# Appendix I

# Transit Ridership Forecasting

## STOPS Ridership Forecasting Overview

The Montgomery County Department of Transportation (MCDOT) is assessing a potential BRT project to connect an area along New Hampshire Avenue to Metrorail at Fort Totten, the planned Purple Line LRT at Takoma Langley and establish higher-capacity transit service between Fort Totten station and Randolph Road. MCDOT is considering five alternatives for the service, each serving the same set of stations but operating on different lane configurations. The objective of this transit project is to provide more mobility options, improve access between activity centers and neighborhoods, and offer a time-efficient, sustainable, and cost-effective alternative to automobiles.

The purpose of this memorandum is to document the ridership forecasts developed by the Project Team utilizing the Federal Transit Administration's (FTA) Simplified Trips-on-Project Software (STOPS) model. STOPS is a standalone ridership model created by FTA specifically for evaluating Capital Investment Grant (CIG) candidate transit projects. It is similar to a conventional four-step model that evaluates zone-to-zone travel markets based on socioeconomic characteristics and the existing transit network. STOPS produces base year average weekday ridership forecasts for CIG mobility, congestion relief, and cost effectiveness measures; and quantifies the projected change in daily automobile Person Miles Traveled (PMT) resulting from implementation of the proposed project, which is used for the CIG environmental benefits measure. STOPS has been calibrated and validated using actual ridership experience on transitways including Bus Rapid Transit (BRT), Light Rail transit (LRT), and commuter rail across the country.

During the model development phase, it was determined that recently collected survey data characterizing transit demand was not available; consequently, the STOPS model was employed in its synthetic mode. The STOPS methodology synthesized total trip-making based on schedule data from the region's transit providers' general transit feed specification (GTFS) files and travel demand information sourced from the Census Transportation Planning Package (CTPP) for the years 2012 to 2016. Initial ridership estimates by route and stop location were compared to actual counts from 2019, and the model was subsequently calibrated to align with the ridership patterns observed during that period. Following this calibration, the model was updated using contemporaneous count data reflecting 2024 transit ridership in the region to forecast base and future year project ridership. This approach adheres to FTA guidance for developing synthetic mode STOPS applications, utilizing pre-pandemic demand information (2012-2016 CTPP) to inform post-pandemic ridership scenarios.

This report documents the methodology, project specifications and ridership forecast results for the five New Hampshire Avenue BRT project alternatives.

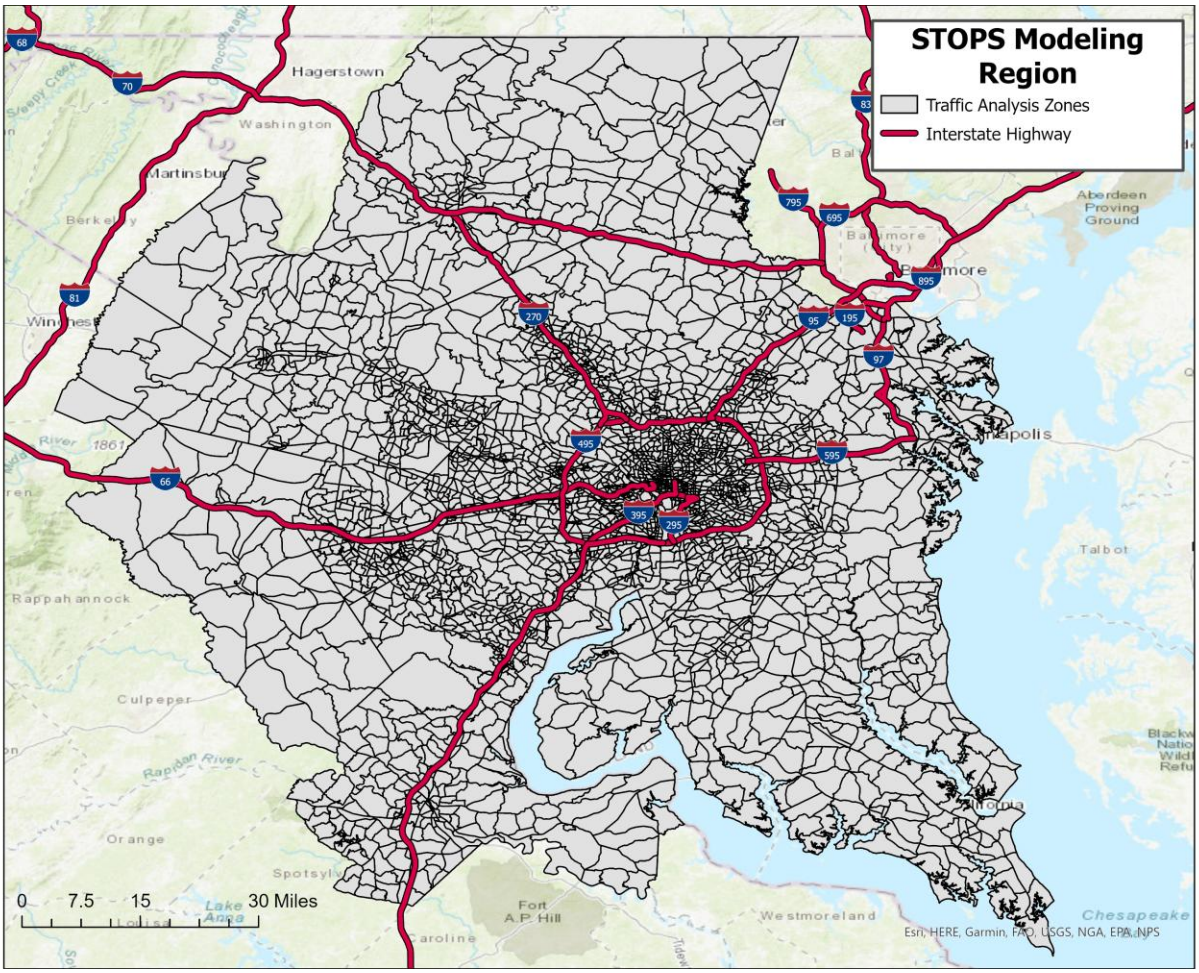
## Geographic Scope

The geographic scope of the analysis was based on the Metropolitan Washington Council of Governments (MWCOG) region and included all of Washington D.C.; Montgomery, Prince George's and Anne Arundel Counties in Maryland; Fairfax and Arlington Counties in Virginia.

Zones were based on the MWCOG's traffic Analysis Zone (TAZ) system with state, county, and tract coding to describe the relationship between GBNRTC TAZs and the American Community Survey Census Transportation Planning Products (CTPP) TAZs.

**Figure 1** presents an overview of the regional zone system and the model region.

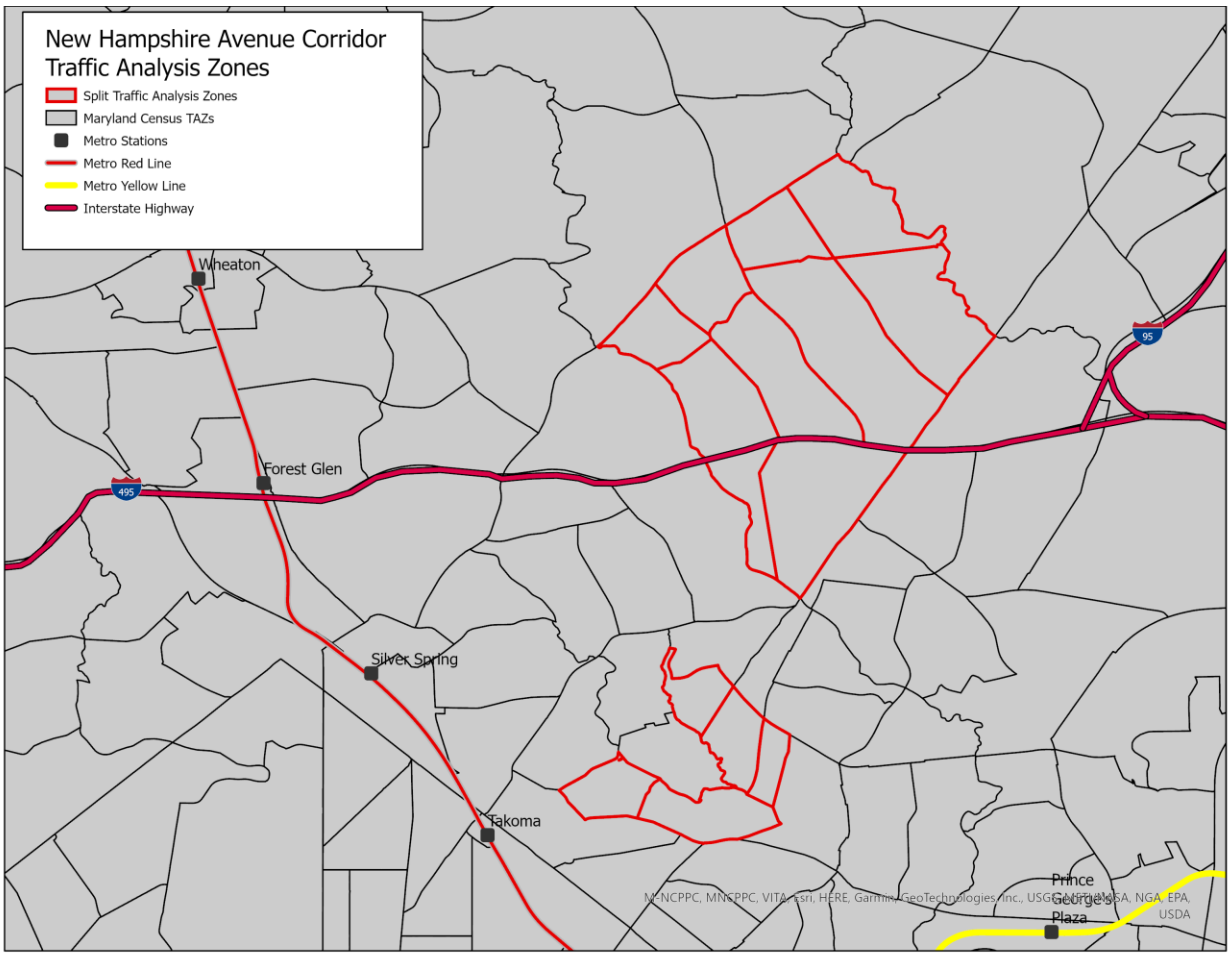
*Figure 1: Overview of Regional Zone System*




TAZs play a fundamental role in developing sound forecasts. During the process of generating individual candidate transit paths for the model, each simulated trip evaluates the distance to the closest transit stop from a TAZ centroid. Therefore, irregularly shaped zones that serve the corridor can affect the model's ability to accurately assign access or egress stops. To address this issue, select zones within the New Hampshire corridor were

subdivided further to enable the model to represent transit trip generation potential more effectively within the corridor's zones. These subdivided zones are illustrated in **Figure 2**.

*Figure 2: Zone Adjustments in the New Hampshire Avenue Corridor*




STOPS requires further zone aggregations, called districts, to simplify many geographic aspects of the model. Districts serve as a fundamental geographic unit for several purposes, including aggregating travel data to facilitate model calibration and the generation of reports. Districts also define the geographic basis for updating CTPP data to reflect current and future population and employment. The district system for the Metro DC region STOPS application was formed by grouping geographically similar zones that share characteristics such as proximity to the transit project, accessibility to stations, and comparable levels of transit service. **Figure 3** shows a map of the DC Metro region's 96 districts used for this project, and **Figure 4** shows a closer view of 31 district groupings that comprise Montgomery County the Northeast DC.

*Figure 3: Regional District System*

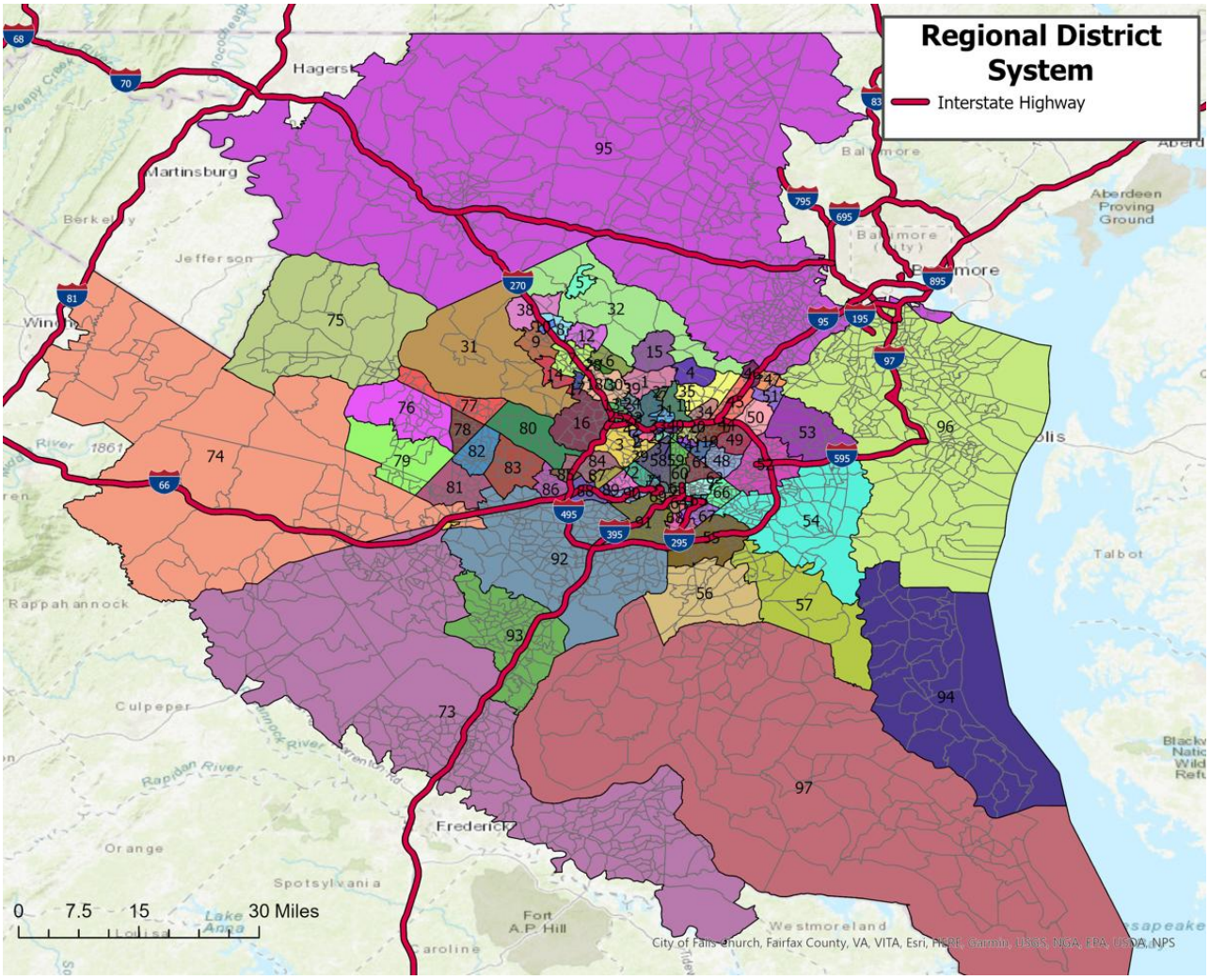
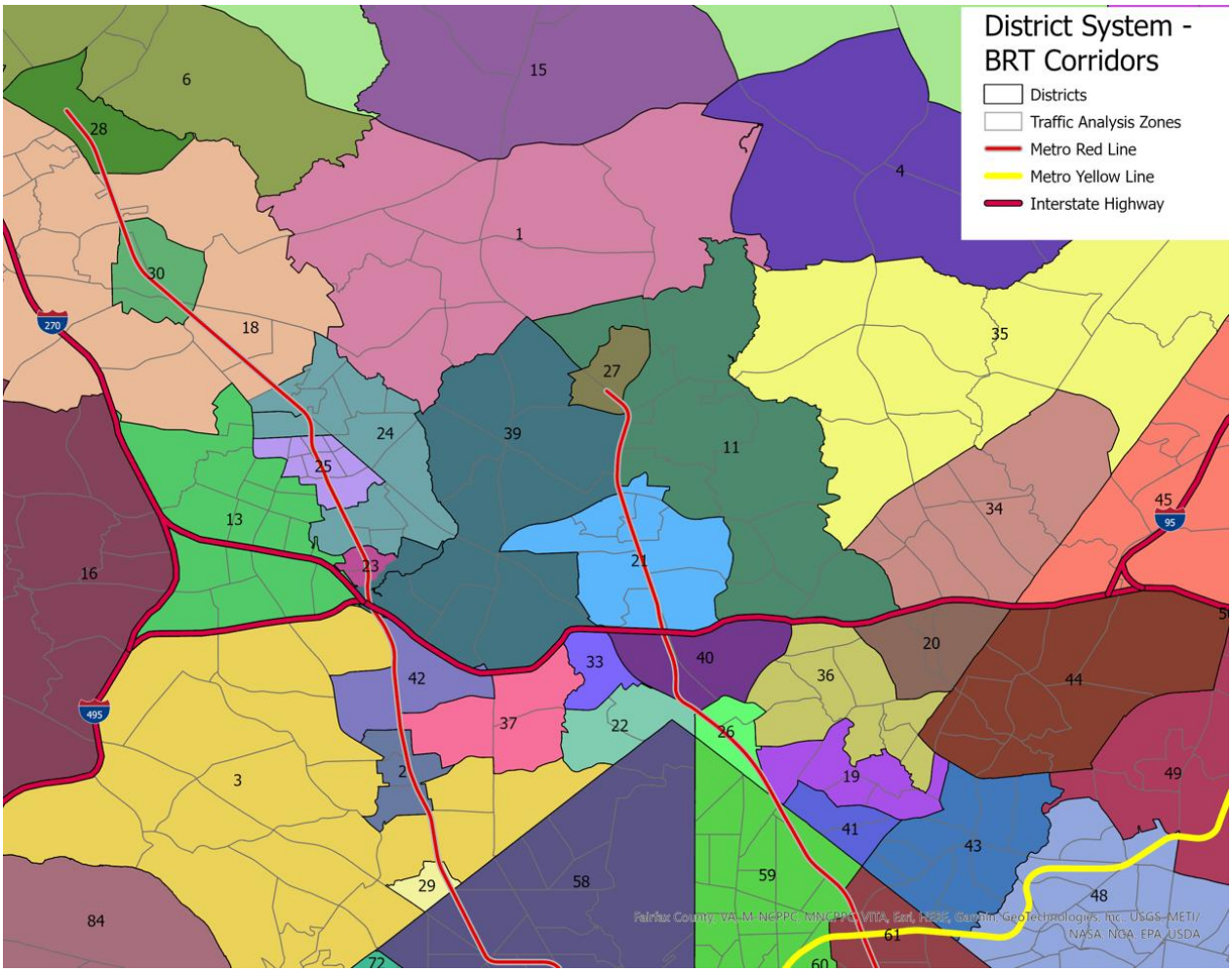


*Figure 4: Montgomery County Districts*




## Population and Employment Forecasts

Regional population and employment projections play a crucial role in the STOPS model. MPO-provided current and forecast year population and employment data are used to "grow" the base year CTPP Journey-to-Work (JTW) flows to represent the current year and future forecast years. This growth is applied at either zone level. Furthermore, population and employment data are essential for the model's calibration process, particularly for calibrating mode choice constants based on district-level transit shares derived from the CTPP. STOPS also uses this socioeconomic data to generate zonal forecasts and for reporting purposes, providing a summary of CTPP workers and employees alongside MPO estimates of population and employment by scenario at the district level. Additionally, employment density, derived from employment statistics, is a factor in determining the attractiveness of park-and-ride (PNR) to transit.

Population and employment projections were provided by MWCOG for 2019 and 2045. **Table 1** presents a summary of base year and forecast year population and employment by

districts in Montgomery County. The table shows that the population is projected to grow by 19% while employment is projected to grow by 22% between 2019 and 2045. Districts with significant growth include Bethesda Center, Chevy Chase/Silver Spring, North Bethesda, White Oak, and Walter Reed areas. Some of these districts will be served by the New Hampshire Avenue BRT project and display potential for increased ridership by the forecast horizon year.

*Table 1: Summary of Population and Employment for Montgomery County*

| DISTRICT | AREA | POPULATION | | | EMPLOYMENT | | |
|---|---|---|---|---|---|---|---|
| | | 2019 | 2045 | Change | 2019 | 2045 | Change |
| 1-AspHi | Aspen Hill | 63,001 | 64,429 | 2% | 9,412 | 10,159 | 8% |
| 2-BethC | Bethesda Center | 15,783 | 22,419 | 42% | 37,934 | 43,841 | 16% |
| 3-BCvyC | Bethesda/Chevy Chase | 76,572 | 82,852 | 8% | 22,503 | 24,375 | 8% |
| 11-KenWh | Kensington/Wheaton | 38,532 | 41,361 | 7% | 5,865 | 6,113 | 4% |
| 13-Beth2 | Bethesda Area | 24,139 | 28,715 | 19% | 23,587 | 31,434 | 33% |
| 18-RckVi | Rockville Area | 54,159 | 69,147 | 28% | 60,533 | 71,115 | 17% |
| 19-SilTk | Silver Spring/Takoma | 11,591 | 12,537 | 8% | 4,305 | 4,531 | 5% |
| 20-AdelW | West Adelphi | 13,820 | 14,153 | 2% | 1,211 | 1,383 | 14% |
| 21-WhtCB | Central Wheaton | 26,195 | 31,562 | 20% | 12,695 | 13,151 | 4% |
| 22-ChevSi | Chevy Chase/Silver Spring | 10,468 | 13,052 | 25% | 2,180 | 3,212 | 47% |
| 23-GvNBe | Grosvenor/North Bethesda | 2,606 | 2,666 | 2% | 302 | 322 | 7% |
| 24-TwnBr | Twin Brook/North Bethesda | 20,182 | 27,160 | 35% | 22,277 | 28,671 | 29% |
| 25-NBeth | North Bethesda | 9,046 | 24,183 | 167% | 25,338 | 36,097 | 42% |
| 26-Silvs | Silver Spring | 18,044 | 28,590 | 58% | 22,260 | 27,071 | 22% |
| 27-Glenm | Glenmont | 4,342 | 8,999 | 107% | 182 | 661 | 263% |
| 29-Frend | Friendship Heights | 7,223 | 8,568 | 19% | 8,783 | 10,038 | 14% |
| 30-RckVC | Central Rockville | 8,343 | 13,956 | 67% | 16,391 | 21,882 | 34% |
| 33-Lyton | Lyton | 1,128 | 1,676 | 49% | 2,705 | 2,854 | 6% |
| 34-WhtOa | White Oak | 19,382 | 30,376 | 57% | 19,294 | 38,153 | 98% |
| 35-Fairl | Fairland | 59,958 | 62,492 | 4% | 13,860 | 14,766 | 7% |
| 36-SilTk2 | Silver Spring/Takoma | 30,108 | 31,985 | 6% | 4,007 | 4,382 | 9% |
| 37-ChvCh | Chevy Chase/Lyton | 9,433 | 12,188 | 29% | 3,633 | 5,166 | 42% |
| 39-KenWh | Kensington/Chevy Chase | 48,819 | 52,900 | 8% | 10,247 | 11,168 | 9% |
| 40-WdSid | Woodside | 7,922 | 8,519 | 8% | 3,367 | 3,402 | 1% |
| 41-Takom | Takoma | 4,534 | 5,237 | 16% | 1,649 | 1,874 | 14% |
| 42-MedCe | Medical Center | 2,459 | 2,944 | 20% | 21,672 | 25,677 | 18% |
| 43-Chilu | Chillum | 28,454 | 28,595 | 0% | 4,823 | 5,562 | 15% |
| 44-Adelp | Adelphi | 36,798 | 36,906 | 0% | 5,711 | 6,888 | 21% |
| 45-BeltH | Beltsville/Hillandale | 28,210 | 36,964 | 31% | 18,235 | 20,671 | 13% |
| 58-RckCr | Rock Creek DC | 111,893 | 132,447 | 18% | 64,634 | 70,949 | 10% |
| 59-FtTot | Fort Totten | 58,977 | 80,302 | 36% | 16,446 | 23,825 | 45% |
| **TOTAL** | | **852,121** | **1,017,880** | **19%** | **466,041** | **569,393** | **22%** |

## Highway Characteristics

MWOCOG provided highway travel time skims for 2019 and 2040, which were checked against online mapping estimates. The locations of these checks are shown in **Figure 5**. During this review, it was determined that a fixed addition of 3 minutes to all travel times would be useful for improving the estimate of highway impedances, particularly for shorter trips. This fixed quantity was added to the highway skims as the input data files were being prepared. **Table 2** summarizes the difference of MPO modelled travel times against online estimates and **Figure 6** shows a regression over the comparison. As these show, even after adjustment, the model generated highway skims that deviated significantly from online estimates. To mitigate these effects, a set of production end constants were added to the district level to help the model recover more reasonable PNR shares in the calibration phase described later.

*Figure 5: Highway Time Check Origins and Destination*

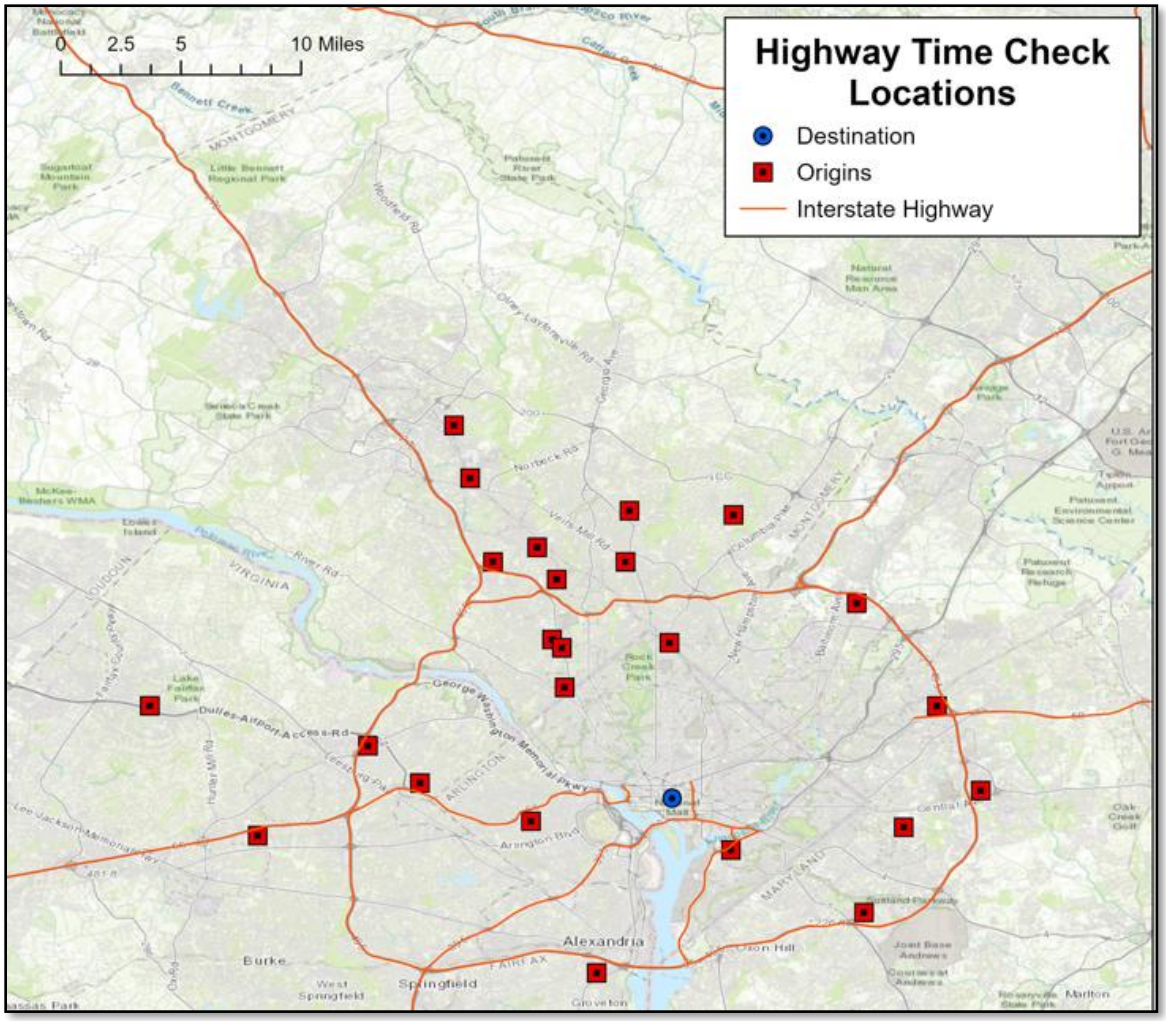
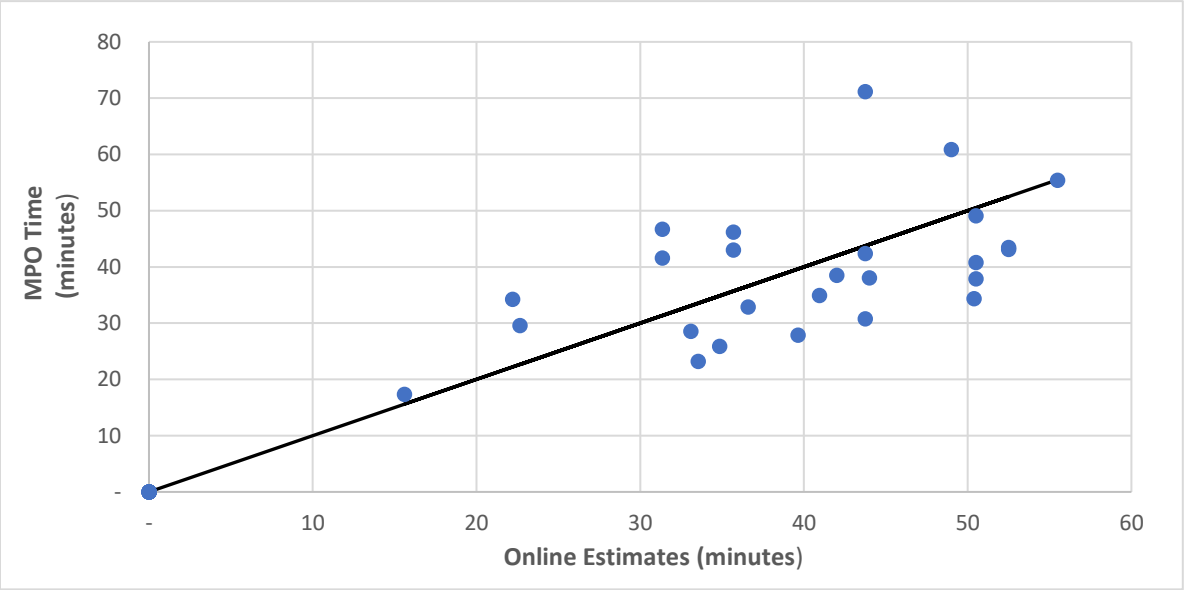


*Table 2: Comparison of 2019 Highway Skims and Online Estimates of Travel By Origin to Downtown DC (11th street NW & Pennsylvania Ave NW)*

| TAZ | ORIGIN LOCATION/INTERSECTION | MPO TRAVEL TIME (MIN) | ONLINE ESTIMATE (MIN) | VARIANCE |
|---|---|---|---|---|
| 521 | Redland Road/Crabbs Branch Way | 55.41 | 55.50 | 0% |
| 687 | WMATA Montgomery Bus Division | 40.78 | 50.50 | -19% |
| 717 | North Stonestreet Ave/Woodland Rd | 49.10 | 50.50 | -3% |
| 663 | Norfolk Ave/Delray Ave | 30.74 | 43.75 | -30% |
| 701 | Tuckerman Ln/Arroyo Dr | 42.39 | 43.75 | -3% |
| 678 | Montrose Ave/Weymoth St | 38.5 | 42.00 | -8% |
| 662 | Old Georgetown Rd/Wisconsin Ave | 27.86 | 39.65 | -30% |
| 639 | Willard Ave/Friendship Rd | 23.18 | 33.55 | -31% |
| 553 | WMATA Glenmont Rail Yard | 43.46 | 52.50 | -17% |
| 560 | Westfield Wheaton Shopping Mall | 38.06 | 44.00 | -14% |
| 625 | Georgia Ave/Burlington Ave | 25.89 | 34.85 | -26% |
| 573 | New Hampshire Avenue/Rosemere Avenue | 43.12 | 52.50 | -18% |
| 894 | Wichita Ave/Lackawanna Ave | 37.88 | 50.50 | -25% |
| 1126 | New Carrollton Train Yard | 34.91 | 40.95 | -15% |
| 1096 | Largo Town Center Metro | 34.34 | 50.40 | -32% |
| 1063 | Walker Mill Middle School; | 28.57 | 33.10 | -14% |
| 828 | Branch Avenue Metro | 32.84 | 36.60 | -10% |
| 363 | Anacostia Metro | 17.33 | 15.60 | 11% |
| 2063 | Richmond Hwy/Fort Hunt Road | 41.59 | 31.35 | 33% |
| 1728 | Sunset Hills Rd/Metro Center Dr | 71.13 | 43.75 | 63% |
| 1869 | Dolly Madison Blvd/Jaguar Tr | 46.71 | 31.35 | 49% |
| 1803 | Blake Ln/Bel Glade St | 60.87 | 49.00 | 24% |
| 1922 | Great Falls St/Crutchfield St | 43.01 | 35.70 | 20% |
| 1415 | N Stuart St/9th St | 29.57 | 22.65 | 31% |
| **AVERAGE** | | -- | -- | **22%** |

*Figure 6: Comparison of 2019 Highway Skim Time to Online Estimates*




## Existing Transit Supply

Transit supply in the Metro DC region is represented by the following elements:

- General Transit Feed Specification (GTFS) files were used to represent available transit services for the base-year calibration and as the beginning point for developing the proposed projects. The transit services included in the application are shown in **Table 3**. The table includes the vintage of the GTFS files used to portray the existing, no-build and build alternatives.

*Table 3: GTFS Files Representing Current, No-Build and Build Transit Services in the DC Metro STOPS Model Region*

| STATE | SYSTEM | AREAS SERVED | TIMEFRAME |
|---|---|---|---|
| Maryland | RideON | Montgomery County | October, 2024 |
| | Maryland Area Commuter Rail (MARC) | Maryland, DC, West Virginia | October, 2024 |
| | Maryland Transit Administration (MTA) | Maryland, DC | October, 2024 |
| | TheBus | Prince George's County | October, 2024 |
| Virginia | Arlington Rapid Transit | Arlington County | October, 2024 |
| | Driving Alexandria Safely Home (DASH) | Alexandria | October, 2024 |
| | Fairfax Connector | Fairfax County | October, 2024 |
| | Cue (City of Fairfax bus system) | City of Fairfax | October, 2024 |
| District of Columbia | WMATA (Metrobus and Metrorail) | DC, Regional | October, 2024 |
| | DC Circulator | DC | October, 2023 |
| | DC Streetcar | DC | October, 2024 |

- **Walk Network**: A walk network based on a geographic database of individual streets in the modeling area.
- **Transit Stops and Stations**: A station file with one station record for each bus or rail stop ID in the GTFS datasets. Key codes for each station included the following:
    - GTFS stop_id(s).
    - Year 2024 average weekday boardings at the station/bus stop level. Stop label APC (automatic person counter) data were obtained for unlinked boardings on RideOn, MARC, and WMATA bus services.
    - Station group definitions that correspond to the district for bus stops. Metro stations, MARC stations and project stops have separate station groups to facilitate reporting.
    - Stop type was set to 1 for all stops and station coded as 1 corresponding to an at grade station without PNR.
        - To account for grade separated access/egress conditions, all Metro stations were assigned 2-minute time penalties for walk, KNR (kiss-and ride) and PNR access/egress links as well as for inter and intra system transfers. All MARC stations were assigned 6-minute time penalties for walk, KNR and PNR access/egress links as well as for inter and intra system transfers. These penalties are added to the times already computed for surface level distance travelled.
    - WMATA Metro stops and MARC stations are categorized into fare zones to represent incremental fare additions based on origin and destination station pairs.
- **Park and Ride Facilities:** All park & ride lots in region were coded for use in the model. **Figure 7** shows a map of the park and ride lot locations. **Table 4** shows the list of park and ride lots included in the GTFS files. The table shows PNR coding:
    - System: The respective GTFS file set the lot is coded in.
    - Type: Used to define the scale and catchment area of the PNR lots. Lots located at the end-of-line points and at fixed guideway stations are assumed to have larger catchment areas that will attract riders from greater distances.
    - Impedance: The implied time penalty added in minutes because of daily costs to park.
    - Daily Cost: The cost to park per day at a lot.
- **Fare Structure**: The fare structure was coded as follows:
    - **WMATA**: $2.00 standard fare. Additionally, each station was assigned to a fare zone that corresponds to WMATA's fare zone structure with consist of 5 concentric circles encompassing the system. Depending on the access and egress station (or how many zones are crossed during a trip), the zone system adds between $0.25 to $4.00 per trip. Transfers to TheBus, DASH and CUE are an additional $0.75, $0.40, and $0.25, respectively.

- **MARC**: $6.00 standard fare. Additionally, each station was assigned to a fare zone that corresponds to MTA's commuter rail fare zone structure. Depending on the access and egress station, the zone system adds between $0.00 to $2.00 per trip. No cost for transfers.
- **RideOn**: $2.00 standard fare.
- **TheBus:** $1.25 standard fare. Transfers to WAMTA vehicles are an additional $0.75.
- **DASH:** $1.60 standard fare. Transfers to WAMTA vehicles are an additional $0.40.
- **CUE:** $1.75 standard fare. Transfers to WAMTA vehicles are an additional $0.25.
- **Arlington Rapid Transit:** $2.00 standard fare.
- **DC Circulator:** $2.00 standard fare.
- **DC Streetcar:** $2.00 standard fare.
- The region traveler value of time was assumed to be $12 per hour.

*Figure 7: Park and Ride Lot Locations by Type*

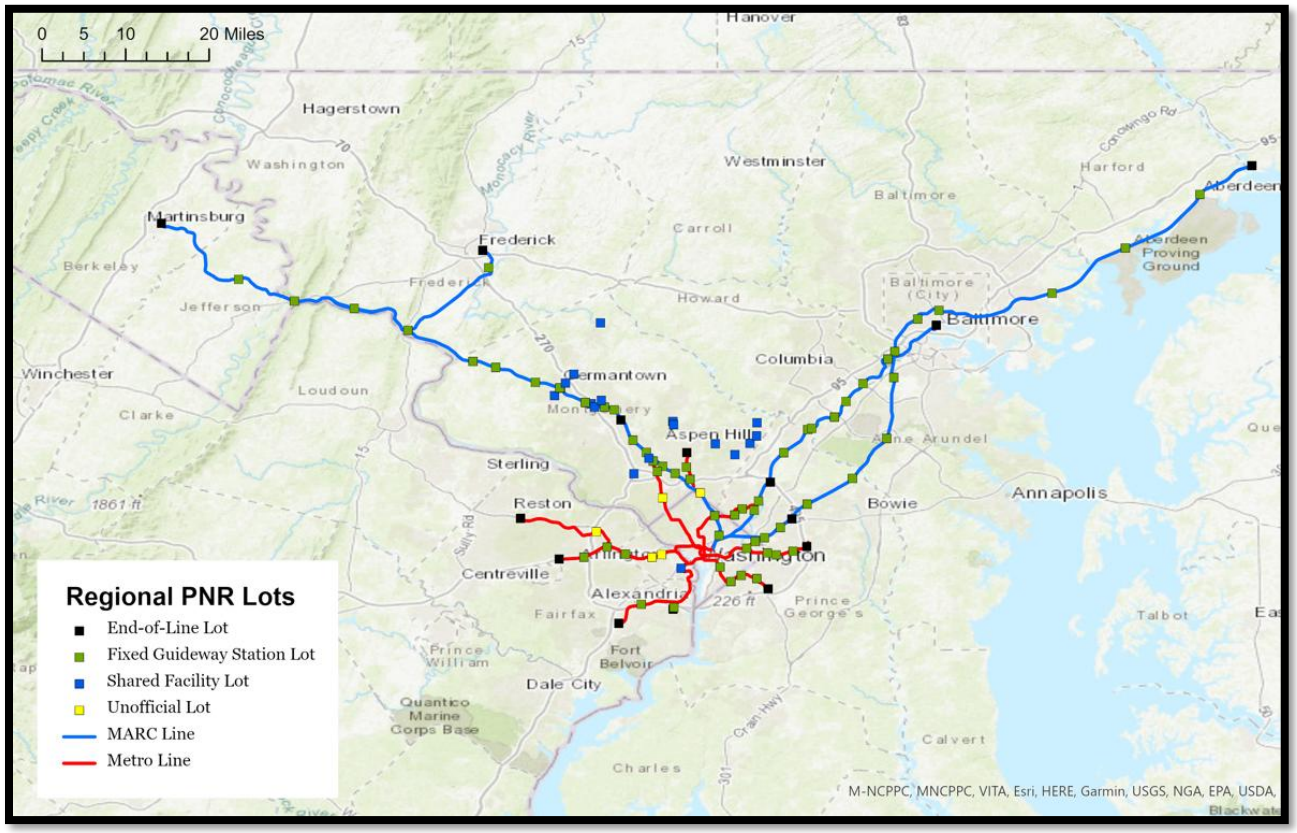


*Table 4: Regional Park and Ride Lots*

| NAME | SYSTEM | TYPE | IMPEDANCE | DAILY COST |
|---|---|---|---|---|
| Aberdeen | MARC | Fixed Guideway Lot | -- | -- |
| Barnesville | MARC | Fixed Guideway Lot | -- | -- |
| Bowie State | MARC | Fixed Guideway Lot | -- | -- |
| Boyds | MARC | Fixed Guideway Lot | -- | -- |
| Brunswick | MARC | Fixed Guideway Lot | -- | -- |
| BWI Rail Station | MARC | Fixed Guideway Lot | -- | -- |
| Camden Station | MARC | End-of-line Lot | -- | -- |
| College Park | MARC | Fixed Guideway Lot | -- | -- |
| Dickerson | MARC | Fixed Guideway Lot | -- | -- |
| Dorsey | MARC | Fixed Guideway Lot | -- | -- |
| Duffields, WV | MARC | Fixed Guideway Lot | -- | -- |
| Edgewood | MARC | Fixed Guideway Lot | -- | -- |
| Frederick | MARC | End-of-line Lot | -- | -- |
| Gaithersburg | MARC | Fixed Guideway Lot | -- | -- |
| Garrett Park | MARC | Fixed Guideway Lot | -- | -- |
| Germantown | MARC | Fixed Guideway Lot | -- | -- |
| Greenbelt | MARC | Fixed Guideway Lot | -- | -- |
| Halethorpe | MARC | Fixed Guideway Lot | -- | -- |
| Harpers Ferry, WV | MARC | Fixed Guideway Lot | -- | -- |
| Jessup | MARC | Fixed Guideway Lot | -- | -- |
| Kensington | MARC | Fixed Guideway Lot | -- | -- |
| Laurel | MARC | Fixed Guideway Lot | -- | -- |
| Laurel Racetrack | MARC | Fixed Guideway Lot | -- | -- |
| Martin State Airport | MARC | Fixed Guideway Lot | -- | -- |
| Martinsburg, WV | MARC | End-of-line Lot | -- | -- |
| Metropolitan Grove | MARC | Fixed Guideway Lot | -- | -- |

| NAME | SYSTEM | TYPE | IMPEDANCE | DAILY COST |
|---|---|---|---|---|
| Monocacy | MARC | Fixed Guideway Lot | -- | -- |
| Muirkirk | MARC | Fixed Guideway Lot | -- | -- |
| Odenton | MARC | Fixed Guideway Lot | -- | -- |
| Penn Station | MARC | Fixed Guideway Lot | -- | -- |
| Perryville | MARC | End-of-line Lot | -- | -- |
| Point of Rocks | MARC | Fixed Guideway Lot | -- | -- |
| Riverdale Park Town Center | MARC | Fixed Guideway Lot | -- | -- |
| Savage | MARC | Fixed Guideway Lot | -- | -- |
| Seabrook | MARC | Fixed Guideway Lot | -- | -- |
| St. Denis | MARC | Fixed Guideway Lot | -- | -- |
| Washington Grove | MARC | Fixed Guideway Lot | -- | -- |
| West Baltimore | MARC | Fixed Guideway Lot | -- | -- |
| Addison Road-Seat Pleasant | WMATA | Fixed Guideway Lot | 13.1 | 4.45 |
| Anacostia | WMATA | Fixed Guideway Lot | 13.1 | 4.45 |
| Ballston (S&P Garage) | WMATA | Unofficial Lot | 37 | 14 |
| Bethesda | WMATA | Unofficial Lot | 34.5 | 13 |
| Branch Ave | WMATA | End-of-line Lot | 12.4 | 4.95 |
| Capitol Heights | WMATA | Fixed Guideway Lot | 12.4 | 4.95 |
| Cheverly | WMATA | Fixed Guideway Lot | 12.4 | 4.95 |
| Clarendon | WMATA | Unofficial Lot | 27 | 10 |
| College Park-U of Md | WMATA | Fixed Guideway Lot | 14.4 | 4.95 |
| Deanwood | WMATA | Fixed Guideway Lot | 11.8 | 4.7 |
| Dunn Loring-Merrifield | WMATA | Fixed Guideway Lot | 14.4 | 4.95 |
| East Falls Church | WMATA | Fixed Guideway Lot | 12.4 | 4.95 |
| Forest Glen | WMATA | Fixed Guideway Lot | 13 | 5.2 |
| Fort Totten | WMATA | Fixed Guideway Lot | 11.8 | 4.7 |
| Franconia-Springfield | WMATA | End-of-line Lot | 14.4 | 4.95 |
| Glenmont | WMATA | End-of-line Lot | 15 | 5.2 |

| NAME | SYSTEM | TYPE | IMPEDANCE | DAILY COST |
|---|---|---|---|---|
| Greenbelt | WMATA | End-of-line Lot | 12.4 | 4.95 |
| Grosvenor-Strathmore | WMATA | Fixed Guideway Lot | 15 | 5.2 |
| Huntington | WMATA | End-of-line Lot | 14.4 | 4.95 |
| Landover | WMATA | Fixed Guideway Lot | 7.5 | 3 |
| Largo Town Center | WMATA | End-of-line Lot | 14.4 | 4.95 |
| McLean | WMATA | Unofficial Lot | 25 | 10 |
| Minnesota Ave | WMATA | Fixed Guideway Lot | 14.4 | 4.95 |
| Morgan Boulevard | WMATA | Fixed Guideway Lot | 12.4 | 4.95 |
| Naylor Road | WMATA | Fixed Guideway Lot | 12.4 | 4.95 |
| New Carrollton | WMATA | End-of-line Lot | 14.4 | 4.95 |
| Pentagon City | WMATA | Shared Facility | 47 | 18 |
| Prince George's Plaza | WMATA | Fixed Guideway Lot | 13.1 | 4.45 |
| Rhode Island Ave-Brentwood | WMATA | Fixed Guideway Lot | 14.4 | 4.95 |
| Rockville | WMATA | Fixed Guideway Lot | 13 | 5.2 |
| Shady Grove | WMATA | End-of-line Lot | 13 | 5.2 |
| Silver Spring | WMATA | Unofficial Lot | 27 | 10 |
| Southern Avenue | WMATA | Fixed Guideway Lot | 14.4 | 4.95 |
| Suitland | WMATA | Fixed Guideway Lot | 14.4 | 4.95 |
| Twinbrook | WMATA | Fixed Guideway Lot | 15 | 5.2 |
| Van Dorn Street | WMATA | Fixed Guideway Lot | 12.4 | 4.95 |
| Huntington | WMATA | Fixed Guideway Lot | 12.4 | 4.95 |
| Vienna/Fairfax-GMU | WMATA | End-of-line Lot | 14.4 | 4.95 |
| West Falls Church-VT/UVA | WMATA | Fixed Guideway Lot | 9.5 | 3 |
| West Hyattsville | WMATA | Fixed Guideway Lot | 12.4 | 4.95 |
| Wheaton | WMATA | Fixed Guideway Lot | 13.1 | 4.45 |
| White Flint | WMATA | Fixed Guideway Lot | 15 | 5.2 |
| Wiehle-Reston East | WMATA | End-of-line Lot | 14.4 | 4.95 |
| Briggs Chaney | RideOn | Shared Facility | -- | -- |
| Burtonsville | RideOn | Shared Facility | -- | -- |
| Colesville Commuter Lot | RideOn | Shared Facility | -- | -- |

| NAME | SYSTEM | TYPE | IMPEDANCE | DAILY COST |
|---|---|---|---|---|
| Damascus | RideOn | Shared Facility | -- | -- |
| Gaithersburg - Route 124 | RideOn | Shared Facility | -- | -- |
| Georgia Ave - ICC | RideOn | Shared Facility | -- | -- |
| Germantown - Kingsview | RideOn | Shared Facility | -- | -- |
| Germantown MARC Station | RideOn | Fixed Guideway Lot | -- | -- |
| Germantown Transit Center | RideOn | Shared Facility | -- | -- |
| Greencastle | RideOn | Shared Facility | -- | -- |
| I-270 Corridor West Diamond Ave | RideOn | Shared Facility | -- | -- |
| Lakeforest Mall | RideOn | Shared Facility | -- | -- |
| Metropolitan Grove | RideOn | Fixed Guideway Lot | -- | -- |
| Milestone Shopping Center | RideOn | Shared Facility | -- | -- |
| Montgomery Mall | RideOn | Shared Facility | -- | -- |
| Montrose Rd/MD 355 | RideOn | Shared Facility | -- | -- |
| Norbeck Rd | RideOn | Shared Facility | -- | -- |
| Tech Road | RideOn | Shared Facility | -- | -- |

## Existing Transit Ridership in DC Metro Region

The synthetic model uses estimates of travel demand from the CTPP and data on transit ridership in the form of route and bus stop/rail station counts. The model also uses estimates of linked transit trips by access mode to develop a better understanding of the reasons for making transit trips and the socioeconomic characteristics of transit riders.

Existing ridership in the DC Metro region was developed using several sources:

- Survey data were used to develop target transit linked trips by purpose and access mode.
- APC counts were acquired where available to describe stop level route level passenger boardings.
- Where neither survey or APC data were available, service level unlinked trips were obtained from the American Public Transportation Association (APTA) Ridership Report. [1]

[1] https://www.apta.com/research-technical-resources/transit-statistics/ridership-report/

## Survey Data

Three transit on-board surveys were located and used to estimate total linked transit trips by purpose. The onboard surveys included:

- 2007-2008 MTA/MARC Transit Rider Survey that provided information on origin and destination zone, access mode, transfers, and trip purpose for MARC commuter rail riders.
- 2008 Metrorail Passenger Survey that provided information on origin and destination zone, transfers, and trip purpose for WMATA Metro riders.
- 2008 Metrobus Passenger Survey that provided information on origin and destination zones, transfers, and trip purpose for WMATA Metro riders.

Because the surveys are more than a decade old and did not contain precise trip location information in latitude and longitude coordinates, or data describing vehicle ownership by respondent household, their utility was limited to estimating linked person trip targets by purpose and auto ownership for the 2019 calibration year. The surveys were each refactored to match 2019 system level ridership using the National Transit Database and then converted for use in STOPS. Trips by access mode are in summarized **Table 5**.

The surveys show that approximately 863,422 linked transit trips occurred in the metro area each weekday on the three systems and result in 1,336,303 daily transit unlinked trips (boardings). The ratio of unlinked to linked trips is 1.55.

*Table 5: Survey Derived Linked Trips by Access Mode and Survey*

| ACCESS MODE | METRORAIL | MARC | METROBUS | TOTAL |
|---|---|---|---|---|
| **Walk** | 353,952 | 3,220 | 270,269 | 627,441 |
| **KNR** | 51,002 | 1,586 | 6,970 | 59,559 |
| **PNR** | 154,251 | 8,515 | 13,657 | 176,423 |
| **Total** | **559,205** | **13,321** | **290,896** | **863,422** |

## Passenger Counts

Data describing boardings were obtained for the following providers:

- **MARC**: Average weekday passenger counts for stations and routes in October 2024. Ridership from and to stations that were outside of the STOPS modeling region or that would have low contribution to the study zone were removed. These stations included: Duffield's, Martinsburg, Harpers Ferry, Halethorpe, West Baltimore, Camden, Penn Station, Martin Airport, Edgewood, Aberdeen and Perryville. The model contains data on 19,270 passenger trips.
- **RideOn:** APC counts describing average weekday stop and route level boardings for the fall of 2024 which totaled 68,599 unlinked trips. Stop level ridership was obtained

by grouping the data by stop and summing APC counts, while route ridership was obtained by grouping the data by route and summing the APC counts.

- **Metrorail:** Average weekday station-level entries for September 2024 were 413,768. Since the data included counted station entries rather than platform boardings, transfer station boardings were estimated by taking 2023 platform boardings and scaling these by the year-over-year growth in overall metro ridership. A growth factor of 1.16 was applied to transfer stations, resulting in a final stop-level total of 567,703 unlinked daily trips. This approximates Metrorail's October 2024's total unlinked trips of 567,703, as submitted by WMATA and provided to the Project Team.
- **Metrobus:** Average weekday route and station level boardings for September 2024 were provided, which totaled 424,237 unlinked trips. Stop level ridership was obtained by grouping the data by stop and summing the average weekday boardings, while route ridership was obtained by grouping the data by route and summing the average weekday boardings. Totals were adjusted to account for unmatched IDs in the GTFS files used to build the stop and route census, resulting in a reduction of 2,553 boardings at the stop level and 2,402 at the route level (Total usable records = 421,853).

For services without an available APC counts or boardings count, APTA-reported data serves as the primary reference. **Table 6** summarizes the available ridership data sources by transit service and state.

*Table 6: Ridership Data Sources by Service*

| STATE | SERVICE | ROUTE COUNTS | STOP COUNTS | APTA |
|---|---|---|---|---|
| Maryland | MARC | ✓ | ✓ | ✓ |
| | RideOn | ✓ | ✓ | ✓ |
| | MTA Commuter Bus | | | ✓ |
| | TheBus | | | ✓ |
| DC | Metrorail* | | ✓ | ✓ |
| | Metrobus | ✓ | ✓ | ✓ |
| | DC Circulator | | | ✓ |
| | DC Streetcar | | | ✓ |
| Virginia | Arlington Transit | | | ✓ |
| | City of Fairfax (Cue) | | | ✓ |
| | Fairfax Connector | | | ✓ |
| | Alexandria (DASH) | | | |

**Table 7** presents the final average weekday passenger counts by route and stop for each service. Most services show closely aligned counts between the two methods. Data sources vary, with several services providing data directly, while others rely on APTA-reported figures or estimates scaled from 2023 ridership. After rounding, the total final ridership across all services is approximately 1,157,000 weekday unlinked trips.

*Table 7: Total Final Weekday Average Unliked Trips by Source and Service**

| SERVICE | PASSENGER COUNTS – BY ROUTES | PASSENGER COUNTS – BY STOPS | SOURCE |
|---|---|---|---|
| MARC | 19,270 | 19,270 | From the provider |
| RideOn | 68,599 | 68,596 | From the provider |
| MTA Commuter Bus | 15,234 | 15,234 | Scaled from 2023 ridership |
| TheBus | 8,000 | 8,000 | 2024 Q3 APTA |
| Metrorail | 567,703 | 567,703 | From the provider |
| Metrobus | 421,835 | 421,684 | From the provider |
| DC Circulator | 5,064 | 5,063 | Scaled from 2023 ridership |
| DC Streetcar | 1,401 | 1,401 | Scaled from 2023 ridership |
| Arlington Transit | 8,200 | 8,200 | 2024 Q3 APTA |
| City of Fairfax (Cue) | 3,000 | 3,000 | 2024 Q3 APTA |
| Fairfax Connector | 31,500 | 31,500 | 2024 Q3 APTA |
| Alexandria (DASH) | 7,822 | 7,821 | Scaled from 2023 ridership |
| **TOTAL** | **1,157,627** | **1,157,472** | --- |

**Small variations between route and stop-level totals are the result of rounding and imperfect stop-level joining between the count data and GTFS.*

## STOPS Application

STOPS reads the transportation supply-and-demand information described above and automatically calibrates itself so that the base-year/existing simulation (i.e., the current year estimate of transit ridership related to existing transit schedules) matches both linked and unlinked transit trip estimates developed from survey and count databases. Initial runs of the model were made without using the count-based adjustment procedures to confirm that the model had no major problems with the representation of transit service or ridership. Final runs were made using the count-based adjustment procedures and result in base-year STOPS ridership estimates that closely match counted ridership for groups of bus or rail stops and for individual routes.

Initial ridership estimates by route and stop location were compared to actual counts from 2019, and the model was subsequently calibrated to align with the ridership patterns observed during that period. Following this calibration, the model was updated using contemporaneous count data reflecting 2024 transit ridership in the region to forecast base and future year project ridership. This approach adheres to FTA guidance for developing synthetic mode STOPS applications, utilizing pre-pandemic demand information (2012-2016 CTPP) to inform post-pandemic ridership scenarios.

## STOPS Calibration

STOPS applies a series of parameters to adjust how different transit paths are evaluated for purposes of finding the best paths between origins and destinations and to estimate the number of travelers who will select each option. These parameters were developed as part of the national calibration of STOPS using transit survey data from cities across the United

States. STOPS parameters can be updated (within reasonable bounds) to represent unique behavior patterns. The process of determining the most appropriate set of model parameters is known as model calibration.

In most cases, the STOPS application in the DC Metro region uses the nationally calibrated version of each parameter. Several parameters, however, have been updated to represent specific travel patterns in the area, or to address limitations with available data to characterize the region's transportation systems. These include:

- The transfer penalty (boarding penalty) was adjusted from the default value of 5.0 minutes to 2.5 minutes of penalty to match regional linked and unlinked trips.
- Partial fixed guide way setting is set to 0.2; this is a typical for FTA to evaluate most BRT projects.
- The standard KNR constant was reduced to 0.35 required to more closely match KNR share reported in the surveys. The KNR Transit Setting affects how much of the nationally calibrated KNR constants are applied to KNR trips in the mode choice element of STOPS. The default for the KNR Transit Setting is 1.0 which uses the nationally calibrated constants without adjustment. Reducing the KNR setting multiples has the effect of increasing the absolute value of these negative constants and decreasing KNR usage.
- The importance of circuity (comparison of drive-to-transit times from origin to destination to drive-all-the-way times) was set to 0. This is because highway travel times were judged to be sufficiently inaccurate preventing this computation from working well.

Evidence that these adjustments resulted in a process that properly represents transit demand in the DC Metro region is presented in the following section on model validation.

## Model Validation

The final base-year run was examined to confirm that the model has an appropriate grasp of the key markets that are the basis for the forecasts. Where available, model results with and without count-based adjustment were examined to confirm that the underlying model understands transit markets in the region and that the count-based adjustments serve as a tune-up rather than a broad (and possibly inaccurate) revision to the underlying travel data.

Validation results are presented in **Table 8**. Key findings include:

1. The model properly represents the ratio of unlinked to linked Metro trips before and after the application of counts. This means that the willingness to transfer is appropriately represented and that count adjustments are not dramatically changing the nature of transit travel from that which is derived from the CTPP.

- STOPS generates a close match to observed bus trips on a route-by-route basis after count-based adjustment for routes that serve the corridor. While regional services are overestimated before count adjustment, the corridor bus routes are underestimated.

However, the count-based adjustment successfully calms this tendency before its use in forecasting ridership for the Project.

2. The model generates a credible grasp of overall ridership on the region's major transit service providers, including Ride On, Metrobus, Metrorail and MARC lines serving Metro DC.
3. STOPS closely replicates regional distributions of trips by access mode.

*Table 8: Validation Summary*

| TEST (SOURCE OF OBSERVED DATA AND RELEVANCE) | OBSERVED VALUE (2019) | INITIAL MODEL 2019 (BEFORE COUNT ADJUSTMENT) | FINAL MODEL 2019 (AFTER COUNT ADJUSTMENT) |
|---|---|---|---|
| Ratio of linked to unlinked transit trips (2008 survey, demonstrates understanding of willingness to transfer) | 1.55 | 1.63 | 1.63 |
| Corridor bus ridership (indicates market potential for transit in corridor) | | | |
| 10-Twinbrook Station | 2,366 | 1,715 | 2,342 |
| 17-Silver Spring-Lan | 1,144 | 578 | 1,131 |
| 20-Silver Spring-Hil | 2,708 | 1,010 | 2,763 |
| 21-Silver Spring-Bri | 293 | 366 | 284 |
| 22-Silver Spring-Hil | 479 | 481 | 471 |
| 24-Hillandale-Takoma | 179 | 453 | 173 |
| Z2 | 822 | 587 | 796 |
| K6 | 5,621 | 2,690 | 5,591 |
| K9 | 1,330 | 477 | 1,288 |
| **Total Corridor Bus Ridership** | **14,940** | **8,356** | **14,839** |
| Transit ridership by major service (demonstrates understanding of trips on the largest) | | | |
| RideOn (All Bus Routes) | 76,262 | 90,197 | 76,017 |
| Metro Bus (All Routes) | 430,189 | 386,654 | 422,202 |
| Metro Rail (All Lines) | 797,756 | 723,926 | 781,273 |
| MARC (All Lines) | 22,928 | 25,980 | 22,279 |
| **Total Regional** | **1,327,135** | **1,226,757** | **1,301,770** |
| Linked transit trips by purpose (Survey adjusted to 2019 APTA, indicates relative size purpose-specific markets) | | | |
| Walk | 627,441 | | 680,427 |
| KNR | 59,559 | | 79,204 |
| PNR | 176,423 | | 151,878 |
| **Total** | **863,423** | | **911,509** |

## 2024 Application

This STOPS application for the DC Metro region was locally calibrated to reflect 2019 pre-pandemic ridership patterns and subsequently utilizes contemporaneous transit demand data from Fall 2024 route and stop level boarding counts. This methodology adheres to FTA guidelines for developing and applying a synthetic version of a STOPS application in regions lacking a recent transit on-board survey. The synthetic application of STOPS employs CTPP data that characterizes regional production-to-attraction transit flows rather than transit trips derived from a survey.

Following the COVID-19 pandemic, transit ridership throughout the DC Metro region declined significantly, affecting many stable, long-term transit demand patterns. Consequently, the underlying data represented by the CTPP that STOPS uses to understand transit flows and shares may differ from more recent regional usage characteristics.

**Table 9** compares DC Metro region transit ridership figures from 2019 to those from 2022 through 2024. The table indicates that overall ridership decreased by nearly 50% in 2022 compared to 2019, recovering to approximately 81% of total boardings by Fall 2024.

*Table 9: Metro DC Transit Boardings by Service and Year*

| SERVICE | FALL 2019 BOARDINGS | FALL 2022 BOARDINGS | FALL 2023 BOARDING | FALL 2024 BOARDINGS |
|---|---|---|---|---|
| Alexandria (DASH) | 13,032 | 5,068 | 6,872 | 7,822 |
| Arlington Transit | 9,658 | 6,600 | 7,700 | 8,200 |
| City of Fairfax (Cue) | 2,137 | 2,700 | 3,500 | 3,000 |
| Fairfax Connector | 28,287 | 26,400 | 31,400 | 31,500 |
| MTA Commuter Bus | 7,192 | 4,388 | 8,827 | 15,234 |
| MARC | 22,928 | 8,485 | 17,068 | 19,270 |
| PGC | 10,707 | 4,356 | 7,433 | 8,000 |
| RideOn | 76,262 | 41,947 | 58,255 | 68,599 |
| WMATA Bus | 430,189 | 331,683 | 381,912 | 421,835 |
| WMATA Rail | 797,756 | 314,217 | 488,360 | 567,703 |
| DC Circulator | 16,223 | 3,281 | 4,449 | 5,064 |
| DC Streetcar | 2,400 | 908 | 1,231 | 1,401 |
| **Total** | **1,416,770** | **750,034** | **1,017,007** | **1,157,627** |

The implications for model calibration and forecasting indicate that the utilization of 2024 rider counts in the STOPS application is superimposing a revised transit market on a model initially calibrated to align with a 2019 demand profile that may no longer be current. Despite regional ridership recovering from the lows experienced in 2022, the transit demand landscape remains different from the 2019 baseline. Although the STOPS application generates plausible estimates of current and future year ridership, subsequent applications

should incorporate high-quality transit onboard surveys, as soon as they become available, to ensure accurate representation of contemporary transit markets.

## Project Definition

This section describes the project definitions used for preparation of ridership forecasts. Each of the alternatives are coded to operate on an identical station arrangement, alignment path and service frequency, but because each alternative includes different lane configurations, station-to-station travel times and total runtimes vary across the alternatives.

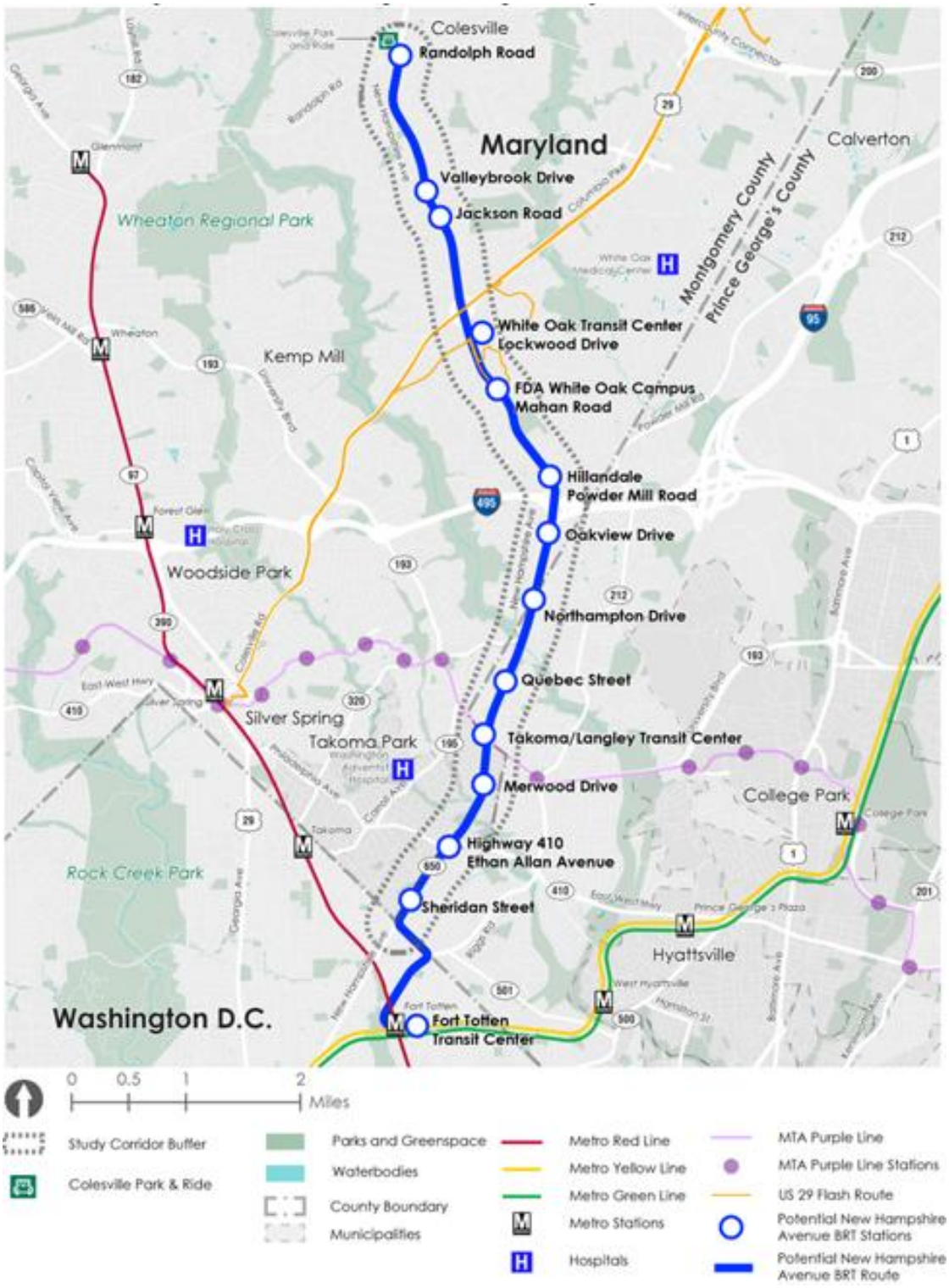
## Alignment and Station Locations

**Table 10** lists the New Hampshire Avenue Project stations. All alternatives have the same stations and locations. **Figure 8** shows a map of the project's alignment and station locations.

*Table 10: Station Locations*

| STATION NO. | STATIONS NAME | LATITUDE | LONGITUDE |
|---|---|---|---|
| 2200000 | Fort Totten NB | 38.952624 | -77.003083 |
| 2200001 | Sheridan NB | 38.968313 | -77.000423 |
| 2200002 | Ethan Allen NB | 38.975737 | -76.993642 |
| 2200003 | Merwood NB | 38.983115 | -76.988313 |
| 2200004 | Takoma Langley NB | 38.989744 | -76.988376 |
| 2200005 | Quebec NB | 38.996134 | -76.984815 |
| 2200006 | Northampton NB | 39.006615 | -76.980170 |
| 2200007 | Oakview NB | 39.015090 | -76.977798 |
| 2200008 | Powder Mill NB | 39.022508 | -76.977490 |
| 2200009 | Mahan NB | 39.033237 | -76.985543 |
| 2200010 | Lockwood NB | 39.039872 | -76.989463 |
| 2200011 | Jackson NB | 39.055097 | -76.995153 |
| 2200012 | Valleybrook NB | 39.058423 | -76.997410 |
| 2200013 | Randolph NB | 39.074644 | -77.002037 |
| 2300013 | Randolph SB | 39.075255 | -77.002326 |
| 2300012 | Valleybrook SB | 39.058716 | -76.997901 |
| 2300011 | Jackson SB | 39.055327 | -76.995805 |
| 2300010 | Lockwood SB | 39.039872 | -76.989463 |
| 2300009 | Mahan SB | 39.033630 | -76.986500 |
| 2300008 | Powder Mill SB | 39.022451 | -76.977785 |
| 2300007 | Oakview SB | 39.015610 | -76.977935 |
| 2300006 | Northampton SB | 39.007040 | -76.980358 |
| 2300005 | Quebec SB | 38.996875 | -76.984731 |
| 2300004 | Takoma Langley SB | 38.989790 | -76.987743 |
| 2300003 | Merwood SB | 38.983599 | -76.988525 |
| 2300002 | Ethan Allen SB | 38.975642 | -76.994115 |
| 2300001 | Sheridan SB | 38.969081 | -77.000148 |
| 2300000 | Fort Totten SB | 38.952242 | -77.002893 |

*Figure 8: Project Alignment and Station Locations*



## Route Definition, Travel Times, and Frequencies

**Table 11** outlines the service characteristics across all five alternatives. Each option features identical service windows, with AM peak from 5:15 to 8:30 and PM peak from 15:15 to 19:15. Peak headways are 8 minutes, while off-peak headways are 15 minutes, indicating consistent service levels across all scenarios.

*Table 11: Route Definition and Headway*

| ALTERNATIVE | AM PEAK | PM PEAK | SERVICE SPAN | HEADWAY (PEAK) | HEADWAY (OFF-PEAK) |
|---|---|---|---|---|---|
| **Alternative 1** | 5:15-8:30 | 15:15-19:15 | 5:00 – 00:25 | 8 mins | 15 mins |
| **Alternative 2** | 5:15-8:30 | 15:15-19:15 | 5:00 – 00:25 | 8 mins | 15 mins |
| **Alternative 3** | 5:15-8:30 | 15:15-19:15 | 5:00 – 00:25 | 8 mins | 15 mins |
| **Alternative 4** | 5:15-8:30 | 15:15-19:15 | 5:00 – 00:25 | 8 mins | 15 mins |
| **Hybrid Alternative** | 5:15-8:30 | 15:15-19:15 | 5:00 – 00:25 | 8 mins | 15 mins |

The station-to-station runtimes for each alternative by direction and time of day are presented **Table 12** and **Table 13**. Each alternative's overall travel time varies by time of day and due to differences in the planned lane configurations. Run times for each alternative between Lockwood Drive and Sheridan Street were estimated using VISSIM simulations. Travel times for station pairs without VISSIM outputs were estimated using a scaling approach. First, baseline station-to-station runtimes were derived from GTFS data for existing local bus routes (K9, K6, Z2) by time period. Planned roadway configurations by alternative were then identified. Scale factors were calculated by comparing VISSIM-modeled BRT runtimes to local bus runtimes on segments with matching configurations. For segments without direct matches, Alternative 3 used averaged factors. Finally, baseline bus runtimes were multiplied by the appropriate scale factors to produce estimated BRT runtimes. The Hybrid Alternative has the shortest travel times in both southbound and northbound directions among all the options. Alternative 1 has the longest travel times in the northbound direction, while with the exception of the Hybrid Alternative, southbound travel times are more consistent across alternatives.

*Table 12: Northbound BRT Station-to-Station Travel Times by Alternative and Time of Day*

| DIRECTION | STATIONS | AM AVERAGE TRAVEL TIME (SECONDS) | | | | | PM AVERAGE TRAVEL TIME (SECONDS) | | | | | OFF-PEAK AVERAGE TRAVEL TIME (SECONDS) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A1 | A2 | A3 | A4 | HYB. | A1 | A2 | A3 | A4 | HYB. | A1 | A2 | A3 | A4 | HYB. |
| Northbound | Fort Totten to Sheridan | 705 | 479 | 592 | 592 | 566 | 691 | 495 | 593 | 593 | 446 | 468 | 358 | 413 | 413 | 268 |
| Northbound | Sheridan to Ethan Allen | 160 | 140 | 102 | 101 | 121 | 188 | 140 | 125 | 129 | 95 | 181 | 135 | 121 | 124 | 91 |
| Northbound | Ethan Allen to Merwood | 112 | 99 | 109 | 111 | 90 | 82 | 93 | 98 | 96 | 83 | 79 | 90 | 95 | 93 | 81 |
| Northbound | Merwood to Takoma Langley | 246 | 184 | 86 | 83 | 72 | 292 | 264 | 127 | 132 | 98 | 292 | 264 | 127 | 132 | 98 |
| Northbound | Takoma Langley to Quebec | 129 | 129 | 85 | 84 | 90 | 294 | 287 | 127 | 129 | 66 | 291 | 283 | 125 | 127 | 65 |
| Northbound | Quebec to Northampton | 224 | 118 | 144 | 148 | 133 | 164 | 119 | 126 | 131 | 112 | 177 | 129 | 136 | 141 | 121 |
| Northbound | Northampton to Oakview | 444 | 240 | 173 | 171 | 209 | 198 | 214 | 148 | 145 | 145 | 210 | 227 | 158 | 155 | 155 |
| Northbound | Oakview to Powder Mill | 119 | 128 | 140 | 170 | 127 | 151 | 130 | 121 | 129 | 122 | 148 | 127 | 119 | 127 | 120 |
| Northbound | Powder Mill to Mahan | 121 | 114 | 131 | 106 | 113 | 127 | 124 | 121 | 103 | 125 | 122 | 120 | 117 | 99 | 121 |
| Northbound | Mahan to Lockwood | 100 | 72 | 130 | 117 | 88 | 114 | 90 | 128 | 118 | 80 | 116 | 91 | 129 | 119 | 133 |
| Northbound | Lockwood to Jackson | 178 | 121 | 149 | 149 | 94 | 186 | 133 | 159 | 159 | 93 | 146 | 112 | 129 | 129 | 86 |
| Northbound | Jackson to Valley Brook | 46 | 31 | 39 | 39 | 24 | 48 | 34 | 41 | 41 | 24 | 38 | 29 | 34 | 34 | 22 |
| Northbound | Valley Brook Randolph | 247 | 167 | 207 | 207 | 130 | 257 | 184 | 220 | 220 | 128 | 203 | 155 | 179 | 179 | 120 |
| | **Total NB (minutes)** | **47** | **34** | **35** | **35** | **31** | **47** | **38** | **36** | **35** | **27** | **41** | **35** | **31** | **31** | **25** |

*Table 13: Southbound BRT Station-to-Station Travel Times by Alternative and Time of Day*

| DIRECTION | STATION | AM AVERAGE TRAVEL TIME (SECONDS) | | | | | PM AVERAGE TRAVEL TIME (SECONDS) | | | | | OFF-PEAK AVERAGE TRAVEL TIME (SECONDS) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A1 | A2 | A3 | A4 | HYB. | A1 | A2 | A3 | A4 | HYB. | A1 | A2 | A3 | A4 | HYB. |
| Southbound | Randolph to Valley Brook | 171 | 270 | 221 | 221 | 109 | 194 | 204 | 199 | 199 | 124 | 174 | 135 | 154 | 154 | 111 |
| Southbound | Valley Brook to Jackson | 45 | 71 | 58 | 58 | 28 | 53 | 55 | 54 | 54 | 34 | 42 | 33 | 38 | 38 | 27 |
| Southbound | Jackson to Lockwood | 147 | 231 | 189 | 189 | 93 | 172 | 181 | 177 | 177 | 110 | 139 | 108 | 123 | 123 | 89 |
| Southbound | Lockwood to Mahan | 183 | 176 | 160 | 150 | 100 | 142 | 145 | 125 | 115 | 105 | 140 | 143 | 123 | 113 | 103 |
| Southbound | Mahan to Powder Mill | 145 | 130 | 137 | 127 | 99 | 192 | 154 | 221 | 213 | 92 | 175 | 141 | 201 | 194 | 84 |
| Southbound | Powder Mill to Oakview | 97 | 127 | 96 | 100 | 81 | 118 | 112 | 163 | 167 | 90 | 114 | 108 | 158 | 162 | 87 |
| Southbound | Oakview to Northampton | 101 | 223 | 79 | 89 | 79 | 86 | 86 | 155 | 165 | 70 | 88 | 88 | 159 | 169 | 72 |
| Southbound | Northampton to Quebec | 187 | 207 | 155 | 162 | 162 | 171 | 122 | 284 | 291 | 145 | 180 | 128 | 298 | 306 | 152 |
| Southbound | Quebec to Takoma Langley | 182 | 85 | 178 | 171 | 88 | 164 | 86 | 204 | 200 | 78 | 165 | 86 | 206 | 201 | 79 |
| Southbound | Takoma Langley to Merwood | 87 | 114 | 50 | 50 | 107 | 112 | 143 | 119 | 118 | 135 | 99 | 128 | 106 | 105 | 121 |
| Southbound | Merwood to Ethan Allen | 120 | 152 | 99 | 98 | 101 | 202 | 187 | 155 | 156 | 151 | 184 | 170 | 140 | 141 | 137 |
| Southbound | Ethan Allen to Sheridan | 102 | 64 | 66 | 65 | 57 | 100 | 67 | 109 | 109 | 59 | 91 | 61 | 100 | 99 | 54 |
| Southbound | Sheridan to Fort Totten | 367 | 390 | 378 | 378 | 342 | 478 | 503 | 490 | 490 | 435 | 343 | 266 | 305 | 305 | 278 |
| | **Total SB (minutes)** | **32** | **37** | **31** | **31** | **24** | **36** | **34** | **41** | **41** | **27** | **32** | **27** | **35** | **35** | **23** |

## Purple Line

The Purple Line is a 16-mile light rail project currently under construction and will connect key communities in Montgomery and Prince George's counties. The project will link major transit hubs, including Bethesda, Silver Spring, College Park, and New Carrollton, facilitating transfers between the Red, Green, and Orange Metro lines, as well as MARC and Amtrak services. Importantly the project will intersect the New Hampshire Avenue Project corridor at Takoma Langley Station.

The Purple Line was included in the No-Build and build alternatives. Station locations, runtimes and frequencies were obtained from the Purple Line Travel Forecasts Results Report (2013). The inclusion of the Purple Line in the No-Build and horizon forecasts permit evaluation for the effects of transfers between the two projects.

## STOPS Ridership forecasting results

This chapter presents the ridership forecasts for the New Hampshire Avenue BRT for 2024 and 2045.

The model uses a distinct treatment to represent how closely the project approximates a full fixed-guideway service. STOPS allows the user to adjust these settings at a route level. The application includes two planned projects that received fixed-guideway treatment:

- **New Hampshire Avenue BRT (The Project)**: Build scenario only. We assumed that in addition to measurable service attributes, travelers are attracted to the visibility, convenience, and reliability of the BRT. For the BRT, these non-service attributes are a blend of the attributes estimated for local buses (80%) and those estimated for heavy rail (i.e., a Subway) and ferry (20%). This option is referred to as "Fixed Guideway (FG) Setting=0.20". This treatment follows FTA guidance for this type of transit service.
- **Purple Line LRT**: No-Build and build scenarios. We assumed the LRT option operates at 100% of a heavy rail system and 10%. This option is referred to as "Full Fixed Guideway (FG) Setting = 1.0". This treatment follows FTA guidance for this type of transit service.

Results are presented in the following sections for each year, each service option, and each mode/fixed guideway setting option. The following statistics are presented for each scenario:

This section presents detailed estimates of unlinked and linked ridership for each forecast year. These data are as follows:

- **Linked transit trips (origin-to-destination) by purpose and auto ownership level.** This statistic describes how each alternative will work to increase the market share of transit. Linked trips represent the entire trip from origin to destination, independently of how many transit vehicles are boarded to complete the trip. This statistic is not influenced by the number of transfers made during the trip and is therefore the most

suitable measure for presenting the effect that the different alternatives will have on increasing transit ridership.

- **Linked transit trips on the study.** This statistic is a subset of linked transit trips and represents those linked trips that use the study service for some portion of the journey. This statistic is a key measure included in the FTA's project evaluation process.
- **Boardings by Route.** This statistic shows the number of travelers boarding the alignment alternatives and a selection of other transit routes in the system and provides an indication of how the study will affect nearby routes. The effects on other transit routes include possible increases if travelers use the route as a feeder as well as possible decreases if riders are diverted from a local route to the new system. Some routes may have sections where it serves as a feeder while others are routes that might compete with any new service.
- **Study stop boardings.** The number of stop-level boardings show how ridership will be distributed along the length the route. The number of stop-level boardings made by access mode provides additional information on ridership patterns. These statistics are reported by all access modes (all trips), walk, kiss-and-ride (KNR), park-and-ride (PNR), and transfers.
- **Vehicle Miles of Travel Impacts**. Estimates of automobile vehicle miles of travel (VMT) impacts are another part of the FTA project evaluation process and represent potential environmental benefits of the study's services.

## Linked Transit Trips by Purpose and Auto Ownership

**Table 14** shows projected DC Metro region daily linked transit trips segmented by trip purpose, household vehicle ownership, and project alternative for the years 2024 and 2045. Trip purposes are categorized as Home-Based Work (HBW), Home-Based Other (HBO), and Non-Home-Based (NHB), with each broken down by households with 0, 1, or 2+ cars. For both forecast years, six transportation scenarios are included: No-Build and five build alternatives (Alt1 through Hybrid). The forecasts show a clear growth in total trips from 2024 to 2045 across all scenarios; with increases most pronounced among households with two or more cars. Across all purposes and ownership levels, the No-Build and Build alternatives yield similar totals, but the slight increases in build scenarios hint at small trip-making potential from the project.

*Table 14: Weekday Metro DC Region Linked Transit Trips by Trip Purpose and Auto-Ownership*

| Year | Year 2024 | | | | | | Year 2045 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No-Build | Alt1 Build | Alt2 Build | Alt3 Build | Alt4 Build | Hybrid Build | No-Build | Alt1 Build | Alt2 Build | Alt3 Build | Alt4 Build | Hybrid Build |
| ***Home-Based Work*** | | | | | | | | | | | | |
| 0-car | 119,754 | 119,719 | 119,712 | 119,710 | 119,710 | 119,719 | 170,920 | 170,893 | 170,885 | 170,890 | 170,889 | 170,899 |
| 1-car | 161,188 | 161,179 | 161,170 | 161,169 | 161,168 | 161,194 | 231,389 | 231,387 | 231,380 | 231,380 | 231,379 | 231,425 |
| 2+cars | 157,446 | 157,434 | 157,448 | 157,421 | 157,421 | 157,477 | 260,420 | 260,425 | 260,439 | 260,414 | 260,414 | 260,490 |
| **TOTAL** | **438,388** | **438,332** | **438,330** | **438,300** | **438,300** | **438,390** | **662,729** | **662,705** | **662,704** | **662,684** | **662,682** | **662,814** |
| ***Home-Based Other*** | | | | | | | | | | | | |
| 0-car | 74,056 | 74,080 | 74,035 | 74,057 | 74,062 | 74,089 | 115,787 | 115,818 | 115,775 | 115,834 | 115,839 | 115,836 |
| 1-car | 45,285 | 45,302 | 45,314 | 45,327 | 45,326 | 45,317 | 66,608 | 66,633 | 66,649 | 66,664 | 66,664 | 66,656 |
| 2+cars | 36,752 | 36,773 | 36,764 | 36,784 | 36,784 | 36,785 | 56,251 | 56,284 | 56,273 | 56,301 | 56,300 | 56,303 |
| **TOTAL** | **156,093** | **156,155** | **156,113** | **156,168** | **156,173** | **156,191** | **238,646** | **238,735** | **238,697** | **238,799** | **238,804** | **238,795** |
| ***Non-Home-Based*** | | | | | | | | | | | | |
| 0-car | 63,426 | 63,443 | 63,407 | 63,424 | 63,428 | 63,449 | 99,211 | 99,234 | 99,199 | 99,243 | 99,248 | 99,245 |
| 1-car | 41,627 | 41,641 | 41,652 | 41,663 | 41,663 | 41,655 | 61,427 | 61,447 | 61,461 | 61,475 | 61,474 | 61,469 |
| 2+cars | 28,884 | 28,899 | 28,893 | 28,906 | 28,906 | 28,907 | 44,223 | 44,246 | 44,239 | 44,257 | 44,256 | 44,260 |
| **TOTAL** | **133,937** | **133,983** | **133,952** | **133,993** | **133,996** | **134,011** | **204,861** | **204,927** | **204,899** | **204,975** | **204,978** | **204,974** |
| **TOTAL** | **728,418** | **728,470** | **728,395** | **728,461** | **728,469** | **728,592** | **1,106,236** | **1,106,367** | **1,106,300** | **1,106,458** | **1,106,464** | **1,106,583** |

## Linked Transit Trips on the Project

**Table 15** summarizes project linked trips generated under each Build alternative scenario in 2024 and 2045. The Hybrid Alternative, which operates the fastest project runtimes, consistently generates the highest number of trips across all categories, particularly for Home-Based Work and Non-Home-Based trips. Overall, the forecasts illustrate how each alternative performs, with the Hybrid Alternative demonstrating the most capability of attracting riders to the project.

*Table 15: Linked Transit Trips-On-Project*

| Year | Year 2024 | | | | | Year 2045 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Alt1 Build | Alt2 Build | Alt3 Build | Alt4 Build | Hybrid Build | Alt1 Build | Alt2 Build | Alt3 Build | Alt4 Build | Hybrid Build |
| ***Home-Based Work*** | | | | | | | | | | |
| 0-car | 1,732 | 1,471 | 1,981 | 1,971 | 2,110 | 2,281 | 1,814 | 2,422 | 2,408 | 2,814 |
| 1-car | 1,247 | 1,410 | 1,453 | 1,447 | 1,775 | 1,646 | 1,773 | 1,944 | 1,936 | 2,350 |
| 2+cars | 1,110 | 1,100 | 1,215 | 1,211 | 1,513 | 1,507 | 1,427 | 1,628 | 1,622 | 2,040 |
| **TOTAL** | **4,090** | **3,981** | **4,649** | **4,628** | **5,398** | **5,434** | **5,014** | **5,995** | **5,965** | **7,204** |
| ***Home-Based Other*** | | | | | | | | | | |
| 0-car | 380 | 518 | 552 | 558 | 571 | 468 | 619 | 798 | 804 | 726 |
| 1-car | 285 | 425 | 490 | 488 | 514 | 373 | 539 | 584 | 582 | 706 |
| 2+cars | 300 | 433 | 272 | 269 | 462 | 421 | 589 | 369 | 365 | 630 |
| **TOTAL** | **966** | **1,376** | **1,314** | **1,315** | **1,547** | **1,261** | **1,748** | **1,750** | **1,751** | **2,062** |
| ***Non-Home-Based*** | | | | | | | | | | |
| 0-car | 319 | 434 | 462 | 467 | 478 | 393 | 519 | 664 | 668 | 607 |
| 1-car | 252 | 381 | 452 | 450 | 472 | 330 | 482 | 536 | 534 | 653 |
| 2+cars | 218 | 298 | 195 | 193 | 327 | 303 | 406 | 264 | 262 | 447 |
| **TOTAL** | **789** | **1,113** | **1,109** | **1,110** | **1,278** | **1,026** | **1,406** | **1,464** | **1,465** | **1,707** |
| **TOTAL** | **5,845** | **6,470** | **7,072** | **7,053** | **8,223** | **7,721** | **8,168** | **9,209** | **9,181** | **10,973** |

**Table 16** shows incremental (new transit riders) attracted by the project. Across all alternatives the project attracts only a modest number of new transit riders. The table shows that, overall, the project alternatives primarily draw transit customers from existing transit routes and do not generate any significant new market of transit riders on the corridor.

*Table 16: Incremental Weekday Linked Transit Trips as Compared to the No-Build Condition*

| Year | Year 2024 | | | | | Year 2045 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Alt1 Build | Alt2 Build | Alt3 Build | Alt4 Build | Hybrid Build | Alt1 Build | Alt2 Build | Alt3 Build | Alt4 Build | Hybrid Build |
| ***Home-Based Work*** | | | | | | | | | | |
| 0-car | (35) | (42) | (44) | (44) | (35) | (27) | (35) | (30) | (31) | (21) |
| 1-car | (9) | (18) | (19) | (20) | 6 | (2) | (9) | (9) | (10) | 36 |
| 2+cars | (12) | 2 | (25) | (25) | 31 | 5 | 19 | (6) | (6) | 70 |
| **TOTAL** | **(56)** | **(58)** | **(88)** | **(88)** | **2** | **(24)** | **(25)** | **(45)** | **(47)** | **85** |
| ***Home-Based Other*** | | | | | | | | | | |
| 0-car | 24 | (21) | 1 | 6 | 33 | 31 | (12) | 47 | 52 | 49 |
| 1-car | 17 | 29 | 42 | 41 | 32 | 25 | 41 | 56 | 56 | 48 |
| 2+cars | 21 | 12 | 32 | 32 | 33 | 33 | 22 | 50 | 49 | 52 |
| **TOTAL** | **62** | **20** | **75** | **80** | **98** | **89** | **51** | **153** | **158** | **149** |
| ***Non-Home-Based*** | | | | | | | | | | |
| 0-car | 17 | (19) | (2) | 2 | 23 | 23 | (12) | 32 | 37 | 34 |
| 1-car | 14 | 25 | 36 | 36 | 28 | 20 | 34 | 48 | 47 | 42 |
| 2+cars | 15 | 9 | 22 | 22 | 23 | 23 | 16 | 34 | 33 | 37 |
| **TOTAL** | **46** | **15** | **56** | **59** | **74** | **66** | **38** | **114** | **117** | **113** |
| **TOTAL** | **52** | **(23)** | **43** | **51** | **174** | **131** | **64** | **222** | **228** | **347** |

**Table 17** presents transit boardings on both the proposed project route and existing bus routes operating within the New Hampshire Avenue corridor for the years 2024 and 2045, under the five build alternatives. The data are split into two categories: Project Ridership and Non-Project Corridor Ridership. Project boardings increase significantly from 2024 to 2045 across all alternatives, with the Hybrid Alternative consistently yielding the highest ridership (8,223 in 2024 and 10,973 in 2045).

Compared to the No-Build alternative, boardings on non-project routes decline. This indicates that the new project primarily shifts demand away from certain existing services. The total ridership in the corridor (Project + Non-Project Corridor Ridership) increases only modestly under each project alternative compared to the no-build. Overall, the table suggests that while the new project boosts total corridor ridership, it also redistributes some trips from legacy routes.

## Boardings by Corridor Route

*Table 17: Project and Non-Project Corridor Ridership by Alternatives*

| Year | Year 2024 | | | | | | Year 2045 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alternative / Route | No Build | Alt1 Build | Alt2 Build | Alt3 Build | Alt4 Build | Hybrid Build | No-Built | Alt1 Build | Alt2 Build | Alt3 Build | Alt4 Build | Hybrid Build |
| ***Project Ridership*** | | | | | | | | | | | | |
| Project Route | - | 5,845 | 6,470 | 7,072 | 7,054 | 8,223 | - | 7,720 | 8,168 | 9,210 | 9,181 | 10,973 |
| **TOTAL** | **-** | **5,845** | **6,470** | **7,072** | **7,054** | **8,223** | **-** | **7,720** | **8,168** | **9,210** | **9,181** | **10,973** |
| ***Non-project Corridor Ridership*** | | | | | | | | | | | | |
| 10-Twinbrook Station-Hill | 2,649 | 2,500 | 2,541 | 2,584 | 2,549 | 2,878 | 4,515 | 4,305 | 4,361 | 4,492 | 4,389 | 4,943 |
| 16-Silver Spring-Takoma-R | 1,719 | 1,326 | 1,314 | 1,300 | 1,296 | 1,285 | 2,080 | 1,633 | 1,625 | 1,614 | 1,610 | 1,557 |
| 20-Silver Spring-Hillandale | 1,298 | 1,080 | 1,224 | 1,073 | 1,073 | 1,271 | 1,375 | 1,152 | 1,293 | 1,136 | 1,137 | 1,363 |
| 21-Silver Spring-Briggs C | 151 | 118 | 126 | 118 | 118 | 112 | 141 | 106 | 113 | 107 | 107 | 101 |
| 22-Silver Spring-Hillandale | 204 | 193 | 192 | 198 | 198 | 185 | 234 | 223 | 221 | 229 | 229 | 213 |
| 24-Hillandale-Takoma-Rte | 117 | 62 | 108 | 60 | 60 | 59 | 154 | 68 | 146 | 66 | 66 | 66 |
| Z2-Colesville-Ashton | 379 | 292 | 326 | 296 | 297 | 283 | 415 | 319 | 355 | 320 | 321 | 305 |
| C8-College Pk-North Bethesda | 2,775 | 2,548 | 2,591 | 2,511 | 2,514 | 2,496 | 3,417 | 3,147 | 3,214 | 3,102 | 3,107 | 3,107 |
| K6-New Hampshire Ave - Maryland Line | 8,708 | 6,651 | 5,685 | 5,721 | 5,725 | 5,391 | 10,409 | 7,841 | 6,658 | 6,745 | 6,730 | 6,102 |
| K9-New Hampshire Ave-MD | 1,067 | - | - | - | - | - | 1,512 | - | - | - | - | - |
| **TOTAL** | **19,067** | **14,770** | **14,107** | **13,861** | **13,830** | **13,960** | **24,252** | **18,794** | **17,986** | **17,811** | **17,696** | **17,757** |
| **TOTAL CORRIDOR RIDERSHIP** | **19,067** | **20,615** | **20,577** | **20,933** | **20,884** | **22,183** | **24,252** | **26,514** | **26,154** | **27,021** | **26,877** | **28,730** |

## Project Stop Boardings

This section summarizes the boarding figures by stops for each alignment alternative. This includes:

- **Table 18** presents boardings by study stops for all access modes including walk, KNR, PNR and transfers. The highest number boardings occur at Fort Totten (transfer point to Metrorail), Takoma Langley (transfer point to the transit center and Purple Line), North Hampton (serving a dense development of town houses) and at Lockwood (serving a shopping center and denser apartment towers).
- **Table 19** presents boardings by study stops for walk-access trips. Overall, nearly half of all station boardings are attributed to walk access, suggesting that the corridor's primary market serves local transit trips. The table indicates that virtually no riders use walk access to reach the project service from Fort Totten or Takoma Langley (the stops with the highest overall boardings). This suggests that most of the ridership at other stops consists of walk access and egress trips within close proximity to the corridor.
- **Table 20** and **Table 21** show boardings for KNR and PNR access, respectively. The corridor is served by one official PNR lot at Colesville. Overall, the service attracts only a marginal number of trips from PNR or KNR access.
- **Table 22** present boardings by project stop for transfer-access trips. Approximately two-thirds of transfers across all alternatives occur at Fort Totten (connecting to Metrorail) and at Takoma Langley connecting to the Purple Line.

Project stations were modeled by direction. It is important to note that STOPS represents all trips in the morning peak using a production–attraction framework and then reverses half of those trips to approximate full origin–destination flows. Because STOPS does not generate separate evening peak skims (doing so would double model run time) it assumes that morning alightings at a destination station correspond to evening boardings at that same station. As a result, modeled boardings at the station–direction level may appear skewed. This outcome reflects an inherent modeling convention in STOPS rather than a data or modeling error.

*Table 18: Weekday Unlinked Trips by BRT Build Alternative Boarding Station*

| Year | Year 2024 | | | | | Year 2045 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Alternative | Alt1 | Alt2 | Alt3 | Alt4 | Hybrid | Alt1 | Alt2 | Alt3 | Alt4 | Hybrid |
| Route | Build | Build | Build | Build | Build | Build | Build | Build | Build | Build |
| Fort Totten NB | 62 | 142 | 142 | 141 | 193 | 103 | 217 | 216 | 215 | 295 |
| Fort Totten SB | 1,777 | 1,839 | 1,997 | 1,992 | 2,362 | 2,318 | 2,218 | 2,549 | 2,543 | 3,006 |
| Sheridan NB | 83 | 102 | 104 | 104 | 110 | 115 | 141 | 139 | 139 | 149 |
| Sheridan SB | 255 | 151 | 371 | 372 | 281 | 435 | 194 | 576 | 577 | 469 |
| Ethan Allen NB | 87 | 89 | 145 | 139 | 212 | 112 | 165 | 262 | 255 | 338 |
| Ethan Allen SB | 363 | 461 | 359 | 358 | 440 | 444 | 542 | 429 | 428 | 525 |
| Merwood NB | 43 | 79 | 85 | 85 | 100 | 65 | 117 | 121 | 121 | 147 |
| Merwood SB | 263 | 262 | 272 | 271 | 339 | 356 | 358 | 365 | 364 | 463 |
| Takoma Langley NB | 346 | 441 | 631 | 636 | 346 | 386 | 505 | 700 | 704 | 420 |
| Takoma Langley SB | 187 | 270 | 221 | 221 | 301 | 250 | 341 | 275 | 274 | 373 |
| Quebec NB | 61 | 78 | 83 | 81 | 104 | 101 | 122 | 141 | 139 | 178 |
| Quebec SB | 432 | 567 | 522 | 524 | 612 | 466 | 612 | 575 | 577 | 682 |
| Northampton NB | 214 | 261 | 447 | 447 | 177 | 227 | 280 | 473 | 473 | 203 |
| Northampton SB | 455 | 558 | 439 | 443 | 604 | 598 | 696 | 579 | 594 | 787 |
| Oakview NB | 109 | 39 | 12 | 12 | 20 | 157 | 52 | 19 | 19 | 43 |
| Oakview SB | 18 | 18 | 16 | 8 | 80 | 24 | 27 | 32 | 13 | 123 |
| Powder Mill NB | 103 | 164 | 176 | 172 | 218 | 150 | 211 | 220 | 215 | 275 |
| Powder Mill SB | 95 | 69 | 84 | 84 | 125 | 134 | 95 | 119 | 119 | 179 |
| Mahan NB | 10 | 23 | 85 | 68 | 95 | 21 | 34 | 170 | 120 | 227 |
| Mahan SB | 55 | 89 | 47 | 46 | 114 | 91 | 127 | 67 | 65 | 151 |
| Lockwood NB | 156 | 141 | 151 | 161 | 223 | 235 | 231 | 227 | 270 | 294 |
| Lockwood SB | 320 | 321 | 344 | 344 | 650 | 492 | 501 | 531 | 532 | 986 |
| Jackson NB | 26 | 15 | 14 | 15 | 22 | 29 | 16 | 14 | 16 | 22 |
| Jackson SB | 12 | 11 | 22 | 22 | 20 | 15 | 18 | 32 | 32 | 28 |
| Valleybrook NB | 60 | 84 | 85 | 85 | 71 | 61 | 93 | 95 | 95 | 73 |
| Valleybrook SB | 70 | 30 | 43 | 43 | 61 | 89 | 37 | 49 | 49 | 70 |
| Randolph NB | 58 | 64 | 39 | 41 | 114 | 79 | 82 | 52 | 53 | 149 |
| Randolph SB | 125 | 103 | 138 | 138 | 231 | 168 | 138 | 181 | 182 | 314 |
| **TOTAL** | **5,845** | **6,471** | **7,074** | **7,053** | **8,225** | **7,721** | **8,170** | **9,208** | **9,183** | **10,969** |

*Table 19: Weekday Unlinked Walk Trips by Boarding Station*

| Year | Year 2024 | | | | | Year 2045 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Alternative | Alt1 | Alt2 | Alt3 | Alt4 | Hybrid | Alt1 | Alt2 | Alt3 | Alt4 | Hybrid |
| Route | Build | Build | Build | Build | Build | Build | Build | Build | Build | Build |
| Fort Totten NB | 2 | 4 | 3 | 3 | 5 | 2 | 5 | 4 | 4 | 7 |
| Fort Totten SB | 2 | 5 | 3 | 4 | 5 | 4 | 8 | 6 | 6 | 8 |
| Sheridan NB | 72 | 101 | 99 | 99 | 101 | 97 | 139 | 131 | 131 | 137 |
| Sheridan SB | 255 | 150 | 367 | 369 | 275 | 434 | 191 | 563 | 564 | 452 |
| Ethan Allen NB | 26 | 62 | 95 | 91 | 105 | 38 | 131 | 180 | 174 | 195 |
| Ethan Allen SB | 316 | 426 | 327 | 326 | 379 | 375 | 484 | 383 | 382 | 441 |
| Merwood NB | 43 | 77 | 83 | 83 | 97 | 64 | 114 | 118 | 118 | 142 |
| Merwood SB | 261 | 261 | 268 | 268 | 336 | 353 | 358 | 356 | 356 | 459 |
| Takoma Langley NB | 14 | 24 | 51 | 34 | 54 | 15 | 26 | 59 | 41 | 60 |
| Takoma Langley SB | 16 | 56 | 73 | 73 | 112 | 20 | 59 | 81 | 80 | 119 |
| Quebec NB | 57 | 64 | 78 | 76 | 104 | 92 | 107 | 135 | 133 | 177 |
| Quebec SB | 431 | 566 | 517 | 519 | 611 | 464 | 610 | 565 | 567 | 681 |
| Northampton NB | 192 | 259 | 429 | 429 | 149 | 197 | 277 | 444 | 444 | 166 |
| Northampton SB | 429 | 529 | 420 | 424 | 551 | 554 | 655 | 545 | 560 | 708 |
| Oakview NB | 33 | 10 | 10 | 10 | 12 | 40 | 17 | 17 | 17 | 16 |
| Oakview SB | 9 | 6 | 3 | 3 | 78 | 12 | 10 | 5 | 5 | 121 |
| Powder Mill NB | 86 | 152 | 165 | 163 | 193 | 114 | 187 | 204 | 202 | 237 |
| Powder Mill SB | 68 | 35 | 59 | 59 | 65 | 88 | 44 | 79 | 80 | 86 |
| Mahan NB | 5 | 12 | 8 | 8 | 11 | 6 | 16 | 9 | 10 | 15 |
| Mahan SB | 11 | 67 | 26 | 26 | 91 | 15 | 89 | 32 | 32 | 112 |
| Lockwood NB | 52 | 61 | 81 | 82 | 108 | 84 | 105 | 127 | 128 | 150 |
| Lockwood SB | 212 | 214 | 215 | 215 | 307 | 317 | 327 | 315 | 315 | 443 |
| Jackson NB | 10 | 7 | 7 | 8 | 13 | 9 | 8 | 8 | 8 | 13 |
| Jackson SB | 10 | 6 | 10 | 10 | 13 | 12 | 7 | 12 | 12 | 17 |
| Valleybrook NB | 59 | 60 | 56 | 58 | 63 | 59 | 61 | 58 | 59 | 63 |
| Valleybrook SB | 44 | 30 | 42 | 42 | 59 | 52 | 36 | 49 | 49 | 68 |
| Randolph NB | 25 | 36 | 29 | 31 | 44 | 34 | 48 | 40 | 41 | 57 |
| Randolph SB | 76 | 48 | 76 | 76 | 101 | 93 | 61 | 93 | 93 | 124 |
| **TOTAL** | **2,816** | **3,328** | **3,600** | **3,589** | **4,042** | **3,644** | **4,180** | **4,618** | **4,611** | **5,274** |

*Table 20: Weekday Unlinked Kiss & Ride Trips by Boarding Station*

| Year | Year 2024 | | | | | Year 2045 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Alternative | Alt1 | Alt2 | Alt3 | Alt4 | Hybrid | Alt1 | Alt2 | Alt3 | Alt4 | Hybrid |
| Route | Build | Build | Build | Build | Build | Build | Build | Build | Build | Build |
| Fort Totten NB | 2 | 3 | 3 | 3 | 5 | 3 | 4 | 5 | 5 | 8 |
| Fort Totten SB | - | - | - | - | - | - | - | - | - | - |
| Sheridan NB | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 4 |
| Sheridan SB | - | - | - | - | - | - | - | - | - | - |
| Ethan Allen NB | - | 1 | 1 | 1 | 1 | - | 2 | 2 | 2 | 2 |
| Ethan Allen SB | - | - | - | - | - | - | - | - | - | - |
| Merwood NB | - | 1 | 1 | 1 | 1 | - | 1 | 2 | 2 | 2 |
| Merwood SB | - | - | - | - | - | - | - | - | - | - |
| Takoma Langley NB | 1 | 2 | 3 | 3 | 3 | 2 | 3 | 4 | 4 | 4 |
| Takoma Langley SB | - | - | - | - | - | - | - | - | - | - |
| Quebec NB | 1 | - | - | - | - | 1 | 1 | - | - | 1 |
| Quebec SB | - | - | - | - | - | - | - | - | - | - |
| Northampton NB | - | - | - | - | - | - | - | - | - | - |
| Northampton SB | - | - | - | - | - | - | - | - | - | - |
| Oakview NB | - | - | - | - | - | - | - | - | - | - |
| Oakview SB | - | - | - | - | - | - | - | - | - | - |
| Powder Mill NB | - | - | - | - | - | - | - | - | - | - |
| Powder Mill SB | 2 | 2 | 1 | 1 | 3 | 3 | 4 | 3 | 3 | 5 |
| Mahan NB | - | - | - | - | - | - | - | - | - | - |
| Mahan SB | - | - | - | - | - | - | - | - | - | - |
| Lockwood NB | - | - | - | - | - | - | - | - | - | - |
| Lockwood SB | 2 | 3 | 1 | 1 | 4 | 3 | 5 | 3 | 3 | 7 |
| Jackson NB | - | - | - | - | - | - | - | - | - | - |
| Jackson SB | - | - | - | - | - | - | - | - | - | - |
| Valleybrook NB | - | - | - | - | - | - | - | - | - | - |
| Valleybrook SB | - | 1 | - | - | 1 | 1 | 1 | 1 | 1 | 3 |
| Randolph NB | - | - | - | - | - | - | - | - | - | - |
| Randolph SB | 15 | 14 | 14 | 14 | 20 | 22 | 19 | 19 | 19 | 29 |
| **TOTAL** | **24** | **28** | **26** | **26** | **40** | **37** | **42** | **42** | **42** | **65** |

*Table 21: Weekday Unlinked Park & Ride Trips by Boarding Station*

| Year | Year 2024 | | | | | Year 2045 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Alternative | Alt1 | Alt2 | Alt3 | Alt4 | Hybrid | Alt1 | Alt2 | Alt3 | Alt4 | Hybrid |
| Route | Build | Build | Build | Build | Build | Build | Build | Build | Build | Build |
| Fort Totten NB | - | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 |
| Fort Totten SB | - | - | - | - | - | - | - | - | - | - |
| Sheridan NB | - | - | - | - | - | - | - | - | - | - |
| Sheridan SB | - | - | - | - | - | - | - | - | - | - |
| Ethan Allen NB | - | - | - | - | - | - | - | - | - | - |
| Ethan Allen SB | - | - | - | - | - | - | - | - | - | - |
| Merwood NB | - | - | - | - | - | - | - | - | - | - |
| Merwood SB | - | - | - | - | - | - | - | - | - | - |
| Takoma Langley NB | - | - | - | - | - | - | - | - | - | - |
| Takoma Langley SB | - | - | - | - | - | - | - | - | - | - |
| Quebec NB | - | - | - | - | - | - | - | - | - | - |
| Quebec SB | - | - | - | - | - | - | - | - | - | - |
| Northampton NB | - | - | - | - | - | - | - | - | - | - |
| Northampton SB | - | - | - | - | - | - | - | - | - | - |
| Oakview NB | - | - | - | - | - | - | - | - | - | - |
| Oakview SB | - | - | - | - | - | - | - | - | - | - |
| Powder Mill NB | - | - | - | - | - | - | - | - | - | - |
| Powder Mill SB | - | - | - | - | - | - | - | - | - | - |
| Mahan NB | - | - | - | - | - | - | - | - | - | - |
| Mahan SB | - | - | - | - | - | - | - | - | - | - |
| Lockwood NB | - | - | - | - | - | - | - | - | - | - |
| Lockwood SB | - | - | - | - | - | - | - | - | - | - |
| Jackson NB | - | - | - | - | - | - | - | - | - | - |
| Jackson SB | - | - | - | - | - | - | - | - | - | - |
| Valleybrook NB | - | - | - | - | - | - | - | - | - | - |
| Valleybrook SB | - | - | - | - | - | - | - | - | - | - |
| Randolph NB | - | - | - | - | - | - | - | - | - | - |
| Randolph SB | 23 | 17 | 20 | 20 | 40 | 36 | 24 | 28 | 28 | 59 |
| **TOTAL** | **23** | **18** | **21** | **21** | **41** | **37** | **26** | **30** | **30** | **62** |

*Table 22: Weekday Unlinked Transfer Trips by Boarding Station*

| Year | Year 2024 | | | | | Year 2045 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Alternative** | **Alt1** | **Alt2** | **Alt3** | **Alt4** | **Hybrid** | **Alt1** | **Alt2** | **Alt3** | **Alt4** | **Hybrid** |
| **Route** | **Build** | **Build** | **Build** | **Build** | **Build** | **Build** | **Build** | **Build** | **Build** | **Build** |
| Fort Totten NB | 57 | 134 | 135 | 134 | 182 | 96 | 205 | 205 | 204 | 278 |
| Fort Totten SB | 1,775 | 1,834 | 1,993 | 1,988 | 2,357 | 2,314 | 2,210 | 2,543 | 2,537 | 2,997 |
| Sheridan NB | 10 | - | 3 | 3 | 6 | 16 | - | 4 | 4 | 8 |
| Sheridan SB | 1 | 1 | 3 | 3 | 6 | 1 | 3 | 13 | 13 | 17 |
| Ethan Allen NB | 61 | 26 | 49 | 48 | 105 | 74 | 32 | 80 | 80 | 141 |
| Ethan Allen SB | 47 | 35 | 32 | 32 | 62 | 69 | 57 | 46 | 46 | 84 |
| Merwood NB | - | 1 | - | 1 | 2 | 1 | 2 | - | 1 | 2 |
| Merwood SB | 3 | - | 3 | 3 | 3 | 3 | 1 | 8 | 8 | 4 |
| Takoma Langley NB | 330 | 415 | 577 | 600 | 289 | 369 | 476 | 636 | 658 | 356 |
| Takoma Langley SB | 170 | 214 | 148 | 147 | 188 | 230 | 282 | 194 | 193 | 255 |
| Quebec NB | 3 | 13 | 5 | 4 | - | 8 | 15 | 6 | 5 | - |
| Quebec SB | 1 | 1 | 5 | 5 | 1 | 2 | 2 | 11 | 10 | 1 |
| Northampton NB | 22 | 1 | 19 | 19 | 27 | 30 | 3 | 29 | 29 | 36 |
| Northampton SB | 26 | 29 | 19 | 19 | 53 | 44 | 41 | 34 | 34 | 79 |
| Oakview NB | 75 | 28 | 2 | 2 | 8 | 116 | 35 | 2 | 2 | 27 |
| Oakview SB | 9 | 12 | 13 | 5 | 1 | 12 | 17 | 28 | 8 | 2 |
| Powder Mill NB | 16 | 11 | 10 | 8 | 25 | 35 | 24 | 15 | 13 | 38 |
| Powder Mill SB | 25 | 31 | 24 | 24 | 57 | 43 | 47 | 37 | 36 | 88 |
| Mahan NB | 5 | 11 | 77 | 60 | 83 | 15 | 18 | 161 | 110 | 212 |
| Mahan SB | 43 | 21 | 21 | 20 | 22 | 76 | 38 | 34 | 33 | 38 |
| Lockwood NB | 104 | 80 | 69 | 78 | 114 | 151 | 126 | 100 | 141 | 144 |
| Lockwood SB | 107 | 104 | 128 | 128 | 340 | 171 | 169 | 214 | 214 | 535 |
| Jackson NB | 16 | 8 | 6 | 7 | 9 | 19 | 8 | 6 | 7 | 9 |
| Jackson SB | 2 | 5 | 12 | 12 | 7 | 3 | 10 | 20 | 20 | 11 |
| Valleybrook NB | 1 | 23 | 28 | 28 | 8 | 1 | 32 | 37 | 37 | 9 |
| Valleybrook SB | 26 | - | - | - | - | 36 | - | - | - | - |
| Randolph NB | 33 | 28 | 10 | 10 | 69 | 46 | 34 | 12 | 12 | 92 |
| Randolph SB | 13 | 23 | 29 | 29 | 70 | 17 | 35 | 42 | 42 | 102 |
| **TOTAL** | **2,981** | **3,089** | **3,420** | **3,417** | **4,094** | **3,998** | **3,922** | **4,517** | **4,497** | **5,565** |

## Vehicle Miles of Travel Impacts

**Table 23** shows the weekday automobile travel impacts by alignment alternatives and variations, including change in person-miles and change in vehicle-miles. STOPS calculates the change in person vehicle miles by first estimating the incremental linked transit trips resulting from a transit project, which is the difference in linked transit trips between the build and no-build scenarios. This change in linked transit trips is then used to infer the impact on automobile travel. In 2024, no alternative generates a decrease in person-miles travelled. This is because the project attracts very few incremental (new) riders. In 2045, Alternatives with higher incremental ridership generate small declines in vehicle miles travelled.

*Table 23: Weekday Automobile Travel Impacts*

| Year | Year 2024 | | | | | Year 2045 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Alternative | Alt1 Build | Alt2 Build | Alt3 Build | Alt4 Build | Hybrid Build | Alt1 Build | Alt2 Build | Alt3 Build | Alt4 Build | Hybrid Build |
| ***Change in Auto Travel*** | | | | | | | | | | |
| Change in Person-Miles | 688 | 1,471 | 1,289 | 1,219 | 183 | 1,175 | 466 | 380 | (757) | (757) |
| Change in Vehicle-Miles | 625 | 1,337 | 1,172 | 1,108 | 166 | 1,068 | 424 | 345 | (688) | (688) |