

Milwaukee County North-South Transit Enhancement Study

TIER 2 EVALUATION

Chapter 5

RIDERSHIP FORECASTS

5.1 OVERVIEW

This chapter describes the methodology and results of the ridership forecasts for the BRT route alternatives and the no-build alternative under consideration, the details of which are described in Chapter 2 of this report.

5.2 METHODOLOGY

Ridership forecasts for the six BRT alternatives and the no-build alternative were developed using the Federal Transit Administration (FTA) travel demand forecasting tool: Simplified Trips-on-Project Software (STOPS). STOPS is a limited implementation of the conventional four step model.

For this analysis, trip and origin-destination travel patterns are derived from 2006-10 American Community Survey (ACS) data from the U.S. Census. It also uses General Transit Feed Specification (GTFS) transit schedule data to replace the traditional coded transit network. Version 2.5 of STOPS was obtained from FTA for use in this project.

Additional data used for this analysis include forecasted future population and employment estimates for 2025 and 2045, which were developed using SEWRPC's population and employment model and future year transit maps, schedule, and travel time information developed by SEWRPC and MCTS using Remix, a public transit planning software, and SEWRPC's travel demand model. GTFS data for the existing transit system was provided by MCTS. Base ridership data was provided by MCTS and is described in more detail below.

Settings for the STOPS analysis were taken from the calibration done for the East-West BRT study to ensure consistency between the studies. The STOPS model calibrates the output ridership based on actual route ridership data MCTS provided to SEWRPC. The “Fixed Guideway” factor was set to 0.3, which is a standard for BRT lines with at least 50 percent dedicated lanes, representing the advantage over a standard bus route running in mixed traffic.

This analysis considers that the proposed BRT service could be implemented in 2025, and that the service would have a life span of at least 20 years; therefore, forecasts were developed for 2025 and 2045. Transit schedule data is based on the proposed service plans described in Chapter 2 and the estimated travel times provided in Chapter 4 for the BRT route alternatives with no changes made to the existing PurpleLine service plan for the no-build alternative. The analysis also assumes that changes to other routes as described in Chapter 2 are implemented for the proposed BRT route alternatives and that the East-West BRT service, which is under construction during the writing of this report, is in service replacing the existing GoldLine for all alternatives.

Base Ridership Data

This study was conducted during a time of significant fluctuation in transit ridership, making forecasting future ridership using base ridership a difficult task for this study and others like it across the country. In 2020, the COVID-19 pandemic caused a sharp decline in transit ridership that has not fully recovered more than two years later. Since it is difficult to predict what travel behavior will look like in the coming years due to factors that include the ongoing pandemic, an expected permanent shift toward more remote work, and varying fuel prices, this study uses two different years of base ridership data—pre-pandemic 2019 ridership and the more recent and significantly lower 2021 ridership—to develop a range of estimated future ridership. Ridership on MCTS for April and May 2022 increased by approximately 20 percent over the previous year, indicating what may be the start of a ridership recovery but also likely partially due to rising gasoline prices.

5.3 EVALUATION

Tables 5.1 through 5.4 provide the following ridership forecast information for all BRT route alternatives and the no-build alternative 2025 and 2045 as a range:

- Average daily weekday boardings on each route alternative (Table 5.1)

- Average daily weekday system boardings for each route alternative (Table 5.2)
- New riders (Table 5.3)
- Vehicle miles of travel (VMT) saved (Table 5.4)

All forecasts are provided as a range using 2021 ridership data as a base for the low end of the range and 2019 ridership data as a base for the high end of the range. This is done to adjust for lower base ridership in 2021 due to the COVID-19 pandemic and uncertainty related to how transit ridership will recover in the near- and long-term future.

Average Daily Weekday Boardings

As shown in Table 5.1, average daily weekday boardings are expected to be significantly higher for all of the BRT route alternatives when compared to the no-build alternative with North Option 2 to South Option A expected to result in the highest average daily weekday boardings by one-way route miles in 2025 and 2045.

Table 5.1
Forecast Range of Average Daily Weekday Boardings: 2025 and 2045

Route Alternative	One-way Route Miles	Total Boardings		Boardings by Route Mile		Percent Change ^a	
		2025	2045	2025	2045	2025	2045
North Option 1 to South Option A	20.5	5,800-11,800	5,800-11,700	280-570	280-570	38-57	38-56
North Option 1 to South Option B	22.1	5,800-11,700	5,800-11,700	260-530	260-530	28-44	28-44
North Option 1 to South Option C	23.0	6,600-12,300	6,600-12,300	290-530	290-540	40-46	41-46
North Option 2 to South Option A	18.0	5,400-10,500	5,400-10,600	300-580	300-590	47-59	47-60
North Option 2 to South Option B	19.6	5,400-10,600	5,400-10,600	280-540	280-540	36-47	36-48
North Option 2 to South Option C	20.5	6,000-10,800	6,100-10,900	290-530	300-530	44-44	45-45
No-Build (Existing PurpleLine)	18.0	3,700-6,600	3,700-6,600	200-370	200-370	--	--

Note: Forecasts are provided as a range, using the 2021 ridership data as a base for the forecasts on the low end of the range and the 2019 ridership data as a base for the high end of the range. This is done to adjust for lower base ridership in 2021 due to the COVID-19 pandemic and uncertainty related to how transit ridership will recover in the near- and long-term future.

^a Percent change represents the difference between the forecast boardings for the BRT route alternatives and the no-build alternative by one-way route mile.

Source: SEWRPC

Total System Boardings

Table 5.2 provides forecasts for total system boardings comparing ridership on the entire the MCTS system if it were to include each of the BRT route alternatives or the no-build alternative, with the implementation of all route alternatives expected to result in a net increase in ridership for the system. North Option 1 to

South Option C is expected to result in the greatest overall increase in transit ridership for the system and North Option 2 to South Option A is expected to result in the greatest increase in system boardings by one-way route mile of investment for both 2025 and 2045.

Table 5.2
Forecast Total System Average Daily Weekday Boardings: 2025 and 2045

Route Alternative	One-way Route Miles	Total System Boardings		Increase in System Boardings per Route Mile of Investment	
		2025	2045	2025	2045
North Option 1 to South Option A	20.5	56,600-115,200	57,300-116,200	2,800-5,600	2,800-5,700
North Option 1 to South Option B	22.1	56,600-115,100	57,200-116,100	2,600-5,200	2,600-5,300
North Option 1 to South Option C	23.0	58,000-116,400	58,800-117,500	2,500-5,100	2,600-5,100
North Option 2 to South Option A	18.0	55,900-113,800	56,500-114,800	3,100-6,300	3,100-6,400
North Option 2 to South Option B	19.6	56,000-114,000	56,700-115,100	2,900-5,800	2,900-5,900
North Option 2 to South Option C	20.5	56,800-114,300	57,500-115,400	2,800-5,600	2,800-5,600
No-Build (Existing PurpleLine)	18.0	54,100-110,000	54,700-110,400	-	-

Note: Forecasts are provided as a range—using the 2021 ridership data as a base for the forecasts on the low end of the range and the 2019 ridership data as a base for the high end of the range. This is done to adjust for lower base ridership in 2021 due to the COVID-19 pandemic and uncertainty related to how transit ridership will recover in the near- and long-term future.

Source: SEWRPC

New Riders

Table 5.3 provides forecasts for the number of average weekday new riders, also referred to as incremental new riders, expected for each BRT route alternative when compared to the no-build alternative, with the proposed BRT service expected to attract anywhere from approximately 1,800 to 7,000 new riders. North Option 1 to South Option C is expected to result in the greatest number of new riders by one-way route mile, which is due in large part to serving areas not currently served by the PurpleLine.

Table 5.3
Forecast Average Weekday New Riders: 2025 and 2045

Route Alternative	One-way Route Miles	New Riders		New Riders per Mile	
		2025	2045	2025	2045
North Option 1 to South Option A	20.5	2,500-5,200	2,500-5,900	120-250	120-290
North Option 1 to South Option B	22.1	2,500-5,100	2,500-5,700	110-230	110-260
North Option 1 to South Option C	23.0	3,900-6,300	4,100-7,100	170-270	180-310
North Option 2 to South Option A	18.0	1,800-3,700	1,800-4,400	100-210	100-240
North Option 2 to South Option B	19.6	2,000-4,000	2,000-4,700	100-200	100-240
North Option 2 to South Option C	20.5	2,700-4,200	2,800-5,000	130-210	140-240
No-Build (Existing PurpleLine)	18.0	--	--	--	--

Note: Forecasts are provided as a range—using the 2021 ridership data as a base for the forecasts on the low end of the range and the 2019 ridership data as a base for the high end of the range. This is done to adjust for lower base ridership in 2021 due to the COVID-19 pandemic and uncertainty related to how transit ridership will recover in the near- and long-term future.

Source: SEWRPC

VMT Savings

Table 5.4 provides forecasts for average weekday VMT savings. This metric is used to understand the amount of automobile travel savings that would be experienced as a result of new riders utilizing the proposed BRT service instead of driving. The VMT estimates were produced using the person miles traveled estimate from the STOPS model and applying a factor of 1.2 to account for average automobile occupancy. North Option 1 to South Option C is expected to result in the highest VMT savings per one-way route mile of investment.

Table 5.4
Forecast Average Weekday Automobile VMT Savings: 2025 and 2045

Route Alternative	One-way Route Miles	VMT Saved		VMT Saved per Route Mile	
		2025	2045	2025	2045
North Option 1 to South Option A	20.5	6,800-14,400	6,900-14,600	330-700	340-710
North Option 1 to South Option B	22.1	7,600-15,700	7,700-15,900	340-710	350-720
North Option 1 to South Option C	23.0	12,300-19,700	12,700-20,200	530-860	550-880
North Option 2 to South Option A	18.0	4,400-9,300	4,500-9,500	240-520	250-530
North Option 2 to South Option B	19.6	6,400-12,700	6,500-13,000	330-650	330-660
North Option 2 to South Option C	20.5	8,200-12,000	8,500-12,500	400-580	410-610
No-Build (Existing PurpleLine)	18.0	--	--	--	--

Note: Forecasts are provided as a range—using the 2021 ridership data as a base for the forecasts on the low end of the range and the 2019 ridership data as a base for the high end of the range. This is done to adjust for lower base ridership in 2021 due to the COVID-19 pandemic and uncertainty related to how transit ridership will recover in the near- and long-term future.

Source: SEWRPC

5.4 SUMMARY OF RESULTS

Table 5.5 provides a summary of the results of all evaluations for route alternatives for the ridership forecasts analysis. Based on the results of the evaluations outlined in this chapter, North Option 1 to South Option A, North Option 1 to South Option C, North Option 2 to South Option A, and North Option 2 to South Option C are rated as green as they are generally expected to result in greater increases in boardings, new riders, and/or VMT savings per one-way route mile of investment. The remaining route alternatives are rated as yellow with lower increases in these metrics generally expected.

Table 5.5
Route Alternative Evaluation Results: Ridership Forecasts

Route Alternative	Average Daily Weekday Boardings	Increase in System Boardings	New Riders	VMT Saved	Summary
North Option 1 to South Option A	●	●	●	●	●
North Option 1 to South Option B	●	●	●	●	●
North Option 1 to South Option C	●	●	●	●	●
North Option 2 to South Option A	●	●	●	●	●
North Option 2 to South Option B	●	●	●	●	●
North Option 2 to South Option C	●	●	●	●	●

Source: SEWRPC