



Safety and Operations Committee

Board Information Item III-C

Capital Delivery Program Report

Washington Metropolitan Area Transit Authority

Board Action/Information Summary

☐ Action ☒ Information

MEAD Number:
203422

Resolution:
☐ Yes ☒ No

TITLE:

Summer '23 Capital Improvements & Modernization

PRESENTATION SUMMARY:

In summer FY23, Revenue Service Adjustments (RSA) are scheduled to aggressively increase reliability and advance system modernization for customers with the following initiatives: roofing, fiber installation, and rail replacement on the Orange Line; fiber installation on the Green Line; modernizing Passenger Information Displays (PIDS) in downtown transfer stations; and replacing vertical transportation at the Dupont Station North entrance.

PURPOSE:

To update the Board on the schedule for capital work events for Summer FY23 which allow capital improvements and modernization throughout five key areas of the rail system.

DESCRIPTION:

WMATA continues to improve the reliability of its system by executing plans supporting five major initiatives:

1. Roofing work on the Orange Line,
2. Replacement of potentially defective high alloy rail (manufactured by HAY) installed in 1982 throughout the western Orange Line,
3. Installation of fiber on the Orange Line and on the Green Line,
4. Modernizing Passenger Displays in the downtown transfer stations, and
5. Replacing vertical transportation at the Dupont Station North entrance.

Effective execution of the five initiatives requires planned, scheduled RSA's to perform all necessary work activities.

Key Highlights:

- Summer FY23 Orange and Green line RSAs (outages) are planned to aggressively improve reliability of the system
- Work for the outages will help address 2022 WMSC findings related to communications (radio fiber installation through the entire system) and WMATA identified concerns identified with the use of the UT inspection vehicle (HAY manufactured rail replacements)
- Work includes canopy structure improvements
- Customers will experience modernization of Passenger Displays and replacement of vertical transportation

Background and History:

HAY Manufactured Rail

In 2019, WMATA identified the root cause of a number of rail breaks and related failures between the Ballston (K04) and Vienna (K08) Stations. High alloy chemistry rail (manufactured by HAY) was determined to be linked to a high number of Ultrasonic Testing (UT) detected failures and rail breaks. The high alloy chemistry rail was installed during the original construction of the above portion of the Orange Line from in 1982. Analysis by the Authority's rail engineers determined that the rail manufactured using high alloy chemistry had a higher failure rate than the rail manufactured using non-alloy chemistry that was installed throughout the system. The higher fatigue rate of the high alloy chemistry rail is believed to be the cause of a high number of UT-identified defects and rail break failures associated with the rail manufactured by HAY. During the winter months of 2022, rail breaks along the K Line increased as compared to previous years; this was likely due to rail's tendency to fatigue over time, and the overarching accumulation of surface defects such that UT could not identify internal defects. Replacing the high alloy chemistry rail will help reduce the number of rail breaks, bobbing Automatic Train Control (ATC) track circuits, and the associated increase in testing and preventive maintenance.

Radio/Fiber

Following the WMSC's 2022 findings, WMATA is required to modernize its radio/communications system. The goal of the Radio and Master Fiber Project is to replace Metro's radio and fiber infrastructure in their entirety and to add cellular coverage throughout the underground tunnel system. This project will also advance the tagging relay project which in turn will allow for increased monitoring and control from the operations control center.

Canopy Roofing Structure Improvements

WMATA has collaborated with PEPCO to complete canopy structure work this Spring during a 10-day single track work event. The PEPCO lines are within 15 feet above the canopy structure; therefore, to safely complete the work, PEPCO will need to turn off their power feeders. This work is a continuation of

the Platforms Project and will provide structural repairs in addition to water proofing and protection of newly installed assets at Deanwood and Minnesota station.

Discussion:

WMATA's Capital Improvement Program focuses on improving the safety and reliability of the rail system for all customers and employees, improving the customer experience, and keeping the region's rail infrastructure in a state of good repair. The RSA outages scheduled for summer 2023 are key to achieving these goals.

Capital Improvements

Together, tracks 1 and 2 between Ballston (K04) and Vienna (K08) comprise 30 miles of high alloy rail that must be replaced due to a high rate of rail fatigue and UT identified defects and rail breaks. Analysis of UT data suggests that the reason for the high rate of defects and failures is the high alloy chemistry process that was used to manufacture the rail. Therefore, replacing the running rail on the Orange and Silver Lines between the Ballston and Vienna stations will help improve reliability, minimize passenger disruptions (from rail breaks and malfunctioning automatic train control track circuits), and reduce the resources required to maintain and test the running rails between the two stations. Steps are underway to help ensure that the rail replacements are completed during the scheduled outages, including:

- Purchase of additional rail
- Creation of a staging area close to the installation locations
- Performance of pre-welding activities to ensure a smooth transition
- Consideration of destressing if installation takes place in under 95°F rail temperatures

The Platforms Project, which began in 2019, entailed the rehabilitation of aging platforms and the installation of customer improvements at 20 outdoor Metrorail stations. We are continuing these improvements at Deanwood and will complete roofing of the platform canopy to provide the necessary structural repair and to waterproof and protect newly installed assets.

Modernization

The Radio and Master Fiber Project began in 2022 to improve communications and address the associated FTA finding. The improvements made under this project will help:

1. Address Metro's aging communication system and associated issues with gaps, coverage, and reliability,
2. Provide employees, first responders, and customers with the ability to call for help if needed, and

3. Provide the required communication infrastructure for other critical safety and reliability functions, including ATC, TCR Rehabilitation, Tunnel Smoke Detection, Station Modernization Enhancement (PIDs, KIDs), Power Systems, CCTV; and real-time monitoring of critical infrastructure.

The installed fiber optics cable will replace the legacy copper cable and will be used to transmit signals to various parts of the Metrorail system. Installation of fiber optics cable is already underway and will help improve the performance of WMATA's voice and data communication systems, boost connection speeds, and improve the safety, dependability, and interoperability of Metrorail and Metrobus operations. To date, WMATA has already installed over 200 miles of fiber optic cable in this area with an additional 500 miles needed to be installed.

New Passenger Information Displays (PIDs) will be replaced at Metro Center, Gallery Place/Chinatown, L'Enfant Plaza. There will be eleven (11) Mezzanines and six (6) Platforms with new digital displays. These additional PIDs will comply with current ADA guidelines and help improve the customer experience:

- Total existing PIDS: 23
- Total PIDs after Construction: 41

Existing PIDs will remain operational for continuity of communication to customers until the new infrastructure is installed and cut-over.

Outages

The planned duration of the outages are as follows:

- Orange Line – Minnesota Ave to Cheverly
 - Continuous Single Track between Stadium Armory to Cheverly from May 12, 2023 to May 22, 2023 (6 weekdays, 4 weekend days)
 - Completion of roof waterproofing at Minnesota, Deanwood and Cheverly Stations
- Orange/Silver Line – Ballston to McLean/Vienna
 - Continuous Shutdown between Ballston to Vienna/McLean from June 3, 2023 through June 26, 2023
 - Completion of running rail replacement and installation of fiber
- Orange Line – West Falls Church to Vienna
 - Continuous Shutdown between West Falls Church to Vienna from June 3, 2023 through July 17, 2023

- Completion of running rail replacement and installation of fiber
- Green Line – Fort Totten to Greenbelt
 - Continuous Shutdown between Fort Totten to Greenbelt from July 22, 2023 to September 4, 2023
 - Fiber Installations
- Metro Center, Gallery Place/Chinatown, L'Enfant Plaza
 - Replace PIDs on 11 Mezzanines and 6 Platforms with new digital displays
 - Minimal impact to passenger service some work will be conducted during passenger service in the off-peak hours
- Dupont Circle station's north entrance
 - Phase 1: July 27th – January 10th, 2024; replace one escalator and elevator (solid alternatives for mobility customers, entrance open with two escalators – one up, one down)
 - Phase 2: mid-January through July 2024; replace two remaining escalators (from Phase 1 have 2.5 times faster elevator and one new, reliable up-running escalator)

FUNDING IMPACT:

Funding is included in the FY23 and FY24 budget.

TIMELINE:

Previous Actions	HAY Rail — Mitigation, continue Ultrasonic Testing (UT). It identifies internal rail defects developed through fatigue. Radio — Currently fiber has been installed over 200 miles of fiber optic cable system-wide.
Anticipated actions after presentation	Coordination with communications to notify public of upcoming outages.

Summer of 2023 Capital Program Initiatives

Proposed Summer Outages to Increase
Reliability and Advance Modernization

Safety & Operations Committee
January 26, 2023



Purpose

- To aggressively increase reliability and advance system modernization for customers with five major initiatives: roofing work on the Orange Line, fiber installation and rail replacement on the Orange Line, fiber installation on the Green Line, modernizing Passenger Displays in the downtown transfer stations and replacing vertical transportation at the Dupont Station North entrance

Background

- Started major outages in 2016 to address safety challenges
- In 2017, continued major outage focus on safety matters and reliability
- In 2023, as the health of infrastructure has improved, focus on reliability and modernization
- Alternatives analysis: continue to balance speed / cost of delivery vs. customer impact vs. long term gains

Orange Line – Minnesota Ave to Cheverly

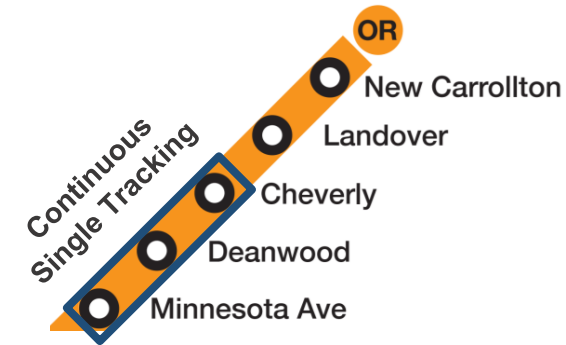
- Completion of roof waterproofing at Minnesota, Deanwood and Cheverly Stations
- Power transmission lines run above parts of these stations
- These lines can only be deenergized in the Spring / Fall due to the critical nature to PEPCO's mission
- During the Summer of 2022 shutdown, completed all work that could safely be done without deenergizing PEPCO's power lines



Orange Line – Minnesota Ave to Cheverly

Preferred Option: Continuous Single Track between Stadium Armory to Cheverly from May 12, 2023, to May 22, 2023

	Continuous Single Track	Continuous Shutdown	Alternatives
Duration	10-day Single Track	10 day	<u>Weekend Single Tracking and Early Outs</u> : can't complete in restricted time frame
Estimated Cost	Setup/Restore: \$131K	Setup/Restore: \$131K	
	Support Cost: \$356K	Support Cost: \$356K	
	BUS Support: -	BUS Support: \$439K	
	Revenue Loss: (\$110K)	Revenue Loss: (\$110K)	
	Total: \$597K	Total: \$1.04M	
Customer Impact	Specific headways being developed, anticipated headways will be faster than express bus from New Carrollton to Stadium-Armory	30-35 minute increase in travel time between New Carrollton and Stadium Armory	



Orange/Silver Line – Ballston to McLean/Vienna

- Completion of 30 miles of running rail replacement and installation of fiber
- Between Ballston and Vienna existing running rail is significantly less reliable and experiences more rail breaks than any other part of the system and is 40 years old

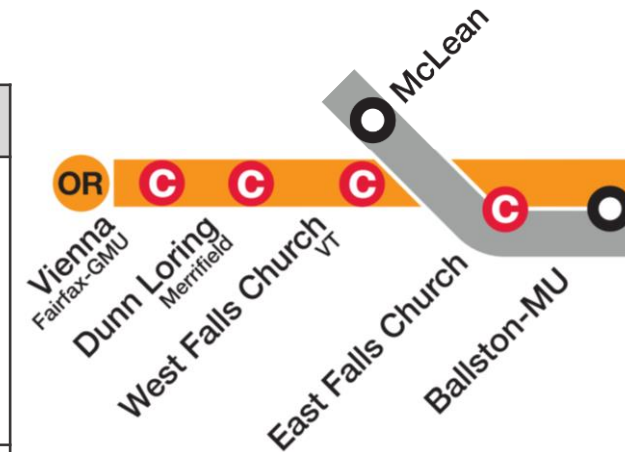


Rail Break and Defect Page 38 of 59

Orange/Silver Line – Ballston to McLean/Vienna

Preferred Option: Continuous Shutdown between Ballston to Vienna/McLean from June 3, 2023, through June 26, 2023

	Continuous Shutdown	Weekend Shutdown	Alternatives
Duration	23-day Shutdown	4 months of continuous weekend shutdowns (15 weekends)	<u>Single Tracking and Early Outs</u> : Single tracking not recommended as the old rail causes track circuit failures that significantly impact customers
Estimated Support Cost	Setup/Restore: \$131K	Setup/Restore: \$2.0M	
	Work Support: \$691K	Work Support: \$2.7M	
	BUS Support: \$1.4M	BUS Support: \$1.5M	
	Revenue Loss: (\$600K)	Revenue Loss: (\$260K)	
	Total: \$2.8M	Total: \$6.4M	
Customer Impact	Bus shuttle: Vienna to Ballston (Orange) and McLean to Ballston (Silver), other headways approximately normal	Bus shuttle: West Falls Church to Ballston (Orange) and McLean to Ballston (Silver), other headways approximately normal	



Orange Line – West Falls Church to Vienna

Preferred Option: Continuous Shutdown between West Falls Church to Vienna from June 3, 2023, through July 17, 2023

	Continuous Shutdown	Weekend Shutdown	Alternatives
Duration	44-day Shutdown	6 months of continuous weekend shutdowns (25 weekends)	<u>Single Tracking and Early Outs</u> : Single tracking not recommended as the old rail causes track circuit failures that significantly impact customers
Estimated Support Cost	Setup/Restore: \$131K	Setup/Restore: \$3.3M	
	Work Support: \$1.2M	Work Support: \$4.5M	
	BUS Support: \$2.2M	BUS Support: \$1.9M	
	Revenue Loss: (\$900K)	Revenue Loss: (\$280K)	
	Total: \$4.2M	Total: \$10.0M	
Customer Impact	Bus shuttle: Vienna to Dunn Loring, other headways normal	Bus shuttle: Vienna to West Falls Church, other headways normal	



Green Line – Fort Totten to Greenbelt

- Completion of fiber installation to advance many technologies that rely on fiber (radio and tagging relay)
- Primary goals are more aggressively completing the radio and tagging relay projects
- Work can only be done during shutdowns
- Fiber project not awarded until well after the Summer of 2021 shutdown

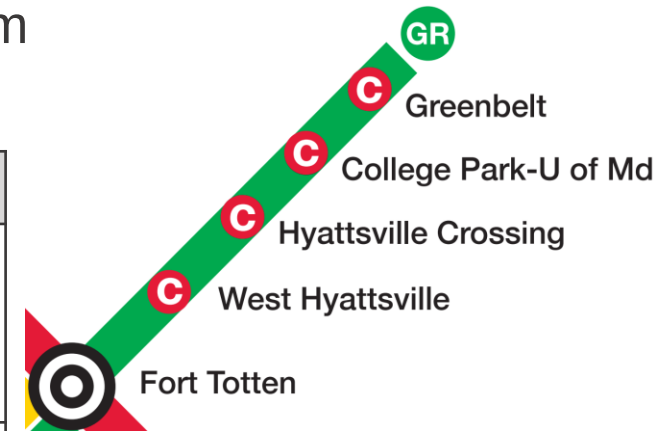


Fiber Installation

Green Line – Fort Totten to Greenbelt

Preferred Option: Continuous Shutdown between Fort Totten to Greenbelt from July 22, 2023, to September 4, 2023

	Continuous Shutdown	Weekend Shutdown	Alternatives
Duration	44-day Shutdown	6 months of continuous weekend shutdowns (25 weekends)	<u>Single Tracking and Early Outs</u> : Not possible based on location of duct banks in middle of tracks
Estimated Support Cost	Setup/Restore: \$131K	Setup/Restore: \$3.3M	
	Work Support: \$1.2M	Work Support: \$4.5M	
	BUS Support: \$5.2M	BUS Support: \$5.3M	
	Revenue Loss: (\$1.6M)	Revenue Loss: (\$650K)	
	Total: \$8.1M	Total: \$13.8M	
Customer Impact	Bus Shuttle: Greenbelt to Fort Totten, other stations approximately normal headways	Bus Shuttle: Greenbelt to Fort Totten, other stations approximately normal headways	



New Passenger Information Displays (PIDs)

Three Downtown Transfer Stations

- PID Replacement at Metro Center, Gallery Place/Chinatown, L'Enfant Plaza:
 - Minimal impact to passenger service
 - Start in May 2023 and completed by September 2023
- Replace PIDs on 11 Mezzanines and 6 Platforms and add more PIDS
 - Total existing PIDS: 23
 - Total PIDs after Construction: 41
- Existing PIDs will remain operational for until the new infrastructure is installed and cut-over



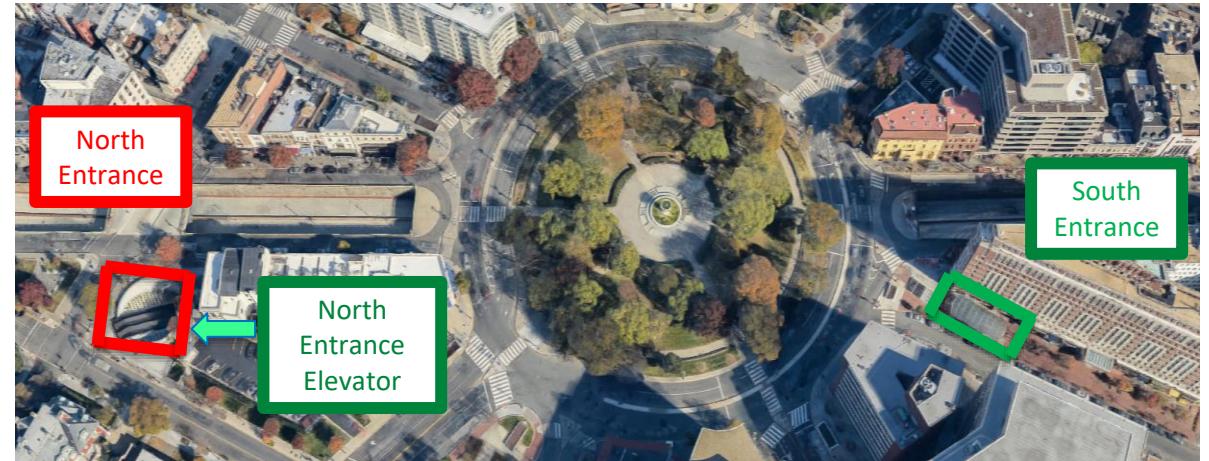
*L'Enfant Plaza Upper-Level
Platform Existing PID*



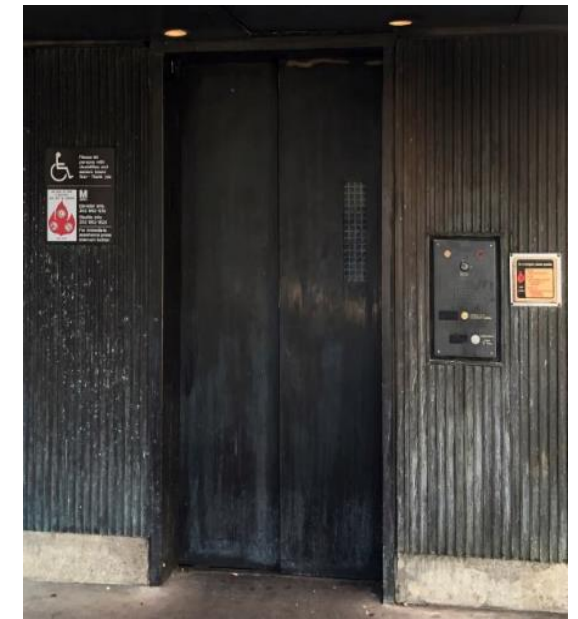
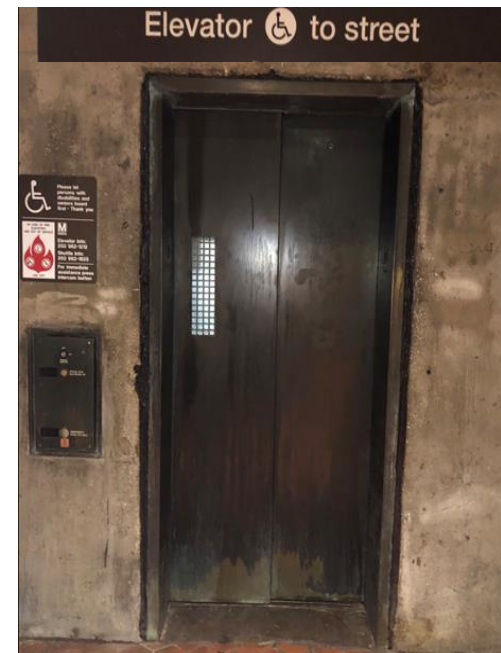
*West Hyattsville Platform
New PID*

Dupont Circle Escalator Replacements

- Three escalators at Dupont Circle station's north entrance:
 - 45 years old, exposed to the elements prior to Summer of 2022
 - 95' rise (sixth longest in system), bottom 10% for reliability
- Preferred option:
 - Phase 1: July 27 – January 10, 2024; replace one escalator and elevator (solid alternatives for mobility customers, entrance open with two escalators – one up, one down)
 - Phase 2: mid-January through July 2024; replace two remaining escalators (from Phase 1 have 2.5 times faster elevator and one new, reliable up-running escalator)

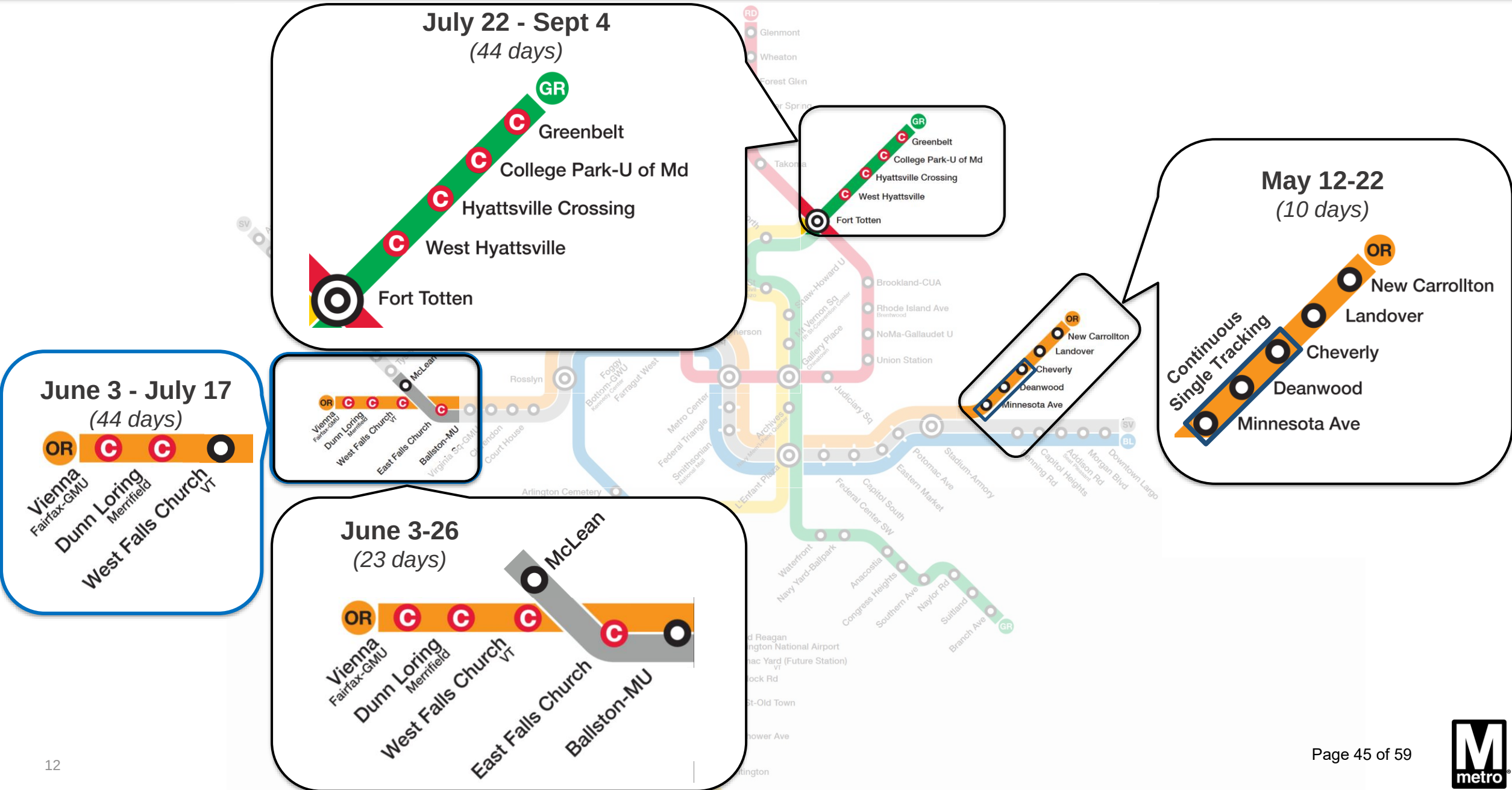


DuPont Circle Entrances



North Entrance Elevator Platform and Street Level Facades

Summer 2023 Outages



Future Outages

- Red Line – Dupont Circle to Union Station
 - Required for major structural work at Farragut North and switch replacement at Judiciary Square
 - Estimated Date – Holiday Season: December 2023 – January 2024

Next Steps

- Begin extensive coordination with impacted stakeholders and local officials to develop alternative service plans
- Deliver detailed service plan ~ 90 days prior to start of each event
- Brief Board within next few months on longer term capital work plan