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July 2021



Overview

The New York City Metro (NYM) territory is central to the NEC with the highest volumes of trains and passengers. It extends from Morris Interlocking in Pennsylvania, which is just south of the Trenton, NJ station, to New Rochelle, NY. Amtrak owns and manages the right-of-way between Morris Interlocking and New Rochelle, NY with projects coordinated by MTA, NJ TRANSIT, and Amtrak. Amtrak, NJ TRANSIT, SEPTA, and the MTA Long Island Rail Road (LIRR) operate service in this territory. Metro-North will provide service in this territory upon completion of the Penn Station Access project.

At the core of the NYM territory, Penn Station New York (PSNY) is the busiest railroad station in the U.S. and North America, serving nearly 460,000 rail passengers per weekday, 98 percent of those on LIRR and NJ TRANSIT. PSNY is a through-station with 21 tracks; four of which are stub-end tracks on the south end of the station requiring trains to turn in the station and exit through the two North River tunnels under the Hudson River. Through trains continue under the four East River tunnels with LIRR continuing to Long Island, Amtrak via the Hell Gate Bridge to New Rochelle, NY, and NJ TRANSIT to Sunnyside Yard.



Penn Station New York West End Concourse (NY)

NYM service has the densest train volumes anywhere on the NEC, with NJ TRANSIT and Amtrak trains running every 2.5 minutes between New Jersey and New York for multiple hours each morning and evening. Capacity constraints under the Hudson River, within PSNY, and under the East River create bottlenecks that impact daily commuters into PSNY and intercity travelers throughout the NEC. Equally important is the urgent need to repair the more-than-100-year-old North River and East River tunnels and their approaches. NYM includes the only 6-track segments of the NEC, representing capital renewal challenges due to traffic levels and space-constrained project sites. However, these challenges present an opportunity to improve hundreds of thousands of trips per day.

C35 investments in the NYM territory will provide the infrastructure needed to sustain and grow intercity and commuter rail service, add new services, and improve access to existing and new markets. The C35 plan leverages regional rail initiatives including the recently completed Moynihan Train Hall and MTA's investment in East Side Access, a mega-project that provides LIRR service to Grand Central Terminal and opens up track capacity in PSNY for a new Metro-North Penn Station Access service into PSNY. This project includes four of the five new C35 NYM passenger stations, served by new commuter rail service to both New York and Connecticut. The NYM projects will double trans-Hudson tunnel capacity and make resiliency improvements to both the Hudson and East River Tunnels.

NYM is home to economic and cultural centers near PSNY. This includes Broadway, Madison Square Garden, and Times Square. The PSNY-area improvements included in the C35 plan will benefit NJ TRANSIT, LIRR, Amtrak, and future Metro-North riders.



Conductor waiting for a train at Trenton Transit Center (NJ)

NYM Project Highlights

The C35 plan includes transformational investment in the NYM territory with benefits that extend to the entire NEC. These investments will address capacity constraints into and through New York City with major new infrastructure such as a new Gateway Portal Bridge, Gateway Hudson Tunnel, Penn Reconstruction, and Gateway Penn Station Expansion. These and other C35 improvements are necessary to support continued economic growth of the New York City metropolitan area with improved connections to the Bronx and Long Island as well as residential and employment centers in Connecticut and New Jersey. Demand into PSNY exceeds NJ TRANSIT peak-hour capacity and C35 investments will accommodate a doubling of NJ TRANSIT peak-hour service. With Metro-North's Penn Station Access service, residents of the Bronx will save up to 50 minutes on trips to Manhattan. Amtrak Acela passengers could save eight minutes north to New Rochelle, NY and almost a half-hour to both Washington, DC and Boston.



NYM Special Project Highlights

- **Pelham Bay Bridge Replacement:** Replaces a century-old movable bridge which crosses the Hutchinson River in the Bronx, NY with a new low-level or mid-level movable, or a high-level fixed bridge with clearance for marine traffic.
- **Penn Station Access:** Provides new Metro-North New Haven Line service to PSNY and construct four new stations in the Bronx. Brings Amtrak's Hell Gate Line to a state of good repair.
- Penn Reconstruction & Gateway Penn Station Expansion: Reconstructs the existing PSNY to transform the outdated and over-capacity station, relieve overcrowding, and be part of an integrated complex with Moynihan Train Hall and Penn Expansion. Expansion provides additional track and platform capacity to support growth in rail service possible with the new Gateway Hudson Tunnels.
- **Gateway Hudson Tunnel:** Constructs a new two-track tunnel beneath the Hudson River and rehabilitates and modernizes the existing two-track North River Tunnel.
- **Gateway Sawtooth Bridge:** Replaces a pair of railroad bridges between Newark and Secaucus, NJ located in the Meadowlands with new structures to support a four-track segment with improved track speeds.
- Hunter Flyover: Constructs a flyover south of Newark Penn Station to eliminate at-grade crossings, thereby reducing conflict between trains, increasing capacity for NJ TRANSIT and Amtrak, and enabling NJ TRANSIT to improve Raritan Valley Line service.
- **Mid-Line Loop:** Eliminates at-grade movements that create conflicts, increasing capacity, and improving reliability. This will enable the New Jersey High-Speed Rail Program's goal of 160-mph speeds on Acela, as well as support enhanced NJ TRANSIT service.
- Gateway Secaucus Station and Loop Tracks: Expand Secaucus Station platform system and add loop tracks at Secaucus Junction. Allows for a one-seat ride to Manhattan from New Jersey's Hudson and Bergen counties and New York's Rockland and Orange counties via Metro-North service operated by NJ TRANSIT.



Figure 6-1: NYM Special Project Groups and Benefits





NYM 2035 Benefits



More Frequent Service

- More than double NJ TRANSIT trans-Hudson peak hour service
- Amtrak 54% increase in service
- Amtrak southbound time between trains reduced from 30 to 15 minutes

New Services



• New one-seat ride service from Main, Bergen County, Pascack Valley, and Port Jervis Lines



Upgrade and Replace Aging Assets

• All major backlog projects complete

Source: C35 Analysis, 2021

NYM Capital Renewal Highlights

The capital renewal programs in the NYM territory include 24 capital renewal programs organized into three operationally independent regions to minimize service impacts: a north region from New Rochelle, NY to PSNY; a central region between PSNY and Metropark in Iselin, NJ; and a south region from Metropark to Morris Interlocking just south of Trenton, NJ. Capital renewal efforts include major upgrades to track (including turnouts, rail, and ties), electric power supply assets (overhead catenary, supporting structures, substations, transmission lines poles), undergrade bridges, and multiple interlockings. Four of the 24 capital renewal programs will be initiated but not completed within the 2035 time frame. These capital renewal programs include major infrastructure improvements such as replacement of approximately two miles of the superstructure along the approaches of the Hell Gate Viaduct and undergrade bridges in Newark and Union, NJ.



Figure 6-2: NYM Estimated Assets Replaced in Territory

2. Numbers rounded

Source: C35 Analysis, 2021

Figure 6-3: NYM Estimated Assets Replaced in Special Project Groups and Capital Renewal Programs



Source: C35 Analysis, 2021



Rendering of Gateway Portal North Bridge (NJ)

SPOTLIGHT

Gateway projects will increase capacity and operational flexibility of the NEC, resulting in more reliable and frequent commuter and intercity service. Capacity constraints at PSNY and the trans-Hudson crossing are bottlenecks for through services to Boston, MA or Washington, DC. As such, Gateway improvements will benefit the entire NEC. Gateway projects include:

- Highline Renewal & State of Good Repair
- Hudson Tunnel
- Secaucus Station and Loop Tracks
- Portal North Bridge
- Portal South Bridge
- Sawtooth Bridge
- Dock Bridge Rehabilitation
- NJ TRANSIT Storage Yard
- Harrison Fourth Track Phase 1
- Penn Station Expansion



Northeast Corridor over the Delaware River (PA/NJ)

Schedule of Investments

The C35 plan sequenced 10 special project groups and 24 capital renewal programs in NYM, and evaluated temporary construction-related service adjustments and permanent service benefits. Special projects and capital renewal, such as the Gateway Dock Bridge Rehabilitation and Westbound Waterfront Connection, were analyzed collectively and sequenced to maximize productivity of track outages, minimize service disruption, and create overall project delivery efficiencies in NYM. The C35 plan does require some peak-period service reductions for NJ TRANSIT and Amtrak to allow for necessary track outages longer than a midday, overnight, or weekend period.

The roadmap for future project delivery provides an initial schedule timeline for efficient construction of special projects and capital renewal over the 15-year period.

Figure 6-4: NYM Estimated Initial Timeline Capital Renewal and Special Project Groups



Figure note: Initial analysis results to be updated in C37 Source: C35 Analysis, 2021



2035



Special Project Groups



2030



If the C35 project delivery sequence is followed, investment in this territory will be as much as \$55 billion total over 15 years.



Figure 6-5: NYM Estimated Total Capital Costs – 5 Year Increments

Source: C35 Analysis, 2021



NJ TRANSIT train at Hamilton Station (NJ)

Improve Mobility and Connections

Reliable Service

In FY2019 NJ TRANSIT trains were delayed over 3,100 hours and 11 percent of trains were late. LIRR trains were delayed over 2,200 hours and 8 percent of trains were late.⁶² The substantial investment in NYM will improve reliability of commuter and intercity service along the entire NEC. The existing capacity constraints in the NYM territory affect service reliability for intercity trains from Boston to Washington, DC and commuter trains operating in New Jersey, New York, and Connecticut.

The C35 analysis of Amtrak 2019 dispatch data identified seven NYM key locations that contributed to Amtrak and commuter train delay. C35 improvements would mitigate or eliminate train delays at each location. The Gateway improvements will provide increased reliability and operational flexibility for Amtrak and NJ TRANSIT. Improvements between PSNY and east to Harold Interlocking include East River Tunnel high density signaling and interlocking improvements. The Harold work will provide conflict-free train routes through the busiest switch point on the NEC, a chokepoint that causes the most delay of any location on the NEC. Located in Queens, NY, this interlocking sorts Amtrak, LIRR, and NJ TRANSIT trains as they travel north and east of PSNY or to access Sunnyside Yard for service and storage.

Hunter Flyover will improve reliability and operating flexibility by eliminating the at-grade crossing where the Raritan Valley Line joins the NEC. This project includes construction of an elevated viaduct structure to allow for NJ TRANSIT's Newark-bound Raritan Valley Line trains to cross over and above the NEC tracks to serve Newark. Eliminating this point of conflict will increase capacity for NJ TRANSIT and Amtrak and support peak-period one-seat ride Raritan Line service into PSNY.





Figure 6-6: NYM Estimated Delay Relief Improvements

Figure note: Connecting corridors not included

Source: C35 Analysis, 2021

New Services

New one-seat ride service on the NJ TRANSIT Main and Bergen County lines (including Metro-North Port Jervis line to Orange County, NY) and NJ TRANSIT Pascack Valley line (including Metro-North service to Rockland County, NY) will be possible with the completion of the Gateway projects with a direct connection between those lines and PSNY. Metro-North's Penn Station Access will provide a one-seat ride between four new stations in the East Bronx and PSNY or the New Haven Line in Westchester, NY and Connecticut.



People walking through the Newark Penn Station Concourse (NJ)

Frequent Service

C35 special projects and capital renewal enable more frequent service across NYM. The maximum time between trains for NJ TRANSIT passengers connecting to the NEC in the off-peak will be reduced overall from thirteen minutes to nine minutes (averaged for all NEC stations).

The C35 plan increases capacity and operating flexibility in the NYM territory to support dramatic growth in NJ TRANSIT commuter service, more than doubling total daily revenue round trips from 196 to 465. The Gateway projects support these service objectives to double trans-Hudson peak hour service into PSNY which NJ TRANSIT hopes to further expand beyond 2035. The C35 plan accommodates up to an estimated 54 percent growth in NJ TRANSIT off-peak service and an estimated 41 percent growth in NJ TRANSIT reverse-peak service by adding capacity and flexibility to the NEC.

With the Penn Station Access project, Metro-North will introduce as many as 51 new daily round trips on the New Haven Line to PSNY. Amtrak Acela and Northeast Regional daily service will be increased by 33 percent corridor-wide, including half-hourly service to Washington Union Station and hourly service Boston South Station. Figure 6-7: NYM Estimated Off-Peak Maximum Time Between Trains Averaged Across All NEC Stations (minutes)





Figure note: Actual times will vary by destination. Source: C35 Analysis, 2021



Figure note:

* No CTDOT or Metro-North service in 2019. Trains leave the NEC at New Rochelle. Penn Station Access will bring CTDOT and Metro-North trains into the territory. Source: C35 Analysis, 2021

Faster Service

As a result of C35 improvements, Amtrak Acela service will save approximately 20 minutes in the NYM territory. Amtrak's Acela express service will be approximately 26 minutes faster between PSNY and Washington, DC (an estimated 15 percent less than the current travel time) and 28 minutes faster between PSNY and Boston (an estimated 13 percent less than current travel time).

C35 improvements that address capacity constraints and reliability, such as the Gateway program, interlocking, and signal system improvements, also support higher-speed service and reduced trip times for commuter and intercity passengers alike. The New Jersey High Speed Rail Improvement Program includes upgrades to electrical power, signal systems, tracks, and overhead catenary wires to extend high speed operations from New Brunswick, NJ to Newark, NJ and reduce trip times for NJ TRANSIT and Amtrak trains. New one-seat ride service for NJ TRANSIT Main and Bergen County line (including Metro-North Port Jervis line to Orange County, NY) and NJ TRANSIT Pascack Valley line (including Metro-North service to Rockland County, NY) customers will eliminate the need to transfer and reduce overall travel time.

Metro-North's Penn Station Access will provide a savings to riders traveling between the East Bronx and PSNY up to approximately 50 minutes and East Bronx passengers traveling to Connecticut could save up to approximately 75 minutes compared to existing transit options.

Station Improvements

Gateway Penn Station Expansion will provide additional track and platform capacity at PSNY to support growth in rail service possible with the new Gateway Hudson Tunnels. This expansion will complement the recently completed Moynihan Train Hall and planned reconstruction of the existing Penn Station, which will transform the station; relieve overcrowding; and improve passenger waiting areas, access, and street-facing elements of the facility. These improvements will benefit Amtrak, NJ TRANSIT, LIRR, and future Metro-North customers.

Metro-North's Penn Station Access project will include four new ADA-accessible passenger rail stations in the East Bronx at Co-op City, Morris Park, Parkchester/Van Nest, and Hunts Point, providing new rail service to Manhattan and key job markets in Westchester and Connecticut.

Station upgrades at Newark, Elizabeth, and New Brunswick, NJ provide for fully ADA-accessible stations, improve the customer experience with better station amenities, and bring the stations into a state of good repair. Improvements at Elizabeth station would also accommodate a future fifth track along the NEC. Newark Penn Station investments include platform capacity improvements (crossovers to provide more flexible operations) to better serve Newark International Airport Station.

Figure 6-9: Estimated Travel Time Improvements (PSNY-DC and PSNY-BOS)





Passengers waiting for a train at Newark Penn Station (NJ)

Q SPOTLIGHT

Newark Penn Station:

A state-sponsored overhaul of Newark Penn Station will include new lighting and improved drainage in the bus facility, along with improved directional and way-finding signage inside. Longer-term enhancements will improve the station's openness, natural light, and overall commuter and visitor experience.⁶³

Create Economic Opportunity

New York City is an economic engine for not only the Northeast but the entire nation. Quality connections between New York City, its surrounding cities and suburbs, and other major cities, are important for continued growth across the region. Faster and more reliable rail service creates more choices for where residents and businesses can locate while sustaining access to affordable housing and good jobs. Improving access in underserved communities is especially important for the future economic health of the region.

Job Creation

C35 investment will generate approximately 434,000 total new jobs (direct construction-related, indirect [non-construction] and induced) in NYM over the 15-year plan, an average of 28,900 jobs per year. These jobs will in turn generate \$27.1 billion in earnings throughout the territory over the 15-year period.

Delivering the C35 plan will require an estimated average of 1,400 specialized railroad construction jobs each year, well in excess of current staffing levels. Workforce development initiatives are necessary to make sure opportunity is afforded to residents within the NYM territory to fill the skilled workforce needs of the C35 plan.

Equity and Access

The NEC serves diverse populations in NYM. While C35 will improve rail for higher income Acela riders with speedier intercity service, 90 percent of riders in NYM use LIRR and NJ TRANSIT services which create access to economic opportunity for a variety of high, medium, and lower income communities.

C35 will benefit historically disadvantaged communities within the territory. Today two-thirds of the population within 3 miles of an NEC station identify as persons of color and/or Hispanic. Over a quarter of the population live in low-income households, defined as earning below 150 percent of the federal poverty line. Nearly half of households do not own a car. Better, faster, and more reliable service will improve access for these populations to strong employment centers.



Additionally, Metro-North's Penn Station Access service will increase access from the four new East Bronx stations to high paying jobs in New York City and Westchester/Connecticut, providing new job opportunities for residents throughout the region and expanding the labor pool for employers.⁶⁴

NYM commuter railroads have seen increased demand for reverse-peak and offpeak services. These trains provide mobility for those working late night shifts, such as essential health care workers. C35 investments provide the capacity to increase these services across NYM.

A major challenge facing the New York region is access to affordable housing. By improving travel times and rail capacity, C35 will facilitate travel between higher wage job centers and communities with lower housing costs. Improved trans-Hudson capacity will improve access to New York City for commuters coming from mid-size cities in New Jersey like Newark and Paterson. Similarly, Metro-North's Penn Station Access will improve mobility for residents of the eastern Bronx to Manhattan and suburban job centers.

The NJ TRANSIT commuter rail network extends well beyond the NEC. Today, six of the nine NJ TRANSIT lines connect to the NEC and major cities along the NEC. With C35, all lines will connect to Manhattan via the NEC.



Hell Gate Bridge circa 1977 (NY)

Penn Station Access

Metro-North's Penn Station Access project includes new rail service for the East Bronx neighborhoods that are underserved by existing transit. It will also bring Amtrak's Hell Gate Line to a state of good repair. This new, direct rail service will significantly reduce commute times for residents and create options to reach jobs, education, and other opportunities in midtown Manhattan, Westchester, and Connecticut. Ninety percent of East Bronx residents are minority, 25 percent are below the poverty level, and many spend up to 11/2 hours each way on their daily commutes.⁶⁵

Combat Climate Change

Reduced Carbon Footprint

The NY Department of Environmental Conservation (NYDEC) states that approximately 36 percent of New York State's GHG emissions come from the transportation sector.⁶⁶ The NYDEC is supporting ways to reduce congestion by upgrading or expanding public transportation systems. New York City committed to reducing GHG emissions by 80 percent by 2050 compared to 2005 levels⁶⁷ and its transportation goals are "...to avoid trips we don't need, shift those trips we do need to lower-carbon modes, and improve existing infrastructure and technology to enable even greater emission reductions".⁶⁸

New Jersey's Global Warming Response Act identified the goal of reducing emissions of climate pollutants (carbon dioxide equivalent emissions or CO_2e) to 80 percent below their 2006 levels by the year 2050 (the "80x50" goal). A strategy towards achieving that goal is to "pursue increased ridership on NJ TRANSIT, expansion of transit villages and work-from-home policies to reduce vehicle miles traveled".⁶⁹

Better and more reliable rail service, provided by the implementation of C35, could attract riders to change their mode of travel to rail thereby contributing to a reduction in GHG.

Resilient Infrastructure

Superstorm Sandy highlighted the flooding vulnerability of the NEC within this territory. It is expected that if climate conditions continue to worsen, events like Superstorm Sandy will likely increase in both frequency and intensity. C35 provides an opportunity to address areas subject to inundation by providing hardened and more resilient infrastructure. In New Jersey, several projects provide infrastructure that will make the overall system more resilient to extreme weather events. The NJTRANSITGRID project will provide resilient and sustainable backup power generation and distribution to the regional network. The Gateway NJ TRANSIT Storage Yard and Delco Lead projects will provide for train servicing and storage outside of flood prone areas.

The Gateway Program of projects provides system redundancy to allow for service to continue in the event of an outage in the existing North River tunnels under the Hudson River. Penn Station Access will add redundancy and resiliency to the Metro-North network by giving New Haven Line trains an alternative destination in Manhattan to Grand Central Terminal.





Amtrak Acela train exiting the East River Tunnel (NY)

River-to-River Rail Resiliency project will protect the East River Tunnels and the West Side Yard against flood hazards to ensure connectivity at PSNY for Amtrak, LIRR, Metro-North, and NJ TRANSIT. The program consists of multiple elements including West Side Yard perimeter protection and drainage improvements, hardening the Queens Portals of the East River Tunnels, and resiliency improvements within the East River Tunnels, including the installation of permanent emergency generators, and waterproofing of the entrances and manhole/conduit points of entry to two ventilation facilities.

Support Desirable Cities and Communities

Station Area Development

The City of New Rochelle, NY, a recipient of New York State's Downtown Revitalization Initiative funds, has rezoned 300 acres around its train station for 12 million square feet of development that includes 7,000 new residential units.⁷⁰ The city also created live/workspace in the train station and another building has made it available to artists and entrepreneurs.⁷¹ New Rochelle is one example of many cities across the NYM territory that have put their NEC station at the center of their economic growth and development plans.





Metro-North trains at New Rochelle Station (NY)

A planned new North Brunswick, NJ train station will be located in the existing North Brunswick Transit Village off Route 1 adjacent to the NEC. "The North Brunswick train station embodies Middlesex County's vision of Destination 2040 and its economic goals. As we move this project forward, we will be creating investment opportunities which will create jobs and new tax rate levels. This will not only benefit North Brunswick, but the County and the region as a whole," said Middlesex County Improvement Authority (MCIA) Chairman James Nolan.⁷² Middlesex County is partnering with the New Jersey Department of Transportation, NJ TRANSIT, North Brunswick Township, and MCIA for the project.



Rendering of North Brunswick TOD (NJ)

At the Amtrak and NJ TRANSIT Metropark Station, plans are underway to convert existing parking into a new, walkable community. NJ TRANSIT is looking to redevelop a 12-acre site next to the station by adding new residential, retail, office, and hospitality space. The site will also include improvements for cars, bikes, and pedestrians accessing the station from the surrounding community.⁷³

Newark, NJ has also been leveraging NEC access to help revitalize the city's downtown. Over the last decade, major firms like Panasonic and the Mars Corporation have relocated their suburban offices to Downtown Newark to take advantage of rail connections. The Prudential Center, which hosts over 200 sports and entertainment events per year, opened in October 2007. At \$375 million, it was the largest private investment in the history of downtown Newark. It is located just 2 ½ blocks from Newark Penn Station and attracts over two million visitors per year. Pre-pandemic (2019), more than a third of Prudential Center patrons chose rail, with some events seeing more than 50 percent of patrons choose rail.



Rendering of Ironside Newark (NJ)

Innovation Districts

Princeton University, Rutgers University, Hackensack Meridian Health, and RWJBarnabas Health will be the first tenants of The Hub, a new collaborative site in downtown New Brunswick, NJ designed to foster research, entrepreneurship, innovation, and start-up incubation in New Jersey. The plan calls for a ten-story, 210,000 square foot state-of-the-art building in downtown New Brunswick with a direct connection to the NEC. The site, owned by the City of New Brunswick and managed by the New Brunswick Development Corporation (DEVCO), provides strong proximity to existing corporate, medical, and academic research activity. The New Brunswick Train Station is situated across the street from The Hub, via a skybridge.⁷⁴

"Through our role as the Hub's first institutional tenant, Princeton University will help transform our region into a vibrant center of innovation with a firm commitment to ensuring inclusive participation. By harnessing the vast reservoirs of ingenuity among our regional research institutions together with community and industry partners, we will build a better future." - Princeton University Vice Dean of Innovation, Rodney Priestley.⁷⁵



Rendering of The Hub @ New Brunswick Station (NJ)