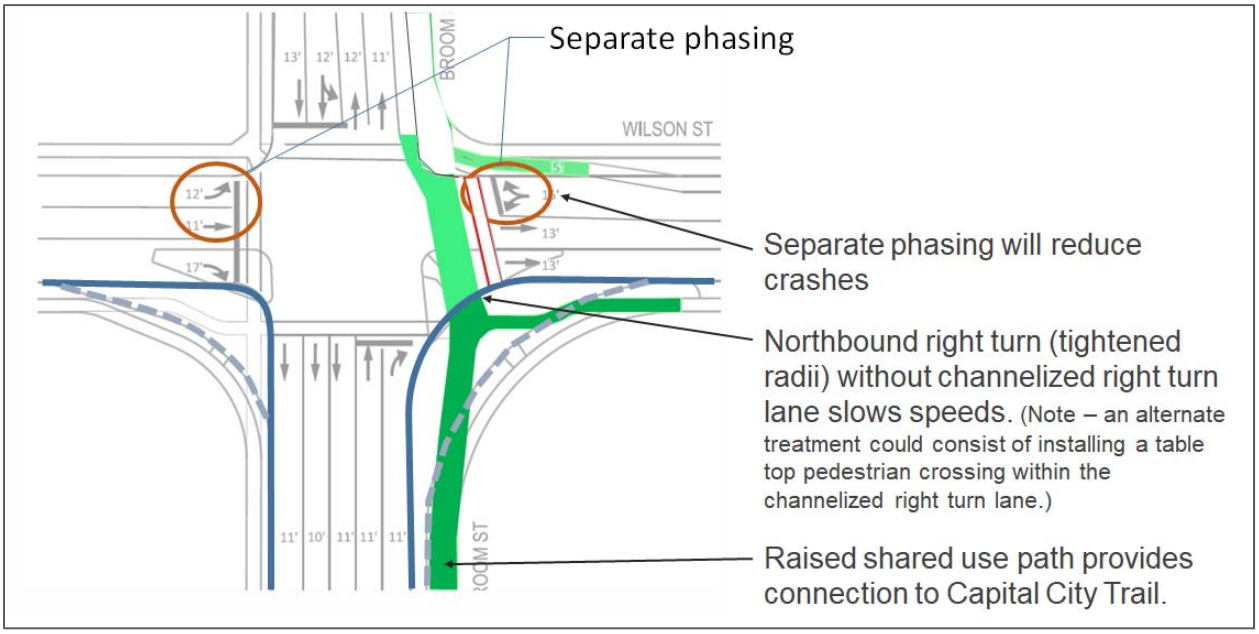
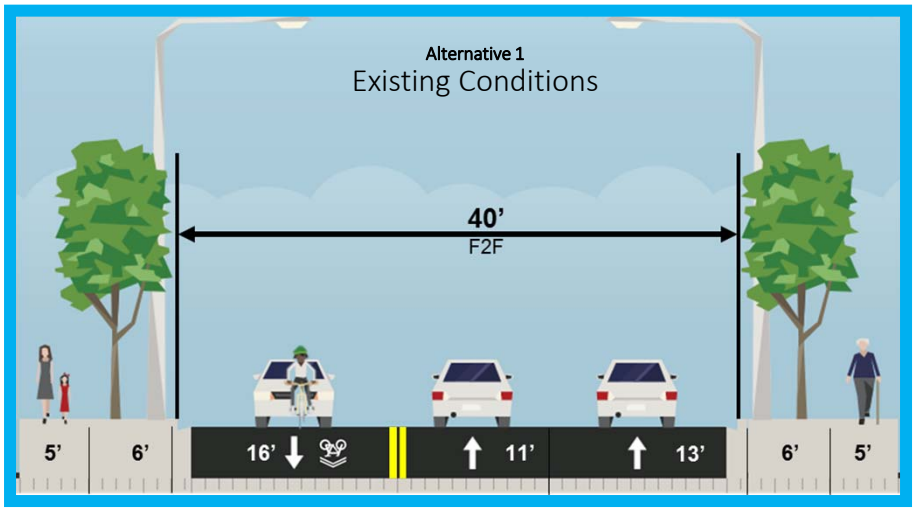
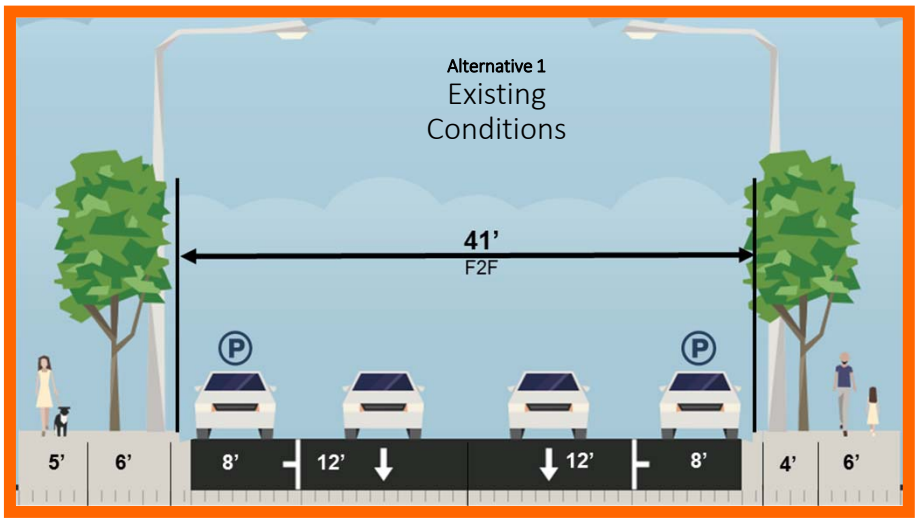
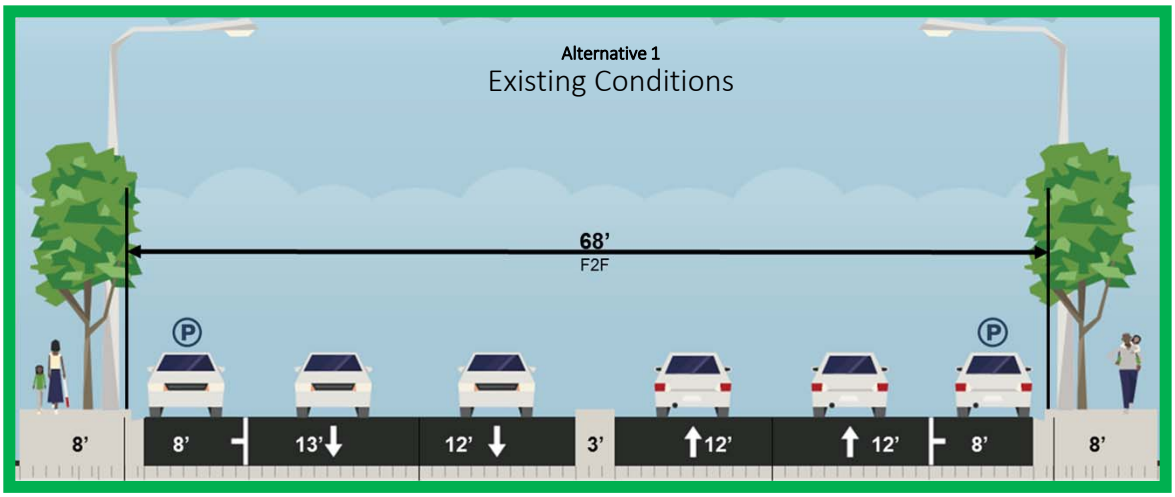


Figure 3.4-1 Wilson Street Broom Street Intersection

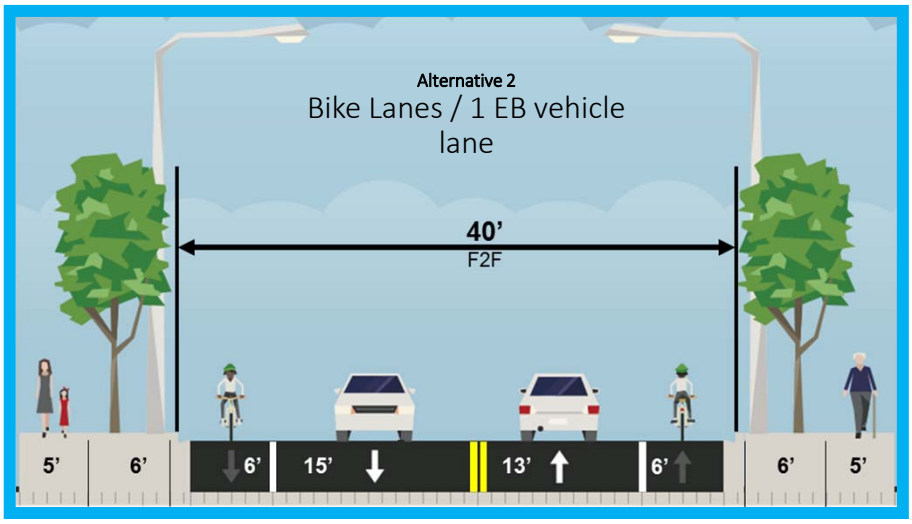
Typical Sections

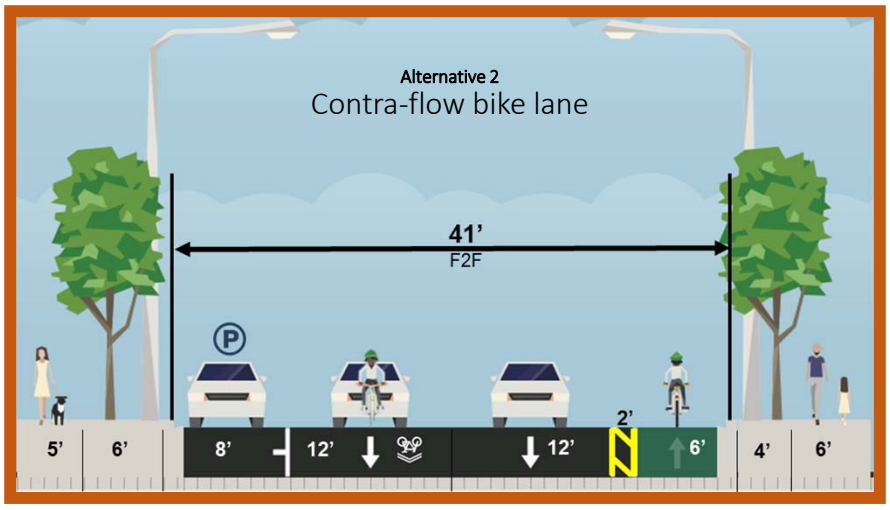


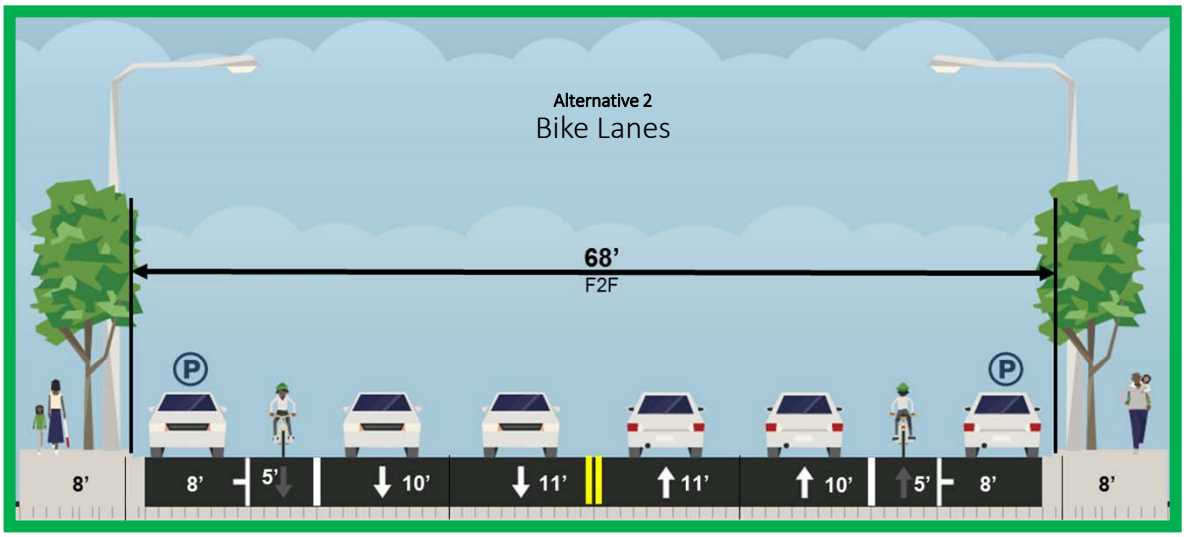




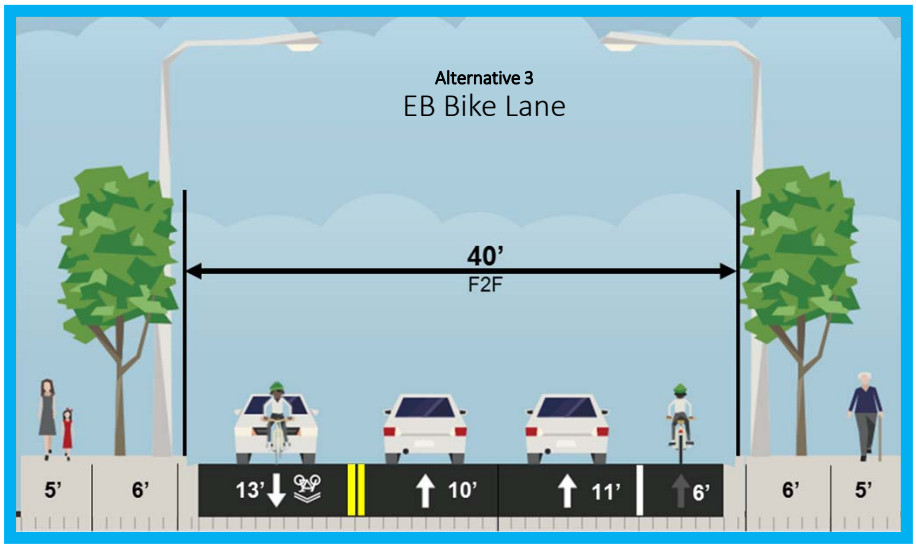
Typical Sections

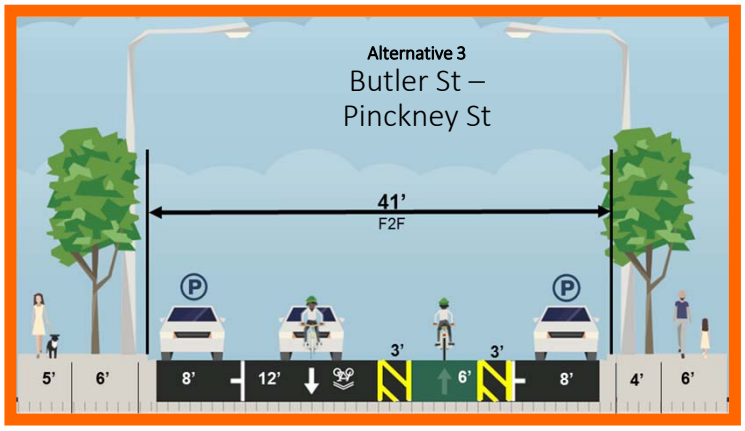


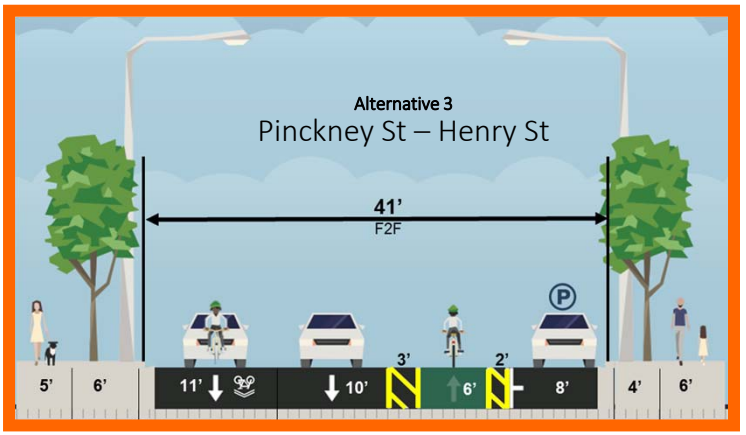


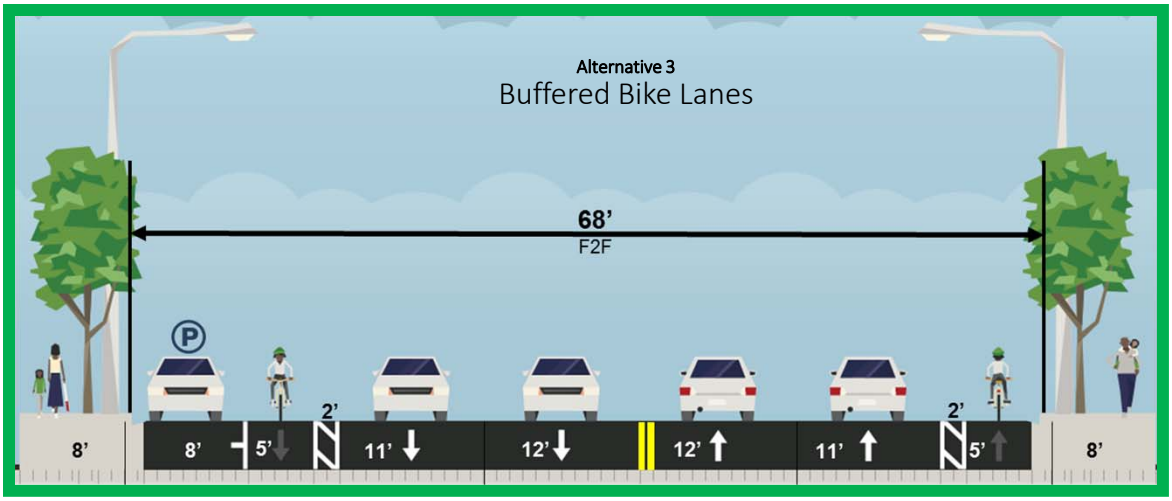


Typical Sections

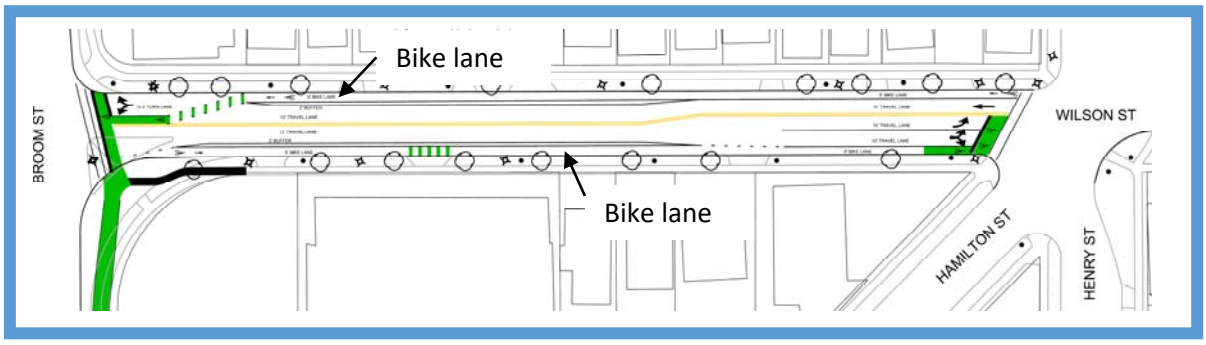


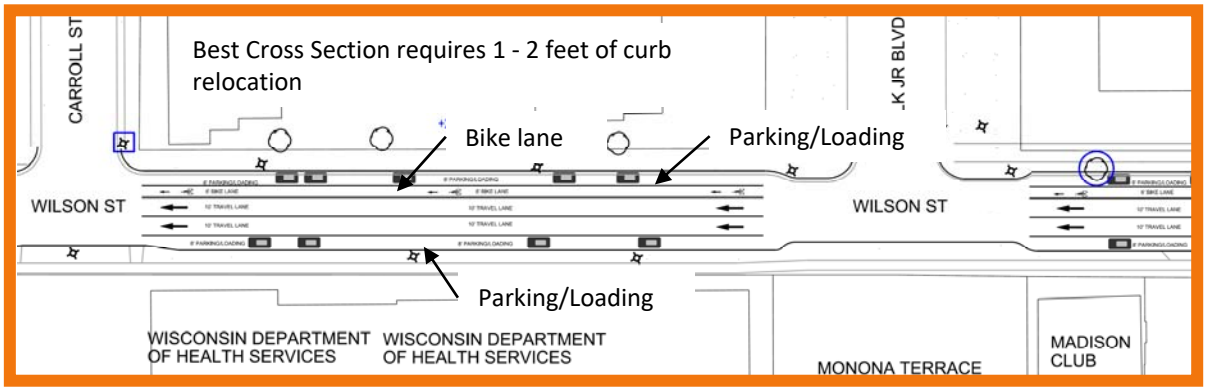


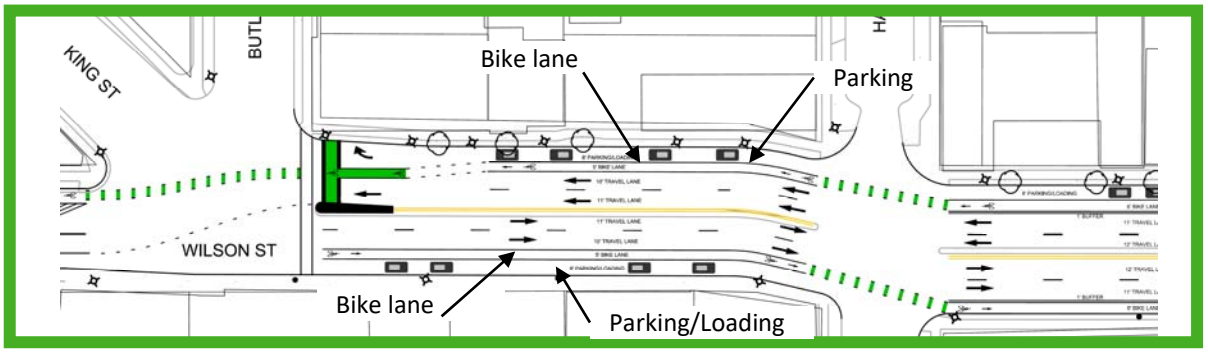




Concept Drawing







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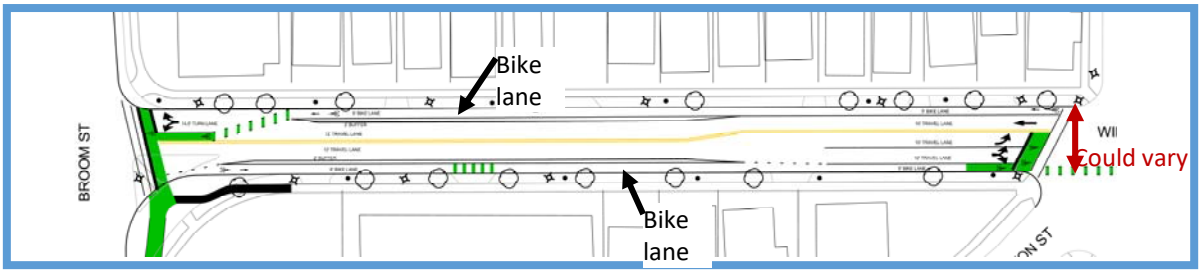
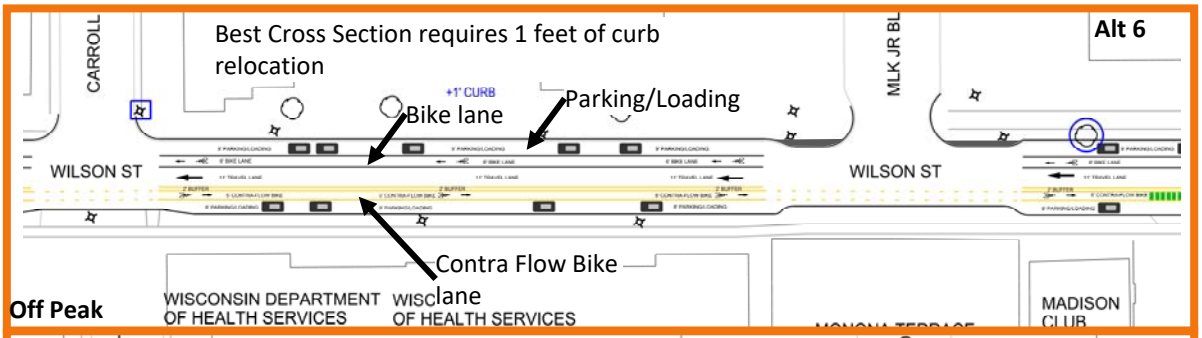
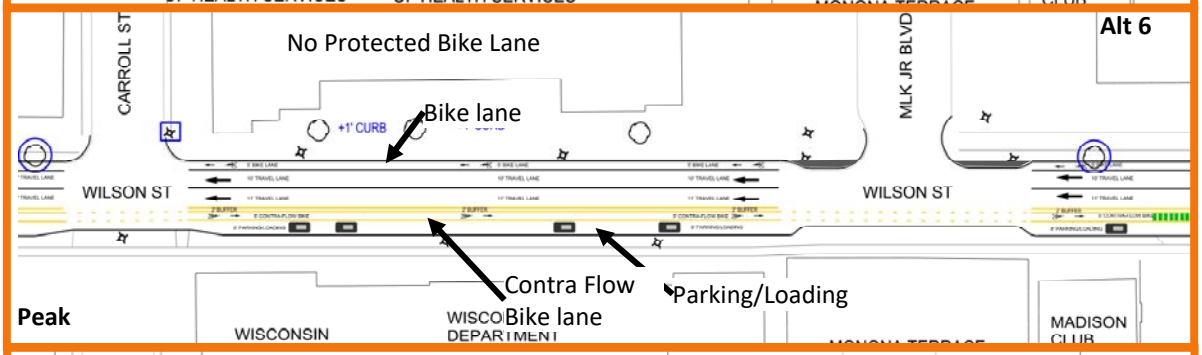
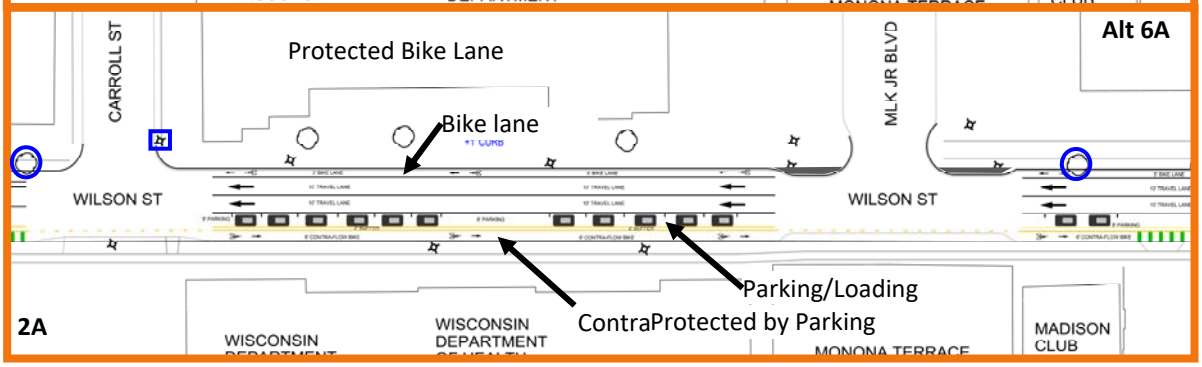
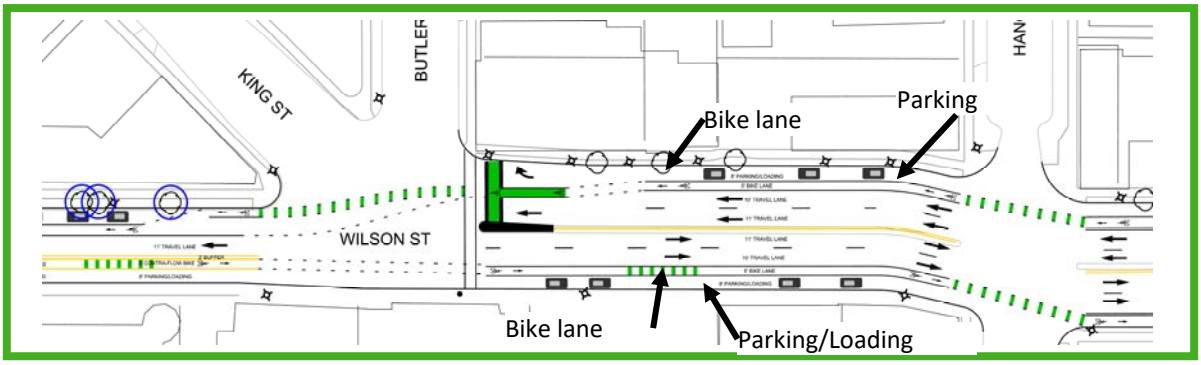








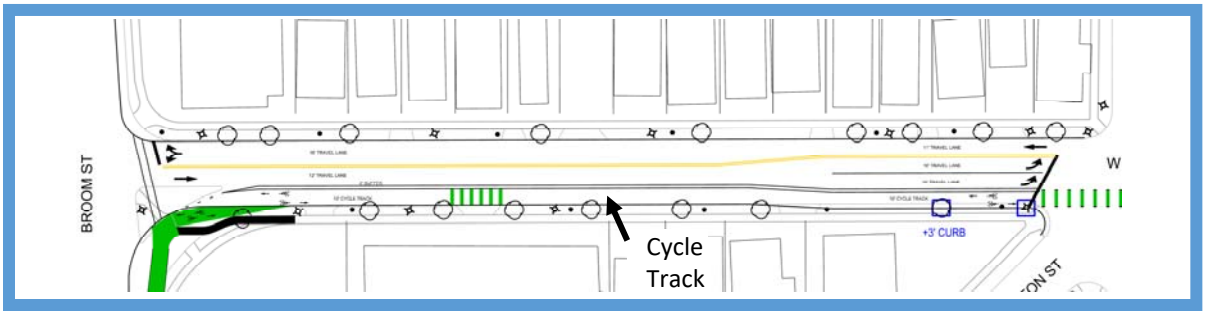


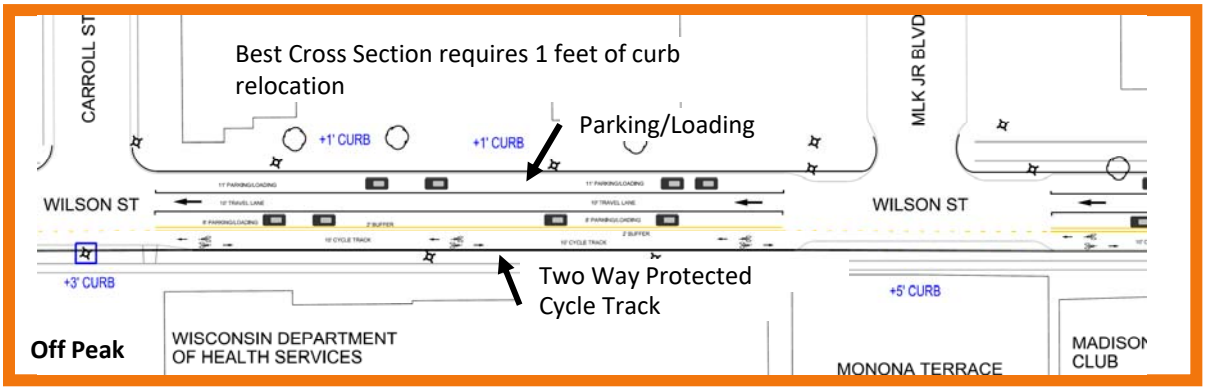
DEPARTMENT OF TRANSPORTATION

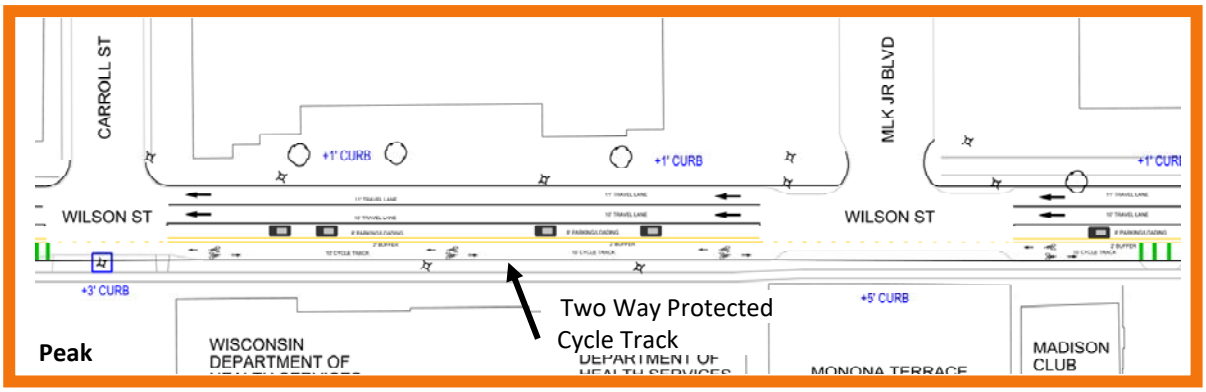
Alternative 6 & 6A – Contra Flow Bike Lane

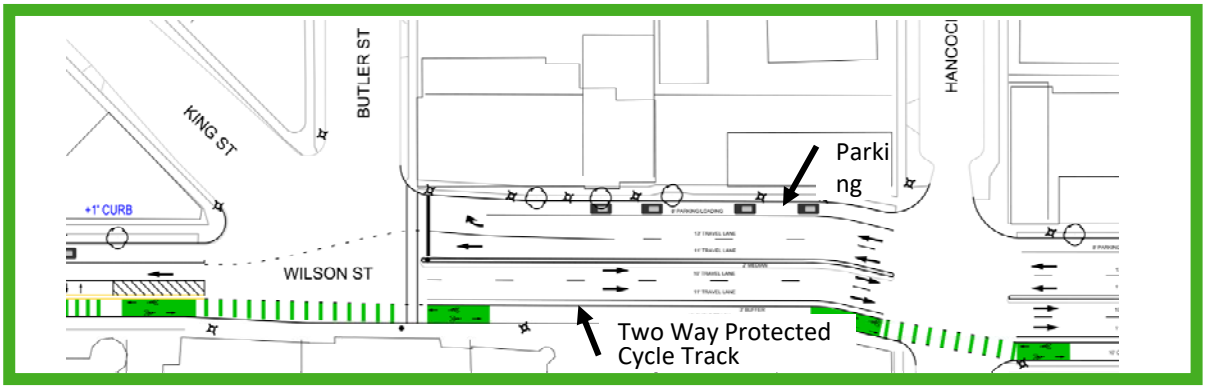
(Alt 2 & 2A at Feb 28 Mtg)

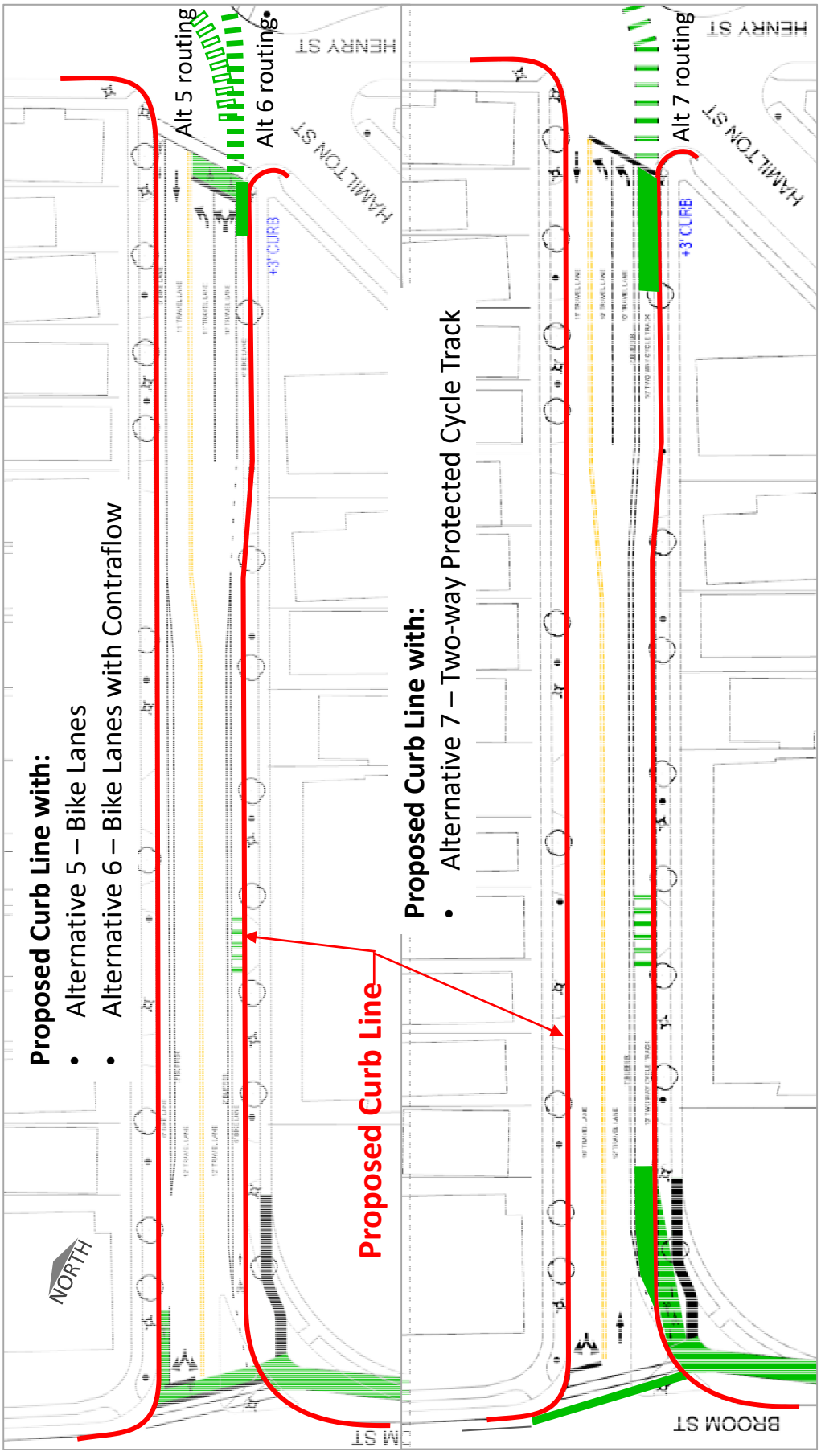
Concept Drawing





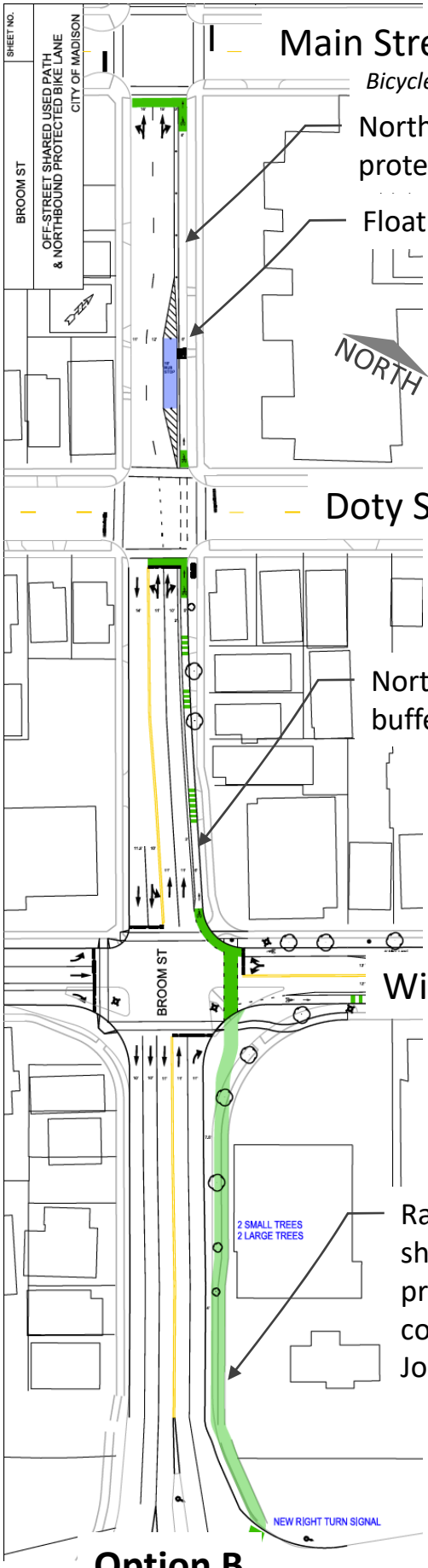




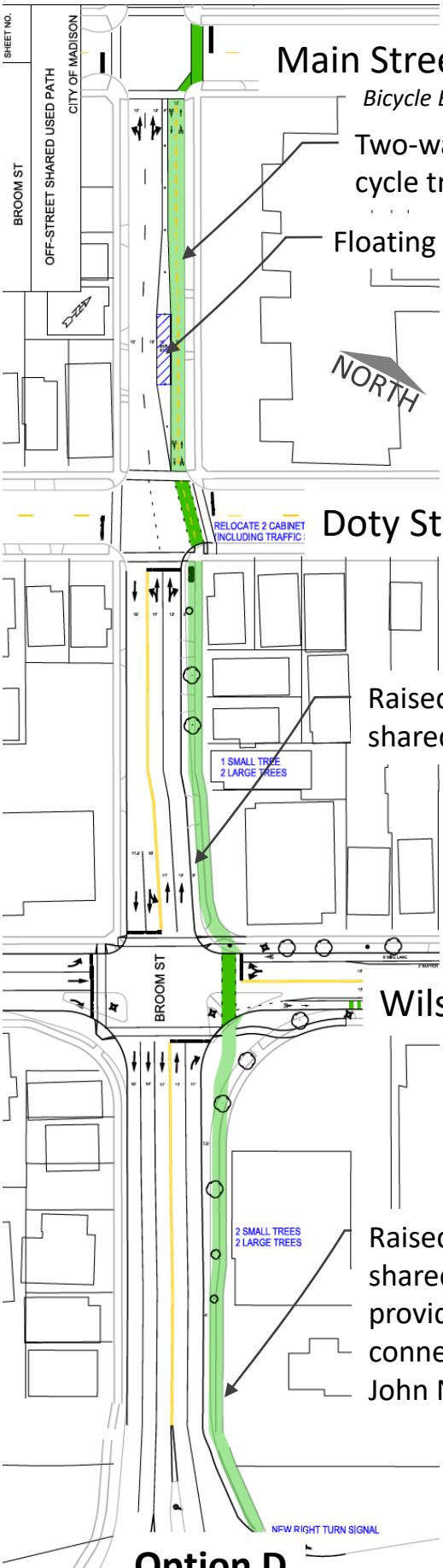


DEPARTMENT OF TRANSPORTATION

Proposed Curb Line 300 Block of Wilson



Option B



Option D

DEPARTMENT OF TRANSPORTATION

Broom Street Alternatives

Appendix B

300 BLOCK W WILSON STREET | SHEET NO.

CONVENTIONAL BIKE LANES

CITY OF MADISON

Interim Recommendation

WILSON ST

6' BIKE LANE
2' BUFFER
12' TRAVEL LANE
12' TRAVEL LANE
2' BUFFER
6' BIKE LANE
5' BIKE LANE
11' TRAVEL LANE
11' TRAVEL LANE
10' TRAVEL LANE
6' BIKE LANE
+3' CURB

EXISTING & PROPOSED CURB

EXISTING CURB

PROPOSED CURB

HAMILTON ST

7.5'

PLOT SCALE:

PLOT NAME:

REV. DATE:

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG, DIV.

FILE NAME: $$...designfile...$$

DATE: $$...plottingdate...$$

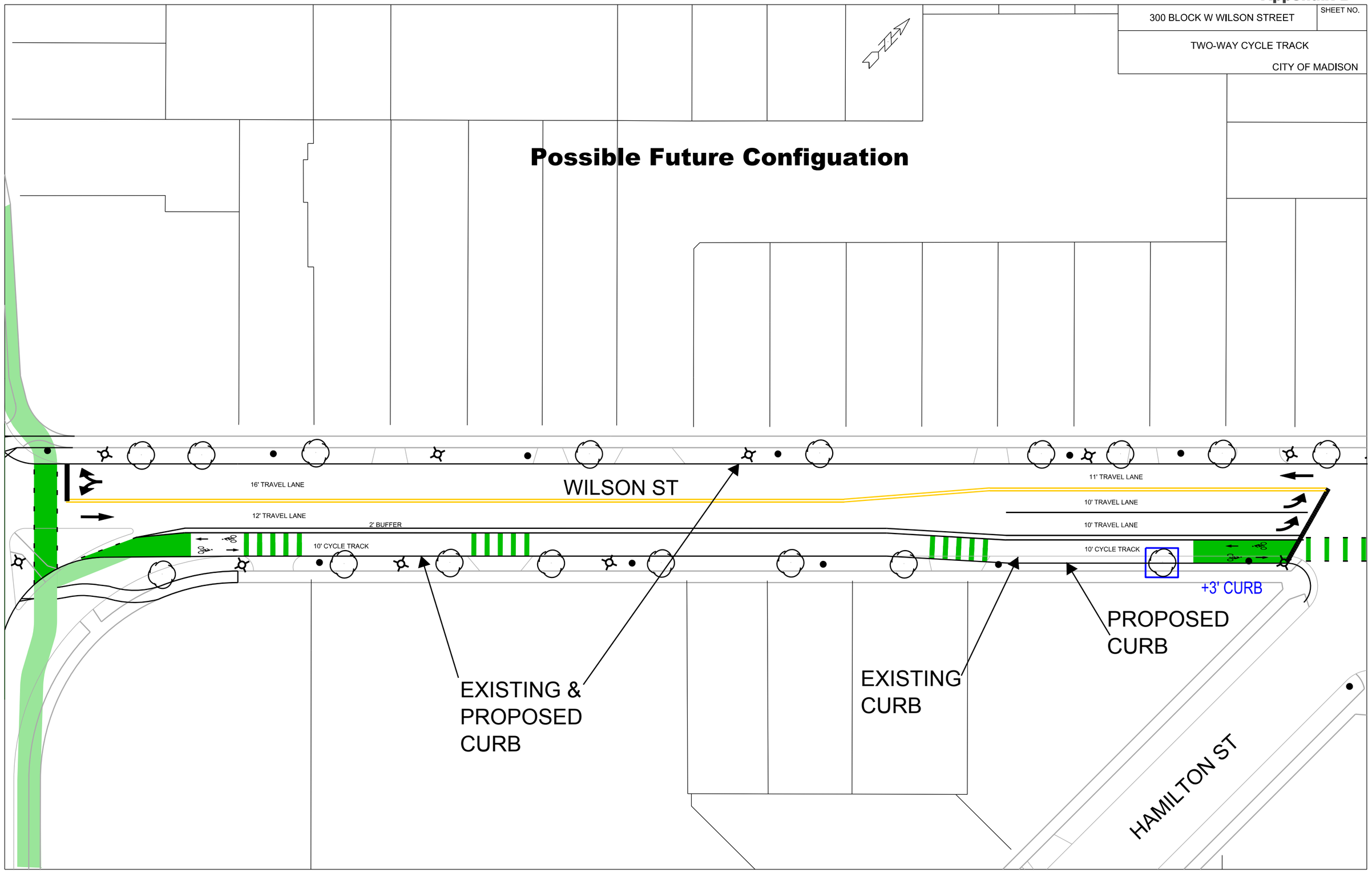
Appendix B

300 BLOCK W WILSON STREET | SHEET NO.

TWO-WAY CYCLE TRACK

CITY OF MADISON

Possible Future Configuation



PLOT SCALE:

PLOT NAME:

REV, DATE:

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG, DIV.

FILE NAME: $$...designfile...$$

DATE: $$...plottingdate...$$

Appendix B

SHEET NO.

BROOM STREET

JOHN NOLEN DRIVE TO WILSON STREET
CITY OF MADISON

WILSON ST

10' 10' 11' 11' 11'

BROOM ST

10' OFF-STREET SHARED USE PATH

EXISTING CURB

7'

2 SMALL TREES
2 LARGE TREES

4'

PROPOSED CURB

Current Recommendation

NEW RIGHT TURN SIGNAL

JOHN NOLEN DR

DATE: $$...plottingdate...$$

FILE NAME: $$...designfile...$$

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.

REV. DATE:

PLOT NAME:

PLOT SCALE:

Appendix B

SHEET NO.

BROOM STREET

WILSON STREET TO DOTY STREET
OFF-STREET SHARED USE PATH
CITY OF MADISON

DOTY ST

14' 11' 10' 5' 2'

EXISTING CURB

1 SMALL TREE
2 LARGE TREES

Current Recommendation

10' OFF-STREET SHARED USE PATH

PROPOSED CURB

11.5' 10' 2' 11' 11' 5'

WILSON ST

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.
REV. DATE:
PLOT NAME:
PLOT SCALE:

FILE NAME: $$....designfile....$$
DATE: $$...plottingdate...$$

Appendix B

SHEET NO.

DOTY STREET TO MAIN STREET
PROTECTED TWO-WAY CYCLE TRACK
CITY OF MADISON

BROOM STREET

MAIN ST

12'
12'
4'
12'

PROTECTED TWO-WAY
CYCLE TRACK

Current Recommendation

REMOVE PARKING

FLOATING BUS STOP

10'
10'
10'
BUS
STOP

DOTY ST

DATE: $$...plottingdate...$$

FILE NAME: $$....designfile....$$

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.

REV. DATE:

PLOT NAME:

PLOT SCALE:

Appendix B

SHEET NO.

BROOM STREET

WILSON STREET TO DOTY STREET
BIKE LANE
CITY OF MADISON

DOTY ST

14' 11' 10' 5' 2'

NORTHBOUND
BUFFERED BIKE
LANE

EXISTING &
PROPOSED
CURB

Alternate Configuration

11.5' 10' 11' 11' 5' 2'

WILSON ST

DATE: $$...plottingdate...$$

FILE NAME: $$....designfile....$$

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.

REV. DATE:

PLOT NAME:

PLOT SCALE:

Appendix B

SHEET NO.

BROOM STREET

DOTY STREET TO MAIN STREET
BIKE LANE

CITY OF MADISON

MAIN ST

16'

15'

3'

6'

NORTHBOUND
PROTECTED BIKE LANE

Alternate Configuration

REMOVE PARKING

11'

12'

10'
BUS
STOP

FLOATING BUS STOP

DOTY ST

DATE: $$...plottingdate...$$

FILE NAME: $$....designfile....$$

ORIGINATOR: CITY OF MADISON, TRAFFIC ENG. DIV.

REV. DATE:

PLOT NAME:

PLOT SCALE: