



SWBID



Kimley»Horn | DC

M Street SE Non-Automotive Mobility Planning Project

**Existing Conditions Summary Briefing
Document**

FINAL DRAFT – May 2021

Table of Contents

Introduction	1
Overview	2
Street Configuration	4
Pedestrian Network.....	6
Bicycle and Micromobility Network	9
Transit Network.....	19
Curb Space.....	27
Traffic Analysis	31
Safety/Crash Trends	36
Summary of Challenges and Opportunities.....	40

Introduction

This document outlines the existing conditions findings of the M Street SE Non-Automotive Mobility Planning Project, informed by a review of available data from the Capitol Riverfront Business Improvement District (CRBID), the Southwest Business Improvement District (SWBID), and the District Department of Transportation (DDOT), as well as firsthand observations from the Corridor Mobility Survey, during which members of the project team traveled across the project area via a variety of different travel modes and options to gain useful insights and experiences to supplement available data. The goal of the project is to increase non-automotive connectivity not only across the Capitol Riverfront neighborhood, but to the rest of the District as well. The project builds on the District's Vision Zero, moveDC, and sustainability goals by analyzing and developing concepts for protected micromobility lanes on M Street, a major east-west connection in Capitol Riverfront that links Nationals Park and the Navy Yard-Ballpark Metrorail station to the Barracks Row/Navy Yard area, which comprises the eastern half of the neighborhood.

The term “micromobility” includes, but is not limited to, bicycles. Beyond bicycles, micromobility includes user-driven devices that are often smaller and slower than automobiles such as bicycles (including e-bikes and cargo bikes), scooters (including e-scooters), skateboards, and powered self-balancing boards.

The SE/SW Mobility Vision Plan supplements the M Street SE Non-Automotive Mobility Planning Project. The SE/SW Mobility Vision Plan will take a high-level approach to how the plans from the M Street SE Non-Automotive Mobility Planning Project can be applied on the SW section of the corridor, while also taking into consideration the transit elements of the corridor, specifically the possibility of bus rapid transit (BRT), as well as streetscape elements to help make the public realm more unified and inviting. While this document is focused on the M Street SE portion of these sister projects, additional map exhibits that include the southwest portion of the corridor are included in **Appendix A: SE-SW Corridor Maps**.

Overview

M Street SE is a six-lane minor arterial street that moves about 15,000 vehicles per day.¹ The focus of this project is M Street SE between South Capitol Street and 11th Street SE. The project area includes 18 intersections (10 of which are signalized), the Navy Yard-Ballpark Metrorail station on the Green Line, and 12 bus stops that are serviced by local and commuter buses. The corridor also includes curbside, peak-hour Car Free (only buses and bikes permitted) Lanes in both directions that shift to on-street parking lanes during the off-peak hours.

The M Street SE corridor and the surrounding area is vibrant and growing. By 2030, the Capitol Riverfront neighborhood is expected to gain nearly 10,000 residential units and more than 3 million square feet of office space. All residential, office, retail, hotel, and other uses included, the neighborhood will see more than 14 million square feet of development activity by 2030.² This strong presence of residential, industrial, and commercial land uses; sports and entertainments venues; federal and District institutions; parking areas; and waterfront parks and open space generate multimodal trips by residents, employees, business patrons, and visitors. These key destinations include, but are not limited to:

Parks

- Canal Park
- The Yards Park
- Anacostia Riverwalk Trail
- Diamond Teague Park
- Joy Evans Park
- Virginia Avenue Park

Federal Institutions

- United States Department of Transportation (USDOT)
- Washington Navy Yard

Sports and Entertainment Venues

- Nationals Park
- Audi Field
- Trapeze School New York

Schools

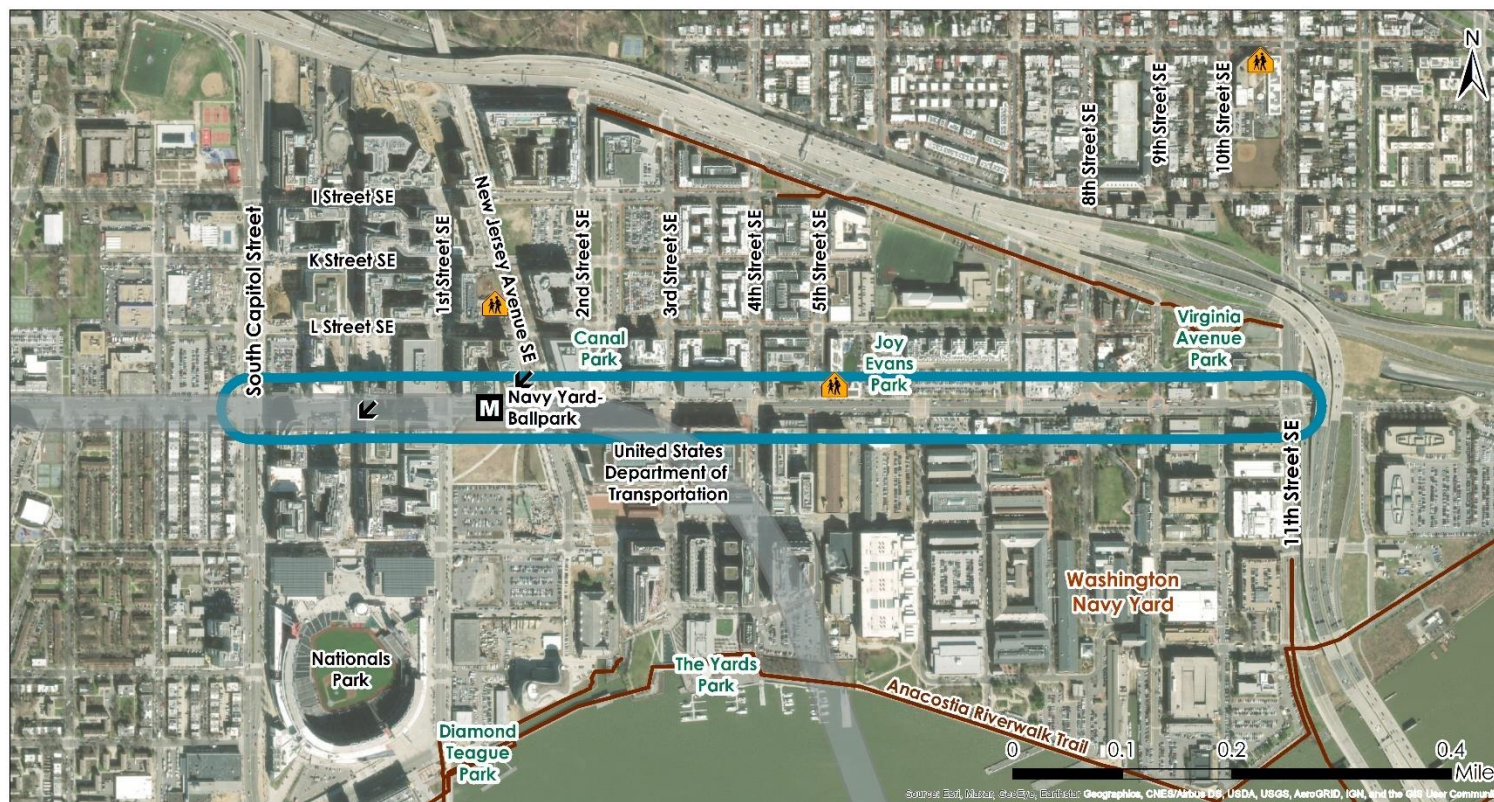
- Van Ness Elementary School
- Eagle Academy Public Charter School

The project area within the broader context of the Capitol Riverfront neighborhood and the District is shown in **Figure 1**.

¹ M Street SE Bus Lane Traffic Analysis Report, DDOT, June 2020.

² Capitol Riverfront Business Improvement District Buildout Numbers

Figure 1: Project Area



Legend

- | | | | |
|----------------------|-------------------|-------------------|------------------|
| Project Area | Metrorail Station | Public School | Off-Street Trail |
| Metrorail Green Line | Station Entry | Park / Open Space | |

Street Configuration

Street configuration and intersection geometry is relatively standard across the project area, with most side streets intersecting M Street SE at 90-degree angles (except for New Jersey Avenue SE). This square geometry allows for a more comfortable experience for people walking, providing direct pedestrian crossings, slowing turning vehicles, and allowing for better visibility for both motorists and pedestrians.

Figure 2: Typical Street Configuration



M Street SE between First Street SE and New Jersey Avenue SE presents a standard representative block, cross section, and street/intersection configuration for the corridor, featuring two general travel lanes in each direction, curbside peak-hour Car Free Lanes (parking in the off-peak period), crosswalks across all legs of intersections, and sidewalks on both sides of the street.

Notable exceptions to this standard street configuration can be found at the following intersections, where wider cross sections, turn lanes, or other street configurations lead to more complex vehicle movements and longer pedestrian crossing distances.

M Street SE and 11th Street SE



M Street SE-SW and South Capitol Street



Various representative cross sections from the corridor are shown on the following page.

Figure 3: M Street SE – Midblock and Intersection Typical Section

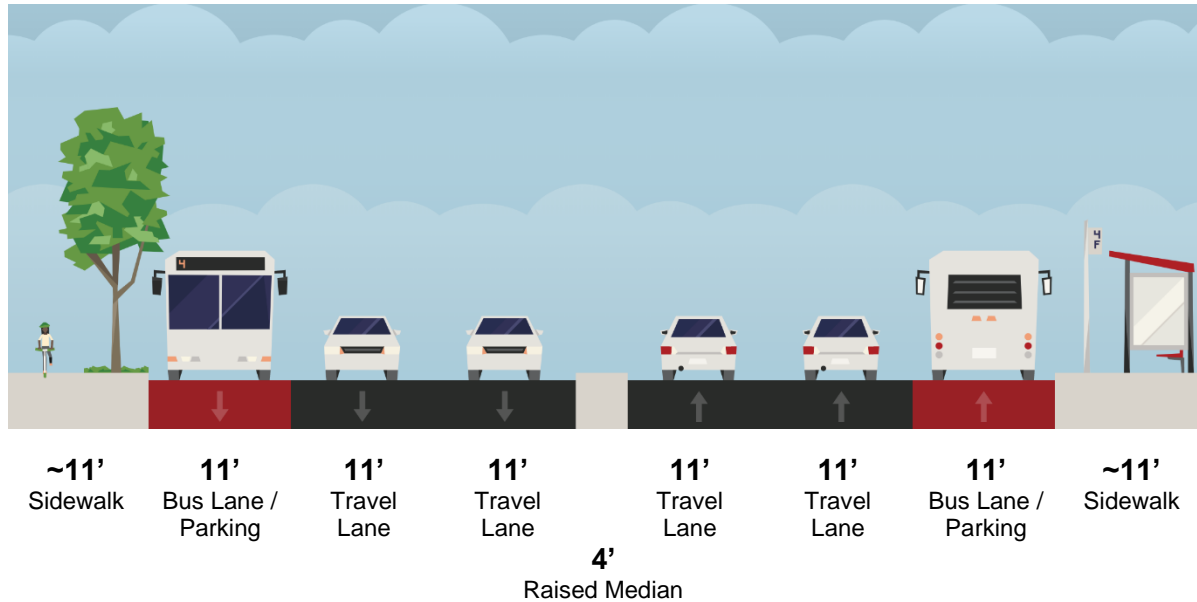
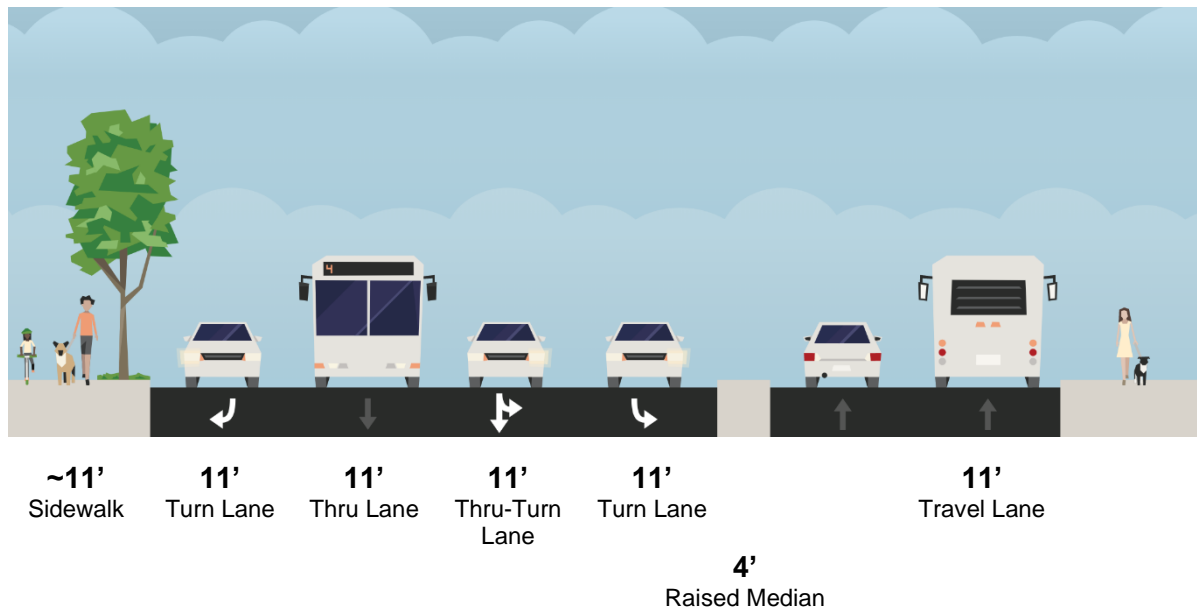


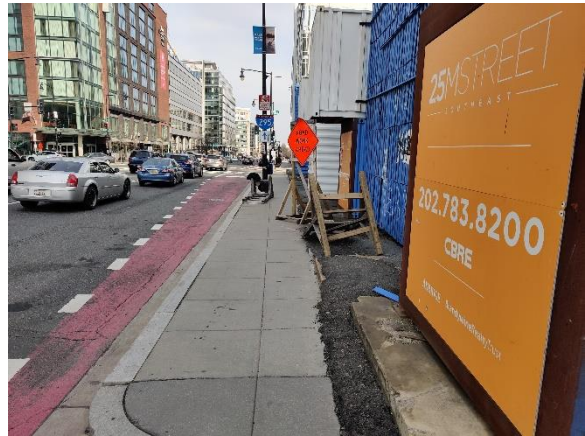
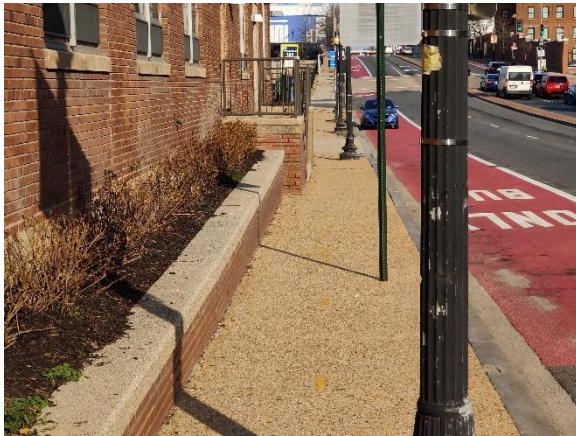
Figure 4: M Street SE and 11th Street SE



Pedestrian Network

Existing Facilities

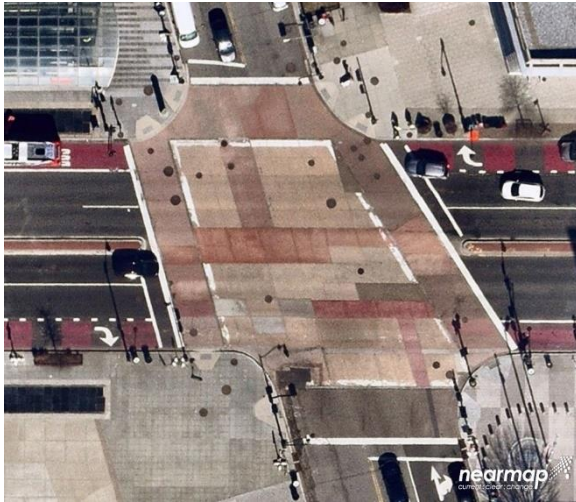
Sidewalks and crosswalks represent the main components of the M Street SE pedestrian network. The sidewalk network within the project area is largely complete, connected, and in a state of good repair, with all street segments having sidewalks along both sides, which is reflective of the overall good sidewalk coverage in the Capitol Riverfront neighborhood and the District at large. Sidewalk widths vary across the study area, but are relatively generous, ranging between 6 and 11 feet wide. Many sidewalk areas adjacent to larger or newer developments feature even wider pedestrian areas with tree coverage and plazas. However, some sidewalk areas are much narrower or more constrained due to construction activity, buildings being closer to the street, and signs or utility poles being present and narrowing the effective width.



Some sidewalk areas, such as in front of Van Ness Elementary School (left) and adjacent to active construction sites (right), are narrower and more constricted.

Curb cuts for parking garage/lot entrances and alleyways are a common feature of the project area. While sidewalks are continuous across these vehicle access points, they do present additional opportunities for conflict and safety risks for people walking.

All pedestrian crossings across M Street SE are located at signalized intersections. Between First Street SE and 10th Street SE, intersections and pedestrian crossings consist of stamped concrete, diverging from the District Department of Transportation's (DDOT's) standard high-visibility crosswalk markings that exist in the eastern and western ends of the corridor and elsewhere across the neighborhood. Many of these concrete intersection and crosswalk treatments are aging and present gaps and elevation differences, presenting challenges for pedestrians crossing the street, especially for pedestrians in wheelchairs or with disabilities. With three lanes of traffic in each direction and minimal median space that is wide enough to provide a refuge, pedestrian crossing distances across M Street SE are longer than others in the Capitol Riverfront area.



Intersections and pedestrian crossings with stamped concrete treatment (left) versus pedestrian crossings using DDOT-standard high-visibility crosswalk markings (right).

Pedestrian signals and crossing phases are programmed into intersection signal cycles and do not require pedestrians to use a pushbutton to call a dedicated crossing phase; however, pushbuttons to trigger audible pedestrian crossing announcements are common across the corridor to aid pedestrians with visual impairments. It was noted by people walking during the Corridor Mobility Survey that pedestrians do not experience many delays when traveling on foot in the project area and are able to get across blocks and intersections efficiently. The more complex geometry and signal timing at the grade-separated intersection of South Capitol Street and M Street SE/SW requires pedestrians to cross in two phases and stop on the overpass, which does not align with expectations or experiences from elsewhere in the project area.

Based on a visual inspection, most pedestrian crossings in the study area appear to have curb ramps that are compliant with the Americans with Disabilities Act (ADA), equipped with wheelchair-accessible slopes, level landing areas, and tactile warning panels to help guide pedestrians with visual impairments. An official inventory or assessment was not conducted as part of this study.

Pedestrian Trends and Activity

With its significant existing housing and office stock, the project area sees a high level of pedestrian activity throughout the day, which is expected to increase as new developments come online. Specifically, as the Yards development advances on the 100 block of M Street SE, pedestrian activity on the south side of M Street SE is expected to increase to a similar level as the north side, and overall pedestrian volume would increase as a whole. In addition, on days when baseball games occur at Nationals Park, overall pedestrian volumes swell at the crossing of M Street SE and New Jersey Avenue SE and along the south side of M Street SE. These increases in pedestrian volumes are primarily concentrated at the start and end of a game.

Challenges and Opportunities

While the pedestrian network in the project area is largely complete and connected, with pedestrian crossings at all intersections, there is opportunity to expand and enhance the quality of pedestrian infrastructure.

Sidewalks:

As private development maintains its pace along M Street SE and elsewhere in the neighborhood, sidewalks will continue to be installed and enhanced to serve existing and future residents, workers, and visitors. This development activity provides widespread opportunity to continue to bring the sidewalk network into a state of good repair with high-quality materials, design, streetscape elements, and accessibility for all sidewalk users regardless of age or ability.

Crosswalks:

Future DDOT resurfacing and street improvement efforts present an opportunity to remove the existing concrete intersection treatments along the corridor and replace them with the District's standard high-visibility crosswalk markings. While elements like pedestrian refuge islands and bump-outs may not be a sensible solution for M Street SE, as they would take away valuable street width for any future bus or micromobility lanes, installation of them on side streets present opportunities to further enhance pedestrian safety and comfort.

Street Configuration:

M Street SE's relatively wide cross section and three travel lanes in each direction presents long crossing distances for pedestrians. Future reallocation of general travel lanes into bus lanes or micromobility lanes may work to reduce the effective/perceived width of the street for people walking and work toward achieving the vision of M Street SE as a true multimodal "main street" for the Capitol Riverfront neighborhood.



Bump-outs at street corners, such as this one at the intersection of M Street SE and 2nd Place SE, are an effective tool to reduce pedestrian crossing distances, promote slow and safer turns from people driving, and frame on-street parking lanes to discourage parking too close to a crosswalk.

Bicycle and Micromobility Network

Existing Facilities

M Street SE itself lacks dedicated lanes for people biking or using micromobility devices, but the broader network in the Capitol Riverfront area features a variety of bicycle facility types and trails, some of which cross or terminate at M Street SE. In the project area and the District at large, available micromobility devices include shared, dockless bicycles and scooters from a range of private operators. While cycling and scooting is allowed on all local streets in the District, many streets have dedicated and marked spaces to ride, enhancing cyclist safety and comfort. Examples of these existing dedicated bicycle facilities include:

- First Street SE
- 4th Street SE
- 6th Street SE
- I (Eye) Street SE
- New Jersey Avenue SE

The majority of existing bicycle and micromobility facilities in the Capitol Riverfront neighborhood are oriented to serve north-south trips. Currently, the bike lanes from Capitol Hill on 4th and 6th Streets SE terminate at M Street SE and I-695, respectively, stopping short of providing full north-south connectivity across the neighborhood. While there is an existing east-west bike lane on I (Eye) Street SE, it and the few other existing east-west facilities that parallel M Street SE are fragmented and do not span the full width of the neighborhood, making east-west travel cumbersome for cyclists. M Street SE is a natural desire line for east-west travel, given its uninterrupted path and connections to all side streets, but is currently uncomfortable for cyclists, leading to much bicycle and micromobility device use occurring on the sidewalk. Those travelling north-south who must cross or travel along M Street SE for short distances also face challenges, despite having more dedicated lanes to choose from.

Additionally, the current Car Free Lanes on M Street SE—a pilot project of DDOT’s Bus Priority Program—allow cycling in this space. As part of the Corridor Mobility Survey, it was observed by project team members that cycling in the Car Free Lanes (an activity that is allowed and formalized with shared lane—or “sharrow”—markings in the lanes) is a slightly more comfortable experience, as the red-painted lanes and associated markings deter people driving from using the lanes (even in the off-peak period when the bus lanes are not in effect). While the bus lane presents a slightly more comfortable space to ride, cyclists still must contend with bus traffic in the peak periods, and in the off-peak periods, parked cars in this lane force cyclists to ride with traffic in the general purpose lanes.



Buffered and parking-protected bike lanes on First Street SE (left) and M Street SE Car Free Lanes with bike symbol (right). There are five Capital Bikeshare stations along the M Street SE corridor, and many others in the surrounding neighborhood.

moveDC Bicycle Priority Network

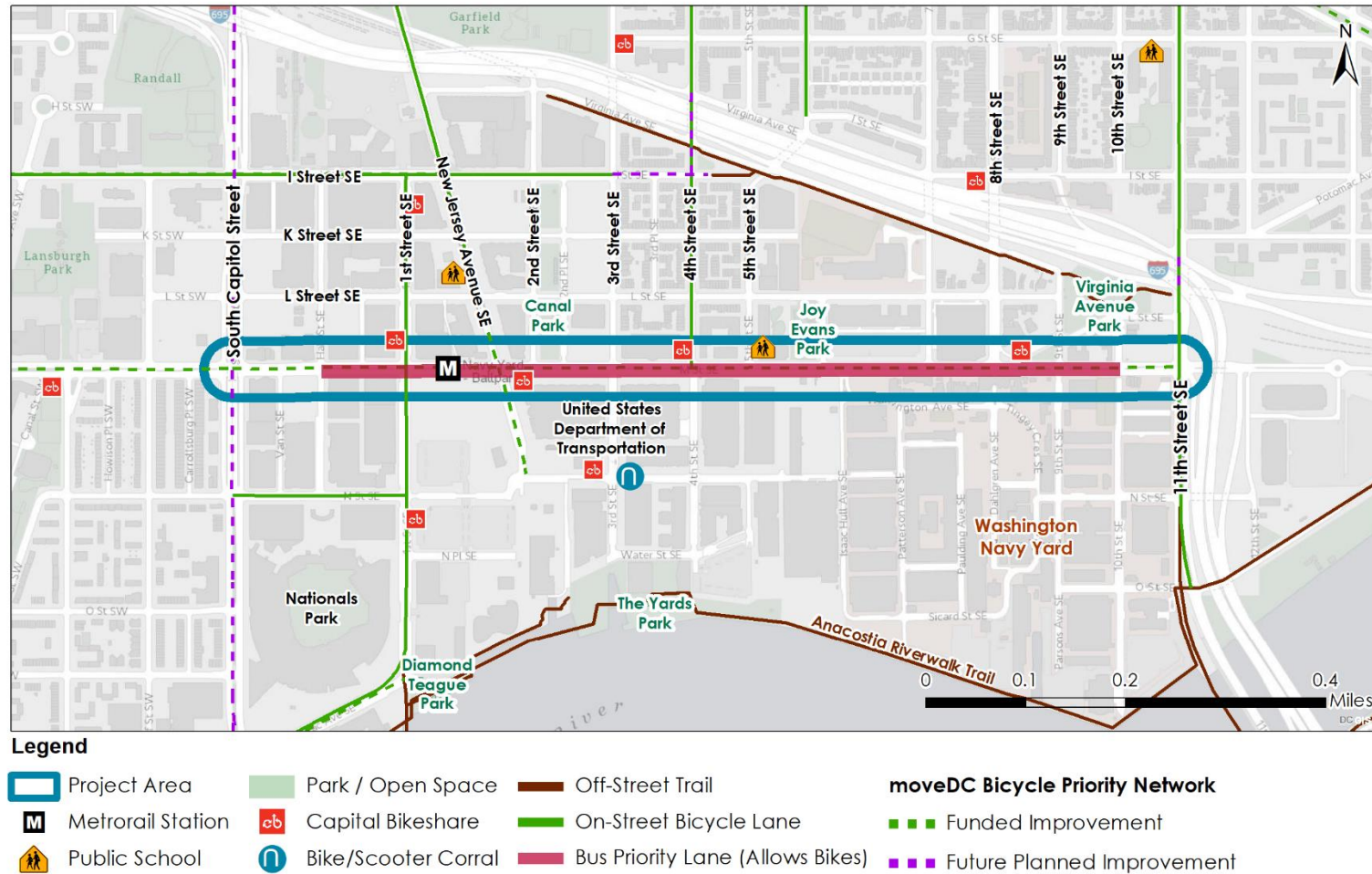
As part of ongoing DDOT efforts to update moveDC, the District's long-range transportation plan, a Bicycle Priority Network was developed and includes both M Street SE and M Street SW. The Bicycle Priority Network includes streets that have bicycle facilities today and streets that are proposed to have them in the future. The network includes the bicycle priority routes from moveDC 2014, plus more recent planning efforts to identify gaps and expand access.

Planned and Funded Projects

Several upcoming DDOT street improvement projects will include the installation of new bicycle facilities as included in the moveDC Bicycle Priority Network, as well as the enhancement of existing bicycle facilities. These include:

- **First Street SE:** The existing dedicated bicycle lanes between M Street SE and I (Eye) Street SE will be upgraded into buffered, parking-protected bike lanes to match the design of the existing First Street SE lanes south of M Street SE.
- **New Jersey Avenue SE:** Protected bicycle lanes will be installed on New Jersey Avenue SE between Tingey Street SE and I (Eye) Street SE, where no bicycle lanes currently exist.

Figure 5: Bicycle and Micromobility Network



Similarly as for people walking, people biking on M Street SE between First Street SE and 10th Street SE must travel through intersections that consist of stamped concrete panels, many of which are aging and present bumps, gaps, and elevation differences, presenting challenges for people biking across these surfaces.



Bikeshare and Micromobility Trends and Activity

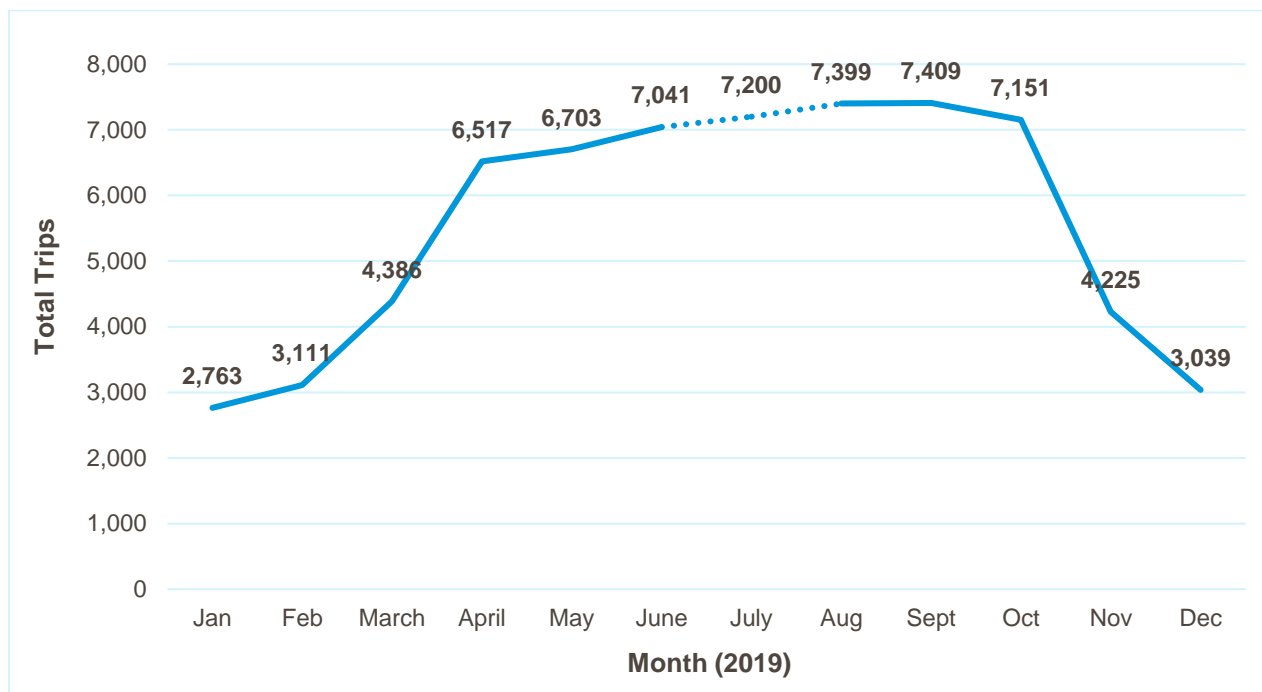
Capital Bikeshare and other micromobility devices are frequently used throughout the District to connect to and travel along the project area. A review of Capital Bikeshare data from January 2019 to December 2019³ was conducted, and trends are reported in the following section. The data includes

³ Excludes July 2019 (data not available) and the bikeshare station at M Street SE and 3rd Street SE (did not exist in 2019).

all days of the week, all trip classifications (Member or Casual), and excludes trips less than 60 second or trips made by Capital Bikeshare staff to inspect or maintain the system.

Capital Bikeshare ridership trends, shown in **Figure 6**, experience seasonal fluctuations with higher monthly ridership in the summer months and lower monthly ridership in the winter months. In August, there is an average of 238 trips per day that either start or end in the project area. While data for additional non-bikeshare micromobility was unavailable at the time this document was drafted, it is likely that micromobility trends follow a similar pattern with ridership and trips increasing during the warmer months and decreasing during the winter months.

Figure 6: Monthly Capital Bikeshare Tips Starting and/or Ending in the Project Area (2019)



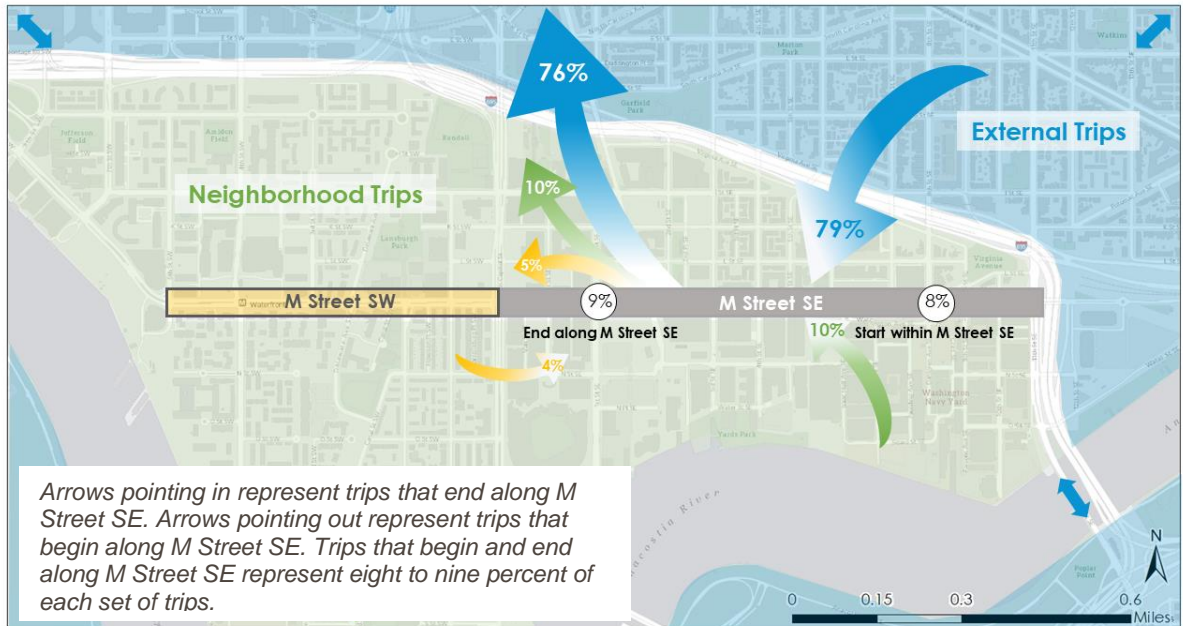
Source: Capital Bikeshare. Excludes July 2019 (data not available).

Capital Bikeshare data also was analyzed to determine origin and destination trends for bicycle trips in and around the project area. Classification of trips is divided into four geographic areas as follows:

- **M Street SE:** Between South Capitol Street and 11th Street SE.
- **M Street SW:** Between South Capitol Street and 6th Street SW/Maine Avenue SW.
- **Neighborhood Trips:** General extents of the broader neighborhood and CRBID/SWBID areas, bounded by I-695 and the Anacostia and Potomac River.
- **External Trips:** All other areas of the Capital Bikeshare service area not within the above bounds.

These boundaries are shown in **Figure 7** along with the percentage of trips in which M Street SE is a origin or destination.

Figure 7: Capital Bikeshare Trip Origins and Destinations



The greatest percentage of bikeshare trips that start along M Street SE end externally (76%) and the greatest percentage of trips that end along M Street SE started externally (79%). These trends, among other things, demonstrate that the project area is within a reasonable biking distance to nearby destinations outside the neighborhood, as well as underscore the large draw of the Capitol Riverfront neighborhood for residents, workers, and visitors from across the District and the region. External trips aside, the remaining shares of bikeshare trips travel to or from other stations along M Street SE, west to M Street SE, or elsewhere within the broader Capitol Riverfront and Southwest neighborhood, demonstrating that bikeshare is serving many more localized travel needs.

The five⁴ Capital Bikeshare stations within the project area see varying daily activity levels. All project area bikeshare stations, with the exception of Potomac Avenue and 8th Street, see more trip ends than trip starts, indicating that more people are using bikeshare to come M Street SE than to leave.

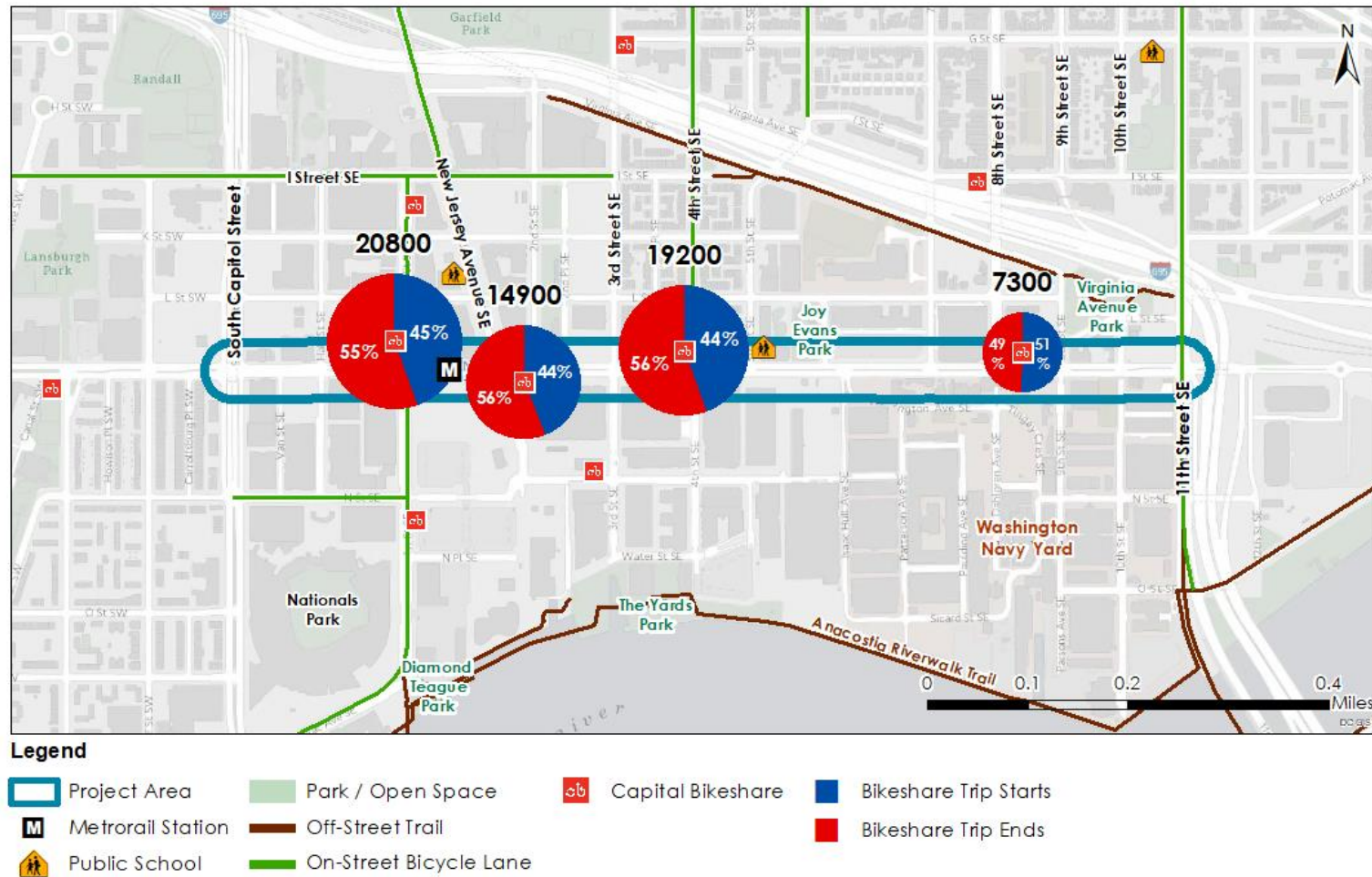
- M Street SE and First Street SE (average of 28 trip starts / 35 trip ends per day)
- M Street SE and 4th Street SE (average of 26 trip starts / 32 trip ends per day)
- M Street SE and New Jersey Avenue SE (average of 20 trip starts / 25 trip ends per day)
- Potomac Avenue and 8th Street SE (average of 11 trip starts / 11 trip ends per day)

⁴ M Street SE's fifth bikeshare station at 3rd Street SE did not exist in 2019 and is therefore not included in this analysis.



These trends in daily activity levels at project area bikeshare stations are also true on an annual basis. In 2019, the split of trip starts and trip ends at bikeshare stations was relatively even, with a slightly greater share of trips ends.

Figure 8: Annual M Street SE Bikeshare Activity and Start-End Split

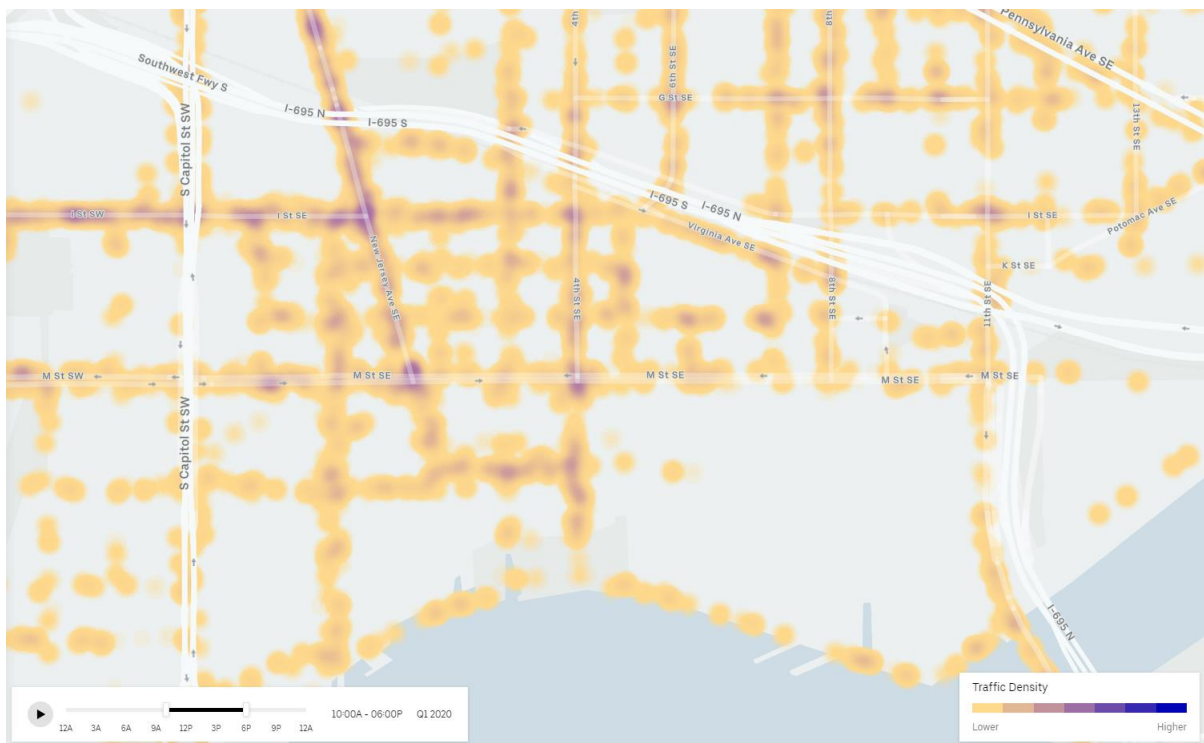


Micromobility trends reveal similar patterns to Capital Bikeshare usage trends. The *New Mobility Heatmap* published by Uber shows micromobility trends on Uber-owned micromobility devices (which include Jump bikes and Lime scooters).⁵ The map compiles GPS coordinates of the bicycles or scooters to show locations with high micromobility usage. Within the M Street SE corridor, higher-density locations include:

- Half Street SE and M Street SE
- First Street SE and M Street SE
- New Jersey Avenue SE and M Street SE
- 4th Street SE and M Street SE

In addition to locations with higher densities of micromobility usage, there is higher micromobility density along the entire M Street SE corridor and nearby streets. Similar to other modes, micromobility usage and density increases on weekends.

Figure 9: Micromobility Activity Density



⁵ Data retrieved from Uber Movement, (c) 2021 Uber Technologies, Inc., <https://movement.uber.com>. Pending confirmation of specific devices included

Challenges and Opportunities

The majority of existing bicycle and micromobility facilities in the Capitol Riverfront neighborhood are oriented to serve north-south trips, and the few existing east-west facilities that parallel M Street SE are fragmented and do not span the full width of the neighborhood. With M Street SE's excess width and capacity, there is ample opportunity to reallocate space that is currently dedicated to general traffic to bicycle, micromobility, and/or transit lanes. The inclusion of M Street SE and SW in the moveDC Bicycle Priority Network represents an opportunity to advance completion of these networks to improve the street for people biking and scooting.

With M Street SE serving as the neighborhood "main street" of the Capitol Riverfront area, it is a logical corridor on which to have complete and connected bicycle and micromobility facilities to serve trips to and through the neighborhood, providing multiple north-south connections at intersections with side streets to serve the waterfront and Buzzard Point to the south and Capitol Hill and Union Station to the north.

Transit Network

Existing Service and Facilities

Metrobus and DC Circulator are the primary transit services along the M Street SE corridor, operated by the Washington Metropolitan Area Transit Authority (WMATA) and DDOT, respectively. Four Metrobus routes and two DC Circulator routes run along M Street SE. Additionally, two OmniRide and three MTA Maryland commuter bus routes operate along M Street SE, serving longer-distance commuters from Virginia and Maryland.

Metrobus:

- 90: U Street – Garfield
- 92: U Street – Garfield
- P6: Anacostia – Eckington
- V4: Capitol Heights – Minnesota Avenue

OmniRide:

- 611/612: Gainesville-Pentagon / Navy Yard Express
- D-100, D-200, D-300: Dale City – Navy Yard Express

DC Circulator:

- Eastern Market – L'Enfant Plaza
- Congress Heights – Union Station

MTA Maryland Commuter Bus:

- Route 315: Columbia & Silver Spring – DC
- Route 735: Charlotte Hall/Waldorf – DC
- Route 850: Prince Frederick/Dunkirk – Suitland/DC

M Street SE is well-served by on-street bus stops. Within the project area, 12 on-street bus stops exist and are served by the above local and commuter bus services. Conditions and amenities at bus stops are varied, with some featuring covered bus shelters and seating, while others simply consist of poles adjacent to the sidewalk with signage and route information.



A bus stop with a shelter and seating (left) versus a bus stop with signage only (right).

moveDC Transit Priority Network

As part of ongoing DDOT efforts to update moveDC, the District's long-range transportation plan, a Transit Priority Network was developed and includes both M Street SE and M Street SW. The Transit Priority Network shows streets where infrastructure should be developed to help transit vehicles move more efficiently, improving travel times and reliability for passengers. Transit priority infrastructure could include dedicated transit lanes, better transit stops and/or special treatments for buses at intersections.

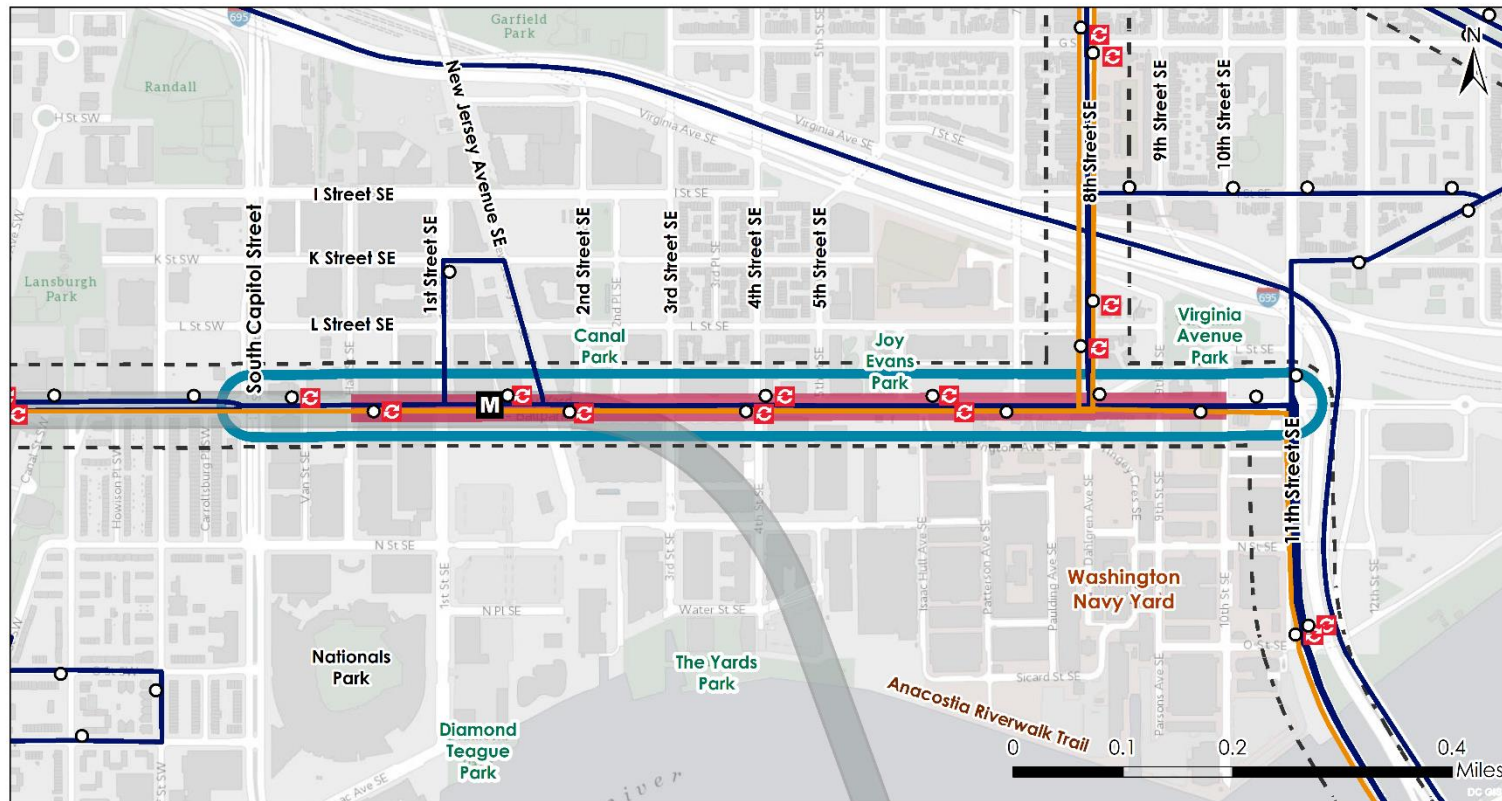
The network reflects where transit is used most, where there is the greatest demand for travel, and where transit demand is expected to grow. This network map does not specify what treatment will be made on a given street, nor does it reflect specific transit routes or modes (i.e., Metrobus vs. DC Circulator vs. DC Streetcar). The moveDC Transit Priority Network is shown in **Figure 10**.

Car-Free Lanes

M Street SE between 10th Street SE and Half Street SE currently has red-painted bus and bike lanes as part of a pilot project of DDOT's Bus Priority Program. These lanes—branded by DDOT as “Car Free Lanes”—are restricted to allow for buses and bicyclists only, in both directions, during the morning and evening peak periods.



Figure 10: Transit Network



Legend

- | | | | |
|---------------------|--------------------------|--------------------|--|
| Project Area | Metrorail Green Line | Metrorail Station | moveDC Transit Priority Network |
| Metrobus Route | Metrobus Stop | DC Circulator Stop | Existing Transit Priority Corridor |
| DC Circulator Route | Transit Priority Network | | |

Ridership Trends and Activity

During the morning and evening peak commuting periods, and to a lesser degree throughout the day, M Street SE sees a high level of transit activity with most bus routes running every 10 to 20 minutes. Weekend service is offered on most routes, but with longer wait times between buses. More than 4,100 bus trips start or end along M Street SE on an average weekday⁶ and the Navy Yard-Ballpark Metrorail station sees nearly 12,700 passengers per day.⁷

A review of Metrobus and DC Circulator data from October 2019 in **In addition** to the locations above, three stops between Patterson Avenue SE and 11th Street SE experience average weekday volumes of approximately 100–200 boardings/alightings. It is observed that eastbound buses have significantly more boardings whereas westbound buses have significantly more alightings. This pattern could indicate that the M Street SE corridor is a destination for people coming from the south or east of Navy Yard.

⁶ *Bus Ridership Data, October 2019, WMATA*

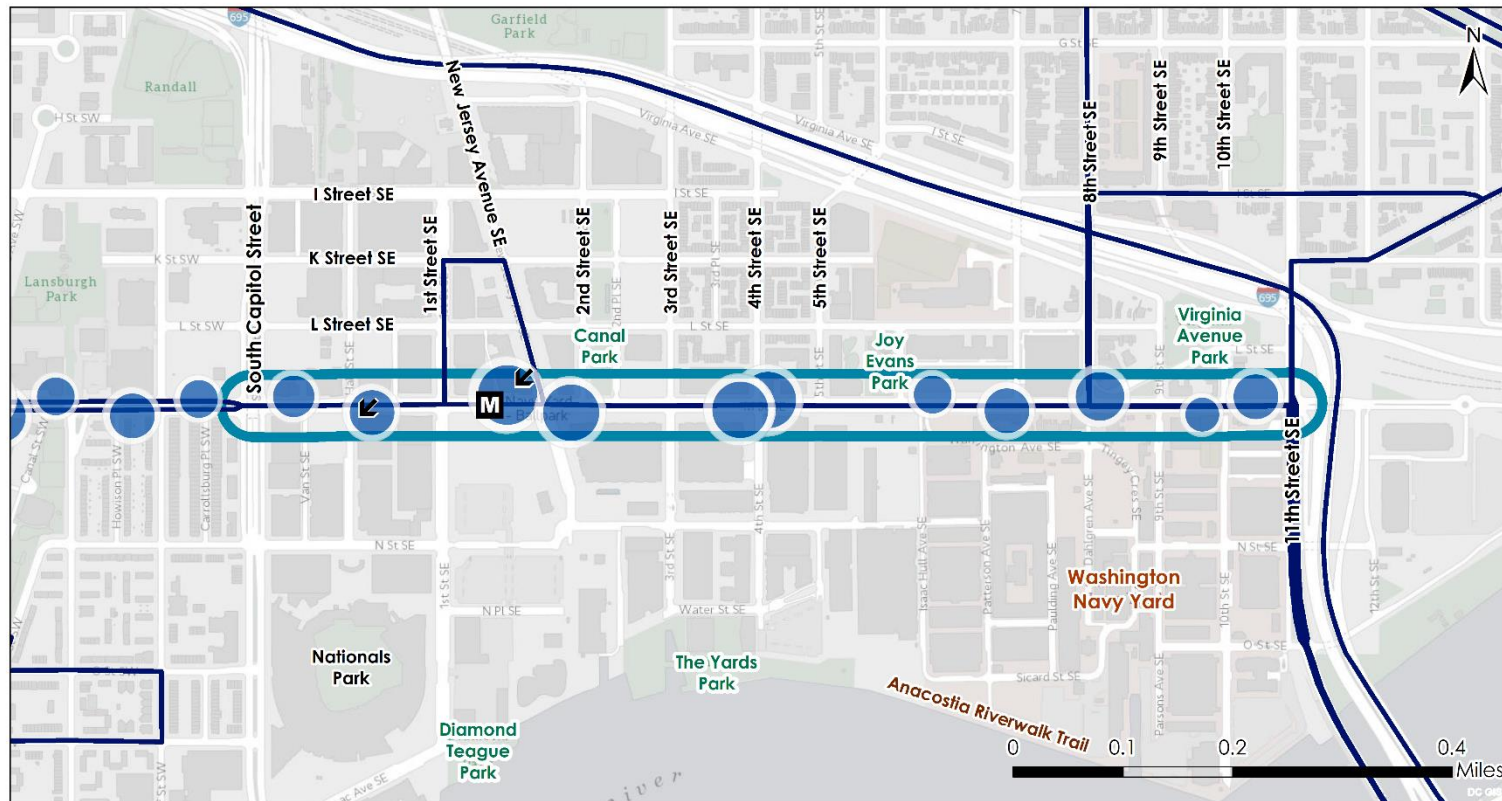
⁷ *Rail Ridership Data Viewer, Weekday Average Daily Entries, October 2019, WMATA*

Figure 11 shows bus transit trends along the entire M Street SE corridor. Average weekday boardings and alightings for bus stops within the project area range between 8 and 690. Locations with the highest weekday average use of Metrobus and DC Circulator include:

- New Jersey Avenue SE and M Street SE
- 4th Street SE and M Street SE

In addition to the locations above, three stops between Patterson Avenue SE and 11th Street SE experience average weekday volumes of approximately 100–200 boardings/alightings. It is observed that eastbound buses have significantly more boardings whereas westbound buses have significantly more alightings. This pattern could indicate that the M Street SE corridor is a destination for people coming from the south or east of Navy Yard.

Figure 11: Transit Activity (Boardings and Alightings)



Legend

- Project Area
- M Metrorail Station
- Bus Route
- Less than 100
- 100 to 400
- Greater than 400
- ↙ Station Entry

Challenges and Opportunities

M Street SE benefits from good levels of transit service, offering efficient and affordable mobility options to people for getting across the neighborhood or across the District. Additionally, recent investments in bus priority lanes along M Street SE underscores the District's commitment to improving travel to and through the Capitol Riverfront area. The early success of the bus priority lanes, as well as the identification of M Street SE in the moveDC Transit Priority Network, present significant opportunities to further enhance transit travel in the corridor in the future.

While bus stops are evenly spaced, not all locations feature full amenities for customer comfort and safety such as shelters, seating, and lighting, presenting opportunities to enhance this part of the transit journey.

Using transit ridership trends to determine where along the corridor experiences the most bus passenger activity can inform where enhanced bus stops or boarding facilities – such as bus bulb-outs or boarding islands – can be deployed, in a way that coexists with the broader goals of this project, to foster enhanced comfort and safety for transit riders.

Curb Space

Inventory

Curb space in the project area has a variety of uses and demands, many of which compete for the same limited space. During the morning and evening peak hours, curbside lanes operate as Car Free Lanes between Half Street SE and 10th Street SE. During off-peak hours, curbside lanes in the project area primarily serve as parking lanes or general travel lanes, with the following being notable exceptions:

- Parking is prohibited on the south side of M Street SE between South Capitol Street and 4th Street SE, with the curbside lane operating as a travel lane during off peak times.
- During ballpark game days, numerous block faces are restricted to specific vehicle types including taxicabs and emergency vehicles between Delaware Avenue SW and 4th Street SE.

While curb space within the project area has dedicated spaces for vehicle travel, transit, and parking, there are other demands that do not have defined space along the curb. Observations of competing demands for curb space between buses, delivery vehicles, rideshare vehicles, and micromobility were noted during the Corridor Mobility Survey. Users of non-vehicle modes often felt unsafe in shared lanes with general traffic and preferred to utilize the Car Free Lane when available or the sidewalk.

The type and intensity of demand also fluctuates depending on the time of day and day of the week. During weekends, there are often higher intensities of non-commute trips, typically resulting in greater numbers of pedestrians and micromobility users.



Examples of different modes competing for curbside space. Delivery vehicle parked in the Car Free Lane during PM peak hour (left). Moving and parked vehicles, delivery vehicles, and bicycles all navigating shared space (right).

Ridehail Trends and Activity

The range of land uses across Navy Yard, including higher densities of office buildings and Nationals Park, draw people to the area during different times of the day and days of the week. A frequent curbside use throughout the length of the project area is rideshare pick-ups and drop-offs. Vehicles either utilize the Car Free Lane, available parking spaces, or the outer travel lane to complete pick-ups and drop-offs.

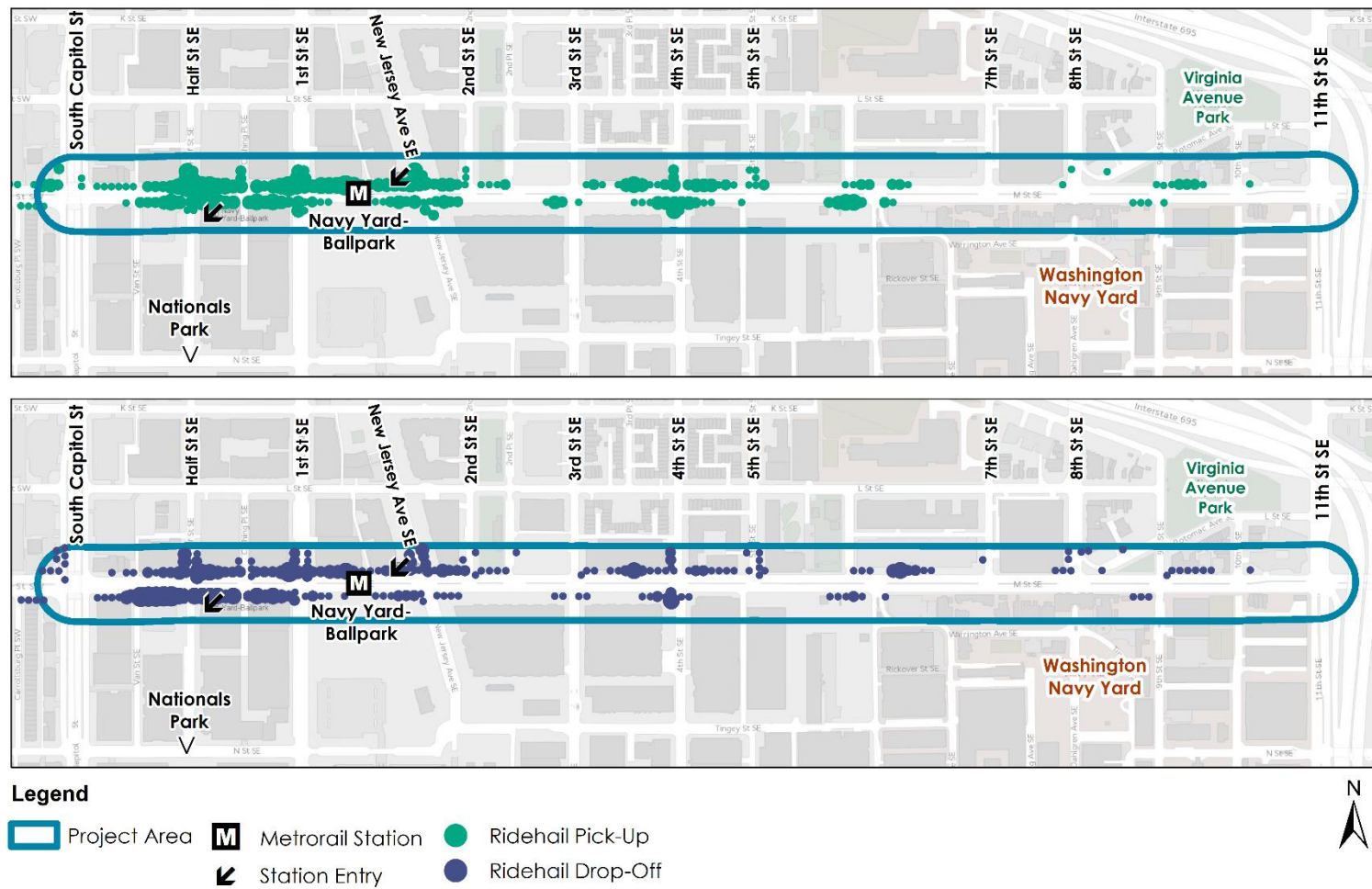
Ridehail trip data provided by DDOT for the following three weeks were analyzed to determine potential ridehail hot spots throughout the corridor:

- February 24, 2019
- April 29, 2019
- June 10, 2019

Figure 12 maps the average hourly pick-up and drop-off rate of ridehail vehicles throughout the corridor. Ridehail pick-ups and drop-offs occur throughout the entire M Street SE corridor, with higher average hourly pick-ups and drop-offs in the following areas:

- Between South Capitol SE and New Jersey Avenue SE
- Between 3rd Street SE and 5th Street SE
- Isaac Hull Avenue SE and M Street SE
- 8th Street SE and M Street SE

Figure 12: Ridehail Activity



Challenges and Opportunities

The M Street SE corridor is dynamic and demand for curb space is always changing. The existing curb space along the M Street SE corridor provides transit priority during peak hours, increasing bus reliability, and space for vehicles to both travel and park during off-peak hours. In addition to curbside uses that have designated spaces, the M Street SE corridor also benefits from other curbside uses such as deliveries, micromobility, and rideshare. Together, these modes increase the accessibility to places and destinations along and near M Street SE.

The current Car Free Lane configuration has inadvertently provided open space along the curb while a bus is not present. While the bus lane presents a slightly more comfortable space to ride a bike or micromobility device, users must contend with bus traffic in the peak periods, and, in the off-peak periods, parked cars in this lane force users to share lanes with vehicles. Using bicycle, micromobility, and ridehail trends to determine where along the corridor modes frequently compete for the same space can inform where dedicated spaces would have higher utilization, provide the most value, and increase safety.

It should be noted that, with demand for curb space varying by time of day, day of the week, and season, a delicate balance must be struck to ensure appropriate infrastructure and facilities for all modes within limited space.

Traffic Analysis

The purpose of the traffic analysis in this effort was to understand the current levels of congestion and flow of vehicular traffic along M Street SE, factoring in the pilot Car Free Lanes. This forms the basis for future analyses that may examine the potential effects of repurposing another general purpose traffic capacity during concept development.

Traffic data was obtained from DDOT for the signalized intersections along M Street SE between South Capitol Street and 11th Street SE. Traffic data was limited to one-hour vehicular and pedestrian volumes provided by DDOT in the corresponding Synchro traffic analysis files for the AM and PM peak hours. The Synchro file was dated April 2013, which indicates the traffic data is 8 years old. This was confirmed with DDOT upon receipt of the files. The only exception to the age of the data is at the following intersections, where June 2016 data was incorporated into the Synchro files:

- M Street SE and South Capitol Street
- M Street SE and 4th Street SE
- M Street SE and 8th Street SE

Given the amount of development that has occurred in Navy Yard since traffic data was last collected in 2013 and 2016, Kimley-Horn of DC performed a limited data collection effort to approximate 2021 volumes at four intersections in the study area—M Street SE/SW and South Capitol Street, M Street SE at Half Street SE, First Street SE, and New Jersey Avenue SE. These four intersections process much higher vehicular and pedestrian volumes than the intersections east of New Jersey Avenue SE. As such, these intersections have the potential to experience greater impacts to operations and mobility for all users and were therefore the focus of the traffic analysis for this study. Based on the data collection conducted in 2021, volumes were approximately 80% of DDOT-provided volumes from 2013 or 2016. Therefore, traffic volumes to approximate existing non-COVID conditions were generated using growth rates from annual traffic growth from 2016 to 2018.

Additional detail on traffic analysis methodology and findings is discussed in **Appendix B: Traffic Volume Estimation Methodology**.

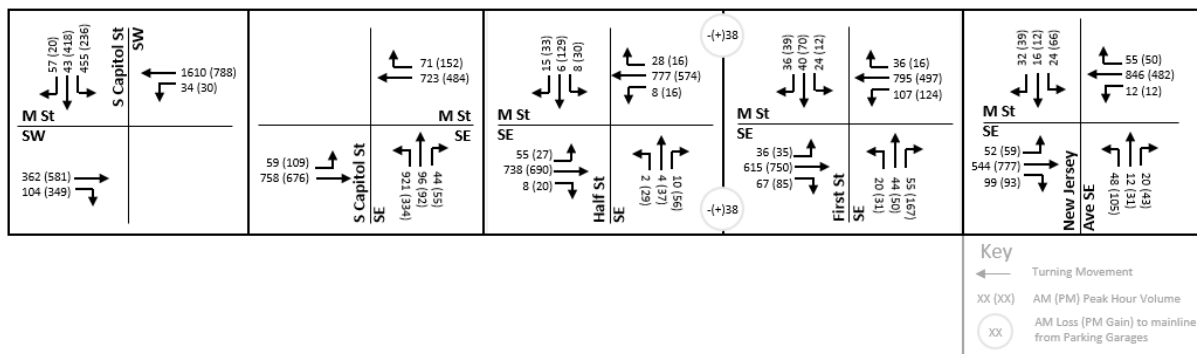
Figure 13 shows the estimated Existing (Pre-COVID) hourly volumes used in the traffic analysis. Eastbound hourly volumes are slightly higher than westbound hourly volumes during the AM peak period, and conversely, eastbound hourly volumes are slightly lower than westbound volumes during the PM peak period. This trend indicates there is a higher proportion of commuters traveling to and from the Navy Yard from points east and south of DC than from points west of DC.

At all signalized intersections within the corridor, with the exception of the westbound left turns at First Street SE, 4th Street SE, and Isaac Hull Avenue SE, all left turns from M Street SE are controlled as permissive only movements in shared through and left-turn lanes. The impact of this configuration at each intersection is that left-turning vehicles must wait for gaps in oncoming traffic to safely complete the turn, which causes secondary delays for vehicles traveling in the same lane intending to travel through the intersection. Capacity impacts are generally low unless left turn volumes are high and the opposing through movement is high or the pedestrian crossing volume is high. Locations with relatively higher hourly unprotected left-turning volumes include the locations listed below. In general,

these locations would be expected to process two or more left-turning vehicles per cycle (or 60+ vehicles per hour), which creates a greater potential impact to concurrent through movements.

- Eastbound at South Capitol SE and M Street SE – PM peak hour
- Westbound at First Street SE and M Street SE – AM and PM peak hour
- Northbound at New Jersey Avenue SE and M Street SE – PM peak hour

Figure 13: Estimated Existing (Pre-COVID) Hourly Turning Movement Volumes, South Capitol Street to New Jersey Avenue SE



Pedestrian hourly volume counts are provided in **Figure 14**, utilizing the most recent available data source, either 2013 or 2016 traffic data. Estimated 2021 hourly pedestrian volumes were not considered as they were lower than counts from 2013 and 2016. Overall pedestrian hourly volumes at the four intersections increased moving east along the M Street SE corridor. Pedestrian hourly volumes at South Capitol Street range from 7 to 98 crossings of a single leg of the intersection, whereas pedestrian hourly volumes at New Jersey Avenue SE, three blocks east, range from 317 to 885 crossings of a single leg of the intersection. The relative increase may be correlated with the Navy Yard Metro entrance/exit on the northwest corner of the M Street SE and New Jersey Avenue SE intersection and proximity to a higher density of office buildings, including the USDOT. Pedestrian volumes crossing the northern legs of the intersections are relatively higher than pedestrian volumes crossing other legs of the intersections. This is likely due to the fact that there is less development on the south side of M Street SE than on the north side.

Figure 14: Estimated Existing (Pre-COVID) Pedestrian Volumes, South Capitol Street to New Jersey Avenue SE

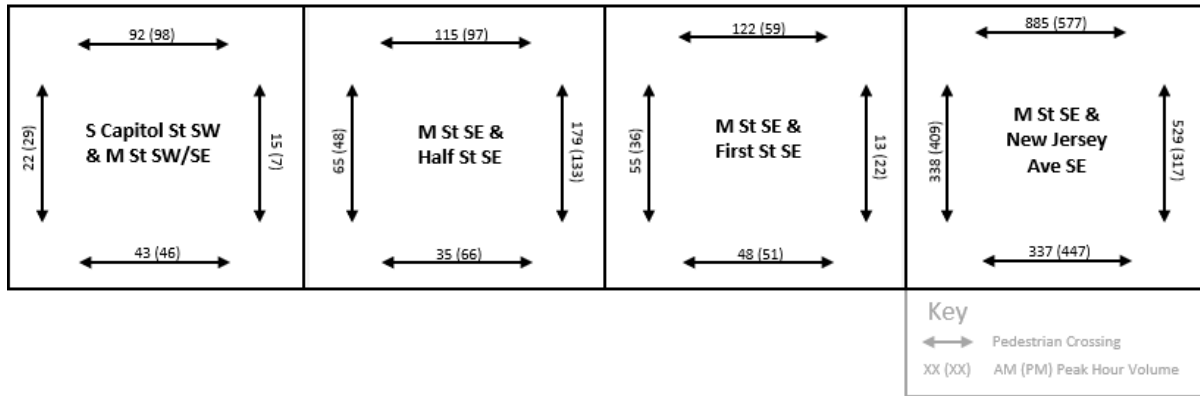
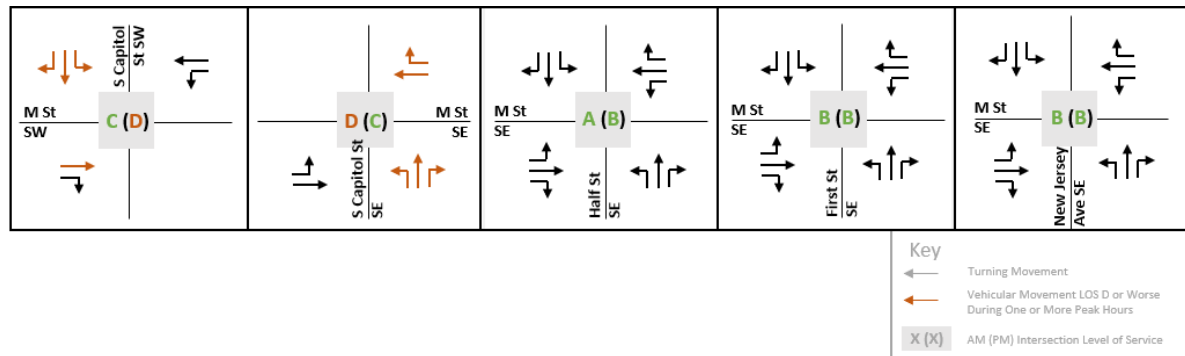


Figure 15: Estimated Existing (Pre-COVID) Intersection Level of Service, South Capitol Street to New Jersey Avenue SE



Challenges and Opportunities

Intersection operations analysis of the four intersections included in the traffic analysis of the M Street SE corridor reveal acceptable levels of service. The analysis includes lane configurations accounting for the Car Free Lane, a part of DDOT's Bus Priority Program, along M Street SE. The results described in the following section focus on level of service (LOS), which is a measure of traffic flow conditions defined by the *Highway Capacity Manual* (HCM). LOS pertains to individual movements, an intersection approach, or the overall intersection, and correlates to different levels of delay experienced by vehicles. LOS A correlates to free-flow traffic conditions, whereas LOS F correlates to a breakdown in traffic flow and high levels of delay. LOS C or better is typically considered to be acceptable, while LOS D indicates the start of a breakdown in operations. LOS E and LOS F are typically not considered to be acceptable by DDOT and may warrant consideration for mitigation, where feasible.

Table 1: Level of Service at Signalized Intersections

Level of Service	Delay ⁸ (seconds/vehicle)	Intersection Conditions and Delay
LOS A	< 10	Stable, free-flow conditions, no congestion
LOS B	10-20	Stable, free-flow conditions, little congestion
LOS C	20-35	Free-flow conditions, acceptable congestion
LOS D	35-55	Starting unstable flow conditions, increased congestion
LOS E	55-80	Unstable flow, congested
LOS F	> 80	Forced flow/stop-and-go

Signalized Intersection Capacity

The intersections analyzed within the corridor operate at or near acceptable LOS with the current lane configuration including the Car Free Lane. The Car Free Lane is an example of reallocating vehicle space within the transportation right-of-way to enhance multimodal operations and promote ridership without negatively impacting corridor operations for general purpose traffic. Similar examples of this in Washington, DC, can be noted on H and I Streets NW, Georgia Avenue NW, and Martin Luther King, Jr Avenue SE. Opportunities to determine how to best allocate space for vehicles, buses, bicycles, and other modes of transportation will continue to support the increasing demand due to placemaking and developments throughout the neighborhood.

In December 2014, DDOT published a report entitled *Prevailing Saturation Flow Rate for Lane Groups in Washington, DC*. Saturation Flow Rate (SFR) is used in operational (and planning) analysis as well as the design of signalized intersections. Assuming that an intersection's approach signal could stay green for an entire hour, and the traffic is as dense as it could reasonably be expected, then the number of vehicles that would pass through the approach during that hour is defined as the SFR. The default value being 1,900 passenger cars per hour per lane (pc/h/ln). As outlined in the report, varying *theoretical* SFR were identified for use in analyses for intersections in Washington, ranging from 1,461 pc/h/ln to 1,559 pc/h/ln depending on the lane configuration.

Recognizing that the signalized intersections do not provide a continuous green, an adjusted hourly flow rate was calculated based on the above ranges. The signalized intersections on M Street SE east of South Capitol Street provide green time along M Street SE ranging from 44% to 55% of the cycle length. That being the case, the estimated hourly SFR could be as much as 850 pc/h/ln. At South Capitol Street, where green time is less than 35% of the cycle length, the estimated hourly SFR could be as low as 350 pc/h/ln. Currently, M Street SE carries between 500 and 850 vehicles per hour across two lanes, not including left- and right-turning traffic. Note that these rates reflect saturated conditions *if the capacity would be reduced to a single lane*, meaning vehicles would be moving along the corridor closely together in what would be considered congested conditions.

⁸ Highway Capacity Manual 2010

The approximation of estimated hourly SFR is provided as a point of reference as considerations for a reduction in vehicle capacity are evaluated. Additional factors could affect the estimated hourly SFR, including lane configurations, turning volumes, pedestrian volumes, and changes in signal operations. These values suggest that a reduction in the number of lanes at South Capitol Street could adversely affect through travel where the estimated existing westbound through volume is 723 vehicles in the AM peak hour. In addition, estimated existing volumes east of South Capitol Street are approximately 850 vehicles at some intersections, which is the highest estimated hourly SFR. This assessment of SFR indicates that block-by-block considerations for capacity reductions may be necessary to understand the effects to vehicular operations.

South Capitol Street and M Street SW/SE

Vehicles at South Capitol Street and M Street SW/SE experience the greatest delay among the intersections included in the traffic analysis. This is due to the more-complex signal operations and intersection geometry as compared to the other intersections along M Street SE. The intersection also experiences the highest hourly approach volumes in comparison to the other intersections analyzed. The eastern intersection of the two-intersection cluster operates at an overall LOS D during the AM peak hour, with the north and westbound approaches operating at LOS E. The western intersection operates at LOS C during the same period with the southbound approach and eastbound through operating at a LOS D and LOS E, respectively. This trend is reversed during the PM peak hour, suggesting that more vehicles are traveling northbound during the AM and southbound during the PM peak hours.

Left-Turning Vehicles from the Mainline

As previously mentioned, left-turning vehicles do not have a protected left-turn phase at intersections along M Street SE, except for First Street SE, 4th Street SE, and Isaac Hull Avenue SE. The traffic analysis indicates left-turning movements operate at an acceptable LOS, even though they are unprotected. However, unprotected left turns can result in more aggressive vehicular movements during periods of higher traffic volumes, which presents potential safety concerns for pedestrians crossing the left-turning vehicle's path. With relatively heavier eastbound and westbound through traffic volumes, queues can quickly develop behind left-turning vehicles waiting for a gap to complete the left turn. Vehicles impacted by left-turning vehicles have been observed on the corridor to complete abrupt lane change maneuvers to bypass the queue, sometimes cutting in front of other vehicles. Unprotected left-turning vehicles maneuvering across two through lanes and the Car Free Lane also must yield to crossing pedestrians. With hourly pedestrian crossing volumes as high as 885 at M Street SE and New Jersey Avenue SE, there is greater potential for unsafe interactions between turning vehicles and pedestrians.

Safety/Crash Trends

A review of crash data from the most recent five⁹ years presents key safety trends and takeaways to consider. A total of 744 crashes occurred within the study area over the five-year period between January 5, 2016, and January 4, 2021. Crash data was obtained from Open Data DC, DDOT's Open Data Portal. Limited information pertaining to each crash record is available from Open Data DC, therefore the review of the available information presented below was limited to the location and date of the crash as well as the crash severity, pedestrian crashes, and bicycle crashes.

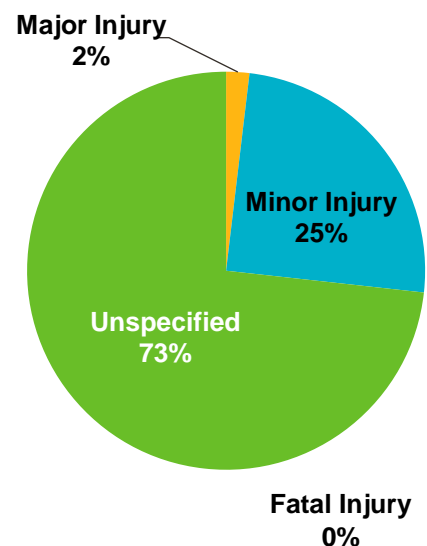
Crash trends are shown as a heat map of crash densities in **Figure 16**. There is a higher concentration of crashes at or near the following study area intersections:

- M Street SE and 11th Street SE (~100 crashes)
- S Capitol Street and M Street SW/M Street SE (~160 crashes)

Intersections along the M Street SE corridor with five or more crashes in one year are observed at Half Street SE, First Street SE, New Jersey Avenue SE, 4th Street SE, 5th Street SE, 9th Street SE, and 11th Street SE. This frequency of five or more crashes in a year could be indicative of safety issues depending on the type of crashes and recurrence of a crash type in a similar location within the intersection.

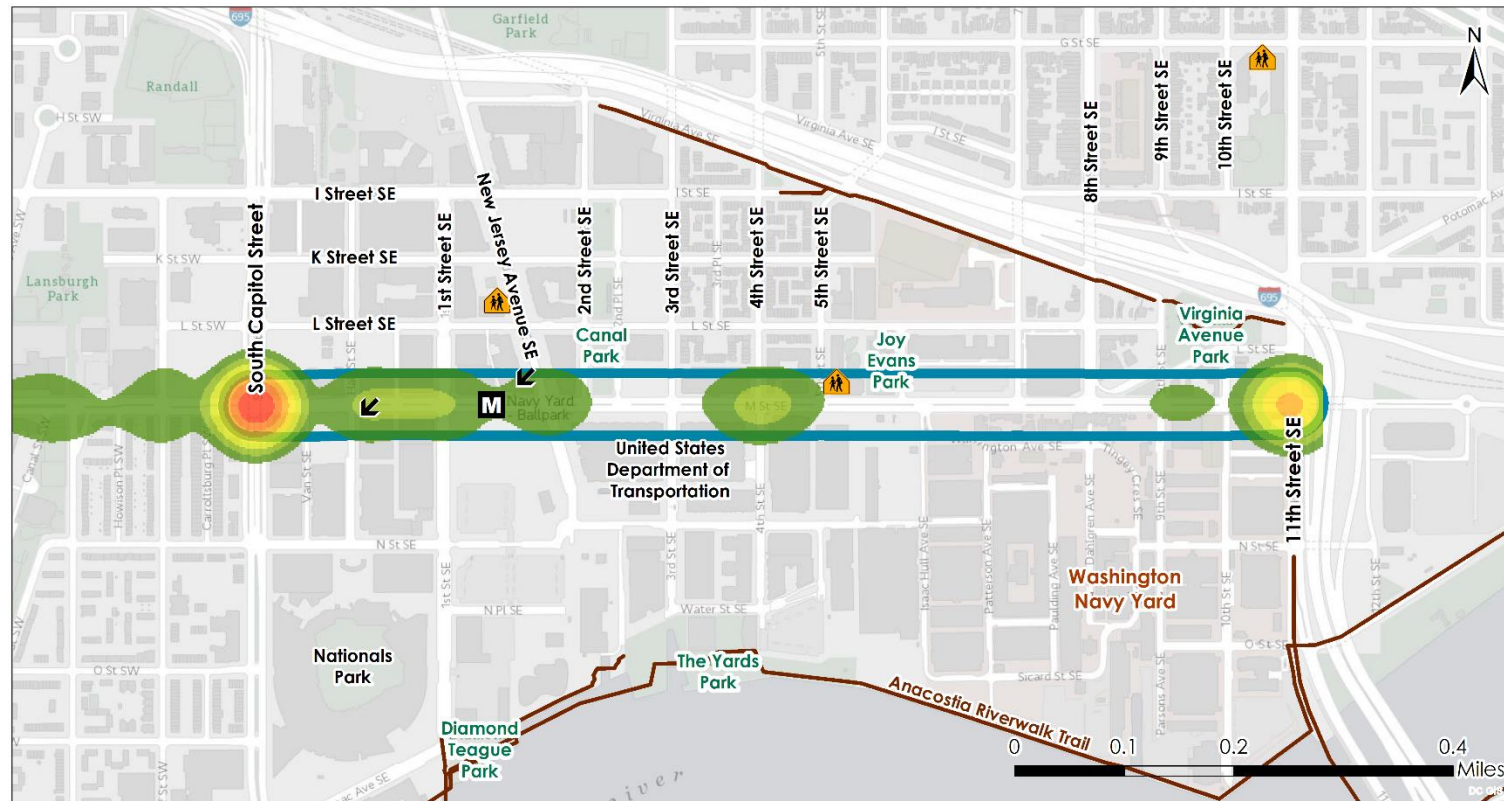
Crashes documented during this period range in severity, from resulting in unspecified/property damage only to minor injuries to major injuries. There have been no fatalities in the project area in the past five years. Severity of crashes is shown in **Figure 17**.

Forty-four crashes (6%) involving pedestrians were recorded in the project area. None of the pedestrian- or bicycle-related crashes resulted in fatalities. Four pedestrian crashes resulted in major injuries and 35 pedestrian crashes resulted in minor injuries. Pedestrian crashes resulting in major injuries occurred at South Capitol Street and 4th Street SE. Additionally, 17 crashes involving a bicyclist were recorded, of which 9 resulted in minor injuries, and the remaining bicycle crashes were unspecified. Pedestrian and bicycle crashes throughout the project area are shown in **Figure 18**.



⁹ Five years of data is analyzed to correct for potential anomalies in crash trends due to COVID-19.

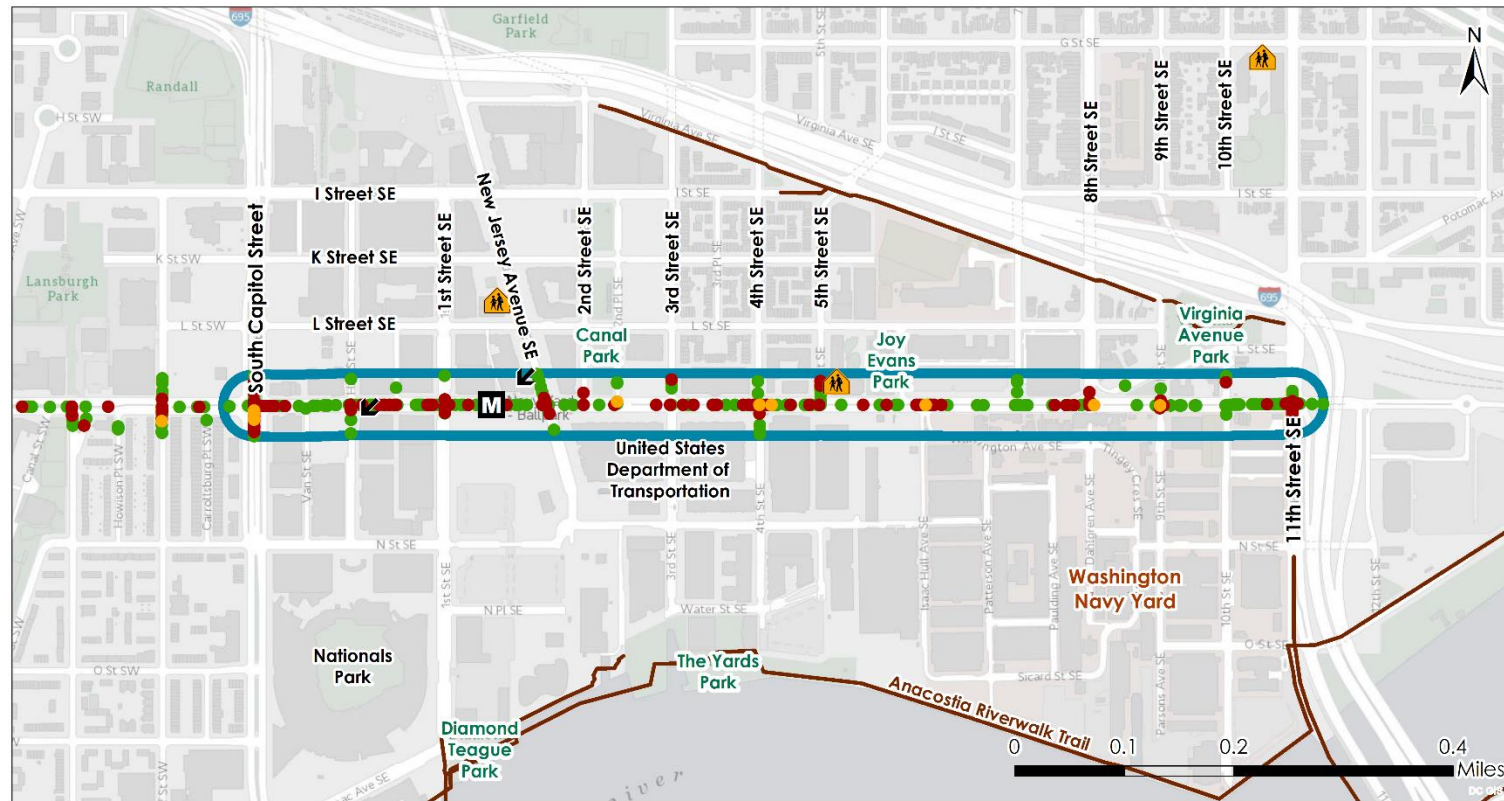
Figure 16: Crash Density



Legend

- Project Area
- M Metrorail Station
- Park / Open Space
- Lower Density
- Medium
- Higher Density
- 🚶 Public School
- ↙ Station Entry
- Off-Street Trail

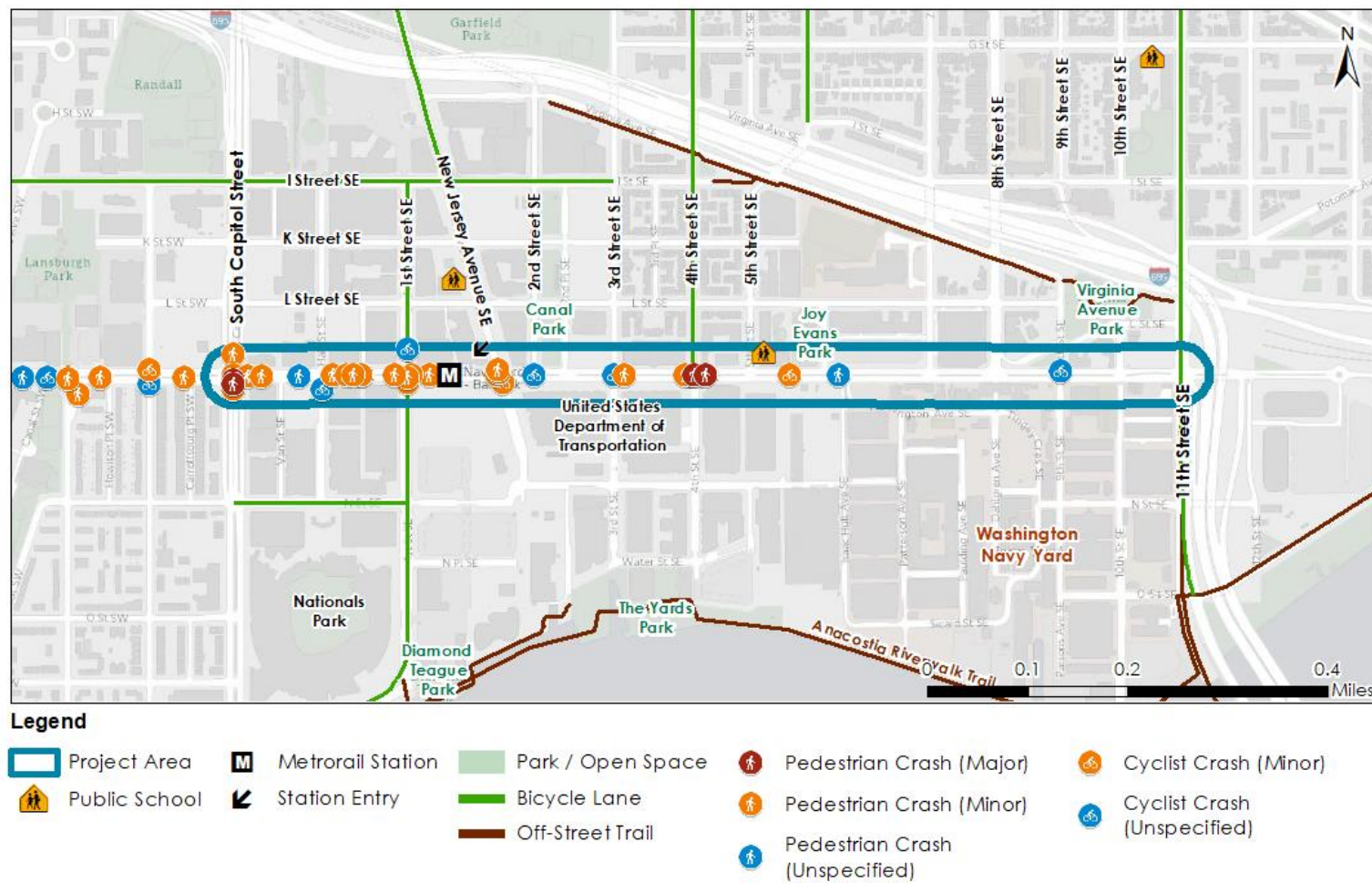
Figure 17: Crash Severity



Legend

- | | | | | |
|---------------|-------------------|-------------------|----------------------|--------------|
| Project Area | Metrorail Station | Park / Open Space | Property Damage Only | Minor Injury |
| Public School | Station Entry | Off-Street Trail | | Major Injury |

Figure 18: Pedestrian and Bicycle Crashes



Summary of Challenges and Opportunities

Pedestrian

Reconfiguring M Street offers an opportunity to enhance connectivity and safety of the pedestrian network. Future reallocation of general travel lanes into bus lanes or micromobility lanes may work to reduce the effective/perceived width of the street for people walking and work toward achieving the vision of M Street SE as a true multimodal “main street” for the Capitol Riverfront neighborhood.

The project area pedestrian network is already complete and connected, and ongoing efforts will continue to enhance the it. Development projects will fill vacant land and with them, bring high-quality materials, design, streetscape elements, and accessibility to their sites. Future DDOT efforts present an opportunity to improve crosswalk markings and pedestrian crossings for enhanced visibility, safety, and comfort.

Bicycle and Micromobility

Reconfiguring M Street can provide new non-motorized connections that link the Capitol Riverfront neighborhood and fill gaps in the existing bicycle and micromobility network.

The project area’s street grid is conducive to a connected network of dedicated bicycle facilities, but the presence and current configuration of M Street interrupts the street grid and therefore diminishes the potential of the existing—and future—bicycle network. Additionally, cycling along streets that cross M Street is difficult – even with dedicated facilities – due to potential conflicts due to higher traffic volumes, larger and more complex intersections, and a lack of dedicated bicycle lanes.

The project area street grid lends itself to improving bicycle travel. The great success of the existing network, the Capital Bikeshare system, and the District’s offering of micromobility and shared mobility devices has demonstrated that people will opt to bike or scooter—for work trips, non-work trips, and recreation—if safe and appealing routes are available. Applying this principle to M Street will make biking and scooting along M Street a safer, more convenient, and more appealing option for existing residents, workers, and visitors and the many more that the neighborhood is projected to have in the future.

Transit

Transit serves a critical mobility need. M Street and the Capitol Riverfront neighborhood is incredibly transit accessible, and the project area’s existing transit network serves critical mobility needs at the local and regional level, especially for essential workers and populations who rely on transit as a lifeline. Districtwide efforts are underway to improve the transit network and better serve riders, and M Street holds much promise to be a success story of the benefits of transit priority.

Curb Space

Many different modes of transportation are competing for limited curbspace. The curb space within the project area primarily serves the function of moving traffic and storing parked personal

vehicles, with opportunity to diversify. The designs for M Street SE that will come out of this project have the potential to provide a greater supply of multimodal curbspace to allocate to high demand uses beyond traffic and parking.

Traffic

Project area intersections operate at or near acceptable levels of service with the current lane configuration including the Car Free Lane. The Car Free Lane is an example of reallocating vehicle space within the transportation right-of-way to enhance multimodal operations and promote ridership without negatively impacting corridor operations for general purpose traffic.

Safety

M Street is relatively safe for all travelers, but there is room for improvement. While traffic crashes and injuries do occur with some regularity in the project area, there have been zero traffic-related deaths on M Street SE in the past five years and very few serious injuries. A redesign of M Street – one that reallocates curb space and travel lanes to more diverse, people-centric, multimodal uses – presents the opportunity to make the corridor even safer, especially for pedestrians, cyclists, transit riders, and other more vulnerable street users.