MIAMI STOPS 2019 CALIBRATION | TECHNICAL REPORT

December, 2021

Miami-Dade Transportation Planning Organization

Miami-Dade STOPS 2019 Calibration

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Miami-Dade Transportation Planning Organization

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EXECUTIVE SUMMARY

This report describes the 2019 interim calibration of the Simplified Trips-on-Project Software (STOPS) model for forecasting transit ridership in Miami-Dade County and surrounding areas. This implementation of STOPS is designed to support ongoing planning, development, and funding applications for Miami-Dade County's Strategic Miami Area Rapid Transit (SMART) plan. Ridership forecasting for the SMART corridor projects commenced with STOPS models calibrated to match observed 2015 transit ridership. As part of the federal approval process for Bus Rapid Transit (BRT) service in the South Dade Transitway, STOPS was updated to represent observed 2017 transit ridership demand.

To continue planning in the remaining corridors, the Miami-Dade Transportation Planning Organization (TPO) began a large-scale transit ridership origin-destination survey in 2020 and planned to use this information to develop a new STOPS incremental (survey-based) forecasting model with a 2020 base year. The COVID-19 pandemic and subsequent disruption to transit ridership patterns have delayed both the survey and the model update projects. In the meantime, the TPO prepared an interim 2019 STOPS synthetic (Census- and count-based) model implementation using the best available pre-Pandemic information.

For the Tri-Rail Downtown link, approximately 2,000 daily trips currently transfer between Metrorail and Tri-Rail at the Metrorail/Tri-Rail transfer station. Tri-Rail plans to alternate service between Downtown Miami and Miami International Airport, offering to serve approximately hourly to each destination. Since the Metrorail service is more frequent (every 9 minutes) and requires approximately the same time to travel downtown, use of the MIA train and transferring to Metrorail is a viable option for about half of all travelers who may wish to arrive in downtown Miami between the arrival of Downtown Link trains. Additionally, Metrorail provides direct service to several stations in central Miami resulting in it being the preferred connection for travelers to the Brickell and Civic Center areas. As a consequence, the modeled diversion of approximately 1/3 of the existing riders to the Downtown Link appears appropriate.

Both the calibration results and the model application to estimate future ridership are presented in the following tables.

CALIBRATION RESULTS – COMPARISON OF COUNTED RIDERSHIP BY ROUTE TYPE TO MODELED RIDERSHIP

Route Type	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership
Metrorail	63,028	61,933
Metromover	30,454	29,413
Tri-Rail	14,769	14,594
Metrobus	164,856	164,073
Municipal Shuttle	38,653	38,799
BCT Bus	87,919	87,579
Palm Tran	31,195	30,804
Tri-Rail Bus	3,276	2,511
Total	**434,150**	**429,706**

APPLICATION RESULTS – COMPARISON OF EXISTING AND NO-BUILD WEEKDAY RIDERSHIP BY YEAR

Service	2019 Existing	2019 with No-Build Network		2040 No-Build with 2040 Highway Times		2045 No-Build with 2045 Highway Times	
Metrorail	61,938	62,304	0.6%	71,862	16.0%	92,020	48.6%
Metromover	29,413	29,327	-0.3%	38,474	30.8%	42,782	45.5%
MIA People Mover	7,608	7,637	0.4%	9,488	24.7%	9,509	25.0%
Tri-Rail Downtown Link	0	718		826		956	
Other Tri-Rail	14,595	14,380	-1.5%	15,870	8.7%	17,864	22.4%
Tri-Rail Total	14,595	15,098	3.4%	16,696	14.4%	18,820	28.9%
South Dade Transitway BRT Limited	0	8,776		9,610		12,873	
South Dade Transitway BRT Local	0	4,960		8,001		7,845	
DTPW/MDT Bus	164,075	152,610	-7.0%	195,079	18.9%	205,053	25.0%
836 Express	0	4,236		4,310		5,154	
Municipal Trolley	38,492	38,413	-0.2%	46,924	21.9%	49,187	27.8%
BCT Bus	87,579	87,369	-0.2%	84,889	-3.1%	114,830	31.1%
Palm Tran Bus	30,806	30,784	-0.1%	32,777	6.4%	37,997	23.3%
Tri-Rail Bus	2,511	2,517	0.2%	2,764	10.1%	3,049	21.4%
Total	**437,017**	**444,031**	**1.6%**	**520,874**	**19.2%**	**599,119**	**37.1%**

Note: Percentages reflect the change from 2019 Existing Scenario

1.0 INTRODUCTION

This report describes the 2019 interim calibration of the Simplified Trips-on-Project Software (STOPS) model for forecasting transit ridership in Miami-Dade County and surrounding areas. This implementation of STOPS is designed to support ongoing planning, development, and funding applications for Miami-Dade County's Strategic Miami Area Rapid Transit (SMART) plan, **Figure 1**. The SMART program of projects includes new rapid transit service in six corridors:

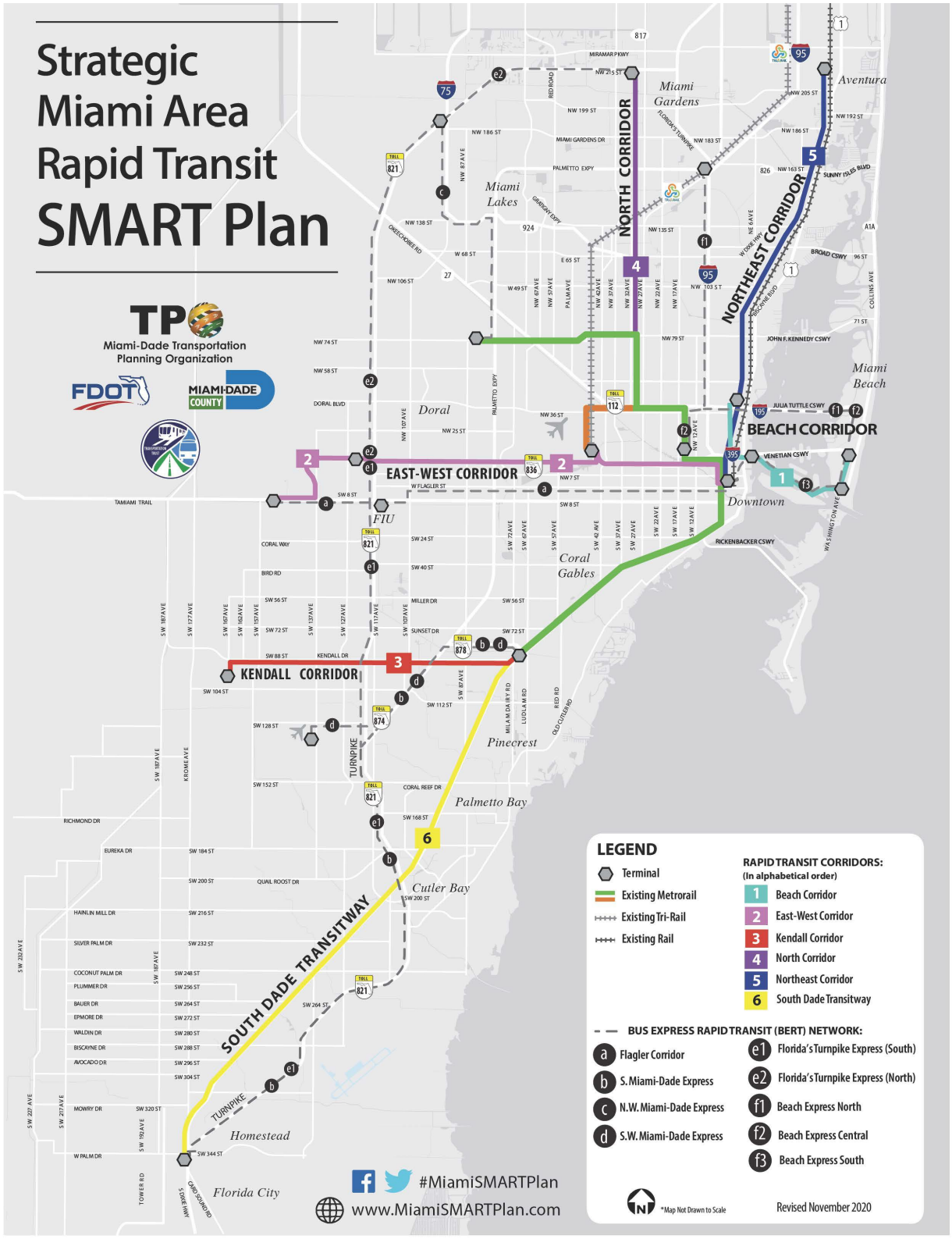
- Beach Corridor
- East-West and Flagler Corridor (part of the Bus Express Rapid Transit network)
- Kendall Corridor
- North Corridor
- Northeast Corridor
- South Dade Transitway

Ridership forecasting for these projects commenced with STOPS models calibrated to match observed 2015 transit ridership. As part of the federal approval process for Bus Rapid Transit (BRT) service in the South Dade Transitway, STOPS was updated to represent observed 2017 transit ridership demand.

To continue planning in the remaining corridors, the Miami-Dade Transportation Planning Organization (TPO) began to conduct a large-scale transit ridership origin-destination survey in 2020 and planned to use this information to develop a new STOPS incremental (survey-based) forecasting model with a 2020 base year. The COVID-19 pandemic and subsequent disruption to transit ridership patterns has delayed both the survey and the model update projects. In the meantime, TPO prepared an interim 2019 STOPS synthetic (Census- and count-based) model implementation using the best available pre-Pandemic information.

The data, coding practices, calibration results, and test application results of that model are discussed in this document.

FIGURE 1 SMART PLAN MAP



2.0 NON-TRANSIT INPUT DATA

This chapter discusses the non-transit input data assembled for this calibration of STOPS. In most cases, these data sets will not require adjustment for the application of STOPS to forecast ridership for any project in Miami-Dade County.

2.1 ZONE AND DISTRICT SYSTEM

The STOPS Traffic Analysis Zone (TAZ) system is based on the TAZ system developed for the Southeast Regional Planning Model (SERPM) Version 8, the travel demand model used in Miami-Dade County and other portions of Southeast Florida. SERPM TAZs are used in lieu of the original American Community Survey (ACS) zone system file supplied by the Federal Transit Administration (FTA) to STOPS users. The use of local TAZs is often recommended by FTA and allows for an exact representation of the socioeconomic information in each SERPM TAZ to be used without allocation or aggregation to ACS zones. Local TAZs also avoid problems in coastal areas where ACS TAZs often include large waterway areas that distort the true geography of urban travel.

The approach for using local TAZs in lieu of ACS TAZs required the following steps:

1. Obtain an ESRI Shape File delineating SERPM Version 8 TAZs and rename to match the ACS zone filename for Florida (AC12_D00.shp).
2. Create ACS identifier fields in the accompanying .dbf file (State, County, and Tract or TAZ)
3. Overlay the original- and SERPM-based ACS files and post the State, County, and Tract/TAZ information from the original ACS zone file to the SERPM-based ACS zone file.

STOPS aggregates groups of TAZs into Districts for purposes of determining calibration parameters and reporting results. For this application, STOPS districts are based on the SERPM 8 Traffic Analysis District (TAD) system for the region and are shown in **Figure 2** (districts in Miami-Dade County), **Figure 3** (districts in and around Broward County), and **Figure 4** (districts in and around Palm Beach County).

FIGURE 2 DISTRICT SYSTEM IN MIAMI-DADE COUNTY

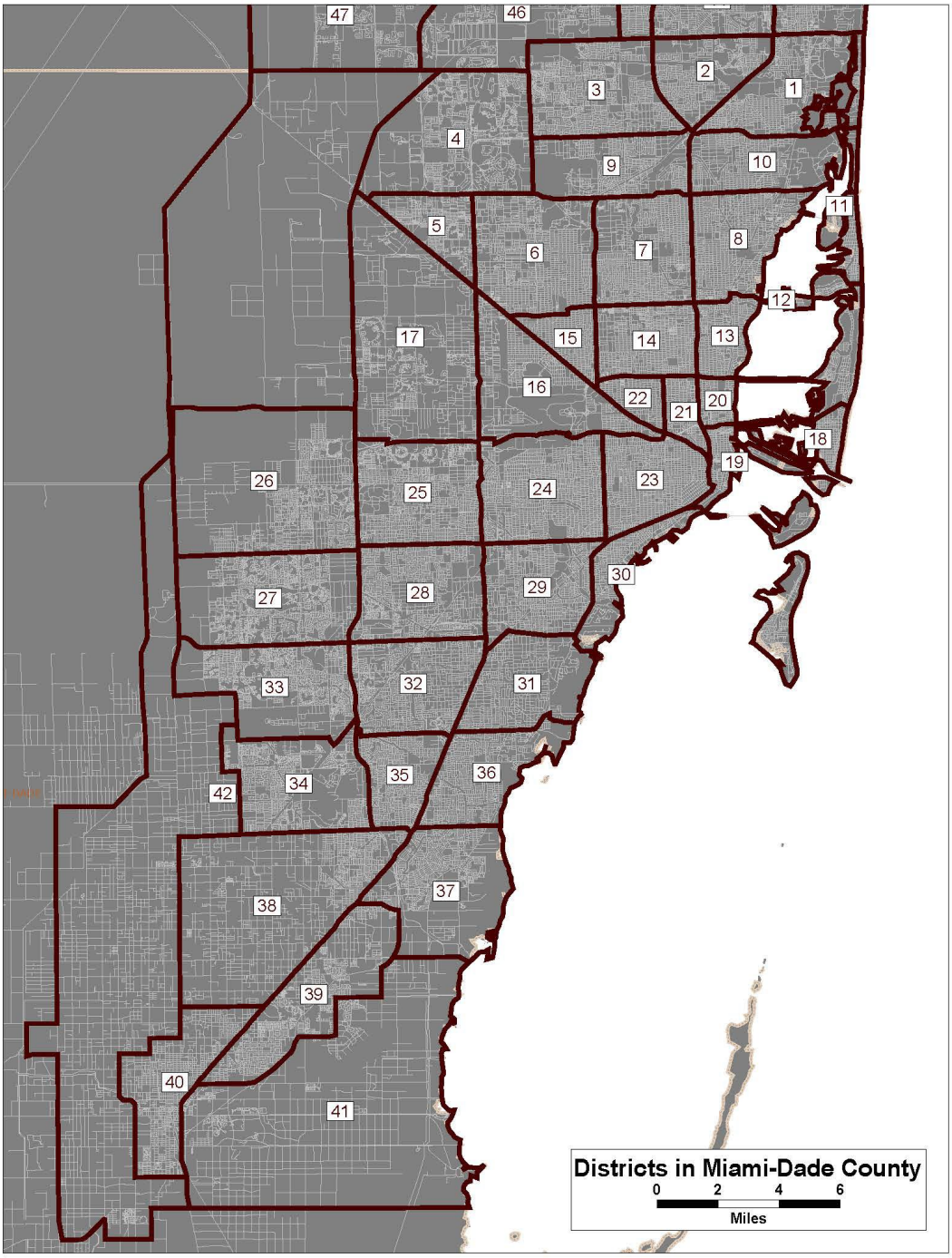


FIGURE 3 DISTRICT SYSTEM IN BROWARD COUNTY

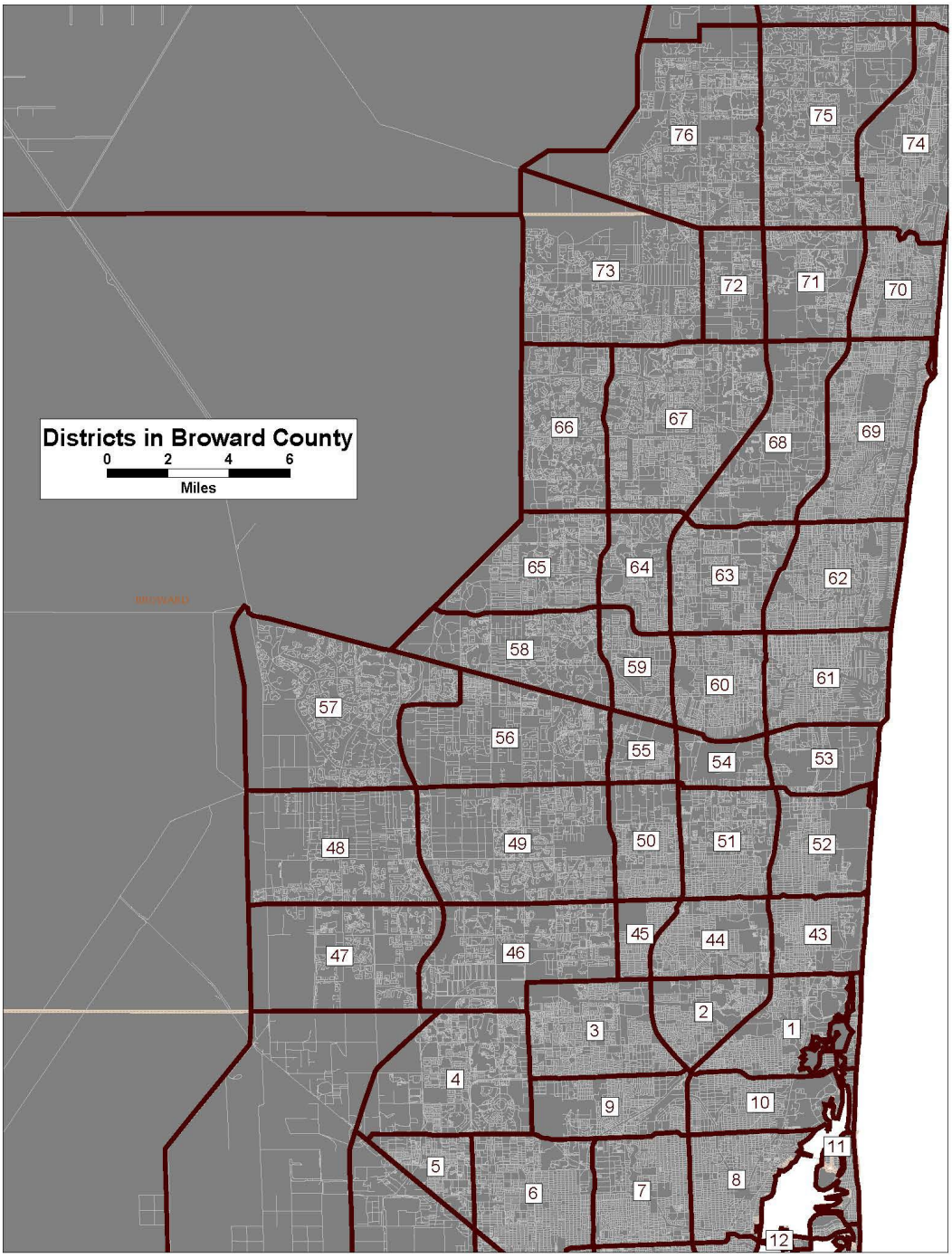
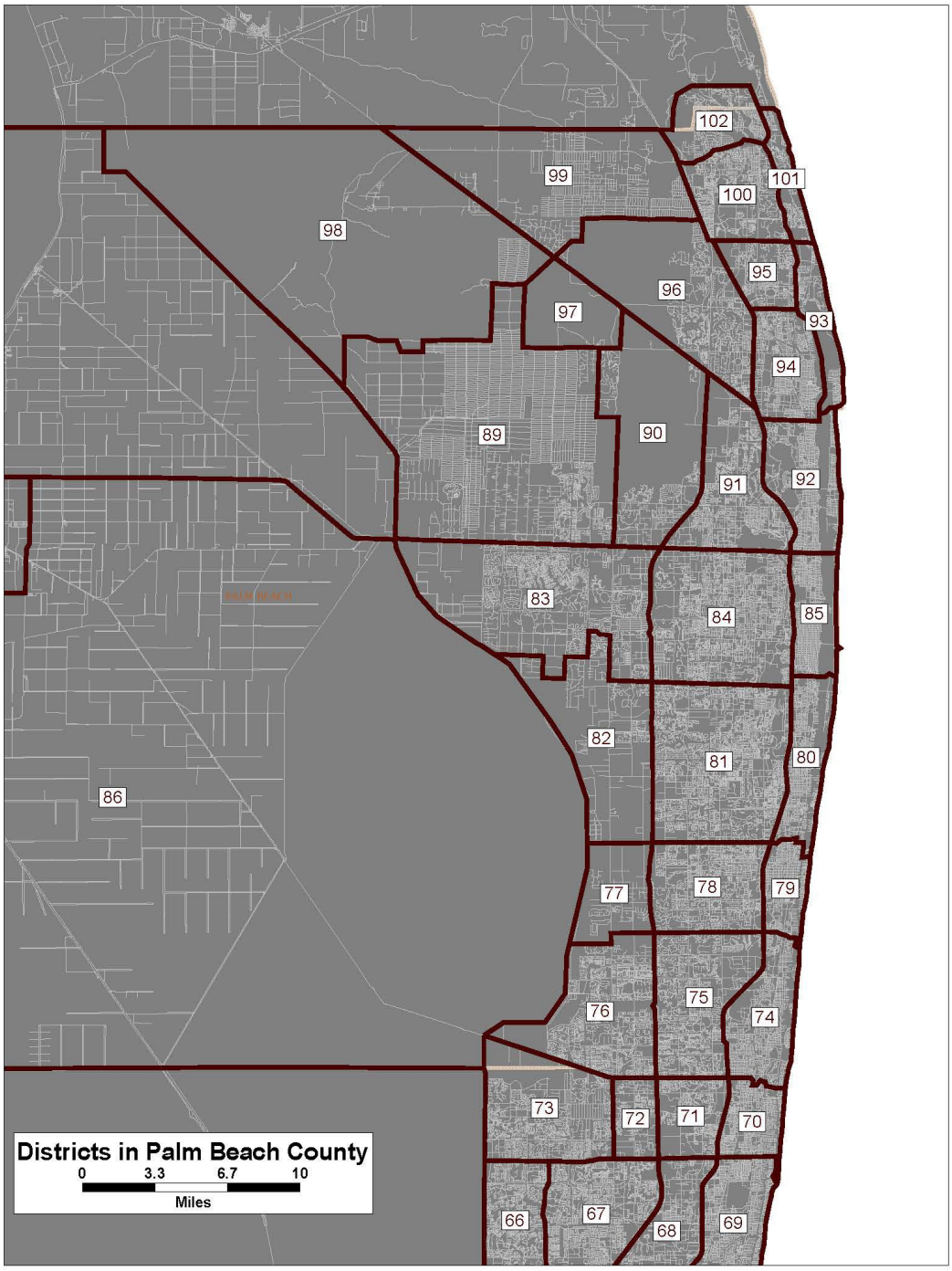


FIGURE 4 DISTRICT SYSTEM IN PALM BEACH COUNTY



2.2 SOCIO-ECONOMIC INPUTS

TAZ-level estimates of population and employment for 2015 and 2045 were obtained from SERPM Version 8 adopted forecasts. Estimates for 2010 were obtained from SERPM Version 7 adopted forecasts (and not changed in Version 8). Year 2019 population and employment estimates by TAZ were prepared by interpolating projections from 2015 and 2045.

In SERPM Version 8, total employment in airport zones is set to zero to prevent SERPM from sending non-work travel to these locations. Segmented employment (i.e., transportation sector employment is coded with the proper (non-zero) values so that work-trips would still be attracted. For input to STOPS, total employment in each airport zone was recomputed as the sum of all employment categories.

The resulting forecasts of population and employment are presented in **Tables 1** and **Table 2**. Population and employment growth between 2010 and 2019 are used to expand the 2006-2010 Census Transportation Planning Products (CTPP) Journey-to-Work (JTW) flow tables to represent (as much as is possible) travel characteristics in the base year (2019) calibration.

Between 2019 and 2045, population and employment in Miami-Dade County are expected to grow by 28.5 and 29.5 percent, respectively. The fact that these two quantities are similar suggests that the forecasts assume approximately the same level of economic health as existed in 2019 but at a level of activity approximately 30 percent higher than today.

Forecasts for the region, including Broward and Palm Beach/Martin Counties, mirror the projections for Miami-Dade County but are slightly lower with growth between 2010 and 2019 of 8.8 percent for population and 20.1 percent for employment. Between 2019 and 2045, the regional population is expected to grow by 24.0 percent and regional employment is expected to grow by 26.6 percent.

TABLE 1. POPULATION BY FORECAST YEAR AND DISTRICT

District	2010	2019	% change from 2010	2045	%change from 2019
1	107,075	116,194	8.5%	142,876	23.0%
2	54,840	59,209	8.0%	74,378	25.6%
3	83,620	88,252	5.5%	108,893	23.4%
4	98,063	107,187	9.3%	133,155	24.2%
5	71,101	75,124	5.7%	86,497	15.1%
6	137,349	142,535	3.8%	165,244	15.9%
7	70,248	74,532	6.1%	89,576	20.2%
8	80,706	86,146	6.7%	104,549	21.4%
9	34,427	37,023	7.5%	46,440	25.4%
10	53,930	57,649	6.9%	78,355	35.9%
11	33,095	37,329	12.8%	44,194	18.4%
12	44,214	48,153	8.9%	57,456	19.3%
13	36,307	40,269	10.9%	59,723	48.3%
14	49,487	56,519	14.2%	76,800	35.9%
15	42,329	44,238	4.5%	50,082	13.2%
16	31,124	33,385	7.3%	41,679	24.8%
17	45,932	60,644	32.0%	88,265	45.5%
18	38,287	40,836	6.7%	50,471	23.6%
19	39,440	54,016	37.0%	112,519	108.3%
20	27,197	34,555	27.1%	68,643	98.6%
21	27,670	30,392	9.8%	47,939	57.7%
22	27,271	28,830	5.7%	36,518	26.7%
23	139,900	148,491	6.1%	181,063	21.9%

(Continued)

Note: Growth between 2010 and 2019 was used to scale the 2006-2010 ACS to represent calibration conditions. Growth between 2019 and 2045 is used to represent growth between the calibration year and the forecast year.
Source: Estimates of population and employment for 2015 and 2045 were obtained from SERPM Version 8 adopted forecasts. Estimates for 2010 were obtained from SERPM Version 7 adopted forecasts.

TABLE 1. POPULATION BY FORECAST YEAR AND DISTRICT (Continued)

District	2010	2019	% change from 2010	2045	%change from 2019
24	114,596	122,420	6.8%	149,706	22.3%
25	130,531	137,088	5.0%	157,881	15.2%
26	86,926	91,756	5.6%	106,008	15.5%
27	116,392	122,654	5.4%	138,446	12.9%
28	72,387	75,418	4.2%	89,093	18.1%
29	46,741	53,476	14.4%	79,660	49.0%
30	36,267	39,914	10.1%	51,870	30.0%
31	20,379	21,831	7.1%	28,384	30.0%
32	45,942	48,679	6.0%	60,741	24.8%
33	78,617	86,624	10.2%	101,893	17.6%
34	67,143	72,526	8.0%	84,234	16.1%
35	35,993	38,173	6.1%	46,395	21.5%
36	24,917	26,649	7.0%	35,520	33.3%
37	49,854	56,195	12.7%	72,902	29.7%
38	42,730	47,993	12.3%	66,468	38.5%
39	63,778	77,843	22.1%	115,855	48.8%
40	42,596	49,919	17.2%	84,538	69.4%
41	43,943	54,446	23.9%	88,324	62.2%
42	22,597	25,675	13.6%	31,263	21.8%
Miami-Dade	**2,515,941**	**2,750,787**	**9.3%**	**3,534,496**	**28.5%**
Broward County	**1,748,060**	**1,878,249**	**7.4%**	**2,213,999**	**17.9%**
Palm Beach/Martin Co.	**1,327,163**	**1,451,577**	**9.4%**	**1,790,233**	**23.3%**
Total	**5,591,164**	**6,080,613**	**8.8%**	**7,538,728**	**24.0%**

Note: Growth between 2010 and 2019 was used to scale the 2006-2010 ACS to represent calibration conditions. Growth between 2019 and 2045 is used to represent growth between the calibration year and the forecast year.
Source: Estimates of population and employment for 2015 and 2045 were obtained from SERPM Version 8 adopted forecasts. Estimates for 2010 were obtained from SERPM Version 7 adopted forecasts.

TABLE 2. EMPLOYMENT BY FORECAST YEAR AND DISTRICT

District	2010	2019	% change from 2010	2045	%change from 2019
1	44,969	57,113	27.0%	71,910	25.9%
2	16,512	18,808	13.9%	25,173	33.8%
3	13,617	18,043	32.5%	25,683	42.3%
4	32,089	46,556	45.1%	86,533	85.9%
5	24,907	30,120	20.9%	37,417	24.2%
6	45,111	56,958	26.3%	69,895	22.7%
7	18,329	25,694	40.2%	32,812	27.7%
8	23,011	27,048	17.5%	37,158	37.4%
9	18,379	23,560	28.2%	31,832	35.1%
10	19,582	18,895	-3.5%	23,259	23.1%
11	8,856	10,387	17.3%	13,408	29.1%
12	25,108	29,080	15.8%	32,380	11.3%
13	15,326	19,603	27.9%	22,004	12.2%
14	20,959	26,879	28.2%	35,497	32.1%
15	11,803	13,924	18.0%	17,256	23.9%
16	71,505	90,002	25.9%	101,148	12.4%
17	104,300	149,363	43.2%	191,968	28.5%
18	36,141	43,567	20.5%	49,282	13.1%
19	66,187	94,463	42.7%	109,791	16.2%
20	13,638	18,331	34.4%	24,154	31.8%
21	28,515	38,669	35.6%	70,023	81.1%
22	15,584	15,997	2.7%	20,524	28.3%
23	39,845	42,240	6.0%	54,991	30.2%

(Continued)

Note: Growth between 2010 and 2019 was used to scale the 2006-2010 ACS to represent calibration conditions. Growth between 2019 and 2045 is used to represent growth between the calibration year and the forecast year.
Source: Estimates of population and employment for 2015 and 2045 were obtained from SERPM Version 8 adopted forecasts. Estimates for 2010 were obtained from SERPM Version 7 adopted forecasts.

TABLE 2. EMPLOYMENT BY FORECAST YEAR AND DISTRICT (Continued)

District	2010	2019	% change from 2010	2045	%change from 2019
24	68,717	89,840	30.7%	112,034	24.7%
25	36,462	44,141	21.1%	54,347	23.1%
26	17,835	21,622	21.2%	30,705	42.0%
27	17,747	16,023	-9.7%	21,461	33.9%
28	29,190	37,161	27.3%	50,002	34.6%
29	53,044	66,615	25.6%	85,993	29.1%
30	21,835	27,266	24.9%	34,777	27.5%
31	11,085	12,344	11.4%	15,694	27.1%
32	23,575	36,478	54.7%	40,383	10.7%
33	27,834	33,485	20.3%	43,306	29.3%
34	13,753	16,822	22.3%	21,593	28.4%
35	6,855	7,420	8.2%	10,589	42.7%
36	12,866	13,885	7.9%	15,903	14.5%
37	11,408	12,700	11.3%	17,323	36.4%
38	13,961	17,398	24.6%	25,052	44.0%
39	8,585	10,923	27.2%	18,410	68.5%
40	11,062	13,583	22.8%	21,979	61.8%
41	14,713	13,933	-5.3%	20,329	45.9%
42	10,268	10,690	4.1%	11,754	10.0%
Miami-Dade	**1,125,068**	**1,417,629**	**26.0%**	**1,835,732**	**29.5%**
Broward County	**871,451**	**997,607**	**14.5%**	**1,240,086**	**24.3%**
Palm Beach/Martin Co.	**638,068**	**748,736**	**17.3%**	**931,149**	**24.4%**
Total	**2,634,587**	**3,163,972**	**20.1%**	**4,006,967**	**26.6%**

Note: Growth between 2010 and 2019 was used to scale the 2006-2010 ACS to represent calibration conditions. Growth between 2019 and 2045 is used to represent growth between the calibration year and the forecast year.
Source: Estimates of population and employment for 2015 and 2045 were obtained from SERPM Version 8 adopted forecasts. Estimates for 2010 were obtained from SERPM Version 7 adopted forecasts.

2.3 HIGHWAY TRAVEL TIME INPUTS

TAZ-to-TAZ Highway travel distance and time estimates (skims) were developed using the SERPM 8 2015 and 2045 demographic forecasts. Year 2019 estimates were prepared by interpolating 2015 and 2045 projections. SERPM Version 7.071 was used to prepare travel time estimates after SERPM 8 travel time estimates were determined to be faster than expected[1]. Time and distance skims are based on AM Peak Drive-Alone Toll paths. Travel times represent a combination of time and cost (i.e., Generalized Cost) using a value of time equal to $13.33 per hour.

During the development of the STOPS model for Miami-Dade County, highway travel times into Miami International Airport were found to overload the ramps connecting the highway system to the airport terminal. To prevent this congestion from causing an unrealistic increase in transit trips, travel time delays on these ramps were capped at 10 minutes.

2.4 CENSUS INPUTS

Census inputs to the Miami STOPS implementation include the following:

- Census block boundary file (obtained from FTA) used to define the density of census blocks throughout the modeling region. Block density is a measure of the complexity of the street system and is used in STOPS to assess the walkability of each TAZ.
- American Community Survey (Parts I, II, and III, obtained from FTA) was used to provide information on TAZ-level travel patterns in the 2006-2010 timeframe, the most recent available from FTA.

[1] SERPM 7.071 highway time estimates were used in this study, as the study team found that SERPM8 travel times between certain TAZs were unreasonable

3.0 TRANSIT INPUTS (STATIC)

Static transit inputs are various descriptions of the transit system that are part of the development of the STOPS application for Miami-Dade County and, generally, do not vary from alternative to alternative. As such, these files will not be regularly adjusted except when changes are required to the STOPS implementation related to changing estimates of existing (counted) ridership, required modifications to calibration parameters, or other system-level changes to the modeling framework.

The following static transit inputs are employed in the Miami-Dade STOPS Model:

- Transit route and stop counts representing April 2019
- Transit fare structure

3.1 TRANSIT ROUTE AND STOP COUNTS

Route and station-level count data for April 2019 were obtained from each operator as shown in Table 3. Stop-level ridership data for Miami-Dade Department of Transportation and Public Works (DTPW) bus routes were obtained from Automated Passenger Count (APC) equipment which is subject to measurement error. APC data were reconciled to reported route-level ridership to prepare a consistent set of route and stop-counts.

Stop-level counts were not available for some municipal shuttle/trolley routes or for DTPW contract services. In these cases, route-level ridership was allocated to the stop level to provide a reasonable distribution of ridership by area. Stops serving Metrorail stations were assigned a higher level of ridership than non-Metrorail stops to reflect usage of many of these shuttles as a last-mile connection to the rail system.

The following generalized percent allocation methodology was applied for estimating the stop-level ridership of the contracted and municipal shuttle/trolley routes. These percentages/ relationships were developed using stop level data from DTPW operated routes.

- For bus routes that start/end at Metrorail station, 20% to 25% of the route ridership was allocated to that stop.
- For bus routes with an intermediate Metrorail station,10 to 15% of the route ridership was allocated to that stop.
- For bus routes with bus stops serving shopping malls/significant landmarks, 10% of the route ridership was allocated to those stops.

For the rest of the bus stops, the stop-level ridership was developed using weighted Micro Analysis zone (MAZ)-level population and employment data within a 0.25-mile buffer.

TABLE 3 APRIL 2019 WEEKDAY COUNTED RIDERS BY OPERATOR AND SERVICE TYPE

Operator-Service Type	FY2019 NTD	Reported Route Ridership (DTPW Monthly Reports and Other Sources)[1]	Reported Station/Stop Ridership (APC/Other Sources)[2]	Reconciled Count[3]	Notes
Metrorail	63,440	63,000	63,028	63,028	
Metromover	28,535	30,400	28,284	30,454	
Tri-Rail-Rail	14,765	15,619[(4)]	15,619[(4)]	14,769	Use NTD[5] since average weekday not available
Metrobus	160,647	164,400	180,996	164,856	
Municipal Shuttle/Trolley		38,765	*	38,653	
BCT Bus	86,073	87,919	*	87,919	
Palm Tran Bus	30,567	31,195	*	31,195	
Tri-Rail Bus	3,139	3,276	*	3,276	
Total				**434,150**	

Note:

[1] DTPW Monthly Reports used for Metrorail/Metromover/Metrobus

[2] From APC counts for Metrobus routes and reported ridership by the station for Metrorail.

[3] Reconciled counts may not exactly equal reported route or NTD ridership due to rounding of the route- and stop-level data.

[4]Estimated from monthly reports of weekday ridership

[5]National Transit Database

3.2 FARE STRUCTURE FILE

The STOPS fare structure file is intended to represent major aspects of a region's fare policy. In STOPS, fares should be coded to represent fares available to all travelers (i.e., not representing discounts for selected population groups) and be consistently applied to all services to show how fares might cause travelers to select one transit service over another. Fares are usually expressed as full one-way fares and are converted to time (in minutes) and discounted using a coded value-of-time. In some cases, monthly pass fares are used if they are more representative of fares typically paid by travelers. Since fare policies are often highly complex with many special cases which cannot be represented in STOPS, the focus is on representing the overall characteristics of the fare system that affect transit choice rather than all the myriad details.

The fare structure coded for the Miami STOPS implementation is based on actual fares adopted in September 2021[2] is as follows:

- Boarding Fare
  - DTPW/MDT Route_Type=1 (Metromover/MIA People Mover[3]): Free
  - DTPW/MDT Route_IDs 20864, 20910, and 20911 (Express Bus Route 95, 301, and 302): $2.65
  - DTPW/MDT (Not defined above): $2.25
  - Municipal shuttle routes: Free
  - Tri-Rail (fixed portion of fare): $2.50
  - BCT: $2.00
  - Palm Tran: $2.00
- Tri-Rail and Brightline Aventura Commuter Zone Charge (in addition to boarding charge)
  - Internal to 1 fare zone: no additional charge
  - 2 or more fare zones: $0.25[4]
- Transfers (coded as savings from the boarding fare of the "transfer-to" transit service)
  - Metrobus, Metrorail, DTPW BRT: $2.25 savings (i.e., free transfer)
  - BCT or Tri-Rail to all DTPW/MDT bus/BRT (or reverse): $1.65 savings

[2] Per FTA requirements for consistent fare policy among alternatives, STOPS only accepts one fare policy. Given the modest changes between 2019 and 2021 fares, 2021 fares have been used for all years.
[3] See chapter 4 for a discussion about the change of route_type for Metromover and MIA people mover from type 0 in the original GTFS file to type 1 in the GTFS files used in STOPS.
[4] Tri-Rail offers a monthly pass for $110 that can be used for any station-pair. Assuming 40 trips per month, this means that any trip can be made by regular commuters for $2.75, $0.25 more than the minimum cash fare. Zone charges for one-way tickets are significantly higher but when used in STOPS these fares results in too few riders for longer Tri-Rail station-pairs. Even with the monthly pass zone fares, STOPS predicts fewer Tri-Rail riders (before count-based adjustment) than counted ridership.

  - BCT or Tri-Rail to all Metrorail (or reverse): $1.05 savings
  - BCT to Tri-Rail (or reverse): $1.50 savings
  - BCT to BCT: $1.50 savings
  - Municipal shuttle to any other service: no discount off the boarding fare
- Value-of-Time (VOT): $8/hour (equivalent to 7.5 minutes of impedance for each dollar of fare). This value was calibrated to balance the use of free and paid services in Miami and is consistent with FTA's experience that a value of time between $6 to $8 per hour properly represents ridership on free and paid bus routes, nationwide.

4.0 TRANSIT SERVICE CODING

This chapter presents a description of the input data used to represent transit services in the Miami-Dade region. This information was used to adapt information on existing transit services for use in STOPS and should also be followed when coding new transit service scenarios (i.e., coding upcoming transit projects).

4.1 GTFS SCHEDULE FILES

Schedules for the following transit services in General Transit Feed Specification (GTFS) format files were assembled for this project:

- Miami-Dade DTPW including selected municipal shuttle routes valid for the modeling day selected for this STOPS application (4/17/2019).
- Miami-Dade municipal shuttle services derived from the DTPW GTFS with added shuttles not included in the DTPW files (4/17/2019)
- Tri-Rail including Tri-Rail feeder bus routes (4/17/2019)
- Broward County Transit (4/24/2019)
- Palm Tran (4/17/2019)

Each GTFS file required modification to be ready for use in STOPS to represent existing conditions. If users wish to update the existing GTFS files with more current GTFS files or wish to code future year alternatives, similar modifications and coding practices are required. Adjustments are described in the following sections.

Miami-Dade DTPW/Transit (MDT) GTFS

Modified Municipal Shuttle/Trolley Routes

The publicly available DTPW/MDT GTFS files include schedule information for many, but not all, of the County's municipal shuttle/trolley operators. These have been extracted from the DTPW/MDT GTFS files and copied to a separate municipal operators GTFS so that the fare policy for shuttles and trolley routes can be efficiently coded in STOPS.

Recode Metromover and MIA People Mover Route Type

In the GTFS files obtained from Miami-Dade DTPW, the Metromover Inner Loop (MMI), Metromover Outer Loop (MMO), and the Miami International Airport (MIA) People Mover are

coded with a route_type equal to 0[5]. The GTFS standards have no route_type associated with automated guideway transit, so associating the people movers with a light rail transit route_type helps to distinguish these services from Metrorail (route_type=2[6]) or Tri-Rail (route_type=2[7]). This approach is quite reasonable in the context of using GTFS to help generate routing recommendations for travelers; the original purpose for GTFS.

In STOPS, however, route_type 0 is used to designate "partial fixed guideway facilities". This designation helps STOPS to understand that many of the non-timetable related attributes of fixed guideway systems may not fully apply to streetcar systems and other similar fixed guideway systems with less elaborate stations and without full protection of its right-of-way. Other partial fixed guideway systems can include BRT lines.

Since the Metromover and MIA People Mover systems have full grade-separation and elaborate station facilities, the route_type for these routes was reset to "1" for application in STOPS so that these services can be treated in the demand models in the same manner as travel made on the Metrorail and Tri-Rail systems.

Recode Existing Busway Route Type

Per FTA direction for modeling the South Corridor Transitway, existing South Corridor Busway Routes (31, 34, 38, and 39) are recoded from route_type 3 (bus) to route_type 0 (partial fixed guideway). In addition to improving the representation of future BRT services, this change significantly improved the ability of STOPS to represent Metrorail usage at the southern end of the line. With this change, busway-to-rail trips are represented as a mixed partial/full fixed guideway trip which better represents the observed ridership in this portion of Miami-Dade County.

Separate Fixed Guideway Stations from Bus Stops

In two locations, buses in the DTPW/MDT GTFS files were observed using the same stops as used for fixed guideway services. This coding does not appear to affect GTFS usability for directions but could cause difficulties with STOPS applications since transfer impedances could be understated and ridership reports would combine bus and rail boarding activity at a station into a single number. The following situations were updated:

- Stop_id 10493 ("Airport Station") is located at the Miami Intermodal Center (MIC) and was coded as a stop for buses and the MIA People Mover serving the MIC. A new MIA People

[5] Route_type 0 is defined as "Tram, Streetcar, Light rail. Any light rail or street level system within a metropolitan area"
[6] Normally, route_type 1 is used for "Subway, Metro, or Any underground rail system within a metropolitan area." However, using route_type 2 for metropolitan rail systems is a common alternative coding practice particularly for metro systems that are predominantly elevated rather than underground.
[7] Route_type 2 is defined as "Rail". This code is frequently used for intercity or long-distance rail modes but as noted above is sometimes applied to urban rail systems.

Mover Station (stop_id 54) was coded and all People Mover stop_times were recoded to use this newly-defined stop.

- Route 20824 (9-Aventura-Downtown via NE 6 & 2 Avenue) was coded as stopping at the Metromover station at Freedom Tower (stop_id 826). A new stop (stop_id 10826) was coded at the same general location and all bus trips formerly coded at the Metromover station are revised so that they use the adjacent bus stop.

Add PNR file

As in all STOPS applications, a park-and-ride file named "pnr.txt" must be added to all GTFS files where parking facilities are available. This file follows the standard STOPS file structure. Key coding elements are as follows:

1. Latitude and longitude are coded to represent the average locations of parked vehicles using the facility. In most cases, this translates to the approximate center of the facility. In large facilities with low usage, the center of the utilized area may be used.
2. End-of-line and next-to-end Metrorail stations with large PNR facilities (Palmetto, Okeechobee, Dadeland South, and Dadeland North) are coded as PNRType=1. Intermediate stations and bus park-and-ride lots with 500 or more parking spaces are coded as PNRType=2. Intermediate stations and bus PNR lots with 100 to 499 spaces are coded as PNRType 3 and intermediate stations and bus PNR lots with fewer than 100 spaces are coded as PNRType=4.
3. Bus PNR lots are free and do not have a parking charge coded in PNRCost.
4. Metrorail parking lots are coded with a minimum PNRCost (generalized cost, in minutes) of 2.50 minutes to account for the fact that these facilities cost $11.25 per month (cost of monthly rail pass with parking less the cost of a monthly pass alone). Assuming 40 trips per month, this translates to $0.28 per trip or 2.2 minutes per trip. This amount was rounded up to 2.5 minutes per trip to allow for modest numbers of parkers paying a daily fee.
5. In cases where parking facilities are at or near capacity (over 90 percent occupied), higher PNRCost values (i.e., shadow prices) may be coded to balance supply and demand. In the existing model, shadow prices were employed at Dadeland South station where the total PNRCost was set to 4.5 minutes (an additional 2 minutes over the PNRCost required for representing the parking charge). Existing busway park-and-ride lots at SW 152 Street, SW 168th Street, and SW 112 Avenue also have parking demand that exceeds capacity and the PNRCost for these facilities are set to 2.0, 3.0, and 2.0 minutes, respectively.

Add Transfer file

The transfer between Government Center Metrorail and Metromover station was represented with a 30-second transfer link to account for the fact that travelers transferring between these two modes at Government Center can do so without traveling to and from street level.

Municipal Shuttle/Trolley GTFS

A special Municipal Shuttle/Trolley GTFS file set was prepared using the municipal services removed from the official DTPW/MDT GTFS files as described in the previous section. This starting point included most, but not all municipal trolleys in operation in Miami-Dade County. To this, schedules for the following municipal trolley routes were added:

- City of Miami Trolley:
  - Liberty City
  - Coconut Grove
  - Little Haiti
  - Little Havana
  - Flagami
  - Wynwood
- City of Doral Trolley (Route 4 FIU)
- City of Aventura
  - Blue Express
  - Green Express
  - Red Express
  - Silver Express
  - Purple Express
  - Yellow Express
- Town of Miami Lakes (Moover)

Since the pnr.txt file contained in DTPW/MDT GTFS files describes all the known PNR lots in Miami-Dade County, no PNR.txt file is included in this GTFS.

BCT GTFS

The Broward County Transit GTFS file is used without any modifications to the standard GTFS files. A PNR file (pnr.txt) was added to represent BCT PNR lots. Lots are coded with latitudes and longitudes representing the middle of the PNR facility. All lots are coded with PNRType=3 except Hollywood Hills which is coded as PNRTYPE=4 due to its small size and its use of spaces shared with a small retail shopping center. No lots are coded with any PNRCost value.

Palm Tran GTFS

The Palm Tran GTFS file is used without any modifications to the standard GTFS files. A PNR file (pnr.txt) was added to represent Palm Tran lots. Lots are coded with latitudes and longitudes representing the middle of the PNR facility. All lots with 100 or more spaces are coded with PNRType=3. No lots have a coded PNRCost except Palms West Hospital where the small PNR lot may be difficult to find for some customers.

Tri-Rail GTFS

The Tri-Rail GTFS was modified to separate all stations and bus stops where the rail station and Tri-Rail feeder bus stop share the same stop_id. This was done by creating a separate bus stop_id consisting of the original numeric station stop_id with an appended “bus”. The following new bus stop_ids (and stop names) were defined:

- 2bus (West Palm Station bus stop)
- 3bus (Lake Worth Station bus stop)
- 6bus (Boca Raton Station bus stop)
- 7bus (Deerfield Beach Station bus stop)
- 8bus (Pompano Beach Station bus stop)
- 9bus (Cypress Creek Station bus stop)
- 10bus (Ft Lauderdale Station bus atop)
- 11bus (Ft Laud. Airport Station bus stop)
- 12bus (Sheridan St Station bus stop)

Tri-Rail park-and-ride facilities are coded in a supplemental GTFS file named “pnr.txt” following STOPS protocols. The end-of-line station at Mangonia Park is coded as PNRType=1. Other very large facilities (roughly 500 or more spaces) are coded as PNRType=2. Facilities with between

100 and 500 spaces are coded as PNRType=3 and smaller facilities are coded as PNRType=4. These facilities are free and no PNRCost is coded.

4.2 STATION FILE

The STOPS station file is used to represent all fixed guideway stations and all bus stops in the modeling region. Data coding for key fields in the modeling system are as follows:

- Latitude, Longitude and station (name) should be similar to the corresponding information in the GTFS files. Latitude and Longitude are only used for displaying station/stops on maps which might be helpful in setting the stop group variable and accordingly should be close to the GTFS specification (i.e., within 50 feet). The station name is used in STOPS reporting and can be changed to clarify the displayed name.
- STAT_GRP (Station or Stop calibration group):
    - Existing fixed guideway stations are coded in groups of 3 or 4 stations, separate from bus services. All fixed guideway stations must be coded with a STAT_GRP between 1 and 30.
    - New fixed guideway stations should be coded with a number generally consistent with existing stations. (Since new stations have no ridership counts, the group number only plays a minor role in reporting).
    - DTPW/MDT Bus stops are coded with the district number plus 30.
    - Tri-Rail bus stops are coded with group number 131
    - BCT bus stops are coded with group number 132
    - Palm Tran bus stops are coded with group number 133
- NEWSTATION. This variable is set to one for project stations and is set to zero for non-project stations. In the distributed application, NEWSTATION is set to “1” for the East-West BRT project stations to allow the proper computation of project trips for this corridor. As this model is applied in other corridors, users will need to add new project stations and set the NEWSTATION variable to one to properly compute project trips for those applications.
- DAILYBOARD (ridership). Daily boarding ridership is developed from reported ridership and APC counts (DTPW/MDT bus only). This value will not be adjusted unless new count data is being used to update the application. All new stations should have a dailyboard value set to zero. Note that for existing stops without stop-level ridership data (i.e., BCT, Palm Tran, and Tri-Rail bus), ridership is coded so that the total group ridership is correct without consideration of ridership at individual stations or stops. Since individual station or

stop volumes are not relevant to the calibration, this simplification has no effect on the model outcomes.

- STOPID_1 contains the GTFS stop_id for the station or bus stop. This data must include the suffixes specified in the parameter file for each GTFS file:
    - MDT: <no suffix>[8]
    - Tri-Rail: "&T"
    - BCT: "&B"
    - Palm Tran: "&P"
- STOPID_2 contains the GTFS stop_id for municipal shuttles. This field is populated for all MDT stops with a copy of the contents of STOP_ID1 with an appended "&m". This coding allows users to add municipal shuttle services to any stop in the existing MDT GTFS files. For stops served by other operators, this field is left blank.
- STOPSTYPE
    - Fixed Guideway Services (except Metrorail Government Center): 3 (i.e., one level grade separation and/or overhead crossing between directions)
    - Metrorail Government Center Station: 5 (i.e., two levels of grade separation to the street).
    - Other: 0
- Time Penalties
    - 99 minutes for Metrorail and Metrobus PNR usage at Tri-Rail PNR lots at the Miami Intermodal Center and Tri-Rail/Metrorail Transfer Station.
    - 0.5 minutes for Metrorail for all time penalties to match ridership before count adjustment and to reflect additional internal circulation and fare collection time. Metromover does not have this time penalty since there is no fare collection (all stations are elevated so the STOPSType setting, described above) accounts for vertical circulation time.
    - 2-minute walk and KNR penalty at the Metrorail Tri-Rail Transfer Station to match observed transfer patterns and reflect the fact that access to the street requires walking through the Tri-Rail Station
    - 3-minute penalty for Tri-Rail walk, KNR, PNR, and transfers at all stations except MIA and Tri-Rail Transfer where this penalty was set to 0.0 minutes both to match

[8] Note that municipal shuttle stop_ids are coded in STOPID_2.

transfer activity at these stations and to reflect the fact that transfers at these locations are within a facility and therefore occur with less impedance to travelers.

- No time penalties coded for bus or BRT stops for any access or transfer mode.

5.0 CALIBRATION

The Miami-Dade County 2019 STOPS interim model is based on the synthetic version of STOPS Version 2.51 (pre-release dated 6/10/2021). This version of STOPS used travel information from the 2006-2010 Census Transportation Planning Products (CTPP, the most recent version available from FTA) to develop a preliminary representation of transit travel in the region. Ridership counts are used to refine these estimates of transit ridership to represent travel in the base year of 2019.

The calibration process involves iteratively running STOPS and testing various model parameters so that the model generates ridership estimates that are as close as possible to the counted estimates of ridership before the count-based adjustment is applied. This strategy means that the count-based adjustment is just a "fine-tuning" adjustment rather than a step that could warp the meaning of the underlying model. This iterative approach is intended to represent local preferences regarding willingness to transfer, usage of park-and-ride lots, and the relative attractiveness of different transit sub-modes.

For the most part, the 2019 interim model calibrated well without resorting to unusual adjustments to default STOPS parameters. The fit of the model is discussed in Chapter 6, Validation.

This chapter presents all non-default STOPS parameters and the rationale for their adjustment.

5.1 ESTIMATED LINKED TRANSIT TRIPS

The ratio of unlinked to linked trips is estimated as 1.65 trips which is higher than the STOPS default of 1.4. This value was established by trial-and-error to obtain realistic bus-to-Metrorail and Metrorail-to-Metromover transfers[9] while using a transfer boarding penalty that conforms to typical STOPS implementations in other cities.

5.2 TRANSFER (BOARDING) PENALTY

By default, STOPS assigns a penalty of 5 minutes each time a passenger boards a transit vehicle. In this application, this penalty is set to 0.60 (equivalent to 3.0 minutes) of this value so that it, in conjunction with the linked transit trip factor, generates linked and unlinked trip estimates requiring little model-wide adjustment to match regional trip-making totals. Other areas in the United States have calibrated values for this parameter between 0.5 and 1.0 with 0.5 being more common in areas with a high-quality transit survey used with the incremental version of STOPS (generally,

[9] Transfer ratios from a 2009 Metrorail survey were used to support this judgement but true transfer rates will be known with greater certainty when the 2021-2022 transit survey is completed.

the most reliable STOPS implementations). This means that the boarding penalty for Miami is within the range of expected outcomes.

5.3 FIXED GUIDEWAY SETTING

In STOPS, the Fixed Guideway Settings are used to define the degree to which full fixed guideway routes (route_types not equal to 0 or 3) and partial fixed guideway routes (route_type=0) are treated in comparison to the bus. These values are typically in the range from 0 to 1.0 with 1.0 equivalent to a rail line such as Metrorail or Metromover and 0 being equivalent to a bus-like fixed guideway. In this application, the full fixed guideway setting is set to 1.2. This value is higher than the default but is the same as that used in the 2015 version of the Miami STOPS model. This value is needed to match modeled Metrorail and Metromover demand before count-based adjustment and may reflect the fact that buses in the Miami system are more likely to be affected by congestion and may therefore be less able to be on time than buses in the other metropolitan areas used to calibrate STOPS.

The partial fixed guideway setting is currently coded as 0.2 (a value often accepted by FTA for BRT systems). The exact setting to use for partial fixed guideway facilities will vary from project to project and should be discussed with FTA before a final decision is made on the most appropriate setting to use.

5.4 CALIBRATION SETTINGS (MAIN PARAMETER SCREEN)

Calibration settings are set as follows:

- Walk weight equals 1.0 (default).
- KNR Transit equals 0.5 (to match ridership patterns from a 2009 Metrorail survey). Note that this is a common value but will need to be confirmed with the upcoming survey and model calibration.
- PNR transit equals 1.0 (default).
- PNR bus equals 1.20 (This setting increases the penalty on park-and-ride to the bus, decreasing utilization to match counted park and ride vehicles at bus lots).
- Auto Time Factor equals 1.11. This value was derived for the 2015 version of the model based on a comparison of highway skim times and expected travel times for equivalent trips obtained from on-line mapping and routing web sites. Since this information is not readily available during the pandemic, the older values are used in this implementation.

5.5 PNR SETTINGS (PNR SETTINGS TAB)

Version 2.51 introduces a new array of PNR settings that are designed to represent the particular regional markets most suitable for park-and-ride transit trips. Most quantities match the current 2.51 defaults with the following exceptions:

- PNR density-related constants were increased for high-density areas (such as the Miami CBD) up to 0.25 model utility units (sometimes called as “utiles”).
- The limit on the sum of all PNR constants as compared to auto constants defaults in STOPS 2.51 to 0.0 (i.e., the constants are equal). In this implementation, it set to 1.0 (the maximum amount allowed in Version 2.51) meaning that PNR can be preferred over driving by up to 1.0 utility units (utiles). This amount is equivalent to $4.44 and is justified by the fact that parking prices for the drive mode are not included in STOPS due to a lack of reliable information for this important determinant of modal choice. This limit helps to account for at least some portion of the effect that parking cost can have on deciding to park-and-ride rather than driving all the way to the trip destination.
- Backtracking settings were reset to 0.7 (the lowest value allowed in the User Interface). This change accounts for the fact that many trips in the Miami grid must first travel north/south or east/west to reach a PNR lot before then progressing to the destination. Such behavior would be prevented by the backtracking analysis if the backtracking penalties were not reduced by 30 percent.

5.6 ADDITIONAL SETTINGS (CALIBRATION SETTINGS TAB)

Version 2.51 introduced an additional settings tab to control the calibration of STOPS. For this implementation, most settings use the Version 2.51 defaults. Non-default values include:

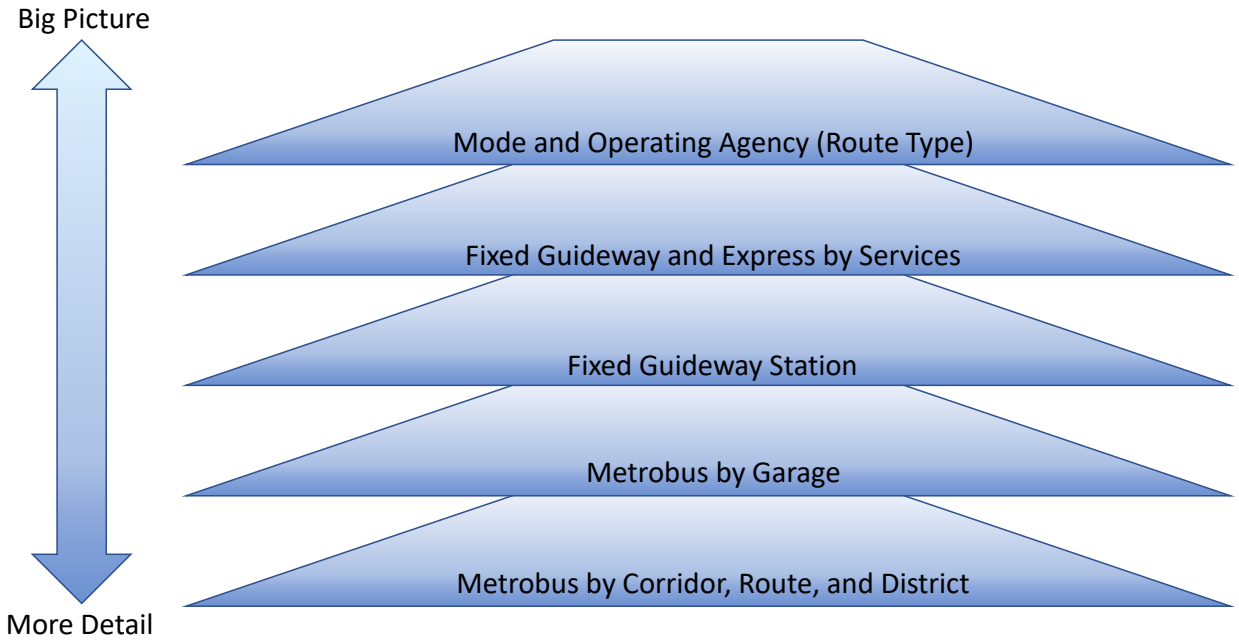
- The count factor limit indicates the maximum adjustment that will be made to the zone-to-zone trip making to match count targets. The Version 2.51 default for this value is 1.5 but is set to the maximum value of 5.0 in the Miami application. This value is the same as the value of this parameter in Version 2.50 of STOPS and was selected to allow STOPS to adjust ridership derived from the CTPP in the same way as older versions of STOPS.

6.0 VALIDATION

This chapter presents comparisons of counted and modeled ridership for different transit services characterized by sub-mode (i.e., fixed guideway and bus services), route, and geographic area. In most cases, ridership is presented for model results before and after count-based adjustment to demonstrate that the model has a strong representation of different transit markets even before the count-based adjustment is used to more closely match ridership on specific services.

The validation process is layered so that the initial tests represent large-scale tests to determine the ability of the model to estimate ridership for each agency and each mode of travel followed by more detailed tests of ridership by fixed guideway station, bus garage, and ultimately SMART corridor routes and districts. Early parts of the validation process are used to confirm model-wide parameters such as transfer rates and preferences for using fixed guideway transit. The later parts of the validation process are used to adjust model details such as station penalties and park-and-ride time adjustments. This process is illustrated in **Figure 5**.

FIGURE 5 OVERVIEW OF VALIDATION PROCESS



6.1 OVERVIEW OF RIDERSHIP RESULTS

Table 4 presents a comparison of counted Year 2019 weekday ridership to modeled ridership for different transit sub-modes and transit operating agencies. As this table shows, most services are well represented before count-based adjustment is used to achieve the final ridership results. The largest error between counted and modeled ridership (before adjustment) occurs for the Metrobus system (20,500 riders representing a 12 percent overprediction). Given the fact that most bus transit systems in the country lost ridership between the time of the ACS and 2019, this experience may be explained by changes in transit choices that have occurred since the input data were gathered. A new on-board survey data could improve the accuracy for the before and after count-based adjustment.

Another significant difference (before count-based adjustment) concerns Tri-Rail. Initial ridership for this system is underestimated by 38 percent. As shown later in this section, the largest differences are from two markets—travel to Miami International Airport and very long trips (trips from Boca Raton and north—which are known to be underrepresented by the ACS Journey-to-Work tables. In all cases, the count-based adjustment process appears to work as intended to bolster ridership in places where the data undercounts ridership.

Finally, Metromover ridership is underestimated by 28 percent before count-based adjustment. This discrepancy is expected since the ACS dataset represents journey-to-work trips and STOPS must infer non-work trip making using national defaults. The Metromover system serves areas in and near downtown Miami and it is likely that mid-day and evening social-recreational trip-making by residents and non-resident travelers comprise the majority of the underprediction. When an on-board survey data becomes available in the future, this discrepancy will probably be resolved. In the meantime, count-based adjustments are successful in correcting ridership to properly represent this mode.

TABLE 4 COMPARISON OF COUNTED RIDERSHIP BY ROUTE TYPE TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT

Route Type	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
Metrorail	63,028	63,405	61,933
Metromover	30,454	21,924	29,413
Tri-Rail	14,769	9,128	14,594
Metrobus	164,856	185,368	164,073
Municipal Shuttle	38,653	42,093	38,799
BCT Bus	87,919	97,283	87,579
Palm Tran	31,195	33,956	30,804
Tri-Rail Bus	3,276	1,487	2,511
Total	**434,150**	**454,644**	**429,706**

6.2 FIXED GUIDEWAY AND EXPRESS SERVICES

Table 5 presents a comparison of counted Year 2019 weekday ridership to modeled ridership for selected fixed guideway and express services that are most similar to the SMART Corridor projects. This table shows that services offering higher speeds and/or fixed-guideway facilities are appropriately modeled after count-based adjustment for bus-based systems (US 1 Busway and I-95 Express) and for rail or Automated Guideway Transit (AGT) systems (all other route types). As noted in the previous section, some fixed guideway services are underestimated before count-based adjustment as is ridership on the I-95 Express system.

TABLE 5 COMPARISON OF COUNTED FIXED GUIDEWAY AND EXPRESS RIDERSHIP BY ROUTE TYPE TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT

Route Type	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
Metrorail	63,028	63,405	61,933
Metromover	30,454	21,924	29,413
US 1 Busway	12,932	14,389	12,744
Tri-Rail	14,769	9,128	14,594
I-95 Express	2,912	1,678	2,581
Total	**124,095**	**110,525**	**121,265**

6.3 METRORAIL BY STATION

Table 6 presents a comparison of counted Year 2019 weekday ridership to modeled ridership for groups of adjoining Metrorail stations. Before count-based adjustment, overall modeled Metrorail ridership closely matches ridership counts. Some differences exist for specific station groups. The largest underestimates (before count-based adjustment) occur at Dadeland (North and South), South Miami to Douglas, and Government Center. Other groups are overestimated such as Coconut Grove - Vizcaya, and several station groups on the northern half of the system. All of these discrepancies appear to represent limits to the accuracy of the ACS and all are corrected by the count-based adjustment process.

TABLE 6 COMPARISON OF COUNTED METRORAIL RIDERSHIP BY STATION GROUP TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT

Station Group	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
MR-Dadeland North/South	12,596	9,635	12,087
MR-South Miami/University/Douglas	8,744	6,415	8,173
MR-Coconut Grove-Vizcaya	2,708	5,075	2,755
MR-Brickell	6,050	4,757	6,038
MR-Government Center	10,090	7,181	9,513
MR-Overton-Culmer	3,338	4,781	3,259
MR-Civic Center	5,672	5,217	5,642
MR-Santa Clara/ Allapattah/Earlington Heights	4,054	7,050	4,367
MR-Miami International Airport	1,604	1,173	1,835
MR-Brownsville/MLK/ Northside	3,188	5,294	3,264
MR-Tri Rail	1,140	1,259	1,122
MR-Hialeah-Palmetto	3,844	5,573	3,882
Total Metrorail	**63,028**	**63,409**	**61,937**

6.4 METROMOVER BY STATION

Table 7 presents a comparison of counted Year 2019 weekday ridership to modeled ridership for groups of adjoining Metromover stations. As noted above, modeled ridership is below counted ridership before count-based adjustment is applied. This outcome is most likely due to the fact that the ACS only represents journey-to-work trips and non-work trips must be inferred by STOPS.

The underprediction (before count-based adjustment) occurs throughout the Metromover system and is averages 28 percent. Interestingly, the two places where extensions to the system are contemplated (Other CBD and Adrienne Arsht-School Board) are considerably better and underestimate Metromover ridership (before count-based adjustment) by less than 10 percent.

In all cases, the count-based adjustment process works properly and the final modeled ridership closely matches counted ridership.

TABLE 7 COMPARISON OF COUNTED METROMOVER RIDERSHIP BY STATION GROUP TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT

Station Group	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
MM-Financial District	1,442	1,064	1,521
MM-Brickell	3,316	1,353	2,663
MM-Tenth St-Riverwalk	4,354	2,249	4,271
MM-Government Center	7,402	5,133	7,095
MM-Other CBD	10,482	9,438	10,644
MM-Freedom Tower-Museum Park	1,160	592	865
MM-Adrienne Arsht-School Board	2,298	2,095	2,355
Total Metromover	**30,454**	**21,924**	**29,413**

6.5 TRI-RAIL BY STATION

Table 8 presents a comparison of counted Year 2019 weekday ridership to modeled ridership for groups of adjoining Tri-Rail stations. As noted earlier, these results show that the model before count-based adjustment significantly understates ridership in the northernmost sections of this service (i.e., Boca Raton to Mangonia Park) by over 50 percent. This outcome is not surprising since these trips are much longer than typical commuter trips and some journeys may be more like intercity trips than urban trips typically handled by STOPS. Travel to Miami International and Fort Lauderdale International Airports are also underestimated because air passenger travel is not directly included in the Journey-to-Work tables from the ACS. Elsewhere ridership (before count-based adjustment) is underestimated by between 10 and 45 percent. This is an indication of either missing trips in the ACS trip tables or an underestimate of the desirability of full Fixed Guideway services such as Tri-Rail. A complete resolution of this issue must await the completion of County-wide transit surveys as FTA prefers not to set the Full Fixed Guideway (FG) setting higher than its present value of 1.2.

As in the other cases, the count-based adjustment corrects these shortfalls resulting in modeled ridership that closely matches counted ridership.

TABLE 8 COMPARISON OF COUNTED TRI-RAIL RIDERSHIP BY STATION GROUP TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT

Station Group	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
TR-Miami Airport	1,065	580	1043
TR-Hialeah Market	228	138	200
TR-Metrorail Transfer	1,010	786	921
TR-Opa-locka-Golden Glades	876	781	848
TR-Hollywood-Sheridan	1,098	639	1,054
TR-FLL Airport	880	426	836
TR-Fort Lauderdale Broward	882	943	905
TR-Cypress Creek-Deerfield Beach	2,581	1,867	2,649
TR-Boca Raton-Boynton Beach	2,996	1,486	2,996
TR-Lake Worth-Mangonia Park	3,153	1,482	3,143
Total Tri-Rail	**14,769**	**9,129**	**14,595**

6.6 METROBUS BY GARAGE

Table 9 presents a comparison of counted Year 2019 weekday ridership to modeled ridership for Metrobus routes categorized by the garage servicing those routes. As noted previously, modeled Metrobus ridership before count-based adjustment is somewhat higher than actual ridership. This phenomenon could be a result of changes to the transit market that have occurred since the ACS data were collected. The upcoming transit passenger survey program should provide a more up-to-date foundation for STOPS to forecast transit ridership.

The overprediction of bus ridership by STOPS before the count-based adjustment occurs for routes assigned to the Northeast Garage and other routes (i.e., those assigned to multiple garages). Routes serving the Central and Coral Way Garages are slightly under-estimated before the count-based adjustment process.

In all cases, the count-based adjustment process corrects the modeled estimates of ridership for routes serviced by each garage.

TABLE 9 COMPARISON OF COUNTED BUS RIDERSHIP BY GARAGE TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT

Garage	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
Central Garage	58,904	56,802	58,288
Northeast Garage	51,759	72,063	52,905
Coral Way Garage	45,673	42,859	45,102
Other MDT Routes	10,891	16,200	9,978
Total	**167,227**	**187,923**	**166,273**

6.7 METROBUS BY SMART CORRIDOR AND ROUTE

Tables 10 through **Table 15** present comparisons of counted Year 2019 weekday ridership to modeled ridership for Metrobus routes categorized by SMART Plan Corridor. In this series of results, the East-West and Flagler Corridors are grouped together since these two corridors are close to one another and are served by the same set of Metrobus routes.

As this analysis shows, ridership before count-based adjustment varies from the counted volumes with one corridor (East-West and Flagler) having modeled ridership before count-based adjustment that is lower than the counts by 31 percent and another corridor (North Corridor) where modeled ridership before count-based adjustment is higher than the count by 39 percent. Modeled ridership for other corridor match counts more closely (i.e., within the -31 to +39 percent range).

After count-based adjustment, bus ridership in all corridors is properly represented.

TABLE 10 COMPARISON OF COUNTED BUS RIDERSHIP BY ROUTE TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT – BEACH CORRIDOR

Route	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
MetroBus Route 0103	432	89	312
MetroBus Route 0110	2,506	4,769	2,491
MetroBus Route 0113	761	1,815	770
MetroBus Route 0119	8,750	4,583	8,452
MetroBus Route 0120	6,082	5,826	6,079
MetroBus Route 0150	1,843	1,760	1,696
Total	**20,374**	**18,841**	**19,800**

TABLE 11 COMPARISON OF COUNTED BUS RIDERSHIP BY ROUTE TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT – EAST-WEST AND FLAGLER CORRIDORS

Route	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
MetroBus Route 0007	3,175	3,501	3,149
MetroBus Route 0011	7,314	2,779	7,060
MetroBus Route 0051	3,081	2,569	3,021
MetroBus Route 0238	528	796	504
Total	**14,098**	**9,645**	**13,734**

TABLE 12 COMPARISON OF COUNTED BUS RIDERSHIP BY ROUTE TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT – NORTH CORRIDOR

Route	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
MetroBus Route 0027	6,484	4,271	6,401
MetroBus Route 0032	2,375	5,111	2,399
MetroBus Route 0277	637	1,727	721
MetroBus Route 0297	1,315	4,013	1,685
Total	**10,811**	**15,121**	**11,207**

TABLE 13 COMPARISON OF COUNTED BUS RIDERSHIP BY ROUTE TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT – NORTHEAST CORRIDOR

Route	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
MetroBus Route 0021	1,853	1,196	1,725
MetroBus Route 0033	1,542	2,760	1,567
MetroBus Route 0119	8,750	4,583	8,452
MetroBus Route 0120	6,082	5,826	6,079
MetroBus Route 0207	1,471	997	1,466
MetroBus Route 0208	1,283	620	1,299
Total	**20,981**	**15,981**	**20,587**

TABLE 14 COMPARISON OF COUNTED BUS RIDERSHIP BY ROUTE TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT – KENDALL CORRIDOR

Route	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
MetroBus Route 0088	2,168	1,121	2,172
MetroBus Route 0104	971	882	996
MetroBus Route 0204	1,134	1,285	1,193
MetroBus Route 0288	836	1,101	880
Total	**5,109**	4,390	5,241

TABLE 15 COMPARISON OF COUNTED BUS RIDERSHIP BY ROUTE TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT – SOUTH DADE TRANSITWAY CORRIDOR

Route	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
MetroBus Route 0031	1,045	1,046	1,006
MetroBus Route 0034	2,069	4,352	2,191
MetroBus Route 0038	6,566	6,009	6,314
MetroBus Route 0052	1,340	1,590	1,352
MetroBus Route 0252	910	630	928
MetroBus Route 0287	348	665	373
Total	**12,278**	**14,293**	**12,165**

6.8 METROBUS/SHUTTLE BY SMART PLAN CORRIDOR AND DISTRICT

Tables 16 through **Table 21** present comparisons of counted Year 2019 weekday ridership to modeled ridership by the district for the Miami Central Business District (CBD) and each SMART Plan corridor. In this series of results, the East-West and Flagler Corridors are grouped together since these two corridors are close to one another and are described by the same set of districts.

This analysis shows a different set of patterns than is reported in the assessment of ridership by the route. In the case of the district comparison, ridership before count-based adjustment is typically quite close to counted ridership except for the North and Beach Corridors. In the North corridor, bus ridership is overestimated by 50 percent before count-based adjustment. In the Beach Corridor, bus ridership is underestimated by 19 percent. In other corridors, the difference is less than 16 percent and often less than 8 percent.

The district statistic is a better representation of the predictive power of the model for new projects since it is not subject to problems caused by misassignment of ridership to individual routes on the trunk lines where multiple routes share the same or nearby streets.

After count-based adjustment, bus ridership in all corridors is properly represented.

TABLE 16 COMPARISON OF COUNTED BUS/SHUTTLE RIDERSHIP BY DISTRICT TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT – MIAMI CBD

District	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
19	20,362	21,327	20,311
Total	**20,362**	**21,327**	**20,311**

TABLE 17 COMPARISON OF COUNTED BUS/SHUTTLE RIDERSHIP BY DISTRICT TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT – BEACH CORRIDOR

District	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
18	12,117	9,718	12,402
Total	**12,117**	**9,718**	**12,402**

TABLE 18 COMPARISON OF COUNTED BUS/SHUTTLE RIDERSHIP BY DISTRICT TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT – EAST-WEST AND FLAGLER CORRIDORS

District	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
16	3,127	4,461	3,281
17	2,723	4,000	2,579
23	17,278	15,411	17,074
24	9,550	10,291	9,556
25	4,749	3,898	4,719
26	1,118	722	1,099
Total	**38,545**	**38,782**	**38,308**

TABLE 19 COMPARISON OF COUNTED BUS/SHUTTLE RIDERSHIP BY DISTRICT TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT – NORTH CORRIDOR

District	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
3	3,935	5,375	3,932
7	7,453	9,930	7,515
9	4,178	8,088	4,148
Total	**15,566**	**23,394**	**15,596**

TABLE 20 COMPARISON OF COUNTED BUS/SHUTTLE RIDERSHIP BY DISTRICT TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT – NORTHEAST CORRIDOR

District	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
1	11,171	8,722	11,041
8	7,869	9,317	7,756
10	3,508	4,186	3,446
13	5,958	9,586	5,916
Total	**28,506**	**31,811**	**28,159**

TABLE 21 COMPARISON OF COUNTED BUS/SHUTTLE RIDERSHIP BY DISTRICT TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT – KENDALL CORRIDOR

District	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
27	1,507	1,082	1,500
28	1,332	1,616	1,318
29	2,364	1,961	2,299
32	2,122	1,412	2,077
33	1,957	1,716	1,949
Total	**9,282**	**7,787**	**9,144**

TABLE 22 COMPARISON OF COUNTED BUS/SHUTTLE RIDERSHIP BY DISTRICT TO MODELED RIDERSHIP BEFORE AND AFTER COUNT ADJUSTMENT – SOUTH CORRIDOR

District	2019 Weekday Counted Ridership	Modeled 2019 Weekday Ridership Before Count-Based Adjustment	Modeled 2019 Weekday Ridership After Count-Based Adjustment
30	3,829	3,588	3,740
31	7,091	7,015	7,003
36	1,016	1,030	994
37	2,788	2,760	2,767
39	1,396	2,484	1,392
41	381	746	372
Total	**16,501**	**17,624**	**16,268**

6.9 PARK-AND-RIDE UTILIZATION

Tables 23 and **24** compare counted and modeled park-and-ride utilization by the facility for Metrorail and Metrobus. The overall distribution of Metrorail park-and-ride utilization for the south and north sections of the line is well-represented by the model. Overall Metrobus park-and-ride utilization is also well-represented.

TABLE 23 COMPARISON OF COUNTED AND MODELED METRORAIL PARK-AND-RIDE UTILIZATION

Station	2019 Weekday Counted Parked Cars	2019 Weekday Modeled Parked Cars	Station	2019 Weekday Counted Parked Cars	2019 Weekday Modeled Parked Cars
Dadeland South	1,177	1,002	**Culmer**	3	53
Dadeland North	1,919	2,597	**Santa Clara**	37	19
South Miami	760	324	**Allapattah**	15	50
University	241	45	**Earlington Heights**	145	131
Douglas Road	215	276	**Brownsville**	34	38
Coconut Grove	80	120	**Dr. Martin Luther King Jr.**	253	91
Vizcaya	63	45	**Northside**	71	211
Subtotal South	**4,455**	**4,409**	**Hialeah**	107	156
			Okeechobee	336	579
			Palmetto	405	402
			Subtotal North	**1,406**	**1,730**
			Total South and North	**5,861**	**6,139**

TABLE 24 COMPARISON OF COUNTED AND MODELED METROBUS PARK-AND-RIDE UTILIZATION

Park-and-Ride Lot	2019 Weekday Counted Parked Cars	2019 Weekday Modeled Parked Cars	Park-and-Ride Lot	2019 Weekday Counted Parked Cars	2019 Weekday Modeled Parked Cars
Busway/SW 152nd Street	200	94	Golden Glades-East Lot	535	11
Busway/SW 168th Street	149	409	Golden Glades-West	242	693
Busway/SW 112nd Avenue (Target)	430	492	Hammocks Town Center	50	0
Busway/SW 244th Street	95	100	Kendall Drive SW 127th Ave	34	3
Busway/SW 296th Street	113	183	West Kendall Transit Center	26	15
Busway/SW 344th Street	180	27	NW 7th Avenue Transit Village	19	0
Coral Reef Drive 117 / Turnpike	42	54	Miami Gardens Drive / NW73rd Avenue	6	18
			Total	2,121	2,099

7.0 NO-BUILD FORECAST

A No-Build network was prepared to test the performance of the model with future services that are already committed for the region and to test the model's performance using future year population and demographic projections to grow demand from the 2019 base year to the 2045 forecast year. This network can also serve as a starting point for analysis in each SMART Plan Corridor. The No-Build forecast assembled for this calibration includes the following existing and committed transit service improvements:

- Metrorail peak services operating on 9-minute headways (compared to existing 10-minute headways)
- Tri-Rail Downtown Miami Link
- 836 Express Bus System
- South Dade Transitway BRT

The implementing agency will define the No-Build network for each specific project in consultation with FTA. Forecasts are prepared for 2019 and 2045. To understand the implications of each 2045 input to the model, 2045 runs are prepared two ways: 1) assuming that the highway times and distances in 2045 will be unchanged from those assumed in 2019 and 2) assuming that SERPM estimates of 2045 highway times and distances are applied to the 2045 runs[10].

Table 25 presents results for all three No-Build runs. Key findings include:

1. Overall transit growth from 2019 and 2045 (33 percent with 2045 demographics and 2019 highway times) is slightly higher than the demographic growth for Miami-Dade County during the same period (29 percent). The difference is probably related to the fact that population growth in downtown Miami is substantially higher than in other parts of the County. Since transit use is also higher in this area, overall transit ridership grows faster than the population and employment growth for the County as a whole.

2. The Tri-Rail Downtown Miami link will both divert some riders from the existing service to Miami International Airport while also growing the total market for Tri-Rail usage. This new service will divert some customers away from Metrorail and so even with a small improvement in frequency, Year 2019 Metrorail ridership is slightly higher in the No-Build than with the existing networks and grows substantially by the Year 2045.

3. Forecasted ridership for the South Dade Transitway Corridor BRT is approximately 8 percent lower in the existing Year (2017-2019) than what was forecasted in the documents

[10] In the STOPS application 2045 socioeconomic assumptions with 2019 highway times and distances are labeled as "2044". Year 2045 socioeconomic assumptions with 2045 SERPM highway times and distances are labeled "2045".

provided by DTPW to FTA for the annual Capital Investment Grant (CIG) Report. This is due, in part, to the fact that those forecasts were based on a 2017 count database and partly due to changes in the STOPS program to better represent trips that utilize both BRT and Metrorail during the journey. Future year forecasts (2045 for this model set and 2040 for the CIG report agree to within 2 percent.

TABLE 25 COMPARISON OF EXISTING AND NO-BUILD WEEKDAY RIDERSHIP BY YEAR

Service	2019 Existing	2019 with No-Build Network		2045 No-Build with 2019 Highway Times		2045 No-Build with 2045 Highway Times	
Metrorail	61,938	62,304	0.59%	86,468	39.60%	92,020	48.57%
Metromover	29,413	29,327	-0.29%	40,390	37.32%	42,782	45.45%
MIA People Mover	7,608	7,637	0.38%	8,125	6.80%	9,509	24.99%
Tri-Rail Downtown Link	0	718		892		956	
Tri-Rail (Other)	14,595	14,380	-1.47%	17,772	21.77%	17,864	22.40%
Tri-Rail (Total)	14,595	15,098	3.45%	18664	27.88%	18,820	28.95%
South Dade Transitway BRT Limited	0	8,776		12,064		12,873	
South Dade Transitway BRT Local	0	4,960		7,722		7,845	
DTPW/MDT Bus	164,075	152,610	-6.99%	198,926	21.24%	205,053	24.98%
836 Express	0	4,236		4,906		5,154	
Municipal Trolley	38,492	38,413	-0.21%	48,632	26.34%	49,187	27.78%
BCT Bus	87,579	87,369	-0.24%	115,008	31.32%	114,830	31.12%
Palm Tran Bus	30,806	30,784	-0.07%	38,087	23.64%	37,997	23.34%
Tri-Rail Bus	2,511	2,517	0.24%	3,097	23.34%	3,049	21.43%
Total	**437,017**	**444,031**	**1.60%**	**582,089**	**33.20%**	**599,119**	**37.09%**

Note: Percentages reflect change from 2019 Existing Scenario

8.0 TEST APPLICATION TO EAST-WEST CORRIDOR

As a test of the model's ability to represent a future "build" project, the Miami-Dade Interim STOPS model was used to prepare ridership forecasts for a recent definition of the East-West Corridor BRT system[11]. This project is currently defined as a BRT service operating on the following routes:

- BRT Route 1: Tamiami Terminal to Miami International Airport Intermodal Center (MIC) with intermediate stops at Dolphin Station, NW 107 Avenue at SR 836, NW 97 Avenue at SR 836, and NW 87 Avenue at SR 836. The end-to-end running time is 24 minutes and operates on 15-minute headways in the peak and off-peak periods.
- BRT Route 2: Tamiami Terminal to Miami Central Business District (Government Center) with intermediate stops at Dolphin Station, NW 107 Avenue at SR 836, NW 97 Avenue at SR 836, and NW 87 Avenue at SR 836. The end-to-end running time is 30 minutes 18 seconds and operates on 15-minute headways in the peak and off-peak periods.
- BRT Route 3: Dolphin Station to Miami International Airport Intermodal Center (MIC) with intermediate stops at NW 107 Avenue at SR 836, NW 97 Avenue at SR 836, NW 87 Avenue at SR 836, Mall of Americas, NW 7 St at SR 826, NW 7 St at 72nd Ave, NW 7 St at 62nd Ave, Blue Lagoon at NW 60th Ave, Blue Lagoon at NW 57th Ave, and NW 45 Ave and LeJeune Road. The end-to-end running time is 27 minutes 12 seconds and operates on 15-minute headways in the peak and off-peak periods.

Table 26 presents the linked trip impacts of the project for 2019, 2045 (with 2019 auto times) and 2045 (with 2045 auto times from SERPM version 7). **Tables 27** and **28** provide a more detailed depiction of the ridership impacts of the project showing ridership by route and ridership by BRT station, respectively.

[11] Note that this project definition will change as this project proceeds through development. As such these ridership forecasts are only intended to demonstrate that the model calibration is behaving properly and differences from the 2015 calibration are explainable.

TABLE 26 WEEKDAY LINKED TRIP IMPACTS OF EAST-WEST BUILD PROJECT FOR 2019 AND 2045 (TEST PROJECT DEFINITION)

Statistic	2019	2045 Demographics with 2019 Highway Times		2045 Demographics with 2045 Highway Times	
No-Build Linked Trips	270,230	360,942	33.57%	368,288	36.29%
Build Linked Trips	270,766	361,674	33.57%	369,167	36.34%
Incremental Linked Trips	536	732	36.57%	879	63.99%
Project Linked Trips	5,909	6,991	18.31%	7,580	28.28%

Note: Percentages reflect the change from 2019 Build Scenario

TABLE 27 EAST-WEST BUILD WEEKDAY RIDERSHIP BY ROUTE FOR 2019 AND 2045 (TEST PROJECT DEFINITION)

Route	2019 with Build Network	2045 Build with 2019 Highway Times		2045 No-Build with 2045 Highway Times	
BRT Route 1	1,116	1,325	18.73%	1,468	31.54%
BRT Route 2	3,958	4,682	18.29%	5,121	29.38%
BRT Route 3	1,104	1,312	18.84%	1,329	20.38%
Total	6,178	7,319	18.47%	7,918	28.16%

Note: Percentages reflect the change from 2019 Build Scenario

TABLE 28 EAST-WEST BUILD WEEKDAY RIDERSHIP BY STATION FOR 2019 AND 2045 (TEST PROJECT DEFINITION)

Station	2019 with Build Network	2045 Build with 2019 Highway Times		2045 Build with 2045 Highway Times	
Tamiami Terminal	587	692	17.89%	774	31.86%
Dolphin Station (BRT)	290	310	6.90%	351	21.03%
NW 107 Ave at SR 836	274	332	21.17%	355	29.56%
NW 97 Ave at SR 836	723	833	15.21%	899	24.34%
NW 87 Ave at SR 836	897	1,117	24.53%	1,202	34.00%
Mall of Americas	268	318	18.66%	329	22.76%
NW 7 St at SR 826	22	23	4.55%	24	9.09%
NW 7 St at 72nd Ave	55	64	16.36%	65	18.18%
NW 7 St at 62nd Ave	79	98	24.05%	103	30.38%
Blue Lagoon at NW 60th Ave	18	23	27.78%	24	33.33%
Blue Lagoon at NW 57th Ave	18	23	27.78%	24	33.33%
NW 45 Ave and LeJeune Road	108	122	12.96%	107	-0.93%
MIA MIC BRT	839	997	18.83%	1,073	27.89%
Government Center	1,979	2,340	18.24%	2,560	29.36%
Total	**6,157**	**7,292**	**18.43%**	**7,890**	**28.15%**

Note: Percentages reflect the change from 2019 Build Scenario

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