Washington Metropolitan Area Transit Authority

Metrorail Ridership Forecasts and Capacity Needs

Presented by

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TPB Travel Forecasting Subcommittee

May 23, 2008

Purpose

- Discuss Metrorail ridership growth trends projected for the next 25 years
- Examine the adequacy of Metrorail system and station capacity to handle the expected growth
- Identify capital improvements needed to enhance Metrorail system and station capacity

Ridership Forecasting Methodology

- Applied AECOM Post-Processing Model to improve detail of mode and sub-mode ridership and generate Metrorail trip assignment
  - Built on Version 2.1D COG travel forecasting model
  - Detailed network coding to represent detailed passenger flows from platform to mezzanine to street
- Inputs/Assumptions
  - COG's Round 7.0 land use forecasts
  - CLRP network
  - Daily and A.M. Peak Hour Forecasts
  - 2005 Validation Year
  - Forecast Years: 2010, 2020, 2030

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Assumed Metrorail System

- Blue/Yellow Line Split by 2010
- Dulles Extension by 2015
- Potomac Yard Station by 2010

Assumed 2020 and 2030 Metrorail System

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Capacity Analysis Methodology

Purpose: To understand when and where the system will likely reach capacity.

Components:

1. Line capacity analysis at maximum load points using system level forecasts
2. Station Analysis: Station-specific peak flow to evaluate station level capacity constraints:
   - Major transfer stations
   - Station vertical circulation

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Ridership Forecasting Validation Data Sources

- May 2005 mezz-to-mezz OD data to validate forecasting results
- Metrorail max load counts to validate line load assignments
- 2002 Metrorail survey results to break down total trips by mode of access
- Data collection/validation on the capacity of station circulation elements including escalators, stairs, farecard vendors, and faregates

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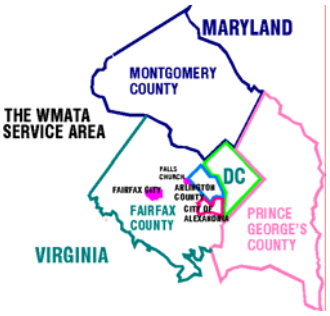
Regional Growth Trends

Regional Growth:2005-2030

	2005-2030	
	Employment	Population
Metropolitan Total	39%	33%
Metro Service Area	34%	24%
Inside Beltway	23%	26%
Outside Beltway	41%	23%
Outer Suburbs	65%	62%



Source:
MWCOG Round 7.0 Cooperative Land Use Forecasts, 2006

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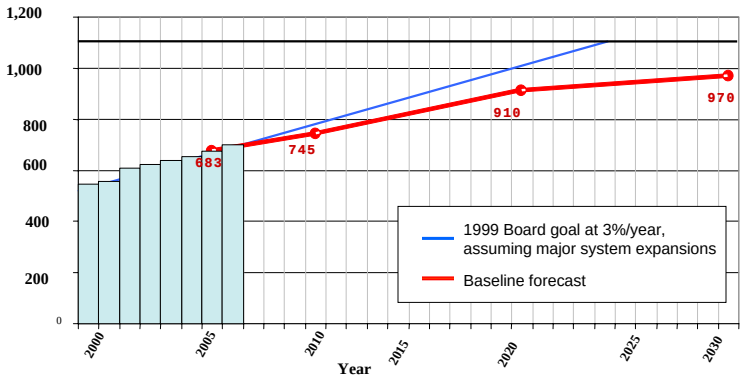
Baseline Ridership Forecast

Ridership expected to grow by 42% between 2005 and 2030, reaching 970,000 by 2030

Weekday Metrorail Ridership Growth (in thousands)



Source for Baseline forecast:
Assume Dulles extension by 2020 and COG Round 7.0 land use forecasts

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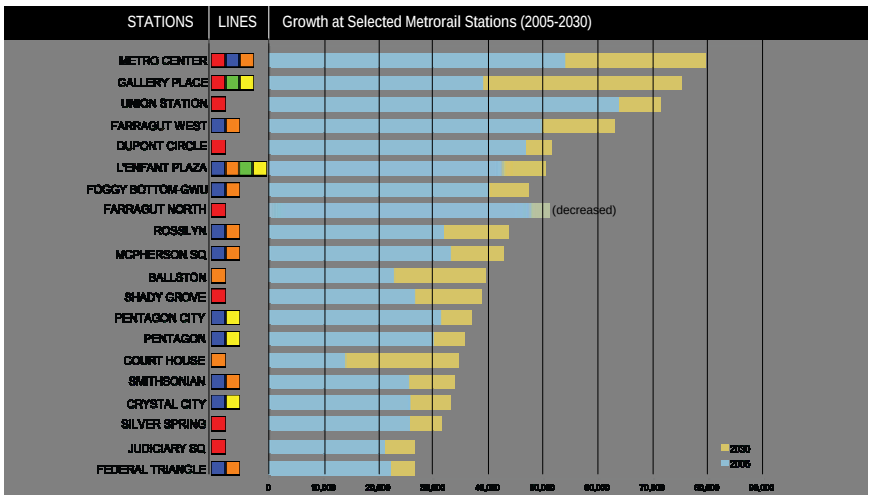
Highest Ridership Stations



Year 2030 Average Daily Passenger Volume
(Total of Daily Entries and Exits)

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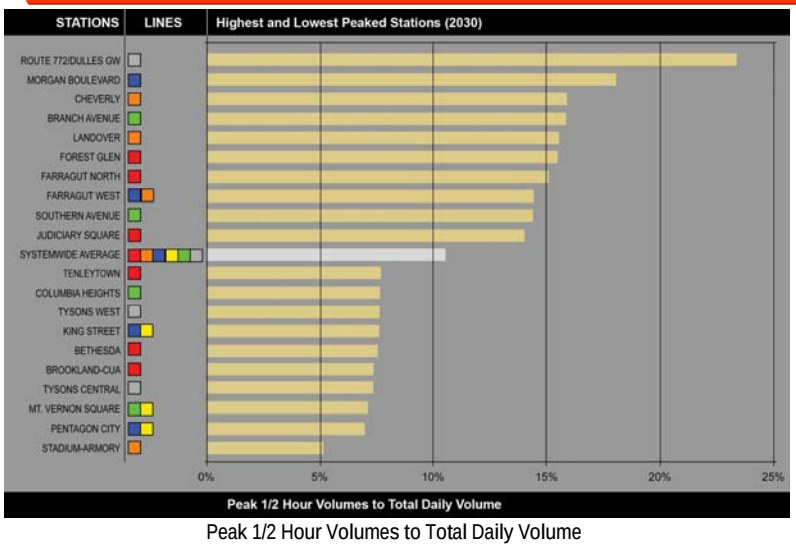
Highest and Lowest Peaked Stations (2030)



Peak 1/2 Hour Volumes to Total Daily Volume

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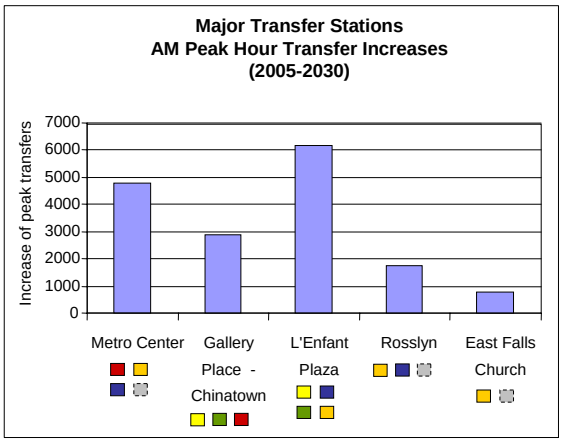
Major Transfer Stations

- Metro Center:
  highest-volume transfer station
- L'Enfant:
  transfer increase due to half of Blue Line trains going over the 14th Bridge
- Rosslyn:
  large increases in both inbound and outbound directions as a result of Dulles Rail Extension



Dulles Rail Extension, also known as Silver Line

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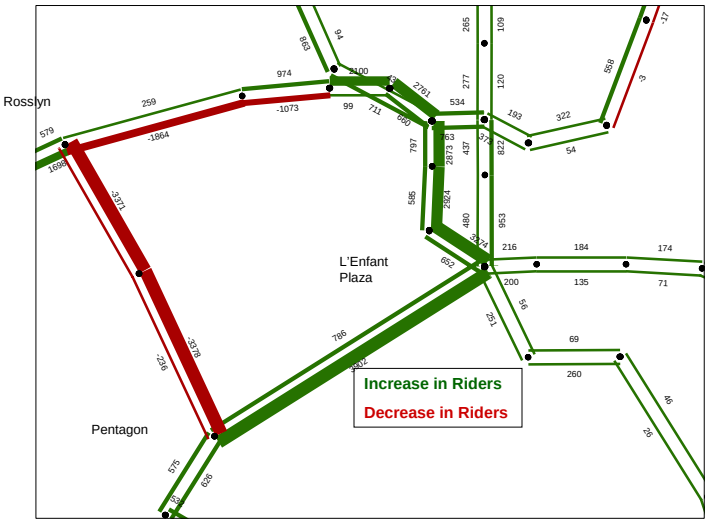
Change in A.M. Peak Hour Rail Volume: 2005 to 2010



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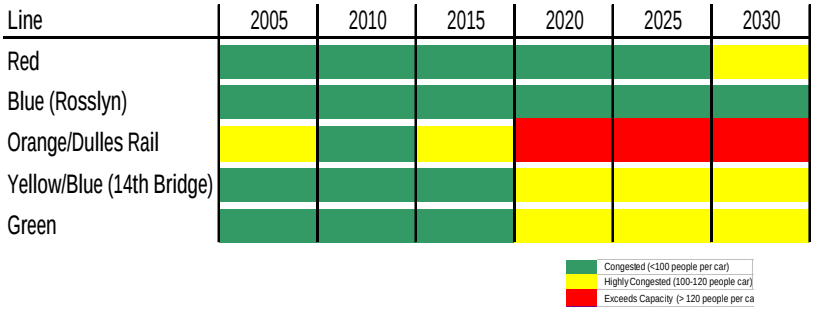
Rail System Capacity – No Additional Fleet Expansion



- Assumes 50% 8-car trains from 2010 through 2030
- In 2010, 50% 8-car trains will bring relief to peak crowding on all lines
- By 2030, entire system is expected to approach capacity
  - By 2020: Orange/Dulles Line will exceed capacity
  - By 2020: Yellow, Blue and Green Lines will become highly congested
  - By 2030: Red Line will become highly congested

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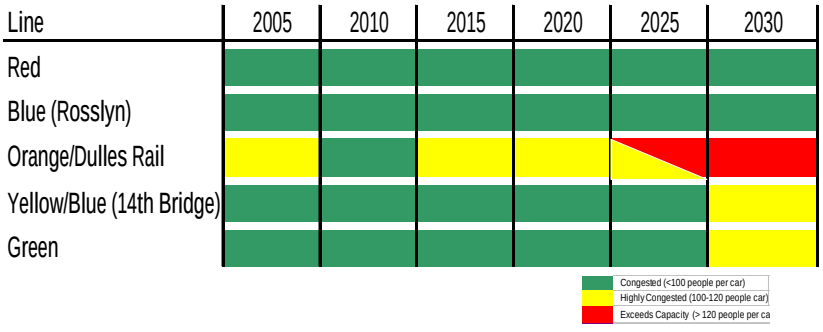
Rail System Capacity – With Fleet Expansion



- Assumes 75% 8-car trains by 2015 (130 additional cars) and 100% 8-car trains by 2020 (90 additional cars)
- Extends adequate system capacity out by 5-10 years into the future

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Station Capacity Analysis

Stations with critical capacity constraints

- Inside the core:
  - Metro Center
  - Farragut North
  - Gallery Place
  - L'Enfant
- Outside the core:
  - Shady Grove

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	⊙	⊙		

◎ Needs improvement (v/c>=0.75)
◉ Needs study (0.5<=v/c<0.75)

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Near-Term Capacity Needs: 2010-2020

- Complete 75% 8-car trains by 2015 and 100% 8-car trains by 2020, including power systems and storage facilities
- Implement Blue Line realignment to increase capacity at Rosslyn Portal
- Construct station connection pedestrian tunnels: Farragut North to Farragut West and Metro Center to Gallery Place
- Add escalators and stairways at core stations
- Expand station access including parking, bus service, and bicycle and pedestrian facilities
  - Maintaining current auto access mode share would require 36,000 more parking spaces by 2030
- Expand the region's bus service and integrate with planned streetcar and light rail lines to supplement Metrorail capacity in major corridors

Station Connection Tunnel Concept

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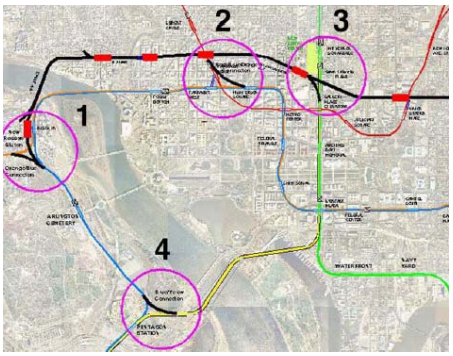
Long-Term Capacity Needs: 2020-2030

- Build pocket tracks to add storage and turnaround track
- Construct inter-line connections to improve system flexibility
- Plan and design new Potomac river crossing between Rosslyn and Georgetown with new line to downtown



Source: 2002 Core Capacity Study

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Next Steps

July 2008	Present the 2011-2020 Capital Improvement Needs - "State of Good Repair" and Capacity Enhancement
2009	Develop capital funding agreement to begin July 2010
2009-2010	Begin engineering and project development activities for rail car, power systems and storage facilities
2011-2015	Implement power and facility improvements and rail car procurement
2015-2020	Expand rail fleet to allow 75% and 100% 8-car train service

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Ridership & Capacity Analysis Issues Identified

- Issues identified for improvements
  - **Forecasts over-predicted the ridership impact of Blue-Yellow Line split**
  - **Some stations showed ridership growth patterns inconsistent with land use projections**
  - **Lack of validation data for passenger transfers at major transfer stations**
  - **Parking demand projections did not respond to increases in parking charge and gas price**
  - **Difficulty in assessing platform capacity: too many parameters**
  - **Difficulty in assessing walking/biking access conditions for a system level study**
  - **Ongoing refinements of the WMATA post-processing**

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For more information …

More information on Metrorail ridership and capacity needs is available at:

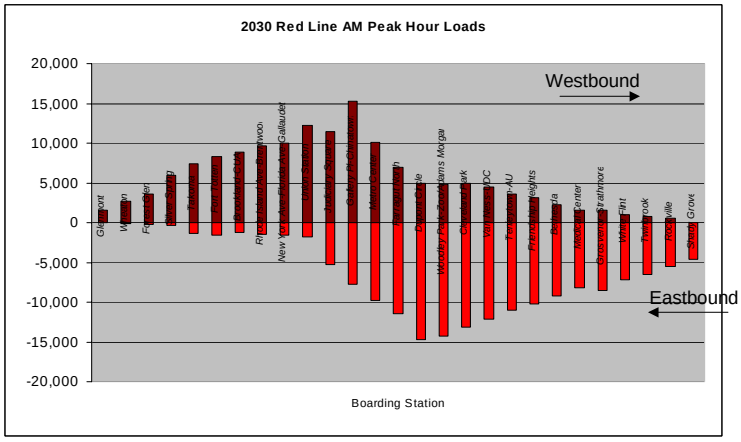
www.wmata.com

About Metro / Planning & Development / Metrorail Plans / Station Access & Capacity Study (April 2008)

Red Line

AM Peak Hour Passenger Flow:

- Continuous high volume eastbound from Telneytown to Farragut North



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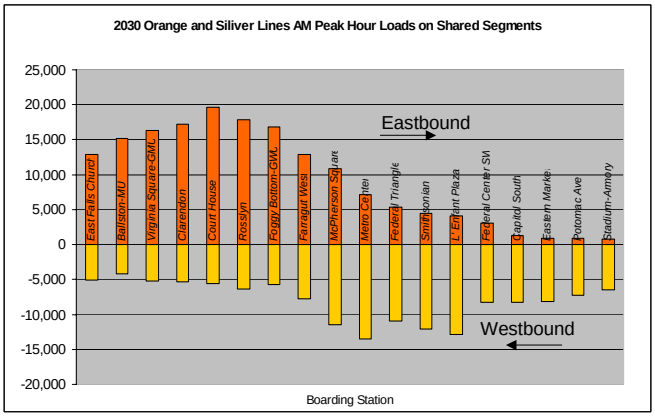
Orange/Silver Lines

AM Peak Hour Passenger Flow

- 2030 am peak hour passenger flow could reach 20,000 at Courthouse
- It might even reach 22,000 if growth is stronger than projected



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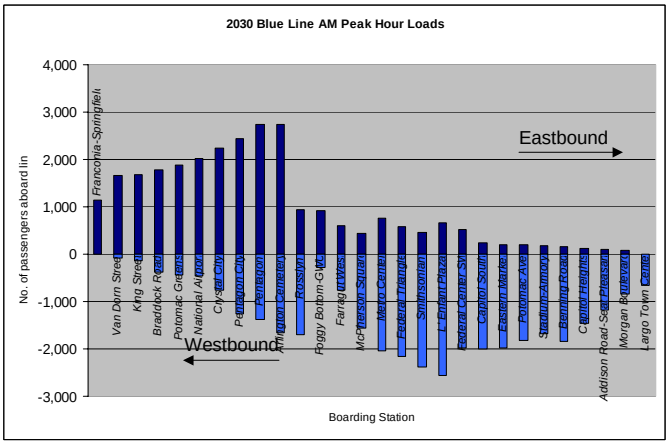
Blue Line via Rosslyn

AM Peak Hour Passenger Flow

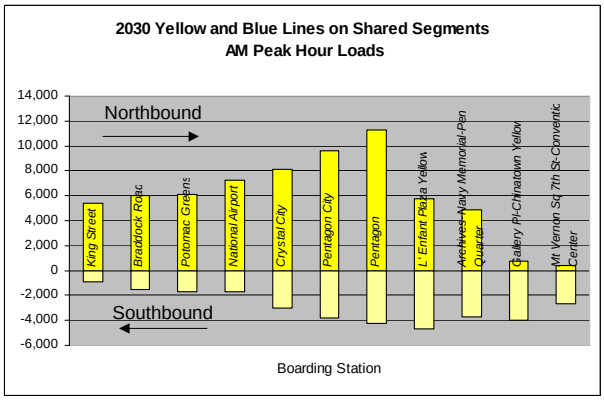
- Increased am peak trips destined to or transferring at Rosslyn on Blue Line



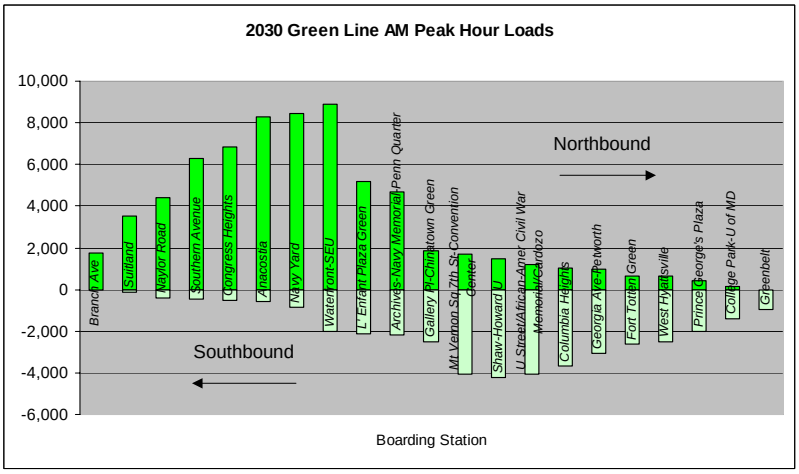
Yellow and Blue Lines

AM Peak Hour Passenger Flow

- Initial forecasts show major transfer impact on L'Enfant Plaza
- Currently conduct refinement of transfer assessment and impact of Blue Line split



Green Line



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