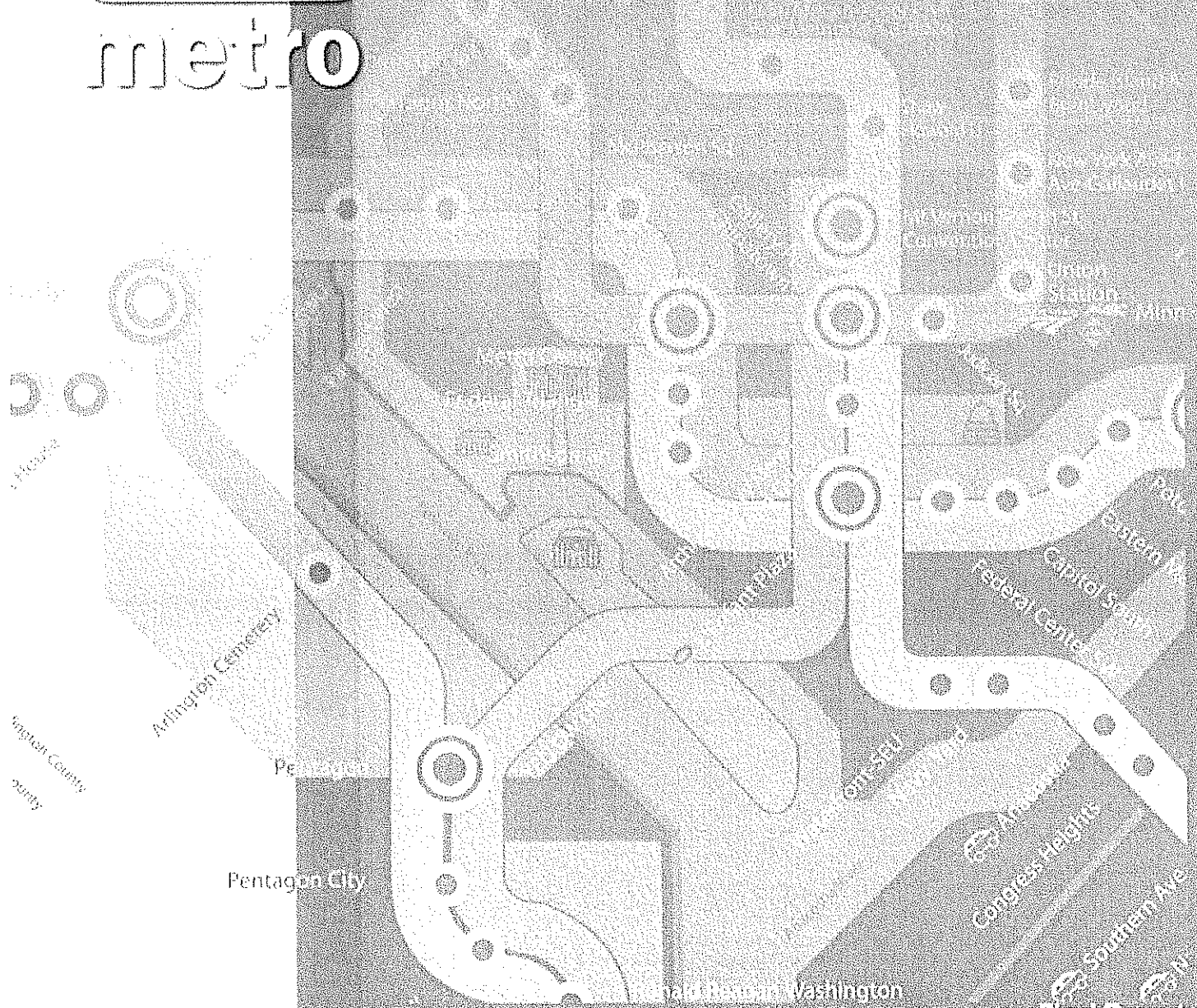




Station Access & Capacity Study



Final Report
April 2008



METRORAIL STATION ACCESS & CAPACITY STUDY

Washington Metropolitan Area Transit Authority



Final Report
April 2008



a joint venture of:

- Parsons Transportation Group Inc.
- PB Americas, Inc.
- Delon Hampton & Associates, Chartered

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ELECTRONIC APPENDICES

(available on CD-ROM)

Appendix A-E: Existing Station Characteristic Inventory

Appendix B-E: Summary of Ridership Forecasts



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EXECUTIVE SUMMARY

Thirty years after service first began on the Washington Metrorail, the system has become an integral and important part of the region's transportation network. Metrorail ridership has increased over the years as the system expanded and the region developed. Ridership continues to increase as development occurs throughout the region, particularly near stations. Continued growth in ridership requires expansion of station facilities to handle passenger flow within the station, as well as expansion of facilities to support auto, bus, and pedestrian access to stations.

In order to meet growing demand and maximize capacity of the system, the Washington Metropolitan Area Transit Authority (Metro) initiated the Station Access and Capacity Study, a systemwide look at future passenger demand and available capacity. The purpose of the study was to identify and prioritize the needs of the existing 86 stations and identify stations where more detailed analysis is needed. The study addressed three basic questions:

- How will ridership grow over the next 25 years?
- Is there sufficient capacity to handle the growth?
- How will customers access the system?

Background

The Station Access and Capacity Study built upon the efforts of two previous studies. The Transit Service Expansion Plan in 1999 called for maintaining transit shares in existing markets, creating new markets through focused development near stations, and expanding the reach of rail throughout the region, the combination of which would result in doubling transit ridership—bus and rail—by 2025. The 2002 Core Capacity Study focused on capacity deficiencies at the core stations in the Metrorail system based on the ridership growth and full system expansion envisioned in the 1999 plan.

Instead of assuming major system expansion like the studies above, this study focused on the planned Metrorail system improvements contained in the region's fiscally Constrained Long Range Plan (CLRP) and addressed the needed improvements to system capacity and station access throughout the entire Metrorail system to support the ridership growth. It also identified stations where further detailed studies are needed.

Findings

The Washington, DC region is growing. Between 2000 and 2030, regional employment and households are each expected to increase by nearly 50 percent. The study found that ridership growth will continue into the future, placing demands on system and station capacity. Ridership increases are expected to be primarily driven by system expansion—the Dulles Corridor Metrorail extension—and regional growth.

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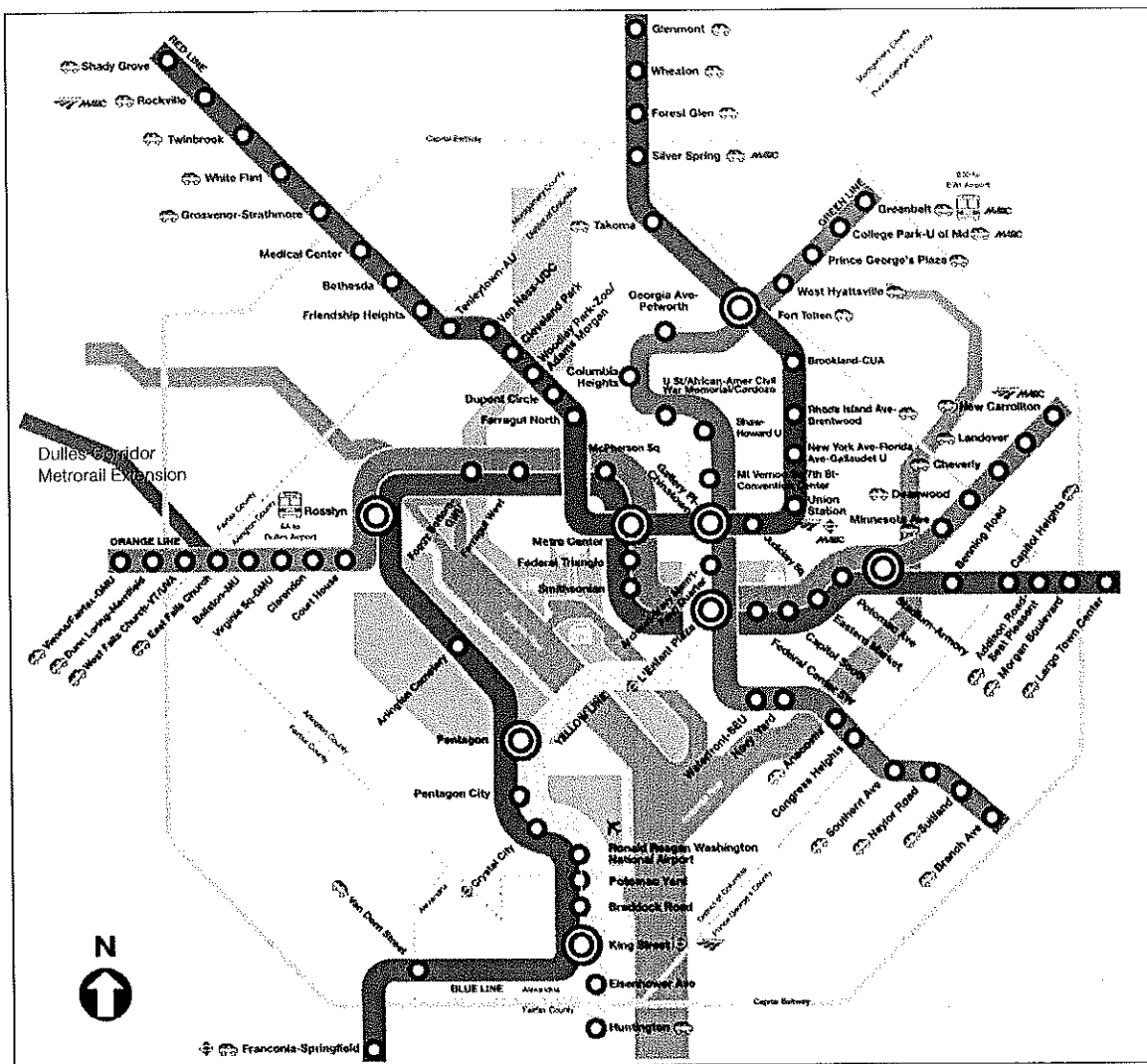


Figure 1. Assumed 2020 and 2030 Metrorail System Map

Ridership Trends

The study forecasted that the system ridership will reach 970,000 daily by 2030, representing a 42 percent increase between 2005 and 2030, or an average annual growth rate of 1.7 percent. This growth trend will be influenced by a number of unknown factors and events such as modifications to the existing Metrorail network, continued increase in gasoline prices, increased parking costs near Metrorail stations, and population and job growth beyond what is already forecasted.

METRO RAIL STATION ACCESS & CAPACITY STUDY

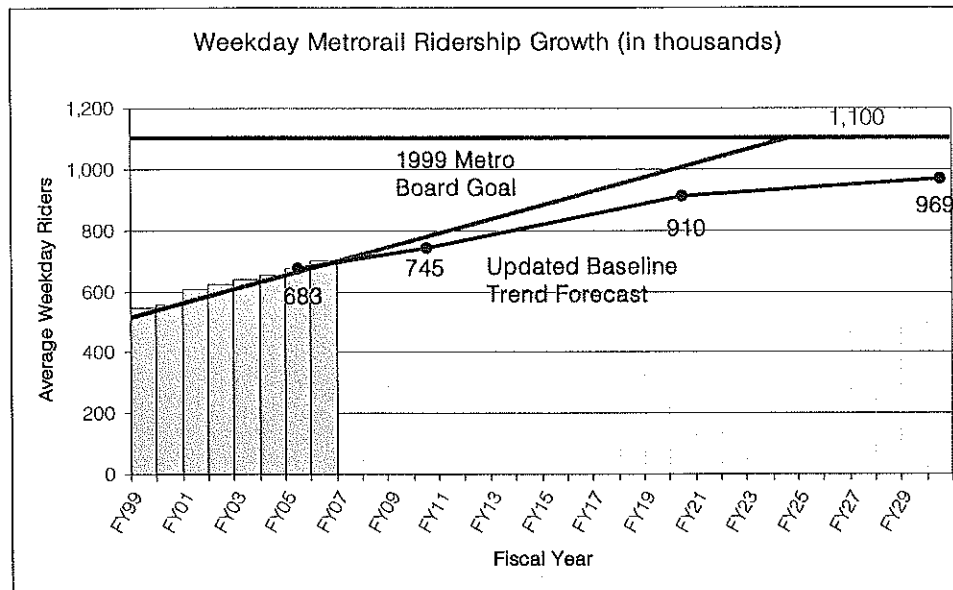


Figure 2. Past and Forecasted Metrorail Ridership

High-ridership stations. The current top ridership stations will remain high-ridership stations. The top ridership stations in 2030 are forecasted to include Metro Center, Gallery Place-Chinatown, Union Station, Farragut West, Dupont Circle, L'Enfant Plaza, Foggy Bottom-GWU, Farragut North, Rosslyn, and McPherson Square. Among the 86 stations, Court House and Gallery Place-Chinatown are expected to have high ridership growth as both neighborhoods will have substantial increases in households.

Growth inside and outside the core. Of the 2030 average daily ridership, 50 percent will be within the core, 12 percent in non-core areas of the District, 19 percent in non-core areas of Maryland, and 19 percent in non-core areas of Virginia. Within the system core, Metrorail ridership on all the lines will remain strong, reaching 365,000 trips daily by 2030. Outside the system core, ridership will experience faster growth than the growth inside the core, indicating a continuing trend of job and population growth in suburbs and an increasing demand for transit service outside the system core.

Peaking. The systemwide peaking pattern in 2030 is expected to be similar to that of 2005. Approximately 60 percent of daily ridership will occur during the AM and PM peak periods. The AM peak-hour Metrorail trips to non-core areas will grow faster than the core, suggesting an increasing demand for reverse commuting on Metrorail during the peak period. Stations located within the system core will remain top destinations of rush-hour trips totaling 75,100, the majority of which are work trips.

Transfers. This study found that significant increases will occur at the major transfer stations. Metro Center will remain the highest-volume transfer station, with large morning volume increases between the westbound Blue/Orange and eastbound Red Line. Rosslyn will see large increases in both transfer directions due in part to Silver Line volumes. Gallery Place-Chinatown will remain a major station handling passengers transferring between the Green, Red, and Yellow Lines. L'Enfant Plaza's peak-hour transfers would almost double, largely due to the future Blue Line split and forecasted ridership increases at Blue Line stations.

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Line Capacity. This analysis showed that eight-car trains are needed on most Metrorail lines by 2020, confirming findings in the Core Capacity Study. If Metro operates all eight-car trains, the maximum load locations along each line would, in most cases, be the same in 2030 as in 2005. The most significant increase in the maximum passenger load between 2005 and 2030 will occur on the Orange and Yellow-Blue Lines. The opening of the Silver Line will result in a significant increase in the total load on the Orange and Silver Lines in Arlington. The increase of maximum load on Yellow-Blue Lines is mainly caused by the Blue Line split at Pentagon. However, further sensitivity tests in the demand-forecasting model are necessary to obtain an accurate assessment of ridership shift from the existing Blue Line to the Yellow-Blue Lines.

Station Trends

This study analyzed station-level access and capacity issues. To maximize ridership, pedestrian and bicyclist improvements should be made at fast-developing stations and mature stations with existing deficiencies. Station capacity improvements should be made at several key core and transfer stations.

Station Access

Based on data from the 2002 Survey, 62 percent of passengers walked or biked to stations, 16 percent drove and parked, 16 percent arrived by bus or commuter rail, and 6 percent arrived by Kiss & Ride, carpool, or taxi. At the core stations, an even greater percentage walk and bike, whereas at the stations outside the core, more drive and park.

Park & Ride. Metro presently owns and operates 58,186 parking spaces. On an average weekday, almost all of those spaces are occupied. Demand for parking will likely continue to outpace Metro's ability to provide it. If the access mode split were to remain constant, and station-area land were to develop according to MWCOG forecasts, as many as 44,000 new parking spaces could be needed by 2030. There are presently 8,100 spaces planned at four Silver Line stations, Glenmont, and Vienna. This falls quite short of what future demand could be, and Metro does not own enough land to make up the difference. A combination of transit-oriented development, satellite parking and feeder bus service, and private-sector and/or shared parking facilities can provide passenger access to stations.

Walking and biking access. The study prioritized pedestrian and bicyclist improvements based on an inventory of existing conditions and forecasted development rates. Stations in developing areas will have new needs, and some built-out and low-density stations need better pedestrian and bicycle facilities.

Station Capacity

Almost all needed capacity improvements will be at key transfer stations in the region's core. These are the highest-priority stations for capital investment, shown in Table 1.

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Table 1. Existing and Future Station Capacity Issues

Station	Mezz	Vertical		Faregate	
		2005	2030	2005	2030
Archives-Navy Memorial-Penn Quarter		⊙	⊙		
Bethesda			⊙		
Branch Ave		⊙	⊙		
Cleveland Park					⊙
Court House			⊙		⊙
Farragut North	SE	⊙	⊙		
Farragut West	W	⊙	⊙		
Foggy Bottom-GWU		⊙	⊙		
Franconia-Springfield			⊙		
Gallery Pl-Chinatown	N	⊙	⊙	⊙	⊙
	W				⊙
Judiciary Square	E		⊙		
L'Enfant Plaza	E	⊙	⊙		
	W		⊙		
Metro Center	N	⊙	⊙		⊙
	S	⊙	⊙		
	W		⊙		
Navy Yard*	E				⊙
Shady Grove		⊙	⊙		
Takoma				⊙	⊙
Twinbrook					⊙
White Flint					⊙
Union Station	S	⊙	⊙		
	W	⊙	⊙		

Legend

- ⊙ Needs study ($0.5 \leq v/c < 0.75$)
- ⊗ Needs improvement ($v/c \geq 0.75$)

**Note: Both Navy Yard mezzanines will have unique future needs, which may not be reflected in this analysis, due to the opening of the Washington Nationals Ballpark in 2008.*

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Based on an order-of-magnitude analysis, the study identified a list of highest-priority capital improvements, including:

- Farragut North-Farragut West Tunnel: Construct pedestrian tunnel between two stations.
- Farragut North: Add southeast mezzanine-to-platform vertical capacity.
- Metro Center: Add platform-to-platform vertical capacity, possibly by building the Farragut North-Farragut West pedestrian tunnel. Building this tunnel could reduce Orange or Blue Line transfers to the Red Line.
- Gallery Place-Metro Center Tunnel: Construct pedestrian tunnel between two stations.
- Gallery Pl-Chinatown: Add platform-to-platform vertical capacity and faregates at the north mezzanine and extend mezzanine between 7th and 9th Street entrances.
- L'Enfant Plaza: Add platform-to-platform vertical capacity, possibly by building the Gallery Place-Metro Center pedestrian tunnel. Building this tunnel could decrease L'Enfant Plaza transfers.
- Shady Grove: Add mezzanine-to-platform vertical capacity.

Conclusion

Strong residential and employment growth in the Washington, DC region and the extension to the Dulles Corridor will generate additional Metrorail riders. Additionally, a proposed split of the Blue Line to accommodate the Dulles Corridor Metrorail extension would increase pressure on key transfer stations. As a result, by 2030, eight-car trains will be needed on several Metrorail Lines. To efficiently handle passenger volumes, Metro will need to enhance the capacity of several stations. One way to do so is to build the two previously proposed pedestrian tunnels between Farragut North and Farragut West, and Metro Center and Gallery Place. Finally, to ensure that passengers can access Metrorail stations, Metro and the local jurisdictions will need to work together to provide and/or improve pedestrian and bicycle facilities, satellite parking and feeder bus service, and shared parking facilities, while continuing to promote transit oriented development.