# SE/SW Mobility Vision Plan

## North-South Transit Connectivity

***FINAL DRAFT – May 2021***

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# Baseline Analysis of Transit Demand

The baseline analysis of transit demand for the North-South Transit Connectivity report identifies where and what type of market exists for transit from H Street NE to Buzzard Point / Fort McNair and 5th Street NE to the Southwest Waterfront (Washington Channel), as illustrated in **Figure 1**.

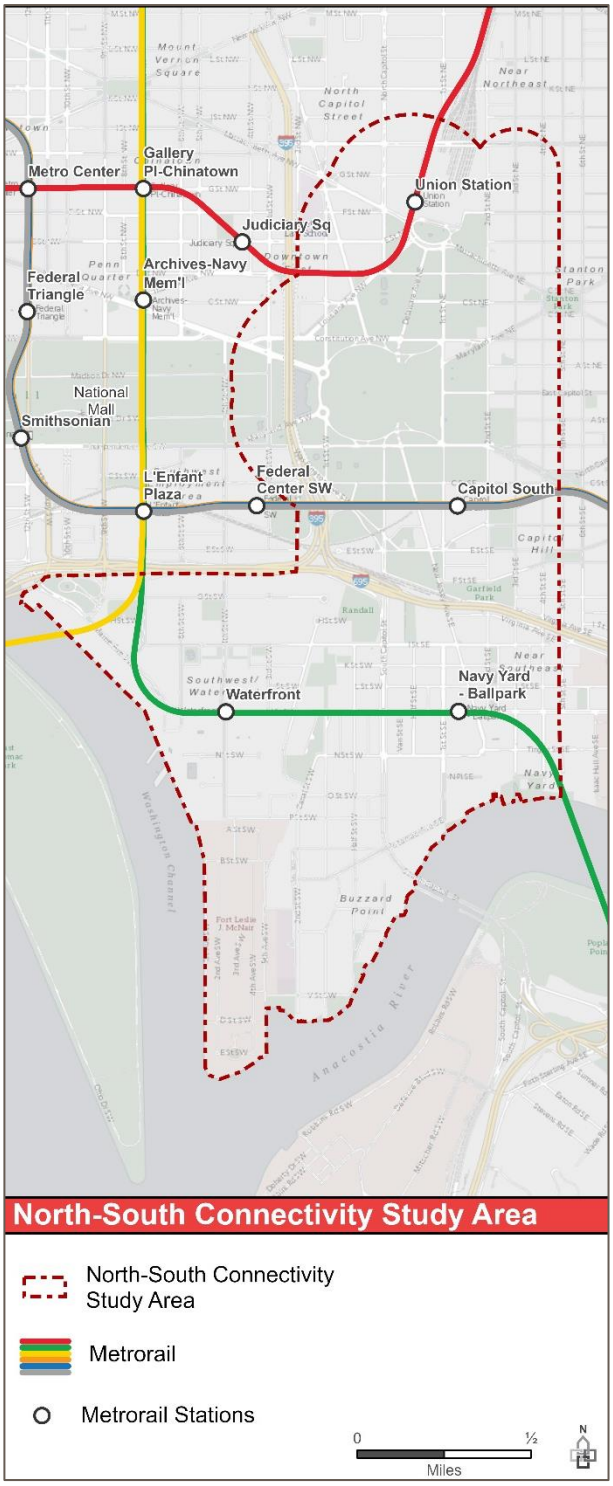
## Analyze Demand and Development

The following analyses assess the demand for transit connecting Buzzard Point potentially to the Metrorail at Navy Yard-Ballpark station, the Waterfront station, the Capitol South station, and at Union Station. It will focus in on where populations that rely on transit live, as well as on which corridors could support higher levels and potentially alternative types of transit. The study area includes several key destinations and activity centers. These include Union Station, the U.S. Capitol, Capitol Hill, the Washington Navy Yard, the Ballpark District, Buzzard Point, the Capitol Riverfront, and the Southwest/Waterfront (including The Wharf), as well as numerous parks and other recreational facilities.

## Planned Development

Transit use is influenced by the built environment. In particular, there are certain land uses – such as retail centers, civic buildings, multifamily housing, educational institutions, medical facilities, and major employment centers – that tend to generate transit trips at a higher rate. Within the North-South study area and in the immediate vicinity numerous developments are planned, under development, or recent completed. By 2030, within the boundaries of the Capitol Riverfront Business Investment District (BID), nearly 37 million square feet of new residential and commercial space will be constructed, including close to 10 million square feet of new office space, 22 million square feet of new residential space (approximately 22,000 units), and over one million square feet of new retail space. **Figure 2**

Figure 1: North-South Study Area



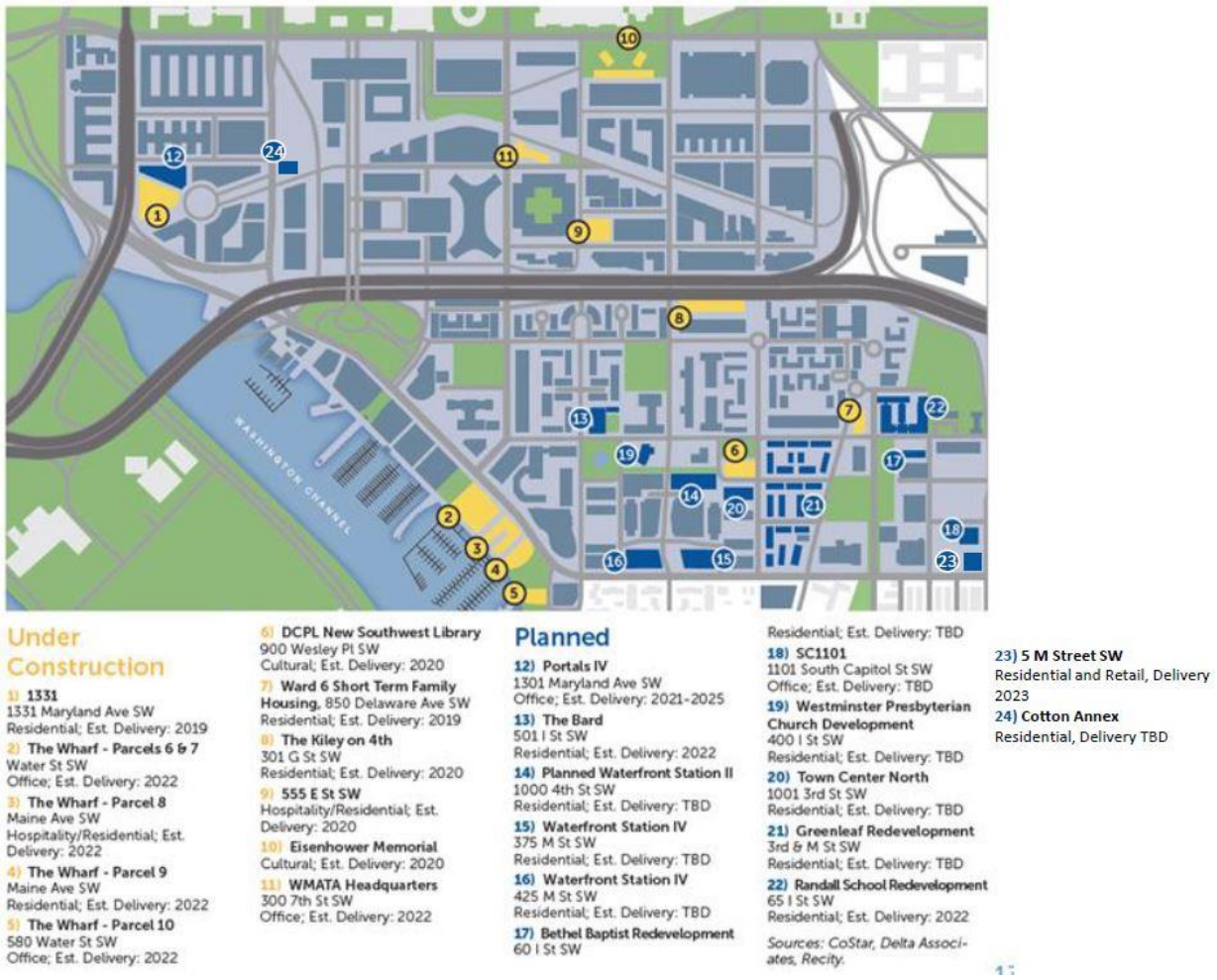
presents the end of year developments in the Capitol Riverfront BID in 2020.[1]

Figure 2: 2020 Development Status in the Capitol Riverfront BID


Within the boundaries of the Southwest BID, significant commercial, retail, and residential development also is in the pipeline. These development projects range from being fully built to under construction or planned. By December 2020, nearly 1.9 million square feet of commercial developments were in the pipeline in the boundaries of the Southwest BID. This represents approximately 18 percent of all commercial development in the District. In addition, over 5,000 square feet of new multi-family residential units are in the pipeline in the Southwest BID as of December 2020, about 10 percent of multifamily residential units in the District. Finally, over 260,500 square feet of new retail space was in the pipeline in the boundaries of the Southwest BID as of December 2020. The planned and under construction developments in the Southwest BID are shown in **Figure 3**.

[1] Capitol Riverfront Business Improvement District (2021), *A Constant Foundation in a Year of Change 2020 Annual Report*, https://www.capitolriverfront.org/about/resource-library.

Figure 3: 2020 Development Status in the Southwest BID




## Existing Transit

The North-South study area is served by numerous Metrorail, Metrobus, and Circulator routes. Metrorail's Red, Green, Blue, Orange, and Silver lines all operate through parts of the study area, serving Union Station, Capitol South, Waterfront, and the Navy Yard-Ballpark stations. In addition, Judiciary Square, Federal Center SW, and Eastern Market stations are located within approximately a half mile of the North-South study area boundary. Twenty-one Metrobus routes operate within the study area, including Metrobus A9, D6, D8, D51, P6, V1, V4, X1, X2, X8, X9, 30N, 30S, 32, 34, 35, 39, 74, 80, 96, and 97, as well as four Circulator routes: Congress Heights-Union Station, Eastern Market-L'Enfant Plaza, Georgetown-Union Station, and National Mall. These routes are shown in **Figure 4** with Metrobus routes symbolized by their route classification type.

**Figure 5** shows 2019 bus stop level ridership (boardings and alightings) for Metrobus and Circulator routes on a typical weekday. In general, compared to the system as a whole, the Circulator and Metrobus stops within the North-South study area have lower overall usage than other areas of the District, with the exception of the stops around Union Station. This is unsurprising given the number of connections across various modes that can be made at Union Station, including Metrorail, Metrobus, the Circulator, regional bus lines, and commuter rail routes, as well as Union Station's proximity to numerous Federal employment sites. After the bus stops around Union Station, Metrobus and Circulator stops on M Street have high use compared to other stops in the study area, with the highest usage concentrated at the stop at M Street SE/New Jersey Avenue SE. This stop is located next to the Navy Yard-Ballpark Metrorail station and is within close walking distance to the U.S. Department of Transportation Headquarters among other destinations.

**Figure 6** presents the weekday AM Peak (6:00 a.m. – 9:00 a.m.) Metrorail, Metrobus, and Circulator travel flows internal to the M Street and the North-South Corridor study areas, based on data from the 2019 Trace model. While the map displays only the weekday AM peak period, the transit travel flows during other times of the day are similar. The travel flows are aggregated to bus stop cluster zones and only zones that intersect with the study areas are included in the analysis. During the weekday AM Peak period, the greatest number of Metrorail, Metrobus, and Circulator passengers travel between Capitol South and L'Enfant Plaza; however, a significant number of transit passengers also travel between M Street the National Mall, and other job centers in Northwest DC. Over 2,000 passengers, for example, travel between the National Archives bus stop cluster zone, near the National Mall to the Navy Yard-Ballpark bus stop cluster zone, which intersects with the M Street study area, and nearly 2,000 transit passengers travel between the National Archives bus stop cluster zone and the Waterfront bus stop cluster zone. Only a small number of transit users travel between M Street and Union station, however, the direct North-South transit connections between the areas are limited.

Figure 4: Metrobus and Circulator Routes Operating in the Study Area

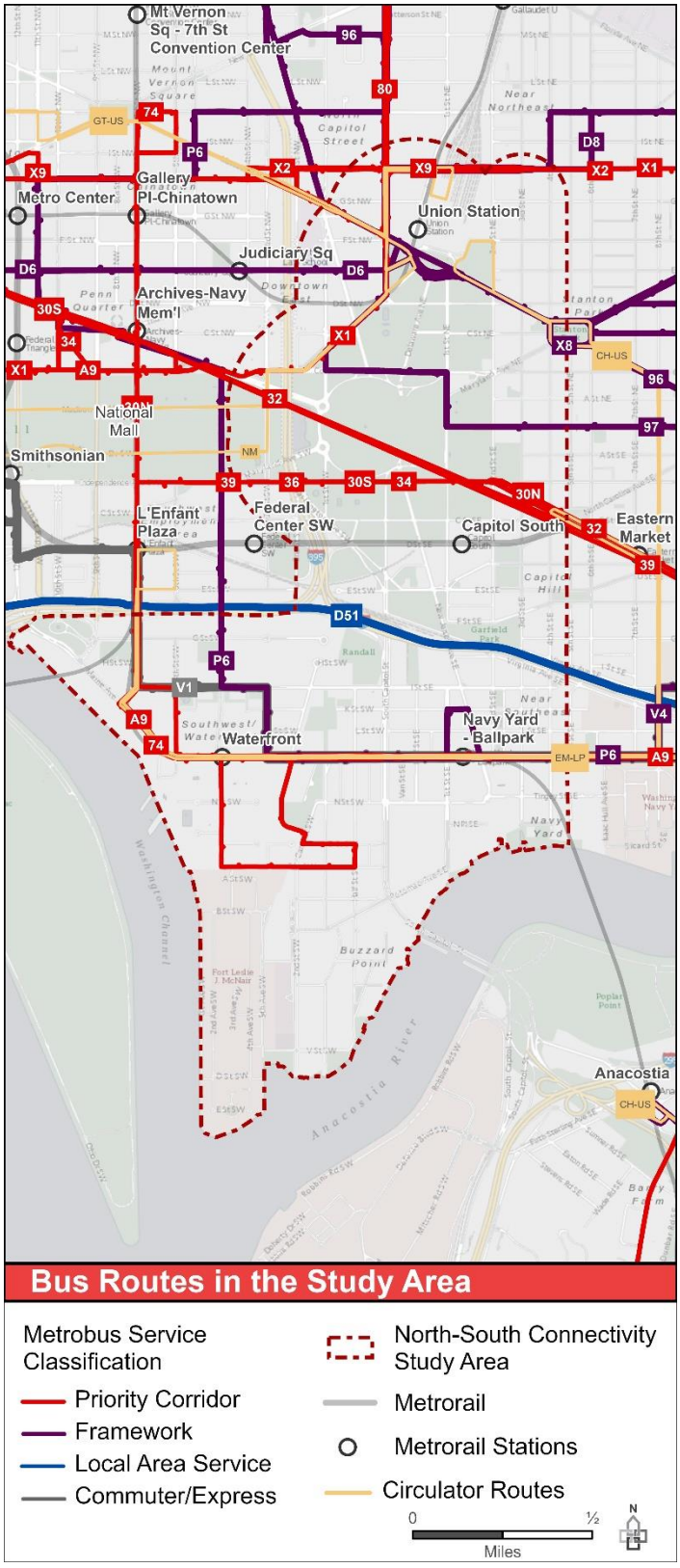


Figure 5: Metrobus and Circulator Ridership by Stop

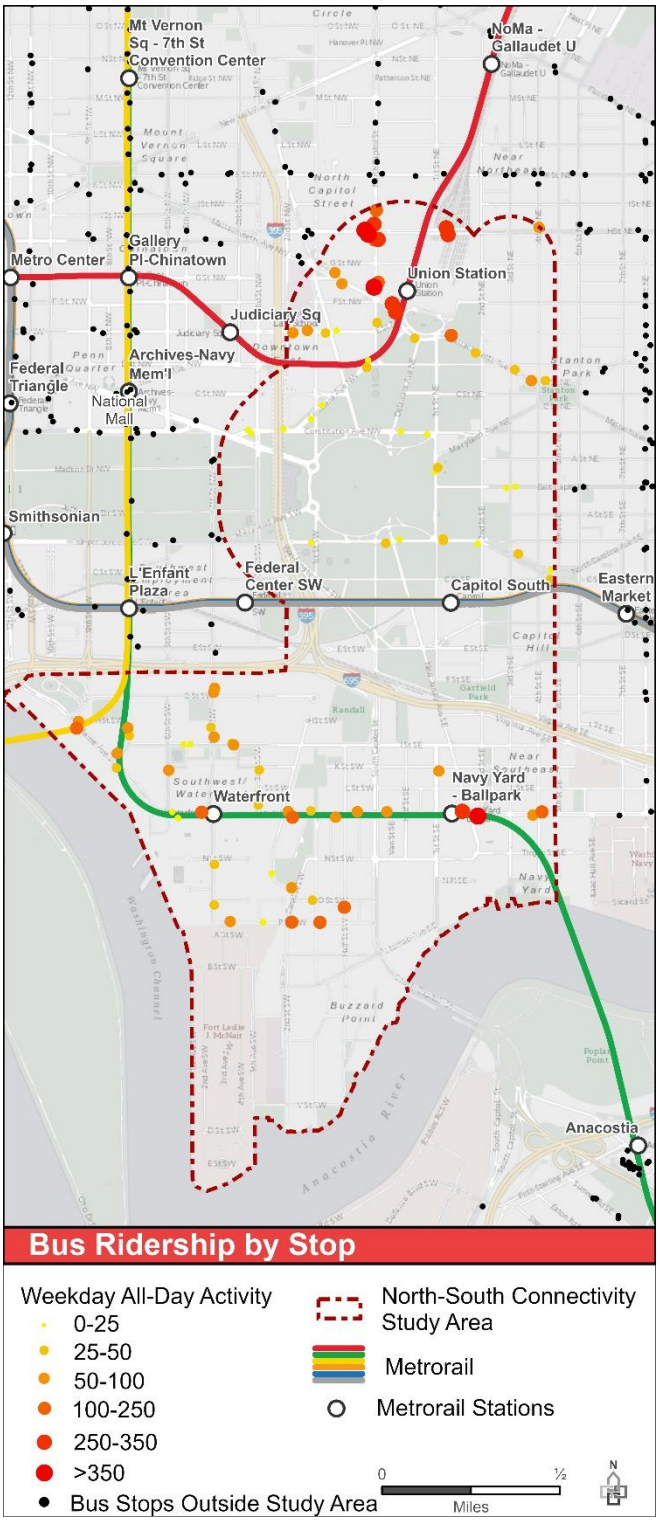
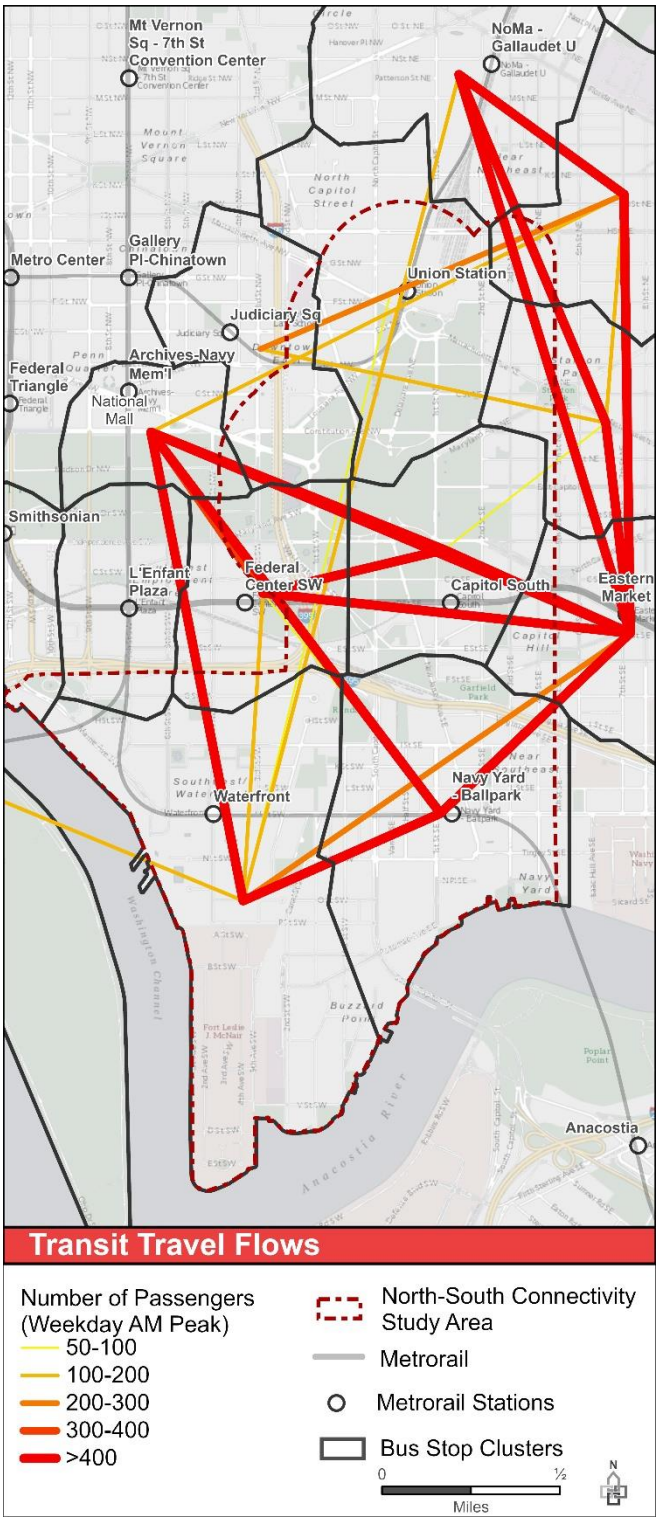



Figure 6: Transit Travel Flows



# Market Analysis

More than any other factor, the effectiveness and efficiency of public transportation is determined by density. Where there are higher concentrations of people and/or jobs, transit ridership tends to be higher. The purpose of this market analysis is to identify the strongest transit corridors between Buzzard's Point and Union Station and to highlight areas with relatively high transit need.

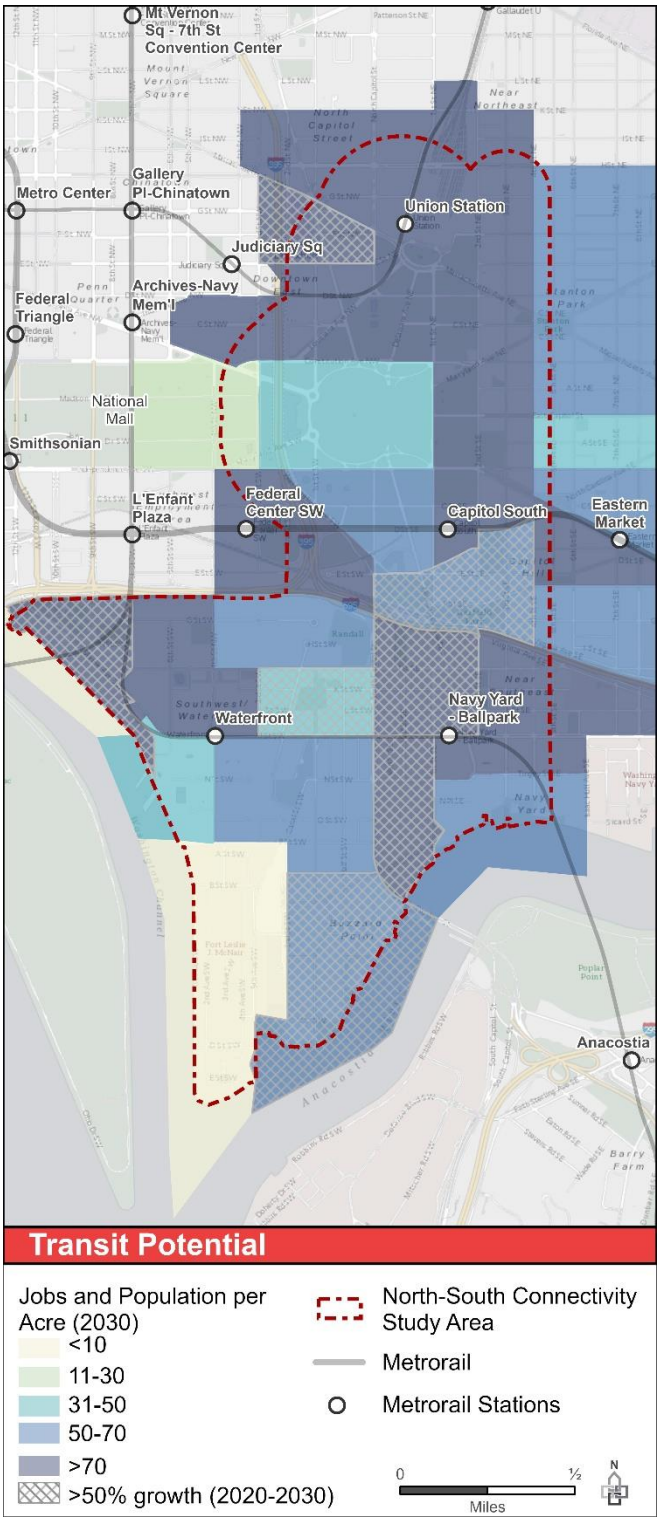
This analysis consists of two key components: Transit Potential which is an analysis of population and employment density, and Transit Propensity which focuses on characteristics such as income, automobile availability, age, and disability status that have been historically indicative of a higher propensity to use transit.

## Transit Potential

Transit service is generally most effective in areas with high concentrations of residents and/or jobs. Given that traveling to and from work accounts for the largest single segment of transit trips in most markets, the location and number of jobs in a region are also strong indicators of transit demand. Transit that serves areas of high employment density also provides key connections to job opportunities. At the same time, public transportation is most efficient when it connects population and employment centers where people can easily walk to and from bus stops. The following Transit Potential analysis uses data from the Metropolitan Washington Council of Governments (MWCOG) Cooperative Forecast Model for 2030. Transit Potential, shown in **Figure 7**, combines the population and employment densities for each Transportation Analysis Zone (TAZ) that intersects the study area to indicate the viability of fixed-route service in an area. **TAZs with cross-hatching are forecasted to experience a growth in population and employment density of at least 50 percent between 2020 and 2030.**

In the North-South study area, the highest concentrations of jobs and population are located around Union Station, the Navy Yard/Ballpark Metrorail station, Capitol Hill, and the National Mall. Buzzard Point as well as much of the Southwest Waterfront have moderately high job and population densities.

Figure 7: Density of Population and Jobs (2030)



Of the seven TAZs expected to experience over 50 percent growth in employment and population density, six are south of the National Mall and four border M Street.

## Transit Propensity

Transit propensity summarizes a range of factors to illustrate where transit may be most likely to attract ridership. By synthesizing various demographic and economic characteristics in the North-South study area, each measure of transit propensity indicates locations that could serve as key origins and destinations for transit trips. This following analysis includes two indices to measure transit propensity: Transit-Oriented Population Origin Index and the Activity Destination Index.

**Figure 8** and **Figure 9** present these two indices, illustrating where high concentrations of likely transit-oriented populations live and where high concentrations of services, such as shopping, medical, religious, and social institutions are located.

The origin index indicates where potential transit users live, while the destination index represents areas where transit users may travel for work or other activities. Variables for characteristics such as age, income, vehicle ownership, work status, and employment sector are weighted within each index to determine how those factors contribute to transit propensity. For each index, these factors result in an estimate for transit propensity for every Block Group, which are then rated from high to low relative to the block groups with greatest and least propensity throughout the study area.

### Transit-Oriented Population Origin Index

Research has shown that areas with high concentrations of youth, seniors, low-income households, households with low car ownership, and persons with disabilities can be indicative a higher likelihood of using transit. **Figure 8** shows the residential and mixed-use parcels with high transit-oriented populations in the North South study area. The greatest concentration of residents meeting these criteria occur south of M Street between South Capitol Street and Delaware Avenue SW. High concentrations are also found in Buzzards Point, Near Southeast, and south of Interstate 695 between Delaware Avenue SW, I Street SW, and South Capitol Street.

### Activity Destination Index

The Activity Destination Index represents locations with high concentrations of services, such as shopping, medical, religious, and social institutions. Areas with high Activity Density propensity typically have a greater propensity for transit throughout the day. **Figure 9** shows the commercial and mixed-use parcels with a high Activity Destination propensity. These areas are concentrated near Union Station and Judiciary Square, south of M Street, near the Navy Yard and Ballpark, around L'Enfant Plaza, and around the Capitol South Metrorail station. It is important to note that this information is presented based on existing development as have the potential to change as new development comes online.

Figure 8: Transit-Oriented Populations Origin Index

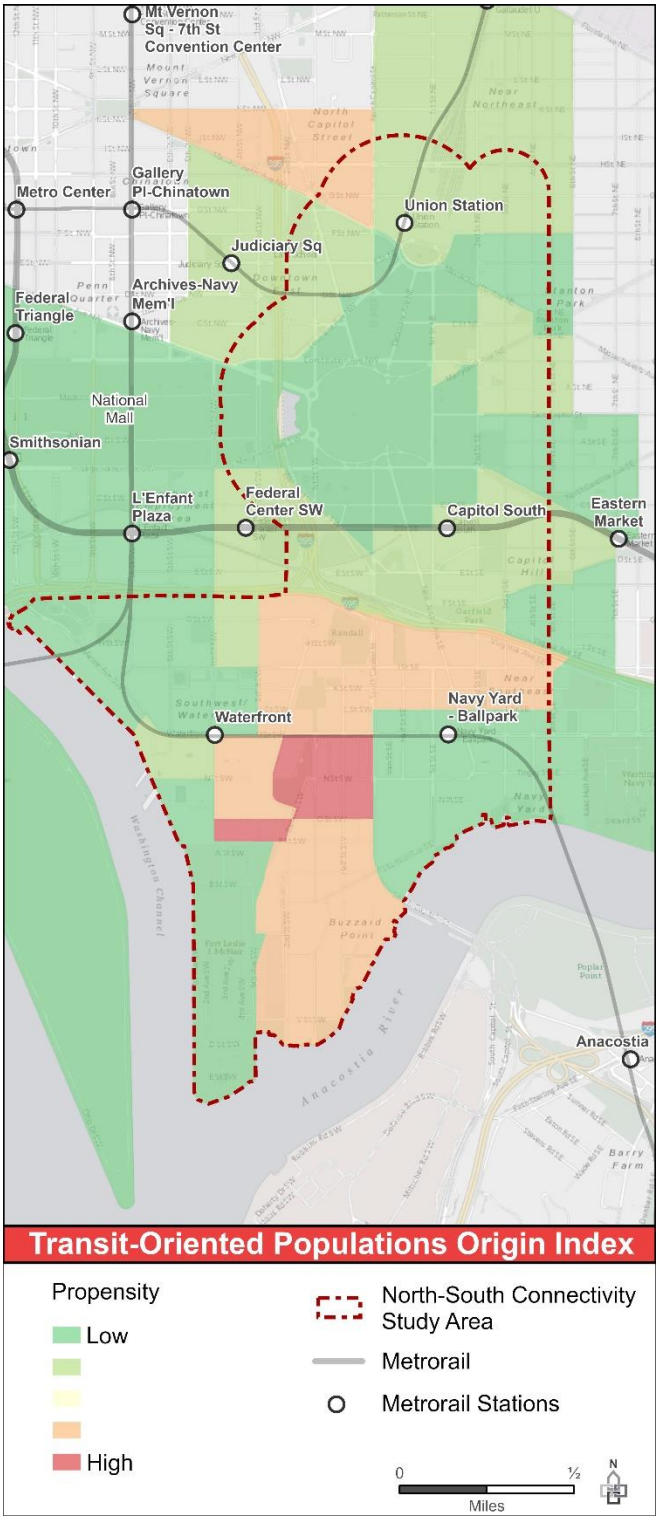
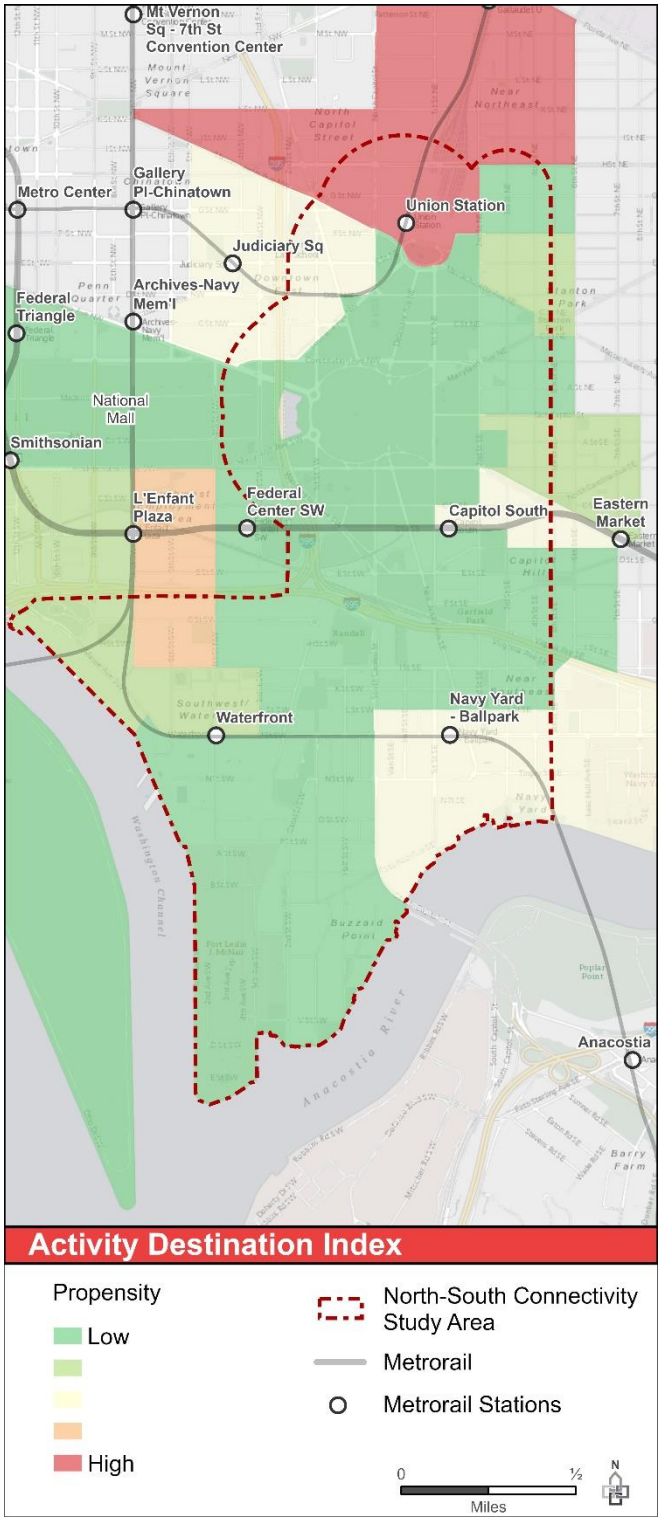



Figure 9: Activity Destination Index

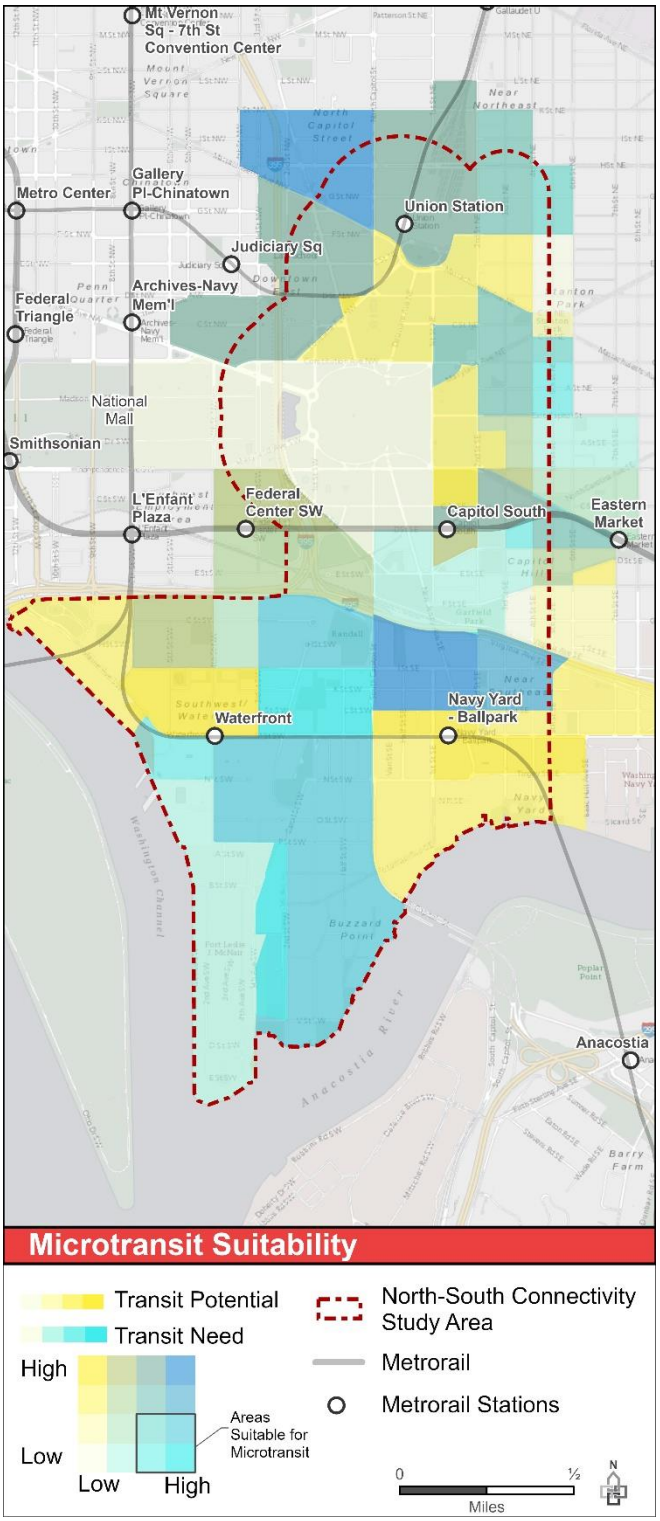


## Microtransit Suitability

Building on the transit potential and transit propensity analyses, a microtransit suitability analysis highlights areas that score higher in transit propensity and lower in transit potential. The microtransit suitability analysis overlays the transit potential analysis, which highlights areas with supportive employment and population densities for transit, and a transit propensity analysis, which highlights where persons reliant on and more apt to use transit are located. For this analysis, the transit-oriented populations origin index is used for transit need. Areas that have a lower transit potential, but a higher transit need may not have the population and employment density to sustain fixed-route service; however, these areas do have a concentration of populations that would likely use and benefit from transit services. In these areas, microtransit could provide a transit service that is financially feasible and flexible enough for the populations residing in the area.

**Figure 10** presents the microtransit suitability in the North-South study area, with the values shown at the TAZ level. In the map, transit potential is shown in shades of yellow and transit need is shown in shades of bright blue, where a lighter shade of yellow and blue represent a low transit potential and a low transit need respectively and the darker shades of yellow and blue represent the areas with a high transit potential and high transit need. Areas in shades of green are those areas where transit potential and transit need overlap, and the dark, royal blue shows where both transit potential and transit need are high. In the North-South study area, transit potential and transit need align in most areas. However, there are some areas in the southern portion of the study area that have a higher transit need and a lower transit potential, which could potentially make them more suitable for microtransit. These areas include Buzzard Point and parts of the Southwest/Waterfront, particularly in the area near the intersection of South Capitol and M Streets. These areas have a higher density of low-income populations compared to other parts of the study area; and the area north of M Street also has a higher non-white density and a higher density of people with disabilities.

Figure 10: Microtransit Suitability in the Study Area



# Travel Demand

To better understand travel patterns in the study area across the highway and transit network in the District, data from the MWCOG's regional transportation model, version 2.3.78 was analyzed. This analysis highlights, within the North-South study area, the trips travelers are making via commuter rail, Metrorail, Metrobus, a combination of Metrorail and Metrobus, and auto trips. The trips were aggregated for all trip purposes included in the model, including home-based work, home-based shop, home-based other, non-home-based work, and non-home-based other. The MWCOG model forecasts travel demand over a multi-year time horizon, using data from the 2007/2008 Transportation Planning Board Household Travel Survey as well as transit on-board surveys for Metrorail (2008), regional bus (2008), MARC (2007-2008), and Virginia Railway Express (2005).[2]

**Figure 11** and **Figure 12** present the model flows within the North-South study area in 2019 and 2030. The flows are aggregated to the TAZ level. For this analysis, all trips that occurred outside of the study area were excluded. As such, the travel flow analysis focused exclusively on the flows between and within TAZs located in the study area. For the purpose of counting the number of flows between any two TAZs, the total number of flows was determined without taking direction into account. On the maps, flows between TAZs are shown as lines and trips that occurred entirely within one TAZ are shown as points. The map is also limited to flows greater than 50, so if a TAZ is modeled to have fewer than 50 trips or if there are fewer than 50 trips between TAZs modeled, these flows do not appear on the map.

Travel flows are fairly similar in 2019 and 2030, with an increased number of forecasted trips between the northern and southern ends of the study area in 2030. The model estimates an increase in total trips within the study area of approximately nine percent. In 2019 the greatest number of person trips connect Union Station to the Southwest Waterfront, followed by connections between the Southwest Waterfront and the Navy Yard. In 2030, the greatest number of person trips connect the Navy Yard to the Southwest Waterfront, followed by connections between Union Station and both the Southwest Waterfront and the Navy Yard. **Further, in 2030, person trips between destinations on M Street and destinations south of M Street, like Buzzard Point, increase by 95 percent.** In general, in both years, more trips are estimated to occur internally within TAZ's than between TAZ's in the study area. The most internal trips occur around Union Station in both years; however, by 2030, an increasing number of internal trips are projected to occur in Buzzard Point and other areas South of M Street. Internal trips around Buzzard Point, for example, are forecasted to increase over by 200 percent.

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[2] *Metropolitan Council of Governments, "Transportation Modeling,"* https://www.mwcog.org/transportation/data-and-tools/modeling/.

Figure 11: Internal Travel Flows, 2019

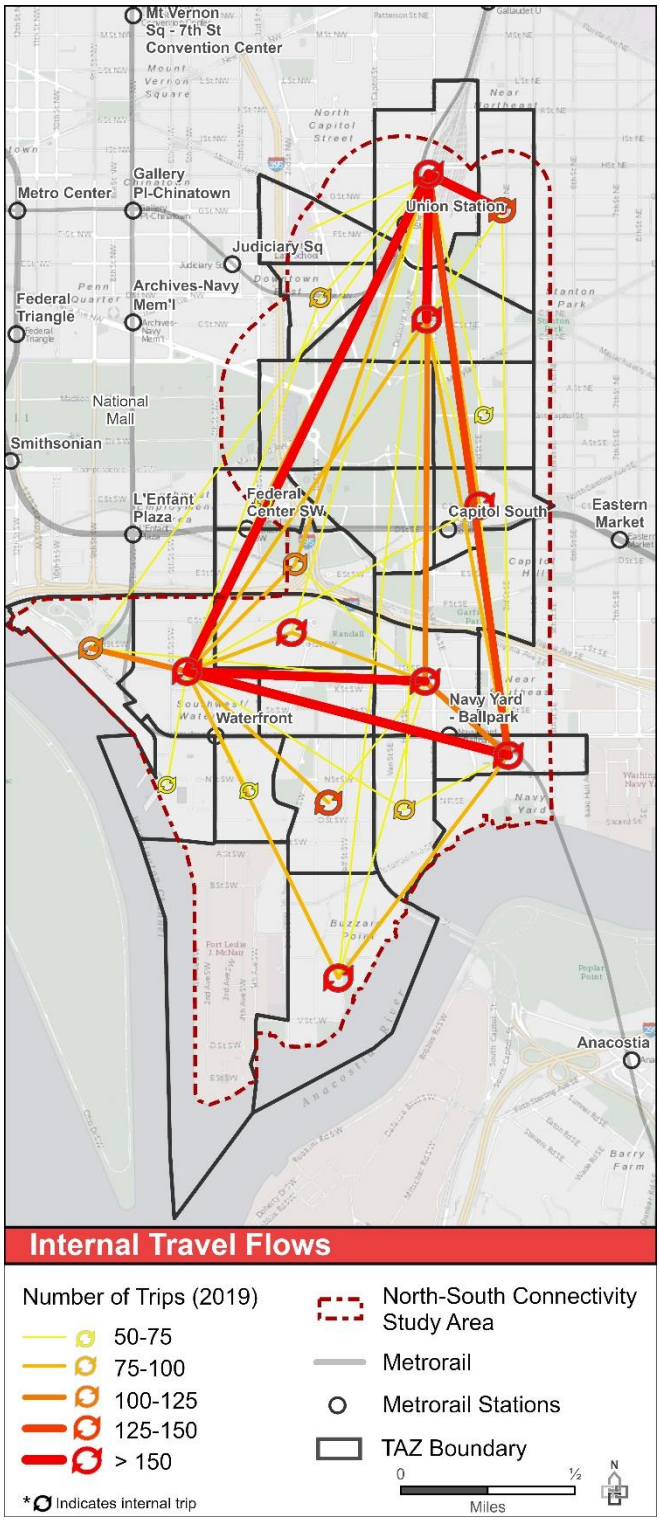
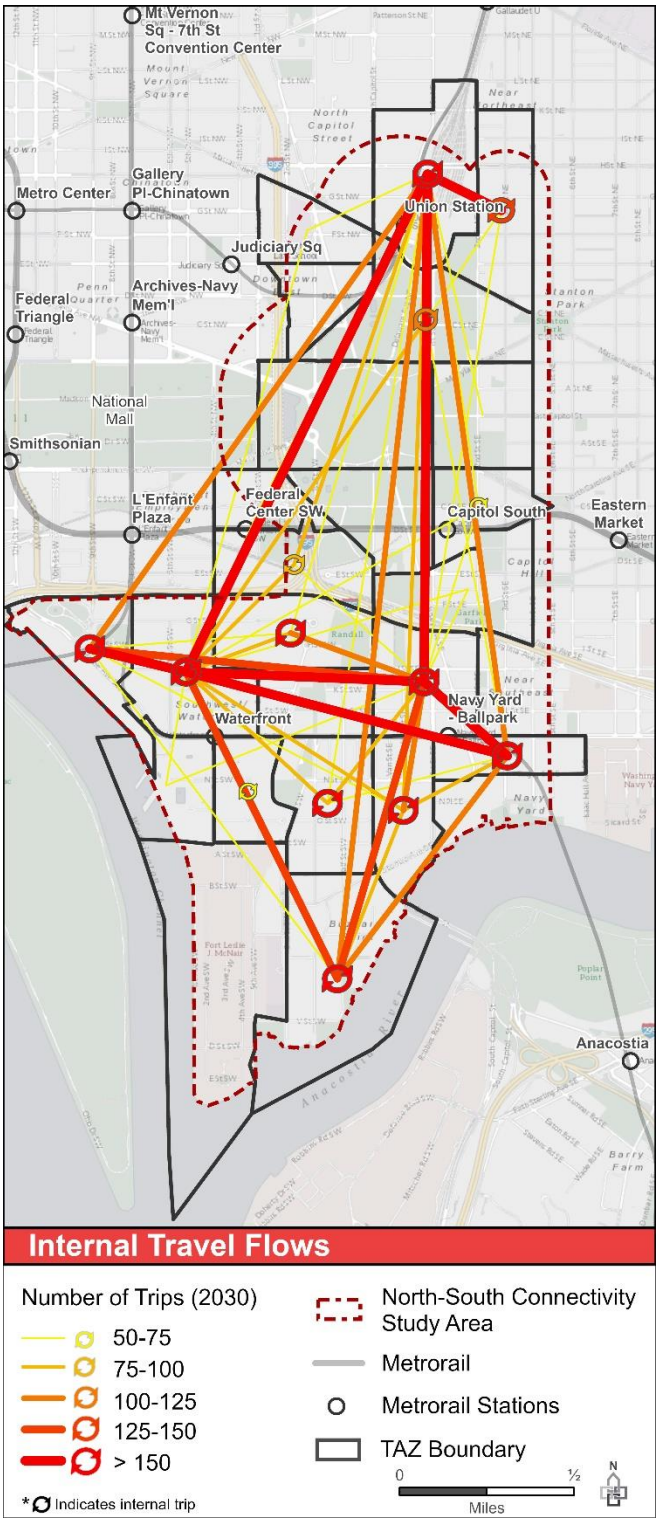
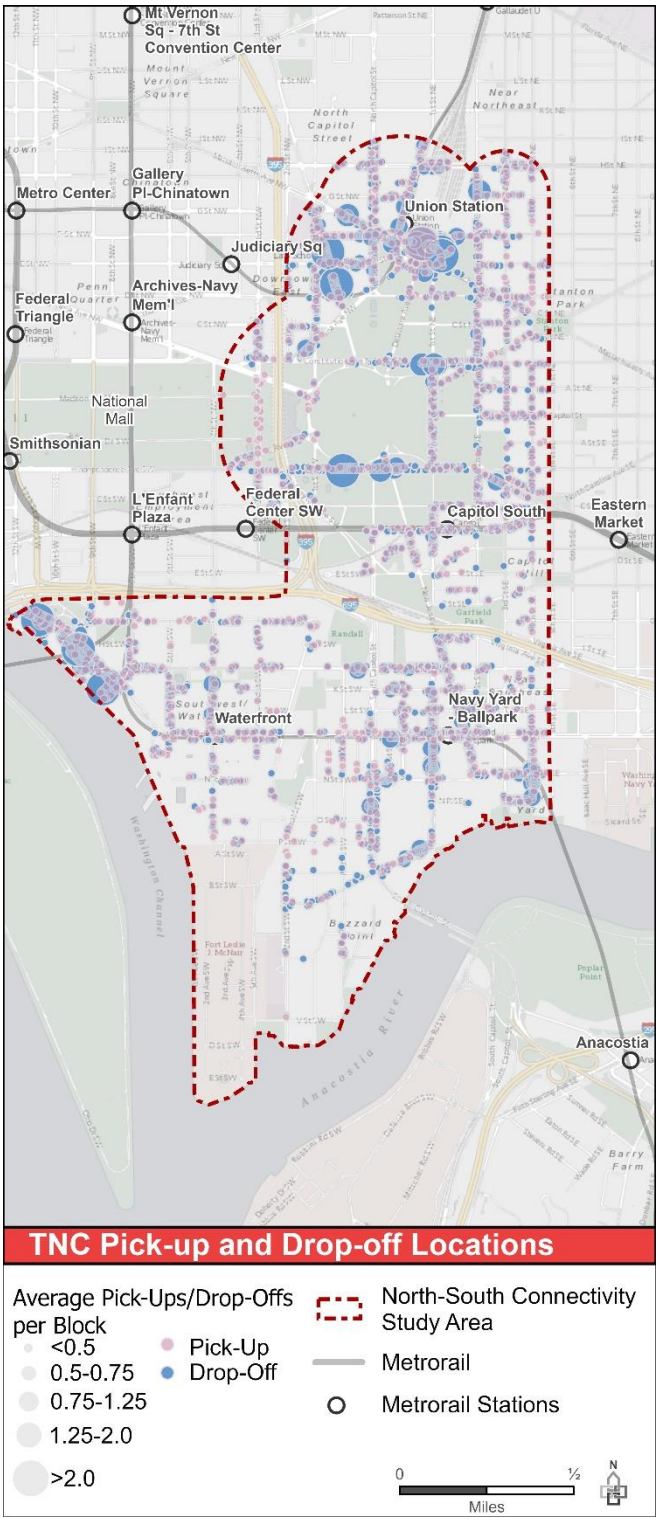



Figure 12: Internal Travel Flows, 2030



Examining transportation network company (TNC) trips further highlights demand in the study area. Hourly average TNC pick-ups (trip origins) and drop-offs (trip destinations) from

Figure 13: TNC Pick-up and Drop-off Locations



2019[3] are shown in **Figure 13**. The pick-up and drop-off locations are summarized within the North-South study area. On the map, the blue dots represent drop-offs per block and the pink dots represent pick-ups. The size of the dot is scaled up or down based on the average number of pick-ups and/or drop-offs per hour, with larger dots indicating more pick-ups or drop-offs.

Across the study area, TNC pick-up locations are relatively evenly spread out, with most blocks that have any trips having less than one trip per hour; however, TNC drop-off locations are more clustered. Only two blocks have an average of more than two TNC pick-ups per hour, both of which are located by Union Station. On the other hand, over 20 blocks had an average of more than two TNC drop-offs per hour. In addition to Union Station, a high number of TNC drop-offs are located around the U.S. Capitol and the Wharf. There are smaller concentrations of TNC drop-offs near the Navy Yard, Ballpark, and Capitol Hill.

This TNC trip data helps paint a picture of where travelers go within the study area, however, the data does not show travel flows, so only general patterns can be determined. Because the data is aggregated to origins and destinations, there is no way of knowing if both the origin and destination are within the study area. In general, however, the data suggests that TNC trip destinations tend to be co-located with Metrorail stations or other destinations, while TNC trip origins are less clustered and are likely tied to a passenger's home or work location.

[3] *Timeframe: 04/29/2019-05/05/2019, 06/10/2019-06/16/2019, and 02/24/2019-03/2/2019*

# Key Takeaways

The following key findings will inform the recommendations for future transit services that will connect Union Station with the Southwest/Waterfront, the Navy Yard, and Buzzard Point.

- Southwest DC is slated to gain several million square feet of new residential, retial, and office space, which will help drive travel demand in future years.
- Numerous bus routes serve the study area, but most operate in the east-west direction, and only one route provides any service south of M Street, highlighting a potential gap in service.
- The most used bus stops in the study area are co-located with Metrorail stations.
- A high number of existing transit trips are taken between the Navy Yard/Ballpark and Waterfront/Southwest and the National Mall, indicating existing demand for north-south connections in the study area.
- Transit potential is greatest in the North-South study area around Union Station, Capitol Hill, and the Navy Yard/Ballpark.
- In Buzzard Point and in parts of Southwest/Waterfront transit need is greater than transit potential, indicating that microtransit may be a suitable option in these areas.
- Travel demand across all modes is growing in the study area, and the number of trips connecting Union Station with M Street and Buzzard Point are projected to grow by 2030.