The Bulletin

Electric Railroaders' Association, Incorporated

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The Bulletin

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This Month's Cover Photo:
R-12/14s (American Car and Foundry, 1948-49) entering the 111th Street station on the IRT Flushing Line on December 8, 1956. R-15 6213 (American Car and Foundry, 1950) is on the north end of a layup.
Unknown photographer,

In This Issue: New Rolling Stock for Paris RER Lines B, D and E…Page 19

RON YEE, 1957-2021
by Alexander Ivanoff

Ron Yee with a tram in Kagoshima, Japan on January 22, 2020.
Lily Yee photograph

ERA Second Vice-President Ronald J.F. Yee (ERA #5169) passed away on October 29, 2021 after a brief illness. He was 64 years old.

Ron was born on April 5, 1957 in New York City to Walter and Betty Yee and from an early age developed a love for electric traction and railroading. He was introduced to trains from an early age, his father having gotten Ron a Lionel O-Gauge train set for the Christmas holidays at the young age of al-

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THE BOARD OF DIRECTORS EXPRESSES ITS DEEPEST APPRECIATION FOR 97 MEMBER DONATIONS IN OCTOBER, 2021

AMOUNT	DONOR(S)			
$1,000	Lewis Hitch			
$200 to $300	Sidney Keyles	Charles Long	Rev. Joseph Pranzo	Victor Spector
$100 to $199	Roland Bell	Robert Fried	David Levine	John Pesult
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	Bruce Elfreth	Richard Levin	Peter Samson	Barry Zuckerman
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ERA is a 501(c)(3) tax exempt corporation. Your donations are fully tax deductible and can be made either with your 2022 renewal, or by using our donation form on our website: www.erausa.org/donate. Your donation helps to maintain ERA's 87-year-long tradition of traction education and entertainment!

NORTH AMERICAN TRANSIT PROJECT OPENINGS IN 2021
by Randy Glucksman

Eighteen projects were proposed for completion this year, including five holdovers. Eleven were delayed to 2022 and one each to 2023 and 2024. Various causes, such as staffing shortages and lack of materials due to COVID-19, were cited as reasons for many of the delays. Recently the Green Line Extensions were scheduled as two separate dates, with the one-station extension to Union Square scheduled to open this month, but that too was moved, to Spring, 2022.

DATE	AGENCY	CITY	TYPE	LINE	DETAILS	NOTES
January 1	New York State Empire Development Corporation	New York, New York	LD CR	Northeast Corridor	Moynihan Train Hall Opens	
April 12	Dallas Area Regional Transit	Irving, Texas	LR	Orange	Hidden Ridge (infill) station opens	Not included in original list
August 30	Charlotte Area Transit System	Charlotte, North Carolina	LR	Gold Phase II	Charlotte Transportation Center to French Street 2.5 miles, 12 stations	From 2020
October 2	Sound Transit	Seattle, Washington	LR	Northgate	University of Washington Stadium to Northgate 4.3 miles, 3 stations	
November 20	MTA Long Island Rail Road	Elmont, New York	CR	Main	Elmont (infill) station south (eastbound) platform	
November 21	San Diego MTD	San Diego, California	LR	Mid Coast Corridor (Blue)	Old Town to USC San Diego 10.92 miles, 9 stations	

Legend:
CR Commuter Rail
LD Long Distance
LR Light Rail

AGENCY	PROJECT	AGENCY	PROJECT
Delayed to 2022		**Delayed to 2023**	
MBTA	Green Line - Union Square	Honolulu Authority for Rapid Transit	Honolulu Rail Transit Phase I
MBTA	Green Line - Medford Branch		
BrightLine	Aventura Station Opening	**Delayed to 2024**	
Edmonton Transit	Valley Line Phase I	Caltrain	Electrification - San Francisco to Tamien
Edmonton Transit	Southeast LRT		
Los Angeles MTA	Crenshaw/LAX Transit Corridor		
SEPTA	Extension to Wawa		
Sonoma-Marin Area Rail Transit	Extension to Windsor		
Tri-Rail	Extension to MiamiCentral		
Valley Metro Rail	Tempe Streetcar		
WMATA	Silver Line Extension to Dulles International Airport		

SUBDIVISION "B" CAR ASSIGNMENTS
CARS REQUIRED NOVEMBER 1, 2021

The following have changed since the assignments that appeared in the August, 2021 ***Bulletin***:

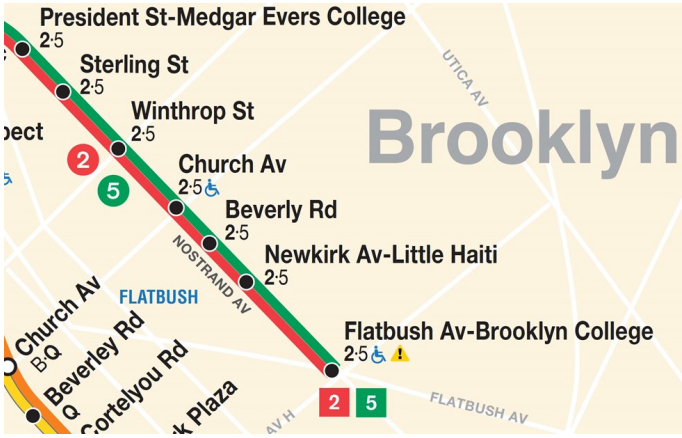
LINE	AM RUSH	PM RUSH	LINE	AM RUSH	PM RUSH
G	65 R-160B-2	65 R-160B-2	N/W	176 R-46, 72 R-68, 16 R-68A	176 R-46, 72 R-68, 16 R-68A

Rail News in Review

New York Metropolitan Area

MTA New York City Transit

On November 18 the Newkirk Avenue 2 5 subway station was renamed as Newkirk Avenue-Little Haiti. The name change reflects the station's location in a section of Flatbush, which is home to New York City's thriving Haitian-American community. The proposal to rename the station is a result of legislation included in the 2021-2022 FY Enacted New York State Budget sponsored by Assembly Member Rodneyse Bichotte Hermelyn and State Senator Kevin Parker, who both represent the neighborhood in Brooklyn.



Inset of the November, 2021 edition of the subway map showing the renamed station.

The Legislature provided funding for the costs of new signage and alterations to maps in the station and on subway cars to reflect the name change, as well as to update the audio systems on platforms and in trains. The renaming is one element in a broader civic project known as the Little Haiti Brooklyn initiative that aims to honor the neighborhood's unique Haitian roots while also bolstering economic development in the area. (MTA press release, November 18)

Speaking of the subway map, a new edition was released last month. It is dated November, 2021, covers all four versions of the map (standard, night, accessible stations and large type) and, most notably, was reformatted. Most of the station names are now shown perfectly horizontal and on a single line of type. In addition, three of the long-term service changes are shown in "call-outs." These include the closures of 181st Street 1 and Clark Street 2 3 for elevator replacement and the suspension of D service between Bay 50th Street and Coney Island-Stillwell Avenue. In addition, the new map shows the free transfer between 42nd Street-Bryant Park B D F M and Times Square-42nd Street N Q R S W 1 2 3 7 for the first time.

Clear-Vu Lighting successfully designed and installed clearNET, the first IOT-based (Internet of Things) wireless monitoring and control system for emergency lighting and other mission critical life safety assets in subway tunnels in the Rutgers Tubes, on the F Line between Manhattan and Brooklyn.

The clearNET system, employed in conjunction with the MTLx LED tunnel light fixture, enables capabilities previously unattainable in transit environments, significantly improving the safety for passengers, workers and first responders, while also realizing energy savings and improving operational efficiencies for transit agencies.

One of the two Rutgers Tubes showing the new tunnel lighting system.
Clear-Vu Lighting photograph

Specifically, the clearNET system incorporates remote asset management via wireless monitoring of fixture and/or battery health; control to instantly change tunnel illumination from NFPA130 emergency light levels up to OSHA 1926 light levels for transit worker safety during inspections, maintenance, construction and evacuations; and a thermal alarm system to provide awareness of potentially dangerous conditions in the tunnels in the absence of traditional fire alarms.

On the Rutgers Tube project, the clearNET + MTLx system generated combined capital and operating savings of $2,744,113 between materials, electricity, maintenance labor and efficiencies tied to the work light function. In addition to the benefits tied to the clearNET system, the illumination levels produced by the MTLx light fixture in the Rutgers Tubes will be four times the standard level throughout the legacy New York City Transit tunnel system for improved visibility. (***Mass Transit***, November 8)

A federally funded contract was awarded to Brookville Equipment Corporation for the conversion of a total of four retired R-110A test fleet passenger railcars into two pump trains to be used for flooding mitigation.

Each pump and generator car set will include one pump car and one generator car to be used in consist with NYCT's existing hose and reach cars to pump water out of the subway system tunnels during special pe-

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riods of emergency response, including following hurricanes and periods of unusually heavy rainfall.

Each pump car will feature a five-pump arrangement, including four inline submersible pumps and one horizontal pump to mitigate water in the subway tunnels. The submersible pumps will work to remove the water from the tunnel, while the horizontal pump will be utilized to pull water in especially low areas when the pump car itself is not submerged. Pumps will be individually controlled through independent motor starters.

Each generator car will utilize a proven, certified EPA Tier 4 diesel engine and connected alternator to power the pumps and auxiliary equipment. Each generator car will also contain an operator control panel, batteries for engine start, solar panels and automatic fire suppression system.

The cars will be connected via a 480V, three-phase trainline system. Additionally, Brookville will supply 480V trainline kits to retrofit the existing hose and reach cars in order to connect them to the converted pump and generator cars. All cars will also receive new 70-ton trucks designed for freight applications.

In addition to the pump and generator car sets, Brookville will provide testing, training, spare parts, and warranty support for the cars. (***Mass Transit***, November 16)

MTA Long Island Rail Road

MTA Construction & Development has completed the replacement of a 40-year-old electrical substation in New Cassel (Substation G19), one of eight along the Main Line corridor being replaced or upgraded as part of the LIRR Expansion Project between Floral Park and Hicksville.

Newly-rebuilt Substation G19, located in New Cassel on the LIRR Main Line.
MTA photograph

Located at Broadway and Bond Street north of the LIRR, the previous substation was nearing the end of its operational life. Its replacement is enabling the extra power needed to operate the additional trains as the LIRR increases service following the LIRR Main Line Expansion. It will accommodate the new third track and enable future growth of the LIRR.

There are 104 substations on the LIRR across all areas of the railroad's electrified territory. At each of these substations, AC voltage is converted to DC voltage and safely fed to the third rail out on the tracks. This electrical power then energizes each train's traction motors, which propel the train.

Substations are strategically replaced as part of every capital program, typically based on age and/or state of good repair. Substations may also be upgraded or replaced as part of a larger project initiative, such as the LIRR Expansion Project and East Side Access.

MTA Construction & Development is currently working to replace substations in New Hyde Park, Garden City/Garden City Park, Mineola, Carle Place, Westbury and Hicksville. (MTA press release, October 28)

On October 31, Governor Kathy Hochul and other executives from the MTA and Long Island Rail Road rode a test train from Jamaica to Grand Central Terminal via East Side Access, which is officially known as the Grand Central Terminal Branch. Scheduled to open one year from now, December, 2022, the Grand Central Terminal Branch is about four miles long, from the bumping posts at around E. 38th Street to the tunnel portals in Sunnyside, Queens.

The test train, composed of Kawaskai Rail Car-built M9s, at Grand Central Terminal on October 31.
Marc Hermann/MTA photograph

On November 16, Governor Kathy Hochul announced the Long Island Rail Road Elmont station, the first new LIRR station in almost 50 years, will open for service on Saturday, November 20. The beginning of service will coincide with the New York Islanders' first home game at UBS Arena. The Elmont station will initially offer eastbound service to the new home of the New York Islanders, UBS Arena, as well as nearby Belmont Park, which retains its own dedicated station.

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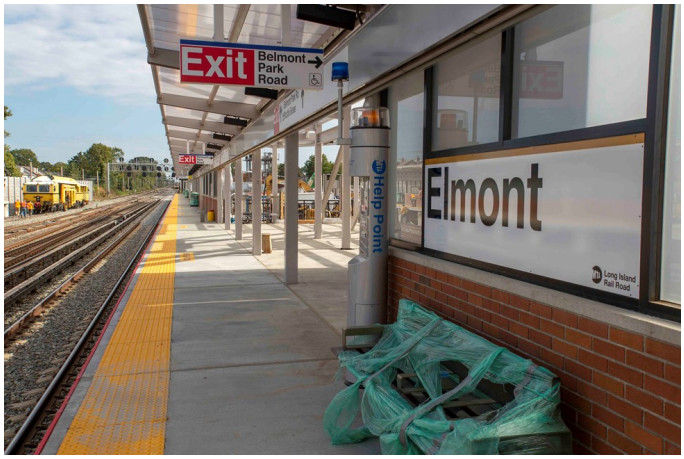
View west of the new Elmont (now Elmont-UBS Arena) station on October 24.
Jeff Erlitz photograph

Service at the station will increase next Summer when the westbound platform opens. At that time, the station will begin full-time year-round service to the local community and will begin to provide westbound service to and from events at UBS Arena and Belmont Park. Long Islanders who live east of Belmont on the Hempstead, Oyster Bay, Port Jefferson and Ronkonkoma Branches will have a one-seat ride straight to events for the first time. This will reduce travel times and is expected to increase the number of event attendees who use public transportation, helping alleviate traffic congestion on Long Island.



View east of the new Elmont station's eastbound platform on October 24. This is the platform that was placed into service on November 20.
Jeff Erlitz photograph

When both platforms are complete, the new station will feature two 12-car-long high-level platforms with canopies, elevators that are compliant with the Americans with Disabilities Act, a pedestrian overpass, USB charging stations, Help Points, security cameras, digital signs with train arrival information, Wi-Fi and a state-of-the-art snow melting system embedded in the concrete of the platforms to ensure they remain free of snow and ice during winter storms. (MTA press release, November 16)

The following day it was announced that the station name was being changed to "Elmont-UBS Arena." On November 17 the MTA Board approved an agreement with New York Arena Partners to name the Elmont Long Island Rail Road station as Elmont-UBS Arena. The 10-year, $1.75-million contract with New York Arena Partners will also cover all costs associated with the creation of new station signage and change signage at end of term. (MTA press release, November 17)

MTA Metro-North Railroad

At a press conference on November 1, Governor Kathy Hochul announced the completion of the full-scale $95 million renewal of Metro-North Railroad's station in downtown White Plains, which has transformed the station into a state-of-the art complex. The renovation began in 2018 as part of Metro-North's Station Improvement Initiative to bring a more passenger friendly atmosphere for commuters.

The top-to-bottom station transformation included a refurbishment of the station's main entrance at the station plaza, the Main Street entrance, the Hamilton Avenue entrance, and the Mott Street tunnel. The station was remodeled to bring an updated, modern aesthetic to the station, including updated signage, glass entrances, wood soffits, a widened main lobby, improved lighting and upgraded HVAC system. The side and island platforms were extended to increase capacity as more commuters return to the system.

The rebuilt White Plains station on Metro-North's Harlem Line.
Marc Hermann/MTA photograph

Crews installed a new elevator that is fully compliant with the Americans with Disabilities Act. The elevator leads from the main lobby to a side platform generally used for northbound arrivals.

The project included construction of new staircases with an automatic system to melt snow and ice as it falls, helping to prevent slippery surfaces during the inclement weather. Crews also installed new platform

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canopies with wood ceilings, and LED lighting to match the upgraded aesthetic of the main lobby.

The waiting room on the island platform was remodeled with expanded space, glass enclosures with new interior station wall panels, wood ceiling and fixtures. The ticket office, restrooms and concession spaces were also remodeled to fit the station's new feel. Digital screens were installed in addition to better heating and cooling control so commuters can comfortably wait for their train.

Commuters looking to get work done on-the-go will also notice added amenities throughout the station such as Wi-Fi and cellular connectivity and USB chargers on benches. Digital screens were added on platforms as well to provide convenient access to train information. The digital signage complements newly installed ticket vending machines to make the station environment even more passenger friendly.

The renovated station also includes new mosaic and laminated glass artwork by artist Barbara Takenaga featuring the artist's signature stylized abstract forms.

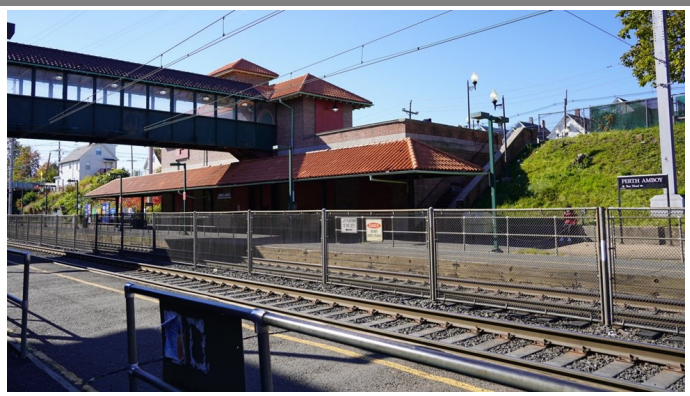
The White Plains station is the third largest Metro-North station, serving more than 12,000 commuters on a pre-pandemic weekday, trailing only Stamford and Grand Central Terminal. Like the Stamford station on the New Haven Line, the White Plains station is a hub station for Harlem Line commuters, providing express and local service. In addition to local and express connections, the station is also a hub for bus connections, with approximately 3,000 bus transfers per day in pre-pandemic times.

The project was part of Metro-North's Station Improvement Initiative, funded by the MTA's 2015-2019 and 2020-2024 Capital Programs. (MTA press release, November 1)

NJ Transit

The NJ Transit Board of Directors advanced major renovations to the Perth Amboy train station with the awarding of a construction contract. The improvements include making the station fully accessible with high-level platforms, elevators and ramps in addition to other upgrades throughout the historic facility. The $45,545,000 contract was awarded to Hall Construction Company, Incorporated of Wall, New Jersey to perform the work.

The Perth Amboy station, which was built in 1927, is located at Smith and Market streets near the Raritan River. The project calls for the construction of two new high-level platforms as well as four new elevators and additional ramps and stairs providing access to the platforms. Upon completion of the project, the station will meet the requirements under the federal Americans with Disabilities Act (ADA). Other improvements include renovation of restrooms, the installation of upgraded security cameras, as well as repairs to both the eastbound and westbound buildings as well as to the pedestrian bridge.



The Perth Amboy station on NJ Transit's North Jersey Coast Line.
NJ Transit/***Mass Transit*** photograph

The Perth Amboy station served an average of 874 weekday customer trips before the pandemic. The station, which has been listed in the National Register of Historic Places since 1984, is built in the Renaissance Revival architectural style. The station's distinctive design elements will be preserved in the newly designed station.

The Perth Amboy project is included in NJ Transit's five-year capital plan, which was launched, along with the agency's first ever Ten-Year Strategic Plan (2030), in June, 2020. The total project cost is estimated at approximately $63 million, with completion expected in the first half of 2024.

NJ Transit is undertaking an ambitious plan to upgrade many of its older rail facilities.

Construction recently began on a project to replace the century-old Lyndhurst station with a new, modern and compliant station which fits the character of the area it serves. (***Mass Transit***, November 11)

Other Systems

Washington, D.C. area

Maryland Transit Solutions (MTS), a team comprised of Dragados USA Incorporated and OHL USA Incorporated, has been selected to be the design-build contractor to complete the Purple Line after a joint evaluation by Purple Line Transit Partners (PLTP), the Maryland Department of Transportation (MDOT) and the Maryland Transit Administration (MTA).

MTS was one of three teams shortlisted to bid on the 16-mile light-rail project. The other two teams were a joint-venture of Tutor-Perini and Lunda and Halmar International, which opted not to submit a bid.

The contract with MTS needs to be finalized and approved by the Maryland Board of Public Works (BPW). It is anticipated MTS will mobilize and resume full-scale construction of the Purple Line next Spring.

MDOT MTA says it intends to return to BPW with the selected contractor, replacement design-build contract and amended P3 Agreement, which will include an updated project cost and schedule for completion. Commercial and financial close is anticipated in February, 2022 and is dependent on BPW's approval.

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The project was nearly derailed by litigation, which was eventually settled with a $250 million agreement between parties and the exit of the project's original contractor. PLTP holds the public-private partnership agreement with MDOT MTA to design, build, finance and operate the light-rail project. The team is comprised of Meridiam and Star America.

When it opens, the 21-station Purple Line will run between Bethesda, Maryland and New Carrollton and provide connections to Red, Green and Orange Metrorail lines, MARC and Amtrak rail services, as well as local buses. (***Mass Transit***, November 8)

LRVs for the future Purple Line are being built by CAF.
Maryland Transit Administration photograph

In other District news, the Metropolitan Washington Airports Authority (MWAA) said the Metrorail Silver Line Phase 2 extension project has reached substantial completion. The construction milestone is required before operational readiness testing can be completed, and the project turned over to Washington Metropolitan Area Transit Authority (WMATA).

Phase 1 of the Silver Line opened in 2014, extending Metrorail service from East Falls Church to the eastern edge of Reston. Phase 2 added 11.5 miles of track from the Wiehle-Reston East Station to its Loudoun County terminus with six stations along the route.

The Dulles International Airport station on WMATA's Silver Line as seen in 2019.
Capital Rail Constructors photograph

MWAA, which managed the construction of the extension, explains the Silver Line's goal is to help ease traffic congestion by providing alternative routes and easier commuting times, access to regional entertainment, shopping and Dulles Airport.

Phase 2 was built by Capital Rail Constructors, which is a Clark Construction and Kiewit joint venture. The project also includes a 90-acre rail maintenance yard at Dulles International Airport, which was built by Hensel Phelps and is also nearing completion under a separate contract.

Washington Metrorail Safety Commission (WMSC), which oversees and enforces safety on the Metrorail system, tweeted during its Oct. 26 meeting that it had 20 open items it was tracking as part of its pre-revenue service review Part 1 with all items having an agreed upon path toward resolution. WMATA is still determining an estimated revenue service date for the line. (***Mass Transit***, November 9)

Chicago, Illinois

The CTA's new Red-Purple Bypass was placed in revenue service on Friday, November 19, limiting delays and making service more reliable, the transportation authority says.

The bypass, which cost $320 million to build, will allow the CTA to add trains during the busiest commute periods, and eliminates a 114-year-old rail junction that had become a chokepoint for service across the rail system. It's the first major improvement completed as part of the $2.1 billion Red and Purple Modernization project.

Kimball-bound Brown Line trains will now be carried over Red and Purple line tracks just north of Belmont station. It was the first new section of track added to the CTA system in 28 years.

View northwest of the new flyover for the Brown Line, north of the Belmont station.
CTA photograph

When the bypass went into service at 4 AM that day, there were minor boarding changes at Belmont.

Kimball-bound Brown Line trains board on the outer track of the Howard-, Linden- and Kimball-bound platform at the Belmont station. Linden-bound Purple Line Express trains continue to board and exit on the inner track, normally used by the Red Line.

The bypass project also included noise-reduction

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walls at the street level, as well as lighting and street pavers. It is the latest modernization to the Red Line, which serves 30% of all CTA rail customers and is the CTA's busiest line.

The Red and Purple Modernization project, which is funded through a transit tax increment financing district, is the largest reconstruction project in CTA history, the transportation authority said.

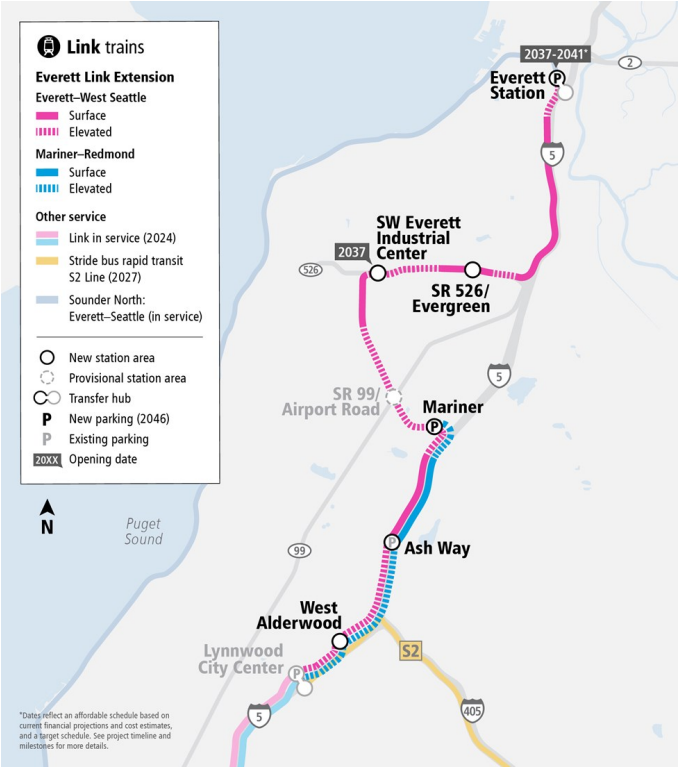
Next up, the CTA will begin to demolish, rebuild and realign the Red and Purple Line tracks between the Belmont station and West Cornelia Avenue. The tracks are more than a century old, the CTA said, and contain a curve that often slows train speeds.

The CTA expects the new Purple and Red Line tracks to be complete by the end of 2024. (***Chicago Sun-Times***, November 18)

Seattle, Washington

Sound Transit has begun scoping work for a possible regional light-rail extension in Everett, Washington.

The extension would include 16 miles of elevated and at-grade rail from the Lynnwood City Center station.



Map of the Everett Link Extension.
Everett Link Extension website map

Six new Link station locations, as well as a provisional and unfunded seventh station, will be studied during the planning process. A new operations and maintenance facility is included in the project, which if it goes ahead, will open in 2034 and support the light-rail system.

The extension itself would be expected to open in 2037, but $600 million in additional funding is needed first for that to happen — otherwise, the timeframe projects a 2041 opening for the Everett station.

This is just one piece of Sound Transit's overarching goal to extend light rail in nearly all directions to form a 116-mile regional system. The agency has recently opened several new stations with more on the way in 2023 and 2024. More information can be found on the agency's website. (***Progressive Railroading***, November 3)

Calgary, Alberta, Canada

The city of Calgary has awarded a contract to CAF to supply light-rail vehicles for the city's Green Line Light-Rail Transit (LRT) Project – the largest infrastructure project in Calgary's history.

The 12.4-mile LRT project will be constructed in two phases with the first connecting 11.18 miles between Shepard to Eau Clare. The second phase will construct the final 1.24 miles from Eau Clare to 16th Avenue North.

Rendering of Calgary's new CAF Urbos 100 LRVs.
CAF rendering

The Green Line LRVs will be the first project that CAF has completed in Canada. While the vehicle manufacturer may be new, the technology built into the LRV is well proven with low-floor LRVs across Canada and the United States.

CAF will supply 28 modern, low floor Urbos 100 vehicles for the project, which Calgary explains will improve accessibility, reduce station footprint and enhance safety for pedestrians and vehicles. The contract includes tools and support for operating and maintaining the new fleet and includes an option to procure additional vehicles for future phases of the Green Line project.

When the first phase of the project opens, it is expected to connect more than 55,000 riders to Calgary's transit network. (***Mass Transit***, November 19)

Berlin, Germany

On October 31, the Berlin Transport Authority (BVG-Berliner Verkehrsbetriebe) opened a connecting stretch of tramway on the southeast side of the city, in the Johannisthal/Adlershof neighborhood of the Treptow-Köpenick district. Measuring 1.66 miles long, it connects the S-Bahn station at Schöneweide with the former loop

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terminal at Karl-Ziegler-Straße.

Operationally, the M17 MetroTram route was extended along the new segment from S-Schöneweide/Sterndamm to three stops past Karl-Ziegler-Straße and now terminates at S-Bhf Adlershof. This provides another tram/S-Bahn transfer point. The 63 tram was extended one stop from Karl-Ziegler-Straße to Landschaftspark Johannisthal while the 61 tram was extended from Karl-Ziegler-Straße to S-Schöneweide/Sterndamm.

Section of Berlin tramway network map showing the new extension between Sterndamm and Karl-Ziegler-Straße.
BVG map

With this extension, there is now a loop between here and the center of Köpenick. (***International Railway Journal***, November 2)

Basel, Switzerland

Baselland Transport (BLT) has awarded Stadler a SFr 125m ($U.S. 140 million) contract for 25 LRVs, which will enter service from December, 2023 with the final vehicles in service during 2025.

Rendering of Baselland Transport's new Stadler vehicles.
BLT rendering

The Swiss manufacturer was selected as the preferred bidder for the contract in February, with the contract confirmed on November 12 after the BLT Board of Directors authorized the release of credit for the procurement of the LRVs. Funding commitments have been obtained from the federal government and the cantons of Basle-Landschaft, Basle-Stadt and Solothurn.

Stadler will build the LRVs at its Bussnang facility in Switzerland and they will replace the existing Schinder LRVs dating from the mid-1980s.

The 50-mph seven-section steel-bodied vehicles will be 149 feet long and 7½ feet wide. They will feature four powered and one unpowered truck. The vehicles will have a total capacity of 268 passengers including 96 seated.

BLT will be the first Swiss operator to use Stadler's new Tina (total integrated low-floor drive) LRV. The vehicles will be 85% low-floor with step-free access.

The LRVs will be equipped with a collision warning system, CCTV, air-conditioning, large panoramic windows and an integrated passenger information system, and will be pre-equipped to allow the subsequent installation of sliding steps on all double doors. (***International Railway Journal***, November 15)

Sofia, Bulgaria

The public transport operator in Sofia has signed a contract with Pesa for another 25 Swing LRVs, the fourth contract between the companies.

Due to restrictions in Bulgaria caused by the COVID-19 pandemic, the contract was signed by post, with the final signature received on November 19.

122NaSF2 (Swing) 2327 (PESA, 10/2019), an example from a previous order.
Pesa photograph

Similar to those previously delivered to the Bulgarian capital, the low-floor, five-section Swing LRVs will be 98 feet long, with capacity for 201 passengers including 41 seated. The vehicles will feature air-conditioning and will be adapted for passengers with reduced mobility.

Pesa was awarded the contract in July, 2020, but the signing was delayed due to appeals from unsuccessful bidders. The proceedings were finalized after the Polish Ministry of Foreign Affairs engaged in talks with Bulgaria, with Deputy Minister of Foreign Affairs, Paweł Jabłoński, and the Embassy of the Republic of Poland

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in Sofia involved in the discussions.

Pesa has so far delivered 37 Swing LRVs to Sofia. (***International Railway Journal***, November 19)

Sydney, Australia

Service on Sydney's Inner West light rail line has been suspended following the discovery of cracks on the low-floor tram fleet. A temporary bus service has been put in place to carry around 5,000 passengers per day.

Cracks were discovered on all 12 of the route's CAF Urbos 3 trams during routine maintenance inspections at Lilyfield Depot. The five-section vehicles were procured in 2014 in conjunction with the extension of the line from Lilyfield to Dulwich Hill, replacing seven Adtranz Variotrams supplied when the line first opened in 1997. A further four Urbos 100 cars are due to be delivered in early 2023 under an order announced in June.

According to Transport for NSW Chief Operations Officer Howard Collins, the cracks in the floor area over the wheelsets were up to one foot long and needed to be addressed before they propagated further. This could include strengthening the vehicles to prevent a recurrence.

Transport Minister Rob Stokes warned that services on the 7.95-mile route could be suspended for up to 18 months, but this was very much a "worst-case scenario" and he anticipated that a limited service could be introduced much sooner. Meanwhile, TfNSW would be notifying the operators of up to 1,000 similar trams around the world, including Newcastle and Canberra, as "this same design flaw is likely to be a challenge for their systems as well." (***Metro Report International***, November 12)

Urbos 3 2115 (CAF, 12/2013) is seen here heading towards Dulwich Hill. It is one of the cars currently out of service due to cracks.
CAF photograph

Cairo, Egypt

November was a busy month for developments on the Cairo Metro. On November 8, the metro's governing agency, Egypt's National Authority for Tunnels, announced that Alstom has been awarded a €876 million contract to supply and maintain 55 nine-car trainsets for Line 1. Based on Alstom's Metropolis platform, the new trains will be specifically modified for Line 1's specific needs. When it opened in 1987, Line 1 became the first subway in Africa and the first in an Arabic nation. It was created by modernizing two existing suburban lines, electrification of one (the other already previously electrified), and linking them via a center city tunnel with five underground stations, giving it the characteristics of a regional metro. Lines 2 and 3 are more traditional subways, as will be Line 4. Line 1 is 27.3 miles in length and carries over 2.5 million passengers a day.

Rendering of the new Metropolis style train for Cairo Metro Line 1.
Alstom rendering

In addition, CAF and Mitsubishi were awarded a contract to overhaul 23 trains of Line 1's current fleet, originally built by Mitsubishi. The contract also includes the modernization of the depot at Kozzika.

In a separate move, a joint venture of Mitsubishi and Kinki Sharyo was awarded a contract to supply 184 cars for the first phase of Line 4, which will run 11.68 miles from El-Malek El-Saleh in central Cairo, passing under the Nile River and heading west to Hadaek El-Ashgar in Giza. Scheduled to open in in 2028, Line 4 will have 16 stations, and is noteworthy for offering the first rapid transit service out to the Great Pyramids on the Giza Plateau, where the future Grand Egyptian Museum is under construction for a 2023 opening. The line will dramatically decrease road congestion caused by the large numbers of tourist buses crossing the Nile between

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Rail News in Review

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central Cairo and Giza. (***International Railway Journal***, November 8; ***Railway Gazette International***, November 8 and 11)

Rendering of the new train for Cairo Metro Line 4.
Kinki Sharyo-Mitsubishi rendering

NEW METRO LINE FOR WASHINGTON, D.C.?
by Subutay Musluoglu

Prior to the COVID pandemic, the Washington Metro was the second busiest subway in the United States, as measured by an average daily ridership of around 626,000. The shared east-west alignment of the Blue/Orange/Silver Lines (BOS) through downtown Washington is maxed out for capacity with the major pinch point being the Rosslyn station in northern Virginia and the adjacent tunnel under the Potomac River, where the effective throughput is 26 trains per hour heading west to east in the peak period.

For most of Metro's history, capacity on the shared alignment had not been a serious issue, with a mostly even balance between the Orange and Blue Lines. However, the 2014 opening of the Silver Line to Wiehle-Reston East, branching off the Orange Line just east of West Falls Church, has completely altered this makeup, which is now arranged as 10 Orange Line and 11 Silver Line trains in the peak period, and only 5 Blue Line trains.

This represents a cut of over half the number of peak period Blue Line trains and a slightly lesser reduction in Orange Line trains, leading to challenges for the shared downtown trunk, while creating a serious issue at Rosslyn, where the high volume of cross-platform transfers has led to severe platform congestion and long dwell times, which is having a cascade effect down the line.

Planning had already been underway for several years in anticipation of this situation, which will only be exacerbated when the Silver Line is finally finished and fully open to Ashburn, Virginia, with a station at Dulles International Airport along the way, sometime in early 2022. Some relief measures are already in progress, such as procuring additional railcars, allowing for the operation of full 8-car trains at all times. WMATA is anticipating that the pandemic's negative impact on current ridership is only a short-term effect, with the BOS projected to increase by 18% over the next 20 years, but more critically, by 30% in the peak period.

On September 9, the WMATA Board's Finance and Capital Committee was given a status update on the BOS Corridor Capacity & Reliability Study by the agency's planning department, during which six alternatives were discussed. One is a No-Build Scenario, and another is a Lower Capital Cost Alternative, which is comprised of signaling improvements, and adding pocket tracks at select locations to increase train turnback capacity.

The remaining four alternatives are new Metro lines across the city, each with varying alignments and terminals. Each has in common the creation of a second Rosslyn station and the addition of a new adjacent tunnel under the Potomac River.

The results of the Cost-Benefits Analysis revealed the alignment which yielded the most benefits is Alternative 3C – a new Blue Line Loop via National Harbor, a new development area in Prince George's County south of Anacostia. The new line starts north of Arlington Cemetery Station, with a realigned Blue Line heading north to a new parallel station at Rosslyn, and from there to a new Potomac River tunnel and an east-west line across downtown Washington, parallel to, and just to the north of, the current BOS trunk.

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New Metro Line for Washington, D.C.?

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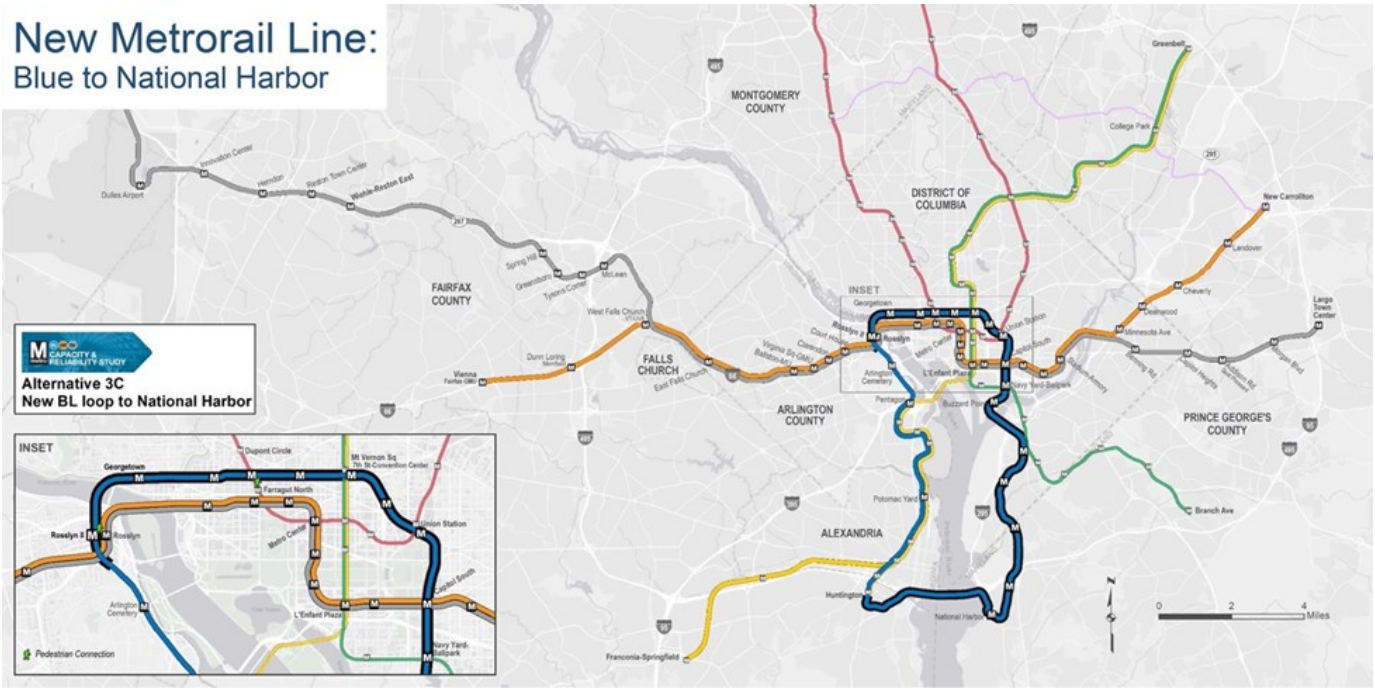

In WMATA's BOS Corridor Capacity & Reliability Study, four potential build options to realign and expand the Blue Line were evaluated. Alternative 3C scored highest and will be studied further.
WMATA map

The alignment is notable for providing rapid transit service to the Georgetown area for the first time and features up to five transfers to existing Metro lines, including at Union Station, the system's busiest station and currently served only by the Red Line. From there, the new line proceeds south to National Harbor and then crosses the Potomac River again, via the Woodrow Wilson Bridge to Virginia. Opened in 2008, the bridge carries I-95 and the I-495 Capital Beltway and contains provisions specifically for a future rail transit guideway. The line rejoins the current Blue Line head on at the current southern terminal at Huntington Station, thus completing the loop.

The new Blue Line is projected to add 16 trains per hour in the peak across Washington and carry 180,000 new weekday trips. At this time the line's capital cost is estimated to be between $20-25 billion and could potentially take up to 20 years to build and implement in phases. There is a long way to go, with additional studies to be done and ongoing public engagement over the next year. The current schedule calls for the WMATA Board to select a Locally Preferred Alternative by Fall, 2022, which would then proceed to an Environmental Impact Statement, preliminary engineering and begin the Federal funding process.

This is an extremely ambitious project which would be a heavy political and financial lift for WMATA and the Capital region. If it were to ever become reality, it would undeniably represent the most significant expansion in the system's history since its original construction first began in 1969. (WMATA Board Finance and Capital Committee Action Item 4A — Blue-Orange-Silver Capacity & Reliability Study presentation, September 9, 2021 www.wmata.com/BOSstudy)

LONDON CROSSRAIL TRIAL OPERATIONS UNDERWAY
by Subutay Musluoglu

In one more required step prior to opening for public service, trial operations started on the central section of London's Crossrail line on November 20. The line has already been in trial running mode since March, with trains operating over the line at various speeds, testing all the communications, signals and interlockings, traction power, stopping and starting at stations, and testing the platform edge screen doors.

For trial operations, these tests will be stepped up in intensity and at higher frequencies to mimic a full timetable service. Over 150 operating scenarios will be performed to ensure that all systems and procedures are working effectively. Exercises will also be conducted with staff responding to a range of simulated incidents, including ill passengers, signal failures, and train evacu-

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London Crossrail Trial Operations Underway

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ations conducted jointly with the fire and rescue services with the help of thousands of staff and volunteers.

Branded as the Elizabeth Line, Crossrail was originally scheduled to open in December, 2018. However, in September of that year it was announced that the opening date would not be met due to the inability to complete several outstanding items. Several rescheduled opening "windows" have come and gone since, but it now appears that enough substantial progress has been achieved to allow for a limited opening between Paddington and Abbey Wood sometime in the first half of 2022.

Crossrail was first conceived in the late 1980s, inspired by the Paris RER as a similar means to develop a regional metro by taking select suburban rail services which terminate at main line stations, routing them into a center city tunnel, and creating new through services across the region. It brings commuters directly into central London and closer to their destinations, avoiding the need for transfers between the main line stations and the Underground, while also providing faster services across the city as an alternative to the Underground. This achieves shorter journey times and relieves Underground congestion. A previous effort failed in 1994 due to rising costs and pressing needs to modernize the Underground first. The current project was initiated in 2009.

Over the last decade, Crossrail has been the largest civil construction project in Europe and is one of the world's most significant and advanced urban railways ever to be built, at a cost of over £17 Billion. The line is over 60 miles in length, running from Reading and Heathrow Airport in the west to Shenfield and Abbey Wood in the east, linking the Great Western Main Line and the Great Eastern Main Line, two legacy railways with 19th Century origins via a core tunnel section under central London. There are 41 stations in total, seven of which are in the core tunnel section and provide transfer to the Underground.

The heavy civil and structural construction of the line was mostly completed three years ago, but major delays have been attributed to station finishes running late, and the immense technical complexity of the various technical systems for the line's operations, especially integrating the three distinct signal systems in use on the line's various segments. Services will be provided by 70 nine-car Class 345 EMUs equipped for operation under 25 kV 50 Hz AC catenary, purpose built for Crossrail but currently holding down terminating services at Paddington and Liverpool Street.

Elizabeth Line proposed services upon initial opening.
Crossrail Limited UK/Transport for London map

Elizabeth Line services will initially be operated in three separate sections: passengers from the west will need to change at Paddington for services onto the central section; the central section runs between Paddington and Abbey Wood; and passengers from the east will change at Liverpool Street. It is hoped to have all the services linked up in Fall, 2022, and the full timetable in place by May, 2023. (Crossrail project website (https://www.crossrail.co.uk/); ***International Railway Journal***, November 22; ***Railway Gazette International***, November 23)

VIENNA-BRATISLAVA-UKRAINE
by Jack May
(Continued from November, 2021 issue)
(Photographs by the author)

Wednesday, June 21

As mentioned in an earlier segment, Ukraine uses the Cyrillic alphabet, and as a result, its principal city and capital, Kiev, has been transliterated in several ways, depending on who holds power. The common Russian spelling is Kiev, which seems to be recognized worldwide, while Kyiv is the Ukrainian spelling.* Kiev has a population of just under three million, and is spread out along the Dnieper River, with large concentration of activities on both sides, although the classic "downtown" is on the west.

*Lviv (Ukrainian) is even more complicated. The Russians translate it to Lvov and the Polish to Lwow. Many German speakers still call it Lemberg.

The city has a very large tramway network of about 90 miles served by some 20 lines, a three-line metro system with 52 stations covering a good 43 miles, plus a circular "S-bahn" line, translated to "Metropolitan Railway" or "Urban Electric Railway," which is operated by Ukrainian Railways, the national railroad company. All of the rail lines are five-foot Russian gauge (1,524 millimeters). Two days of activities were scheduled for the group to cover this system. I decided to spend those days railfanning on my own, as I wanted to be sure I would get to the essentials of the operation, and also to experience it as a regular passenger, while not limiting myself to group photo stops.

Clare and I had visited Kiev in 1997, at the time our daughter-in-law was pregnant with our older granddaughter, and had stopped to meet our son's in-laws in the relatively nearby city of Bryansk in Russia, after seeing Paul and Irina in St. Petersburg and Novgorod. (Kiev is an overnight train ride from Bryansk, which is 300 miles to the northeast, with Moscow being 250 more miles in the same direction.) At that time the streetcar network was larger, as the Metro had not yet taken its full toll on the tramway system. Since then the connecting tram tracks over a bridge spanning the Dnieper were abandoned and now there are two networks on either side of the river isolated from each other.

But a great deal stayed the same over the ensuing 20 years — more than has changed. Tatra T3 and T6 PCCs still provide the bulk of the service, although new low-floor cars keep trickling in and some PCCs now are wheelchair-accessible due to modifications (as well as being combined into articulated units). Major parts of the six-mile-long "express tramway" from the main railroad station have been upgraded with newly-built stations and station fare collection, and another four-mile-long express tramway (or light rail line) has been created on the east side of the Dneiper. Maintenance also looks like it is better now than it was in the first years after the end of communism.

After breakfast, and while the charter bus was being loaded with tourmembers heading for a carhouse visit and fantrip on the western side of the river, I walked the ¾-mile or so to the main railroad station on Vokzalna Square, where I would be beginning my activities. I was hoping to find a source of day tickets, but alas there are not any and I had to buy individual ride paper forms from news kiosks. But they were not expensive — only about 15 cents per ride — so I bought them in bulk.

After my hunt through the station for a day ticket, I went out on the plaza and asked directions to the tram stop. I knew it was a bit of a walk from my experience 20 years earlier, but I was not sure of the direction. I would come upon a sign, but then after following it there would be a fork in the path (and all I could think of was Yogi Berra's instructions, which were definitely not very practical). With the help of strangers (I have always depended on the kindness of strangers — an old Tennessee saying) I was directed up some stairs and through a covered market, and finally reached the loop. En route I passed the Vokzalna station of the Metropolitan Railway and (of course) stopped for photos from the overpass. As it turned out (and something I took advantage of on the following day) the walk from the hotel directly to this point was quite a bit shorter.

The Starovokzalna terminal is really two loops in one, as the express tramway's stop (Routes 1 and 3) has station fare control while regular streetcars (Routes 15 and 18) stop at platforms that have unrestricted access. As a result the layout is rather interesting, with the loop tracks splitting, crossing and then joining each other.

I spent the next hour or two on the 1, 2 and 3 lines (see map at http://www.urbanrail.net/eu/ua/kiev/tram/kyiv-tram-map.htm) riding and photographing. The combined 1 and 3 to Hnata Yury (which is where the lines split with the 2 running on the third leg of the wye to connect the outer stops), has been upgraded to "light rail" standards with a substantial amount of infrastructure; station fare collection is employed and the right-of-way is fenced in. This applies also to the 3 all the way to its Kiltseva Doroha terminal, but Line 1, from the junction to Mykhailivska Borschahivka, still looks like a typical center-of-the-road streetcar line, something like Beacon Street or Commonwealth Avenue in Boston (while the 3 is now more like the Newark City subway). I hope the photos give you a sense of the line.

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Vienna-Bratislava-Ukraine

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The main railroad station, called Kiev-Pasazhyrskyi, in a view from Symona Petlyury Street. The enormous structure was completed in 1932. The name translates to Kiev-Passenger. The Cyrillic words on the facade transliterates to Vokzal, and Vokzal and Vokzalna translate to Railway Station. [You will see that I used the term "Vokzalna station" in this section of the report, which is actually redundant, as it literally means "railway station station." Sorry, but I cannot think of an alternative.]

The Vokzalna station of Metro Line 1 is part of the railroad station complex. Although most references to the beauty of Soviet Metro stations usually refer to their lavish ornate interiors, in a large number of cases the architecture of many entrance buildings (specifically their attractive and prominent pillars) also comprise a quintessential indication of the period in which they were built.

A three-car train of the Metropolitan Railway approaches its Vokzalna station, close to Kiev's main railroad terminal and stations served by Metro Line 1, the express tramway and local streetcar lines. It is a major transfer point, but not particularly user-friendly because of the long walks between the different lines. Service over the 15-station 33-mile long circular loop began in 2010, and interestingly enough, operates only during weekday peak periods where frequencies range from 15 to 30 minutes. There are no trains between 10:30 and 16:30. The electric MU train pictured is one of several types of Electrichka, the common term used throughout the former Soviet Union for an electric local train, and such cars can still be found operating throughout the length and breadth of Russia and the territories it controlled. This particular train is made up of model ER9M 25kV AC eMUs that were built between 1976 and 1983, part of a series (ER9) of some 648 cars built in Riga that were introduced in 1962 and refined through the years until the end of production in 2002. They are also used in suburban commuter service in Kiev. [The fact that I didn't know that service on this line is limited to rush hours led me to an error on the following day (see a forthcoming segment).]

Starovoklzalna loop (old railroad station loop). A train of Tatra T3 cars on Route 3 pauses at the express tramway station. Another train of T3s on Route 18, led by 5835 in the center, has already stopped at a different platform further back, and is about to cut in front of 6008, which is still loading passengers. A Pesa Fokstrot car is out of service on the right side of the photo.

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Vienna-Bratislava-Ukraine

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Tatra T6 317 at the head of an inbound two-car train entering the Heroiv Sevastopolia stop of the express tramway. The infrastructure is rather substantial.

The junction of the 1, 2 and 3 lines just beyond the Hnata Yury station of the express tramway showing an inbound Route 3 train of Tatra T3s. The section of the wye directly below the overpass in the right photo is used by Route 2, which is a lower-frequency cross-town service connecting the outer ends of the 1 and 3. The 1's trackage turning to the left is shown in the foreground.

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Vienna-Bratislava-Ukraine

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One last view of the manicured and fenced right-of-way of the express tramway, showing an inbound train of Tatra T3s approaching the Lepse stop.

Here is an assortment of new and rebuilt cars operating over express tram routes 1, 2 and 3 at various stops on the west side of the Dneiper.

Two views near the Hryhorovycha station at the outer end of Route 1. The left photo illustrates Kiev's KT3UA trams, which consist of two rebuilt Tatra PCCs sandwiching a low-floor center section. The 14-strong fleet was fabricated about 10 years ago. Also in keeping with the need to service mobility-challenged riders, the right photo shows one of five Electron-built (in Lviv) five-section 100-percent low-floor cars. [Note: the three-section version was shown in the Lviv report earlier.]

One of up to 50 three-section 100-percent low-floor cars that are being built by PESA in Poland, shown at the Starovokzalna terminal of the express tramway. These modern Fokstrot Twist cars may become the mainstay of Kiev's future modernization plans. It also should be noted that from 90 to 120 of these Polish-built cars are being delivered to Moscow.

In the next installment we will continue the day's survey of Kiev's tramway and see more of Kiev's attempt at modernizing its fleet.

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Ron Yee, 1957-2021

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most three. In a 2014 email Ron remarked that his first and second grade teachers had noticed that he was having problems focusing in class on long division, instead paying attention to the IRT Flushing Line that ran right outside his classroom. In class, Ron was writing down car numbers, making note of when trains passed by and remarking what track they were on. Ron's mother unintentionally encouraged his interests, even waiting an hour with Ron to spot the "bluebird" R-33s on their first day of revenue service in October of 1963. That encouragement would lead Ron to becoming a railfan and a successful railroad manager. Ron joined the ERA on July 19, 1976.

Ron obtained a chemistry degree from Queens College and a master's degree in transportation planning and engineering from the Polytechnic University of New York in Brooklyn (now the Tandon School of Engineering at New York University). After a short stint at a consulting firm Ron applied for and was hired by the fledgling Metro-North Commuter Railroad (now MTA Metro-North Railroad) in 1983, mere months after Conrail's Metropolitan Division operations were taken over by the MTA. Ron started as a Supervisor of Passenger Checkers before going on to Operations Planning, Manager of the Crew Dispatching Center and finally On-Board Services Officer before retiring in 2013. During his time with Metro-North Ron often blended both work and play together, organizing ERA fan trips over Metro-North territory. The farewell excursions for the FL-9s and the ACMU cars were Ron's doing.

Ron was married to his wife Lily for thirty-seven years, with his wedding being right around the time that NJ Transit retired the Lackawanna MU cars. Lily often accompanied Ron on his railfan excursions, getting to see the sights along the way and making friends with all of Ron's friends and spouses. Over the years, Lily has become a beloved part of the ERA family.

Outside of his love for his wife Lily and railroads, the other passion in his life was baseball. Ron was a season ticket holder for the New York Mets and was a fan no matter how terrible the team was. Often, Ron would mention in his emails that he was sending said email in front of the TV watching a game. Despite being a Mets fan Ron followed other baseball teams as well. In addition, Ron was a Trekkie (a fan of the TV show Star Trek) and he and Lily frequently went on Star Trek-themed cruises.

To say that Ron lived life to the fullest was an understatement. On ERA trips/conventions he was always the first one out the door and the last one back, maximizing activity time to get the best photos possible. I recall that one more than one occasion Ron skipped breakfast on a convention to do some photo shooting. And when the coronavirus struck the cruise ship *Diamond Princess*, Ron made the best of a dire situation, intimately documenting his and Lily's experience through the ordeal. Ron was not only a sharp photographer, but also a fantastic writer. His emails were often lengthy but with a served purpose: to serve as a travel guide for those who followed. In no small way was Ron a pathfinder. Even in his final days Ron accepted his fate in stride.

Ron's passing is a deep loss for his friends, family and the ERA and he will be dearly missed.

NEW ROLLING STOCK FOR PARIS RER LINES B, D AND E
by Subutay Musluoglu

Towards the end of this past Summer, dynamic testing began on the new rolling stock destined for Paris RER Lines D and E. Commonly referred to as RER-NG (for Nouvelle Generation) and formally designated as Class Z58000/Z58500 in the SNCF unit numbering hierarchy (Z is for French electric multiple units), 255 trains are being built by an Alstom-Bombardier joint venture under a €1.55 billion contract originally awarded in 2017, preceding the merger of the two train manufacturers which was finalized earlier this year.

The new trains are a unique blend of single-level and bi-level cars. This is a striking departure from the typical full bi-level trains that have equipped most of the RER system for the last 40 years. This new design concentrates more of the traction package in the single-level cars, freeing up space to maximize seating, standing and circulation space in the bi-level cars. They are capable of operating under both 1.5 kV DC and 25 kV AC overhead catenary.

Five pre-series trains have been navigating various segments of the Ile-de-France network since August. The schedule initially had the first 71 trains of the production series entering service by the end of this year, with most of the full order's balance to be delivered by the end of 2022.

However, reports began to emerge in early November that manufacturing is seriously behind schedule and may result in a delay of up to two years for the entire order to be delivered. Numerous factors have been cited as the delay's cause. The most obvious has been the pandemic's disruptive effects on production, along with numerous changes to the trains' specifications reflecting the technical complexity of this new class.

Another critical factor has been the challenge of integrating the carborne elements of the new NExTEO Communication-Based Train Control system. NExTEO is now being installed on Line E and will be active on the line's new western extension currently under construction. The first segment to Nanterre-la-Folie is due for completion by the end of 2022 and there are concerns that any significant delay will jeopardize this opening if there are not enough NExTEO equipped trains to operate the extended services.

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New Rolling Stock for Paris RER Lines B, D and E

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RER D will be receiving 125 seven-car trainsets, designated as Z58500 and arranged as two single-level driving motor cars at the ends, bracketing two bi-level motor cars and three bi-level trailers for a set length of about 430 feet. RER E's 130 six-car trainsets are designated Z58000 and will be composed of two single-level driving motor cars, two bi-level motor cars and two bi-level trailers for a set length of about 367 feet.

Paris RER-NG undergoing dynamic testing.
Christophe Masse photograph via ***Railway Gazette International***

The arrival of the Z58000 will trigger changes to the look of the RER. Line D's current fleet consists of Z20500 bi-level units (delivered 1988-1998), and more recently acquired Z57000 Regio 2N bi-level sets built by Bombardier. The RER-NG trains will displace all the Z20500 units over to RER Line C, which in turn will force the retirement of the Z5600 class, the first bi-level EMUs to operate on the RER when they were introduced in 1982.

Less certain is the fate of Line E's 53 Z22500 sets. These date to the late 1990s and were acquired in a joint order with Paris Métro operator RATP to fulfill a double objective — to relieve capacity issues on RER Line A, jointly operated by both RATP and SNCF, and simultaneously inaugurate the opening of Line E in 1999, which was built and exclusively operated by SNCF.

The RATP sets are designated as MI2N "Alteo" and though their external appearance is almost identical to the SNCF sets, their internal arrangement is significantly different to meet the unique conditions of Line A's operations and ridership. This rules out cascading the Z22500 sets from Line E to Line A. As the oldest of these trains are just over 20 years old and presumably still have some life left, it will be interesting to see what eventually becomes of them. Line E's fleet also includes 45 single-level Z50000 "Francilien" sets, which are multi-section articulated units introduced in 2015.

Meanwhile over on RER Line B, the only RER line not currently utilizing bi-level equipment, a new bi-level class designated MI20 is on order to replace the single level MI79 and MI84 classes, originally delivered in phases between 1980 and 1990. The MI stands for Matériel Interconnexion, which denotes rolling stock that can operate over both RATP's 1.5 kV DC territory and SNCF's 25 kV AC lines.

Line B has a very unique history. Its southern section is comprised of the legacy Ligne de Sceaux dating back to the mid-19th Century. In 1895 the line was extended by tunnel into the Latin Quarter on the Left Bank. Starting in the 1970s the line was progressively extended northward until it reached the Gare du Nord and services were extended northeast from there over SNCF lines. As such, the type of train that can operate over Line B's entire length is governed by the physical characteristics of its southern section, its tight curvature and restricted tunnel clearances ruling out the introduction of bi-level stock.

Until now. Line B's ridership has exploded in the last two decades, straining the line's operations. Various measures have been implemented, including eliminating the driver change between RATP and SNCF territories and opening a new central command center. Resignaling with NExTEO is planned. In 2018 Paris regional transportation authority Île-de-France Mobilités solicited bids for replacing the line's fleet and specified that a bi-level design was preferred. In early 2020 a CAF/Bombardier joint venture put in a successful bid that fulfilled the specifications. Similar to the RER-NG, their MI20 is also a hybrid trainset composed of single-level and bi-level cars.

Artist's rendering of the MI20 for RER Line B.
Île-de-France Mobilités rendering

However, losing bidder Alstom lodged an official protest, which tied up the procurement for a year. By early 2021, the original bid was upheld and Alstom withdrew their protest in the face of mounting pressure and potentially losing the opportunity to bid on upcoming contracts to equip the Grand Paris Express orbital metro. The dispute is now effectively moot, as Alstom's merger with Bombardier keeps them in the equation.

It is hoped that the first of the 146 seven-car MI20 trains will arrive in 2024. (www.iledefrance-mobilites.fr; ***International Railway Journal***, November 3; ***Railway Gazette International***, August 26)