

Renewing the New York Railroads

How Affordable, Frequent Metro-North and LIRR Service Can Grow Ridership and Expand Opportunity



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About the Research

This report was written by TransitCenter’s Steven Higashide and Kapish Singla, and Conveyal’s Anson Stewart and Matthew Wigginton Bhagat-Conway. The authors thank TransitCenter’s David Bragdon, Mary Dailey, Tabitha Decker, Ben Fried, Hayley Richardson and Tri-State Transportation Campaign’s Liam Blank and Felicia Park-Rogers for their review.

The access-to-opportunity analysis contained in the report was conducted by Conveyal. With guidance from TransitCenter, Conveyal created custom General Transit Specification Feed files representing hypothetical new transit schedules for Metro-North, LIRR, and NICE Bus. Conveyal also created a database of regional fares and fare rules in order to conduct a fare-constrained access-to-opportunity analysis using methods described in Bhagat-Conway and Stewart’s “Getting Charlie off the MTA: a multiobjective optimization method to account for cost constraints in public transit accessibility metrics.”¹

The report’s estimates of potential ridership increases on the LIRR are based on an analysis conducted by Mike Smart of Rutgers University. TransitCenter estimated the potential ridership increase for Metro-North.

1 Conway and Stewart (2019), “Getting Charlie off the MTA: a multiobjective optimization method to account for cost constraints in public transit accessibility metrics,” *International Journal of Geographical Information Science*, 33:9, 1759-1787, DOI: 10.1080/13658816.2019.1605075.

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Fixing Unequal Transit Outcomes in the New York Metro Region



In the Bronx and Queens, and municipalities in northern New Jersey and Nassau and Westchester Counties, residents who cannot afford to pay more than \$5 for a one-way transit trip can access only 54% of the jobs that people without a budget constraint can reach in an hour.

Public transportation provides affordable mobility to millions of people in the New York City region and is central to the region's inclusive growth. But the benefits of transit accrue unequally, especially on the basis of race and income.

The region's "commuter rail" system that is designed to ferry affluent riders in and out of midtown Manhattan at peak hours is in large part to blame for these disparities.

For people who can afford a ride on Metro-North Railroad (MNR) and the Long Island Rail Road (LIRR), the system is a seamless and efficient way to travel. But with some of the highest commuter rail fares in the country, both systems effectively shut out people who can't afford a ride, consigning them to long, unreliable local transit trips to reach jobs, healthcare, and education.

This has a big impact on economic opportunity. In the Bronx and Queens, and municipalities in northern New Jersey and Nassau and Westchester Counties, residents who cannot afford to pay more than \$5 for a one-way transit trip can access only 54% of the jobs that people without a budget constraint can reach in an hour.

There are pronounced racial gaps to these disparities. As of September 2021, the average white resident in the New York metropolitan area could access nearly a million potential jobs within 45 minutes using public transit—85% more than the average Black resident with access to only 539,000 potential jobs.

People who must travel outside of peak hours are also effectively shut out of the system because the railroads' schedules do not align with their travel needs. For example, during the morning peak period, northbound Metro-North trains stop at Fordham, in the Bronx, almost four times an hour. Around lunchtime, there is a full hour in-between trains.

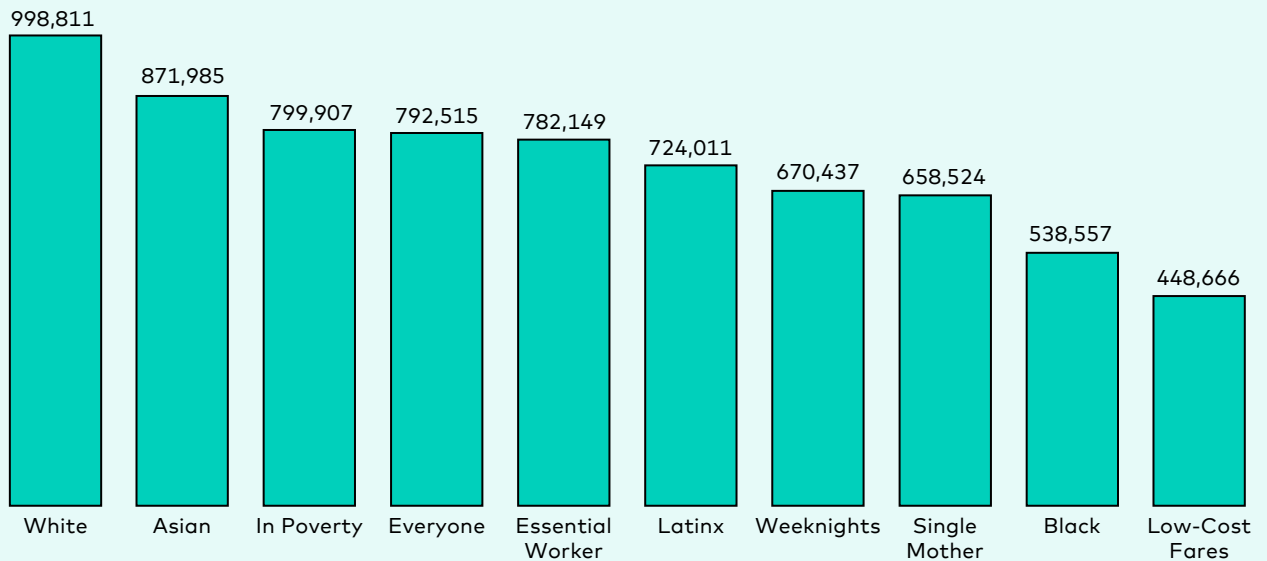
This access disparity enacts a time penalty on low- and moderate-income residents. Before the pandemic, a subway and bus trip between Midtown Manhattan and many neighborhoods in East and Southeast Queens took more than 90 minutes. In effect, Queens riders are paying with their time when an LIRR ride could easily halve travel times.

It's time for a new approach to moving people around the New York Metro Region. The pandemic has accelerated changes in commuting patterns and a decline in the number of office workers traveling to and from Manhattan during peak hours. At the same time, growing housing costs have displaced lower-income New Yorkers to neighborhoods in the outer boroughs, New Jersey, Long Island, and the Lower Hudson Valley, subjecting them to long, arduous commutes.²

2 See, for example, https://philanthropynewyork.org/sites/default/files/resources/06.11.15%20Funding%20Where%20Poverty%20Lives_Berube.pdf. Between 2000 and 2013, the number of poor residents declined in Manhattan and Brooklyn, but grew in Queens, the Bronx, Staten Island, and 19 suburban counties in the New York metropolitan area.



Figure 1: Jobs accessible in 45 minutes by transit



Data for travel in the New York Urban Core on weekdays from 7 a.m.–9 a.m. (except if noted weeknights 10 p.m.–12 a.m.) as of the week of September 12, 2021.

In order to match transit service with changing demand, we must fundamentally reimagine the purpose of the region's commuter rail network. This paper analyzes the potential benefits of operating commuter railroads more like regional rail within New York City's boundaries, with affordable fares and more frequent service.

We used the open-source Conveyal transit planning software to test several changes to commuter rail infrastructure, fare policy, and service within New York City, Westchester County, and Nassau County:

- **A \$2.75 commuter rail "city fare":** Reduce the fare on Metro-North and LIRR trips that begin and end within New York City (without leaving city limits).
- **Free transfers to local transit and "step-up" transfers from local transit:** In New York City, Nassau, and Westchester Counties, allow riders to transfer from commuter rail to the subway or local buses for free. Riders traveling from the subway or local bus can board commuter rail by paying the difference between a local transit fare and the commuter rail fare.
- **Additional frequency on in-city commuter rail stations:** We modified pre-pandemic LIRR and Metro-North schedules so that Yonkers and the majority of commuter rail stops within NYC's five boroughs have rail service every 15-30 minutes between 7 a.m. and 10 p.m. (A full description of the schedule changes is contained as an appendix.)

The fare and service changes we modeled would open up the transit system, with the fare changes particularly benefiting low-income riders. **We find that a "city fare" of \$2.75 would allow residents to access more than a million potential jobs in an hour.**

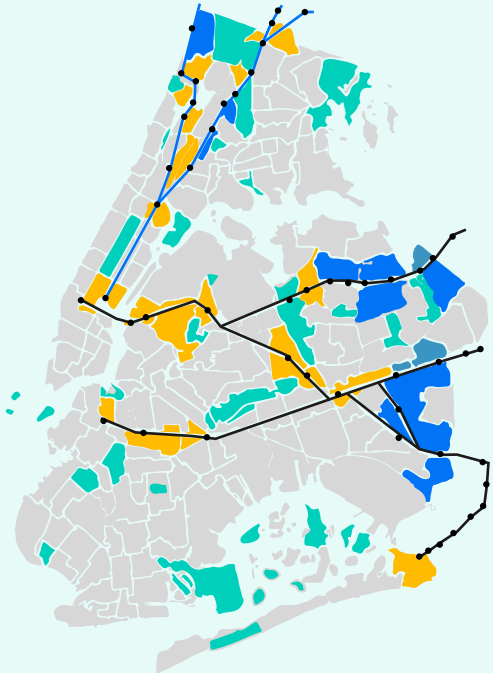
Current MTA ridership forecasts suggest that, under the status quo, Metro-North ridership may be as low as 60% of pre-pandemic levels by 2026, and LIRR ridership as low as 79 percent. We estimate that fare reductions in concert with better all-day service could grow ridership at rail stations within the city by **88 to 146 percent, translating to systemwide ridership increases on Metro-North of 5-8 percent, and LIRR of up to 22 percent.** This would accelerate the railroads' recovery from the pandemic.

This preliminary analysis suggests that regional rail transformation would have a ridership impact equivalent to multiple megaprojects. For example, McKinsey's ridership modeling for the MTA has suggested the Grand Central Madison project to bring LIRR service to Grand Central could increase LIRR ridership by 4 percent.³

Figure 2: What we modelled: NYC rail improvements

	Existing	Modelled
Fares within NYC	\$4.00-10.75; no transfer to local transit	\$2.75 with free transfer to local transit
Service	Hourly at off-peak times at many stations; every 15-20 minutes peak at some	Operating every 15-30 minutes between 7 am and 10 pm

- Only commuter rail service
- Commuter rail and subway service
- Metro-North
- LIRR
- Parks



This impact comes with much lower cost than a megaproject, however. In a 2018 report, the New York City Comptroller’s office suggested that the financial impact of lowering the commuter rail fare to \$2.75 within NYC would be as minimal as \$50 million in annual forgone revenue.⁴ In fact, as we recount later in this report, there have been several times when Metro-North lowered fares for select trips and saw *increased* net revenue as a result.

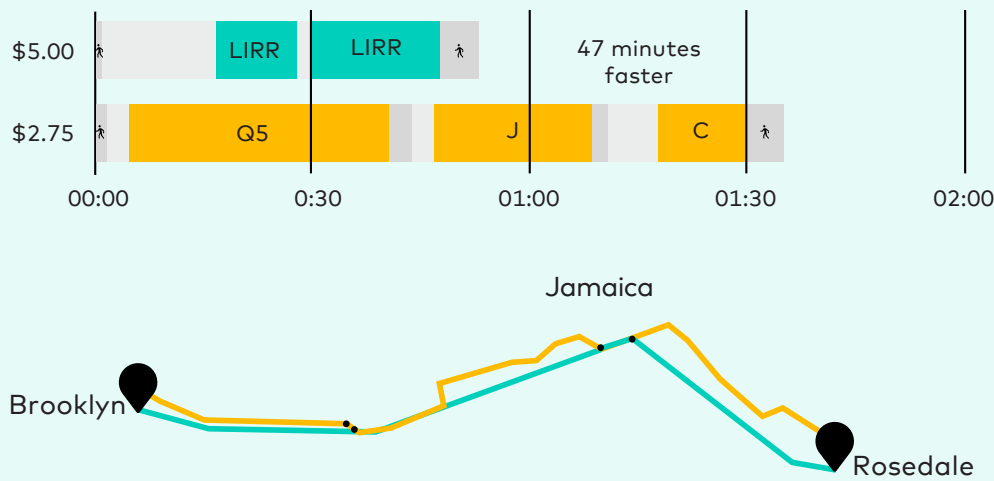
Metro-North and LIRR have a rich history of experimentation with service expansion and innovative fare discounts. Over the past several decades, they have already taken steps toward all-day service that is more affordable for riders. The time is now to double down on the types of operational changes that would attract new riders and make the system more equitable and accessible for all New Yorkers.

How the Status Quo Affects Riders

Imagine Cecilia, a home health aide living in Rosedale who works an overnight shift providing care to a client in downtown Brooklyn. In theory, she has two transit alternatives. She can take the LIRR from Rosedale to Jamaica, transferring to another commuter train

3 <https://new.mta.info/document/91791>
4 <https://comptroller.nyc.gov/newsroom/stringer-unveils-new-transit-plan-to-integrate-all-brooklyn-queens-and-bronx-commuter-rail-stations-with-the-mta/>

Figure 3: Rosedale to Brooklyn, trip starting at 7:15 a.m.



that brings her to Atlantic Terminal. This trip would take well under an hour.

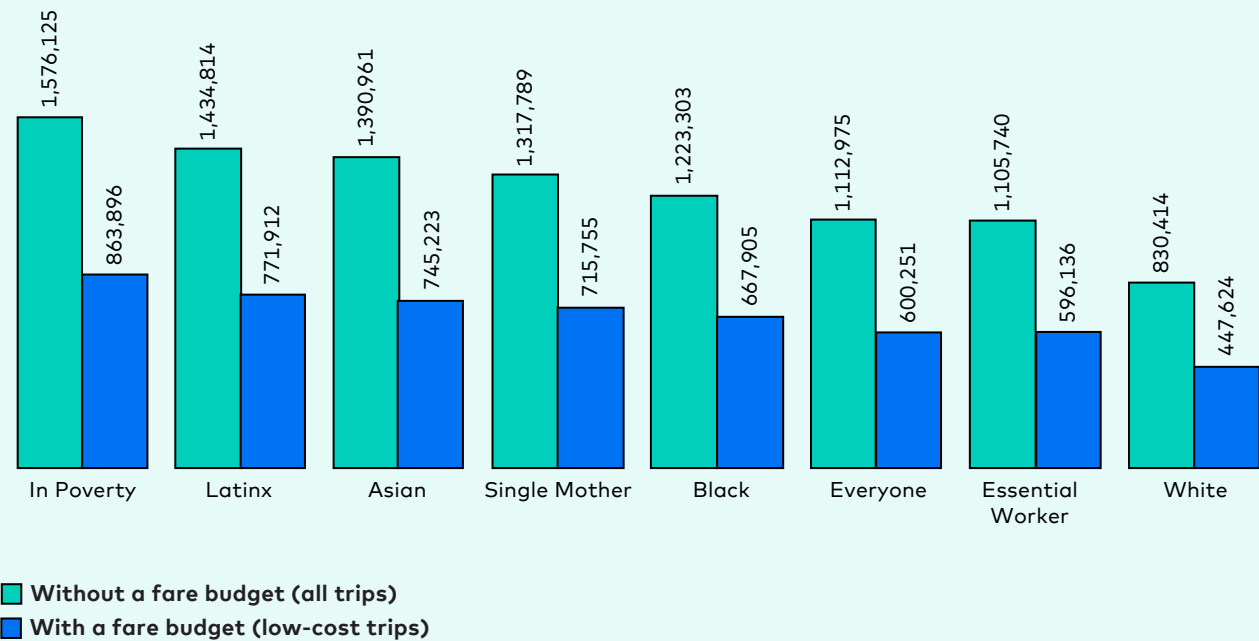
However, she rarely takes this trip. Instead, her evenings are spent on a much longer and more grueling commute. Most nights, she catches the Q5 or Q111 bus, both of which spend 40 minutes making local stops in Queens before connecting to the subway at Jamaica. Cecilia then spends almost another hour on the train before reaching her client’s home.

Why does she choose this exhausting trip? New York transit fares and schedules work against her.

First, the LIRR trip Cecilia could make is more expensive. A trip between Rosedale and Atlantic Terminal costs \$7.75. The MTA’s “Atlantic Ticket” pilot program theoretically discounts the fare to \$5—but confusingly, riders can only access this fare by choosing a special option at the LIRR ticket machine or on their ticket app. By default, someone buying a ticket for this trip is charged the higher fare. Even with this discount, Cecilia prefers to maximize her take-home pay by opting for local transit.

Second, when Cecilia has tried to take the LIRR, she has found that the schedule eliminates much of the possible time savings. Her

Figure 4: Number of jobs reachable in 60 minutes with and without a fare budget



Data for travel in the New York MSA, on weekdays from 7a.m.–9a.m. as of the week of September 12, 2021.

shift begins at 10 p.m., but at night the LIRR departs Rosedale only about once an hour. One train leaves at 8:47 p.m., which gets her to Atlantic Terminal by 9:22 p.m., forty minutes early for her shift. The next train does not leave until 10:02 p.m., after her shift has begun.

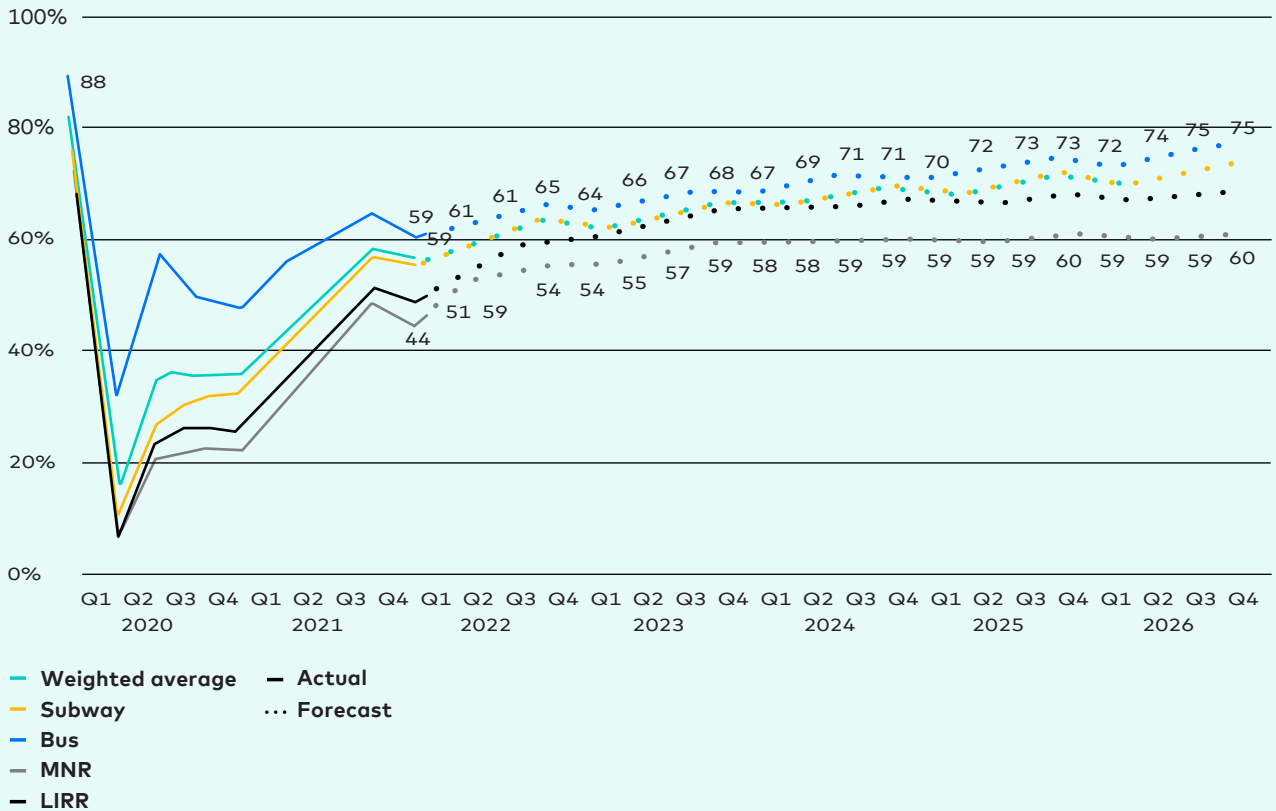
For Cecilia and hundreds of thousands of residents of the region, more affordable and frequent regional transit would massively expand the number of jobs they could access, and give them back hundreds of hours in time savings over the course of a year.

The Time for Change Is Now: COVID-19's Hit to "Commuter Rail"

Commuter railroads' traditional constituency of office workers traveling to and from downtown Manhattan have been the slowest to return to work. In the first quarter of 2022, ridership on the LIRR and Metro-North were both below 55% of pre-pandemic levels. At

5 <https://new.mta.info/document/91791>

Figure 5: Transit ridership over time by mode



Paid ridership scenario forecasts, as percentage of pre-pandemic ridership (ridership values reflect a percentage of current service)

its July 2022 board meeting, the MTA released updated forecasts projecting that even by 2026, ridership on Metro-North would rebound only to 60–79% of pre-pandemic levels, with LIRR ridership trending about ten percentage points higher, behind both the New York City subway and bus.⁵

The slow ridership growth forecasted for the commuter railroads is in large part attributable to the persistence of work-from-home policies and the railroads’ heavy reliance on work trips—pre-pandemic, 64% of LIRR trips and 85% of Metro-North trips were for work purposes.

The implications are clear: The railroads' best shot at avoiding the diminished future forecasted by the MTA is through transforming themselves in order to better serve non-office workers and non-work trips.

Getting the Most Out of LIRR's "Grand Central Madison"

The seismic changes in commuting behavior over the past several years are happening alongside a massive increase in commuter rail capacity. The MTA's East Side Access project (new tunnels bringing the LIRR into Grand Central Terminal) will enable the LIRR to carry 45% more riders between Long Island and New York City during peak hours, after it is completed in 2022. The MTA also plans to run new Metro-North service into Penn Station.

If all remains on schedule, in December 2022, the MTA will open a new LIRR terminal in Grand Central, providing LIRR riders with

Table 1:

Station	Midday (10 a.m.–4 p.m.*) trains	
	Existing	With new service
Rosedale, Laurelton, Locust Manor	6 westbound trains 7 eastbound trains	8 westbound trains 9 eastbound trains
Queens Village, Hollis	6 westbound trains 7 eastbound trains	6 westbound trains 6 eastbound trains
St. Albans	7 westbound trains 6 eastbound trains	8 westbound trains 8 eastbound trains
Little Neck, Douglaston, Bayside, Auburndale, Broadway, Murray Hill, Flushing-Main	12 westbound trains 12 eastbound trains	13 westbound trains 12 eastbound trains
Forest Hills, Kew Gardens	7 westbound trains 7 eastbound trains	12 westbound trains 12 eastbound trains

*Midday trains here are defined as westbound trains arriving at the terminal between 10 a.m. and 4 p.m., and eastbound trains leaving the terminal between 10 a.m. and 4 p.m.



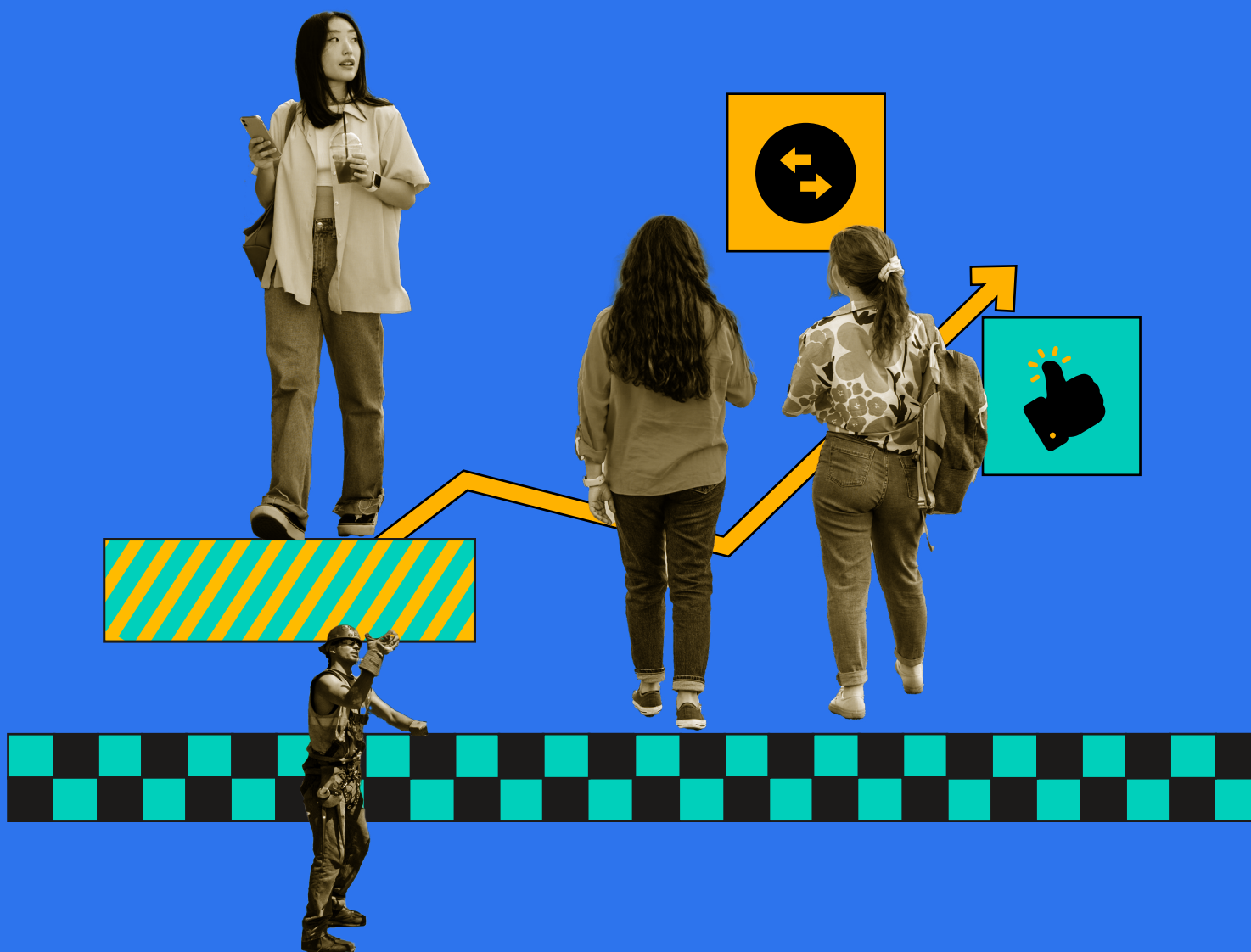
a direct ride to East Midtown. This project was known as East Side Access for most of its development; earlier this year, Governor Kathy Hochul announced that the new terminal would be known as Grand Central Madison.

This report does not attempt to estimate the impact of the new service, as it is based on an analysis performed before the LIRR released draft schedules associated with the new service (in September 2022).

However, a review of these schedules suggests that LIRR service will remain a peak-focused service that at other times of day is infrequent and inconvenient for many New York City residents, especially in Eastern Queens.

This is a missed opportunity to align service patterns with needs.

Current Commuter Rail Policy and Recent Improvements



LIRR and MNR have a lot of reform to undertake before they will resemble regional rail systems like London Overground. Still, both agencies are among the best positioned in the U.S. to transform their service models.

Since the mid-twentieth century, the LIRR and MNR have prioritized transporting white-collar workers from NYC suburbs to job centers in Manhattan. Referred to as “commuter rail,” this service model caters to riders with nine-to-five work schedules. Operationally, this comes at the expense of providing frequent, all-day service that’s more useful for shift work trips and other travel including to medical appointments or college classes. Commuter railroad transit fares are also high, ensuring that the rider base is primarily composed of well-paid office workers who have the financial ability to purchase discounted “monthly tickets.”

Despite adherence to this long-standing core business model, over the years both MNR and LIRR have made infrastructural investments that could enable higher frequency and more bidirectional service. In addition, both agencies have shown willingness to enact policy changes that have resulted in the implementation of reduced-fare programs. Notably, in August 2021, Metro-North President Catherine Rinaldi invoked the term “regional rail” to discuss how she envisions the future of service.⁶ LIRR and MNR have a lot of reform to undertake before they will resemble regional rail systems like London Overground. Still, both agencies are among the best positioned in the U.S. to transform their service models.

There’s also an urgency for MNR and LIRR to adapt their systems toward regional rail as COVID-related lockdowns have collapsed the traditional market for commuter rail. The pandemic caused a sharp decline in white-collar commute trips as work moved to home settings.⁷ This shift is evidenced in the collapse of multi-day passes that formed much of LIRR and MNR revenues before the onset of the pandemic. In 2019, monthly and weekly tickets accounted for 55% of LIRR ridership; through the first four months of 2022, those types of ticket accounted for only 33% of rides.⁸ A survey of large employers by the Partnership for New York City found that 78% view hybrid office attendance as their predominant post-pandemic policy.⁹ These recent trends don’t forecast that the “peak travel” market will become obsolete, but support a growing recognition that LIRR and MNR will have to orient service and adjust fares to rebuild ridership and accommodate new demands.

Fare Policy

Fares on both systems are notoriously amongst the highest in the US. On the LIRR, a round-trip peak fare from Hicksville (in Nassau County) to Manhattan’s Penn Station costs \$28 dollars. On

6 <https://www.nytimes.com/2021/08/28/nyregion/commuter-railroad-conavirus-new-york.html>

7 <https://www.politico.com/news/2021/06/10/commuter-rail-changing-492025>

8 See <https://new.mta.info/document/15771> and <https://new.mta.info/document/87686>

9 <https://pfny.org/news/nearly-80-of-new-york-city-employers-anticipate-hybrid-work-model-moving-forward-partnership-survey-finds/>



Metro-North, a round-trip peak ticket from New Rochelle to Grand Central (a distance of 19 miles) costs \$22.50. Moreover, a rider who needs to ride a subway or bus to reach their end destination has to pay an additional round-trip fare of \$5.50.

In addition to stations located in the suburbs, the LIRR operates stations in Queens and Brooklyn and Metro-North maintains stations in the Bronx. Many of these outer-borough stations are located in neighborhoods typically deemed to be “transit deserts,” or areas in New York City where the subway doesn’t reach. TransitCenter analysis found that people who lived in a half-mile radius of a LIRR stop in Queens often opted for very long bus-and-subway commutes to reach their destinations due to the inconvenient and inaccessible nature of the LIRR.¹⁰ In other words, it’s simply more economical to take the bus-to-subway trip (which allows for free transfers) than to take the LIRR to the subway or bus (no free transfers). In effect, many Queens riders who can’t afford premium fares are paying with their time.

Advocacy efforts led by the Permanent Citizens Advisory Committee to the MTA (PCAC) and New York City Transit Riders Council (NYCTRC) have long sought more affordable fares for in-city travel. In 2003, PCAC proposed a CityTicket that would reduce fares on weekend travel that occurred within NYC limits. In 2004, the MTA introduced CityTicket as a pilot program with a \$2.50 fare. From its start, CityTicket was a success. Over 100,000 tickets were sold in the

10 <https://transitcenter.org/priced-out-how-fare-structures-limit-access-to-lirr-service-in-eastern-queens/>

11 <https://nypost.com/2004/03/15/discount-weekend-tickets-a-rail-big-success/>

Building on the success of CityTicket, NYCTRC began to advocate for a similar fare discount for weekday travel. NYCTRC’s new ticket concept—dubbed “Freedom Ticket”—would build on CityTicket by including free transfers to subways and buses.

first months that it was introduced, with solid weekend-to-weekend growth.¹¹ As of 2022, a single-use CityTicket costs \$5, discounted from the normal off-peak fare which costs \$7.75 from Zone 3 (where most outer-borough LIRR stations are) to Penn Station or Atlantic Terminal.

Building on the success of CityTicket, NYCTRC began to advocate for a similar fare discount for weekday travel.¹² NYCTRC’s new ticket concept—dubbed “Freedom Ticket”—would build on CityTicket by including free transfers to subways and buses. NYCTRC examined six neighborhoods in Southeast Queens with LIRR stations. Their analysis showed that lines that stopped in or passed by these SE Queens stations often had empty seats and could accommodate more riders. For example, 49% of seats in A.M. peak period on trains traveling from Jamaica (Queens) to Atlantic Terminal (LIRR’s western terminus in Brooklyn) were empty. The report points out that lowering costs for riders in these stations would have multiple benefits, including: 1) alleviating overcrowding on subways in Queens; 2) revenue gains for the MTA by converting commuters from other modes to LIRR riders; 3) dramatically reducing commute times for Queens riders in “transit deserts.”

In 2018, the MTA adopted a version of the Freedom Ticket dubbed “Atlantic Ticket.” The Atlantic Ticket provides discounted weekly or one-way tickets from SE Queens to Atlantic Terminal.¹³ Currently in a “pilot phase,” the Atlantic Ticket weekly ticket costs \$60 and includes a weekly unlimited MetroCard. The cost of this trip without the pilot fare is \$104.25.¹⁴ In addition, the time-savings are consequential. A rider who used to travel over 90 minutes from Queens Village to lower Manhattan on bus-to-subway could now more affordably use the LIRR to reach their destination in under 60 minutes. Similar to CityTicket, the Atlantic Ticket pilot showed immediate signs of success. By February 2020, more than 2.3 million Atlantic tickets had been sold since the pilot began in June 2018, roughly 23,000 per week. In the same period, it generated more than \$10 million in revenue.¹⁵ Additionally, ridership growth from these Queens stations outpaced ridership growth in any other part of the LIRR system. Moreover, despite the lower cost of transit fares, the LIRR collected more revenue in this pilot program by attracting more riders to use the system and for occasional riders to more regularly use the system.¹⁶ The Atlantic Ticket pilot has also demonstrated that the MTA is able to provide seamless and integrated fare transfers between the LIRR and its subways and buses.

The Atlantic Ticket pilot wasn’t the first time in recent history that lower fares led to higher revenue. A report by the Regional Plan

12 <https://www.pcac.org/wp-content/uploads/2015/12/Freedom-Ticket-reduced.pdf>

13 <https://new.mta.info/fares/atlantic-ticket>

14 <https://www.ny1.com/nyc/brooklyn/news/2018/06/06/mta-rolls-out-atlantic-ticket-discount-fare->

15 <https://www.thecity.nyc/transportation/2020/2/18/21210508/success-of-lirr-brooklyn-queens-tix-renews-call-for-citywide-2-75-rail-fare>

16 <https://www.thelirrtoday.com/2019/11/atlantic-ticket-ridership.html>

Data from programs like CityTicket, Atlantic Ticket, and ConnDOT reverse commute fare reductions demonstrate that lower fares can attract more riders and raise more revenue.

Association (RPA) details how the Connecticut Department of Transportation, which sets fares for Metro-North travel to CT stations, lowered fares a few times in the 1990s. In 1994, fares for reverse commute trips from the Bronx to Greenwich, CT, and Stamford, CT, were lowered by as much as 20%. After that reduction, ridership on reverse commute routes rose 34% and revenue increased by 17%. In 1997, ConnDOT reduced fares by 6%, which led ridership to increase by 21%. As Jeff Zupan of RPA wrote, “Each produced more, not less revenue, belying conventional wisdom among transit operators that you cannot make up the revenue with higher ridership if you lower fares.”¹⁷

In February, the MTA instituted a major expansion of CityTicket. CityTicket was originally available only on weekends; now, \$5 tickets for trips within New York City are available for off-peak trips during the week as well. Between February and May 2022, weekly sales of CityTickets increased by 68% for LIRR trips and 50% on Metro-North.¹⁸

Data from programs like CityTicket, Atlantic Ticket, and ConnDOT reverse commute fare reductions demonstrate that lower fares can attract more riders *and* raise more revenue. These successful pilots merit the MTA to further explore how to permanently implement lower fares and offer fare integration with other MTA transit services. These fare reductions have enabled riders to see LIRR and MNR as attractive transportation options conducive for all kinds of trips, whether it’s to visit a park with family on weekends or reach a college class more quickly on a Wednesday afternoon. New York City residents, especially cost-constrained riders with fewer transportation choices, deserve to access the infrastructure that runs through their neighborhoods.

Metro-North: From One-Way to Bidirectional Service

Since the 1980s, Metro-North has made deliberate attempts to court “reverse commuters,” or people traveling north from Manhattan and the Bronx to access opportunities in nearby cities such as White Plains, NY.¹⁹ To attract this market segment, MNR officials have taken steps like modifying rail schedules to ensure timely transfers with other transit services like subways and local buses.

Metro-North also recognized potential in adding a third track on a roughly 3-mile stretch of the Harlem Line between Mount Vernon and Crestwood to better accommodate reverse-commute travel. On a normal weekday morning during peak hours (defined as trains with a scheduled arrival time into NYC between 6 a.m. to 10 a.m.),

17 <https://s3.us-east-1.amazonaws.com/rpa-org/pdfs/RPA-Four-Transit-Issues-on-Long-Island.pdf>

18 <https://www.amny.com/transit/cityticket-sales-soared-lirr-metro-north/>

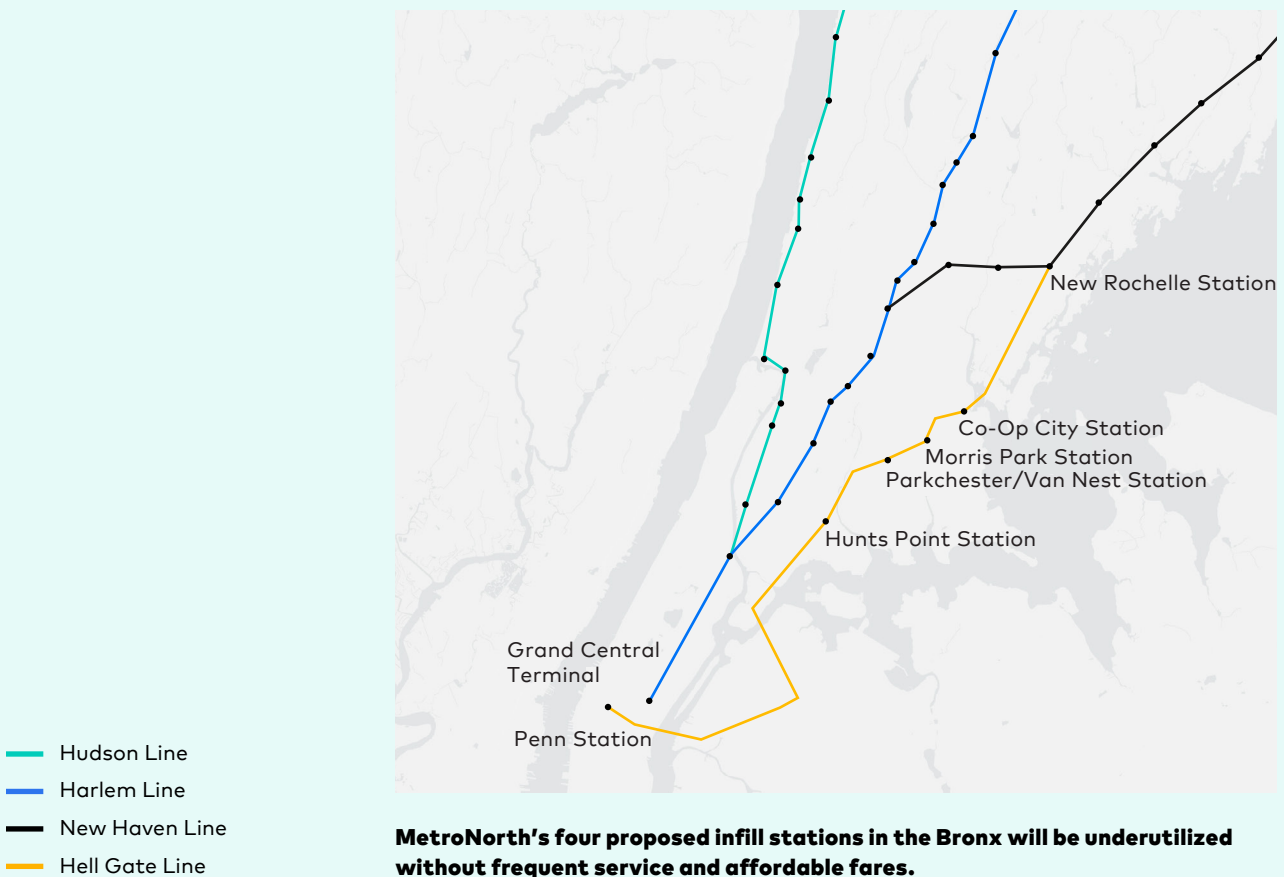
19 <https://www.nytimes.com/1989/06/18/nyregion/accomodating-new-riders-all-going-the-wrong-way.html>

commuter rail is typically oriented toward delivering riders into the city core. This means that any portion of the line with two tracks is usually reserved for Manhattan-bound trains. One track is used for local service that serves more stops, and the second track is used for express trains that skip lower-ridership stations and allow for faster commutes. This constraint would make it difficult to run service in the reverse direction (that is, from the city to suburbs) during these periods. Adding a third track has enabled MNR to run more trains from the city to the suburbs in these peak periods.

Construction for a third track on the Harlem line began in 2001 and was completed in 2004. Upon completion, Metro-North increased the frequency of reverse-commute trains from 90 minutes to 30 minutes.²⁰

Former MNR VP of Operations George Walker noted: “We used to just move trains. Now we move people.”²¹ What he’s pointing out is that trains operating northbound in the A.M. peak periods were primarily run with the intention of turning back around in order to

20 https://www.rauchfoundation.org/files/9913/5818/7008/How_the_LIRR_Could_Shape_the_Next_Economy.pdf
 21 https://www.progressiverailroading.com/passenger_rail/article/Inside-New-York-Citys-Metro-North-Railroad--31828





serve passengers headed south to Manhattan. But with careful attention to the reverse-commute market, including the mid-Harlem project, MNR began intentionally providing service to city residents to access suburban job centers. Through the 2000s, ridership growth was primarily seen in the reverse-peak and off-peak travel market. In 2012, WNYC reported that Metro-North's reverse-commute ridership had grown threefold since 1985.²²

The mid-Harlem third track project yielded new customers, particularly passengers boarding from the Bronx headed to offices and hospitals in Westchester County and Connecticut. The 2004 completion of the project also aligned with efforts in the city of White Plains to build more housing and attract businesses to its downtown.

Metro-North often touts itself as the largest reverse commute market in the country.²³ Its success is due to best practices, which includes adjusting reverse-commute schedules, lowering fares, and aligning infrastructural improvements with cities that have clear plans to capitalize on them.

In the coming decade, Metro-North has ambitious plans to improve rail access in the region including new stations within New York City. In 2021, the FTA approved Metro-North's Penn Station Access Project, which will bring four new accessible rail stations to the East Bronx and introduce Metro-North service to Manhattan's West Side at Penn Station. Maximizing the potential of this new service will require instituting a more equitable fare policy.

22 <https://www.wnyc.org/story/285912-mta-bronx-reverse-commute-on-the-rise/>

23 http://web.mta.info/mnr/pdf/WayAhead_vWeb1.pdf

The infrastructure of the third track and accompanying projects on the section of the Main Line like station upgrades, new switches, and substation replacements will make the system more reliable and better able to provide frequent bidirectional service.

2022: A Big Year for LIRR Capital Construction Projects

The Long Island Railroad is the busiest commuter rail system in the US. The railroad logged more than 91 million passenger rides in 2019—the highest ridership it had recorded since the 1940s.²⁴ By the end of 2022, LIRR will have completed two ambitious and complementary construction projects.

Third Track on the Main Line

LIRR, like MNR, has long identified a need for a third track in a key segment of its network. In 2018, construction began for a third track on a 9.8-mile segment between Floral Park and Hicksville on LIRR's Main Line; the railroad celebrated its completion in October 2022. Similar to Metro-North's Harlem Line third-track project, the stated benefit of a third track on LIRR's Main Line is to allow for more frequent reverse-commute trips for eastbound trains during the morning-peak and westbound trains in the evening-peak period.²⁵ The Main Line is the central segment in the Long Island Rail Road network that runs through the middle of Long Island. Several branches, including the heavily used Huntington and Ronkonkoma branches, utilize the Main Line. This section of the Main Line is home to some of the busiest LIRR stations like Mineola and Hicksville. The MTA is currently seeking proposals from developers for TOD projects at the Main Line station at Westbury.²⁶

The infrastructure of the third track and accompanying projects on the section of the Main Line like station upgrades, new switches, and substation replacements will make the system more reliable and better able to provide frequent bidirectional service. At the moment LIRR's reverse-commute market isn't as robust as MNR's reverse-commute share, and LIRR should begin to preview how exactly it can provide more frequent reverse-commute service.

A key difference between the MNR and the LIRR third track projects is that more railroad lines branch off LIRR's Main Line. The LIRR will need to be more explicit about which of the Queens stations along the Main Line could receive more reverse-peak service. Additionally, the LIRR will have to continue to work with county and city governments to promote dense housing projects along upgraded Main Line train stations.

Grand Central Madison

The second major construction project is Grand Central Madison

24 <https://www.masstransitmag.com/rail/press-release/21126212/mta-headquarters-mta-posts-best-january-metrics-in-several-years-for-nyc-subway-lirr-metronorth>

25 <https://www.amodernli.com/project/thirdtrack/>

26 <https://new.mta.info/mta-seeking-proposals-transit-oriented-development-lirr-west-bury>

(formerly known as East Side Access), which will bring LIRR trains to Grand Central Terminal.

For decades, all Manhattan-bound LIRR trains terminated at Pennsylvania Station on Manhattan's West Side. Grand Central Madison (GCM) will change that by also bringing LIRR riders to an eight-track, four-platform concourse within Grand Central Terminal. Construction on Grand Central Madison began in 2007 after decades of planning and false starts, and it's set to open by the end of 2022. On a per-mile basis, GCM is the most expensive rail project in the world, at over \$11 billion dollars for 1.7 miles.²⁷

One of the stated benefits of GCM is that it'll save commuters up to 40 minutes, primarily for workers whose offices are on the east side of Manhattan and who currently double back after getting off at Penn Station. However, as the traditional market for the kind of riders that this project serves—that is, white-collar commuters—has been diminishing during COVID, the MTA must outline how this project can benefit a larger portion of New Yorkers.

GCM will allow the LIRR to operate more trains, because service will no longer be constrained by track space at Penn Station, which it shares with Amtrak and NJ Transit. But this physical infrastructure is only as useful as the ability to maximize the operations and service of the trains.

The MTA must meet with communities along Queens stations to help determine service planning to Grand Central and Penn Station. Fare changes like the expanded CityTicket have made LIRR more accessible to city residents; this momentum must continue.

27 <https://transitcosts.com/projects/>



Models for Full Regional Rail Transformation



Instead of unidirectional service focused on peak commuter markets, railways in London and Paris now offer frequent all-day service between the central city and outlying suburbs, as well as within the central city, with comparable fares to local transit.

Well-known examples of international “regional rail” models include Paris’s Réseau Express Régional (RER) and the London Overground. In both cases, a number of separate suburban railways were gradually integrated with the city transit network. This integration required significant infrastructure investments to enable more frequent service and through-running.

But they also encompassed operational and fare policy changes that oriented the service to new riders. Instead of unidirectional service focused on peak commuter markets, railways in London and Paris now offer frequent all-day service between the central city and outlying suburbs, as well as within the central city, with comparable fares to local transit.

In London, Overground ridership tripled between 2007 (when the city transportation authority took over management of the rail lines) and 2011. The largest increases took place on the East London branch, which was significantly extended. However, even on branches where service was not extended, higher frequencies and lowered fares led to a ridership increase of 110%.²⁸

Many North American commuter rail agencies are taking steps toward this model. Chicago’s Metra has been piloting half-price fares on two lines running through communities of color on the city’s South Side and the region’s South Suburbs. Boston’s MBTA initiated a similar program that lowered fares on its Fairmount Line and has recently changed its commuter rail schedules (which were heavily peak-oriented) to provide hourly service.

Philadelphia’s SEPTA has the largest ambitions amongst US agencies that provide commuter rail service. The agency recently proposed three options for new operating models, aimed at providing service at least every 30 minutes all day, and potentially every 15 minutes at some stations.²⁹

Internationally, expansion of regional rail has often involved labor reform in order to reduce the cost of providing frequent service. In 2013, for example, the London Overground eliminated onboard conductors, with train operators as the only staff. Changes to operations (such as moving to a proof-of-payment fare collection system) and technology (like using train-mounted cameras to ensure that passengers are safely away from doors) have made many of the traditional functions of conductors redundant. Current staffing practices at Metro-North, LIRR, and NJ Transit, where trains may have four or more conductors on board, make it costly to operate service more frequently.

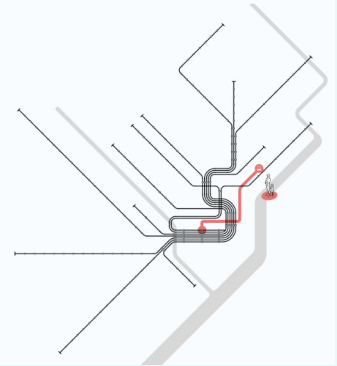
28 <https://ro.uow.edu.au/cgi/viewcontent.cgi?article=1004&context=isngi2013>

29 <https://www5.septa.org/septa-releases-options-for-future-of-regional-rail/>

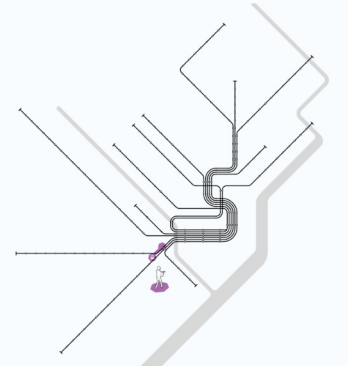
Figure 6: SEPTA's Reimagining Regional Rail website includes a slideshow explaining how existing service excludes certain riders due to cost, schedule, accessibility, and walkability concerns.

But, Regional Rail also leaves people behind.

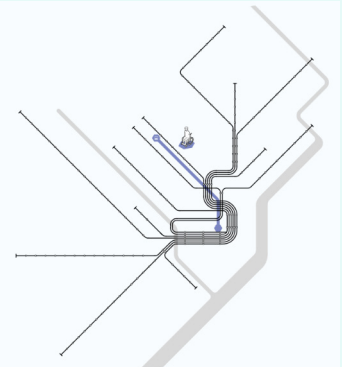
An office worker who lives in Tacony takes the #56 bus to Center City instead of taking Regional Rail because of the cost.



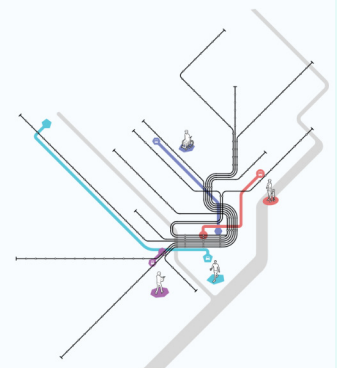
A student at Penn Medicine takes the trolley even though Regional Rail would be a shorter walk because the trolley comes more often throughout the day.



A Mount Airy resident takes the bus because they cannot get their wheelchair on the train.



Can Regional Rail work for them as well?
Let's Reimagine Regional Rail!





WHAT WE MODELED

Regional Rail in NYC



We calculated the potential increase in accessible destinations after two transformational changes to how regional rail operates within New York City:

A \$2.75 “City Fare”: We set Metro-North and LIRR fares to \$2.75 for any trip that begins and ends within New York City (without leaving city limits) and added a free transfer between regional rail and the bus or subway (the transfer is valid for 2 hours after the start of the trip).

Frequent in-city service: Next, we modeled frequent, all-day service for regional rail stations in New York City. We added service so that, at the busiest stations outside of Manhattan, trains arrive every 15 minutes during the day, and that at other outer-borough stations service arrives at least every 20–30 minutes.

This schedule would increase service as follows:

- In the Bronx, service would run at Fordham and Woodlawn at least every 15 minutes from 7 a.m. to 10 p.m., and at least every 30 minutes at Melrose, Tremont, Botanical Gardens, Williams Bridge, and Wakefield (on the Harlem Line); and Ludlow, Marble Hill, University Heights, and Morris Heights (on the Hudson Line).
- In Queens, service would run at least every 20 minutes at Woodside, Forest Hills, and Kew Gardens (on the Main Line); 30 minutes at Flushing-Main Street, Murray Hill, and Broadway (on the Port Washington Branch); Locust Manor, Laurelton, and Rosedale (on the Far Rockaway Branch); and St. Albans (on the West Hempstead Branch).
- In Brooklyn, service between Atlantic Terminal and Jamaica, including Nostrand Avenue and East New York would operate every 30 minutes (pre-COVID, this was the case for most of the day, but the schedule did include gaps in service).

Generally, we modeled these changes by reviewing schedules (as of March 2020) and adding stops to train runs that bypass NYC stations. In some cases, we added new shuttle services. These are not necessarily the best ways to operate frequent regional rail service within NYC; they were chosen for ease of modeling.

We also modeled the addition of an infill station on the LIRR’s Port Washington Line (at Elmhurst, allowing a walking transfer to M, R, and late-night E subway service at Elmhurst Avenue; the LIRR previously had a station here, which closed in 1985). This did not significantly change accessibility.

Benefits

By making the railroad a viable travel option, hundreds of thousands of commuters would see their transit trips shortened, sometimes by more than half.

Before the pandemic, a subway and bus trip between Midtown Manhattan and many neighborhoods in East and Southeast Queens (like Rosedale, Laurelton, Cambria Heights, and Bayside) took more than 90 minutes.

Affordable regional rail fares would change the calculus. **In over a dozen outer-borough neighborhoods—including Belmont, Norwood, Williamsbridge, Morris Heights in the Bronx, and Woodhaven, Jamaica, St. Albans, Hollis, Queens Village, Laurelton, Rosedale, Murray Hill, and Auburndale in Queens—a “city fare” would allow residents to access more than a million potential jobs in an hour, for \$2.75.**

Figure 7: Change in number of jobs accessible for \$2.75, with fare integration within 45 minutes.



Figure 8: Change in number of jobs accessible for \$2.75, with fare integration within 60 minutes (*top*) and 90 minutes (*bottom*).

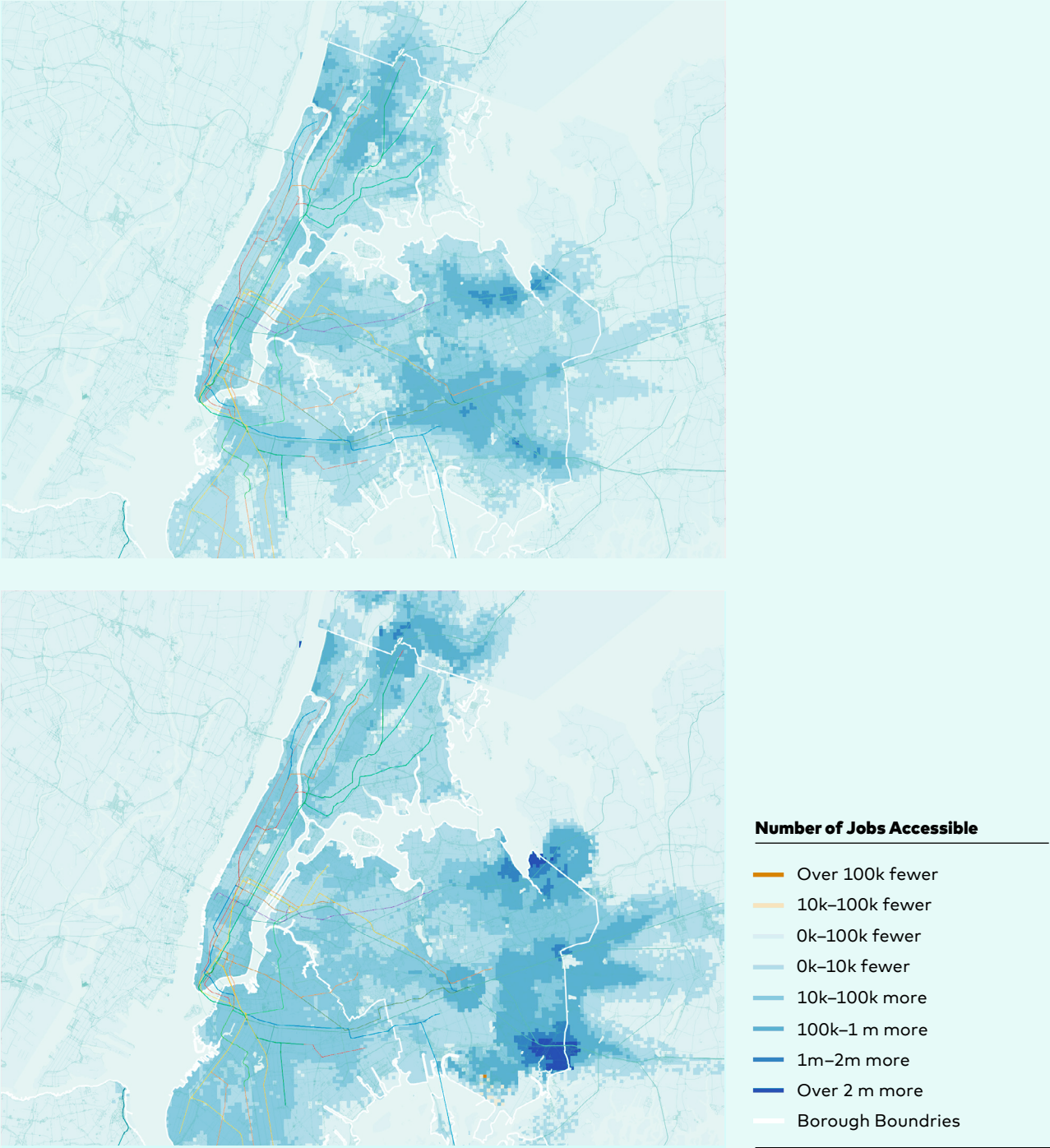


Figure 9: Change in number of jobs accessible for \$2.75, with fare integration and frequent rail service within 45 minutes (top) and 60 minutes (bottom).

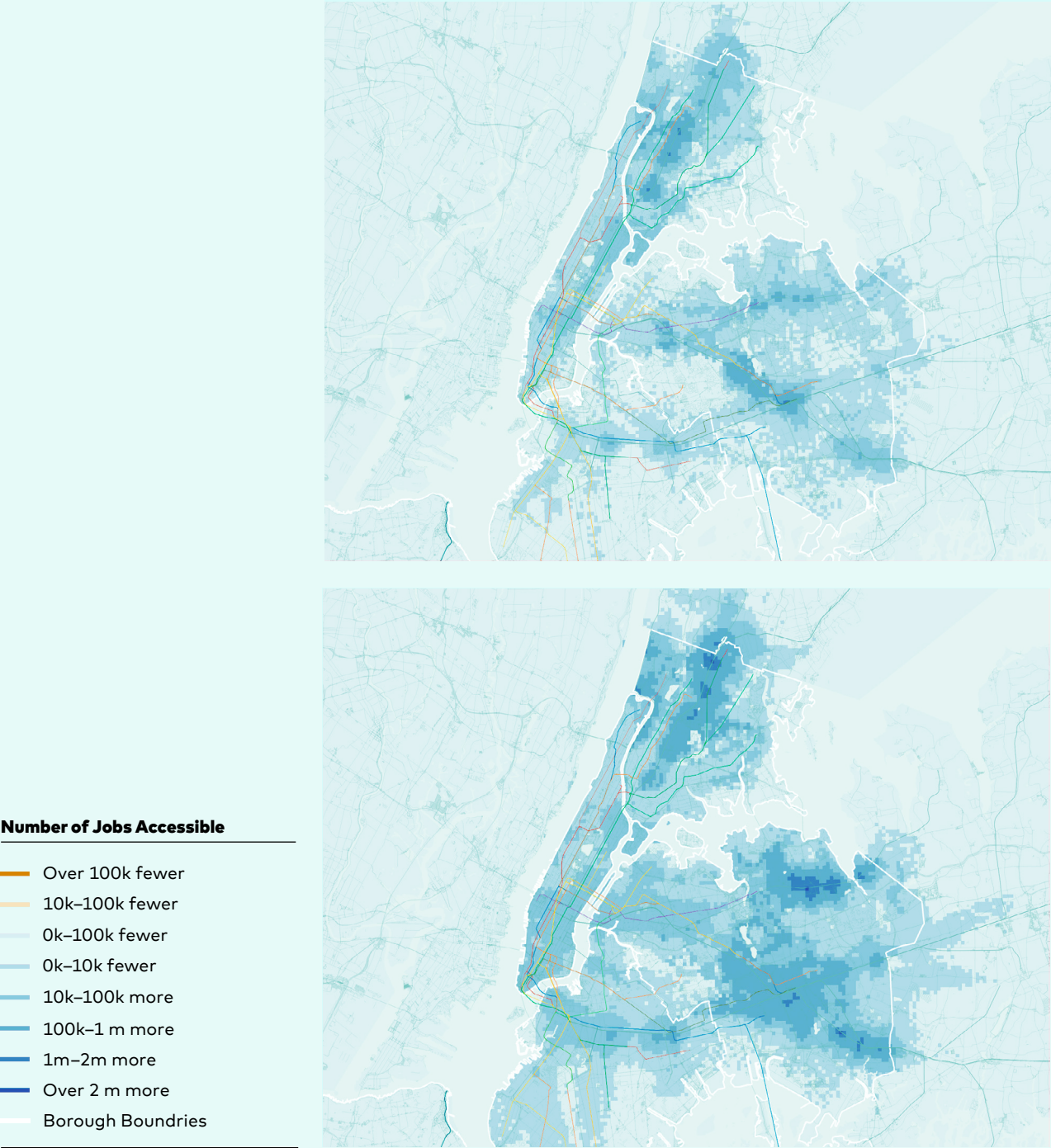
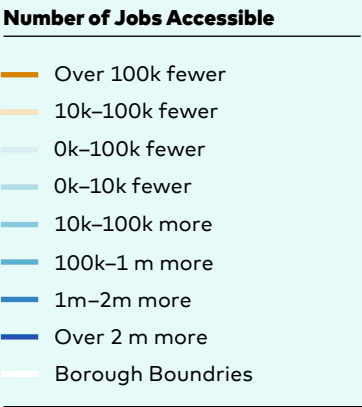
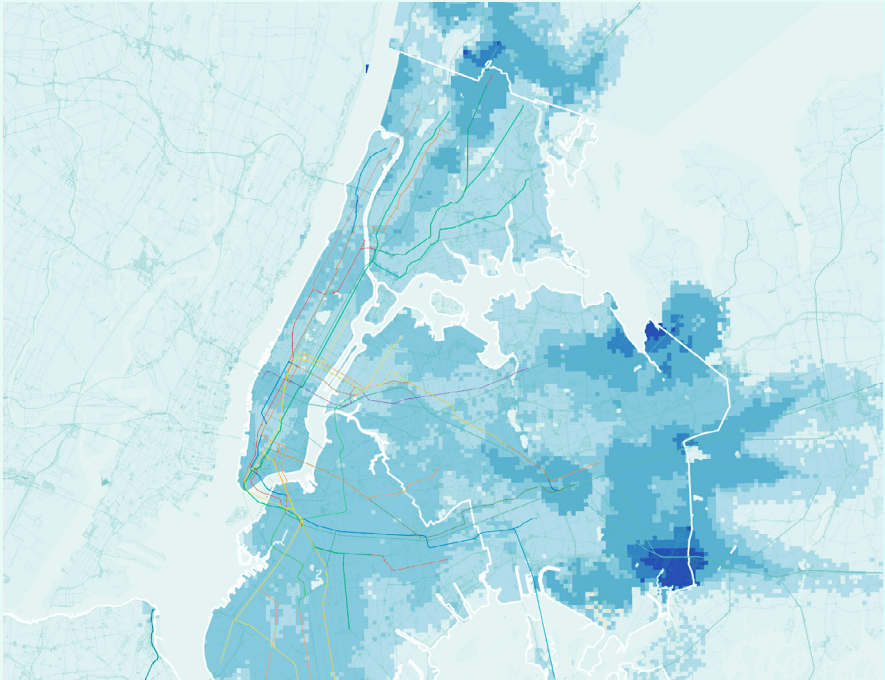


Figure 10: Change in number of jobs accessible for \$2.75, with fare integration and frequent rail service within 90 minutes



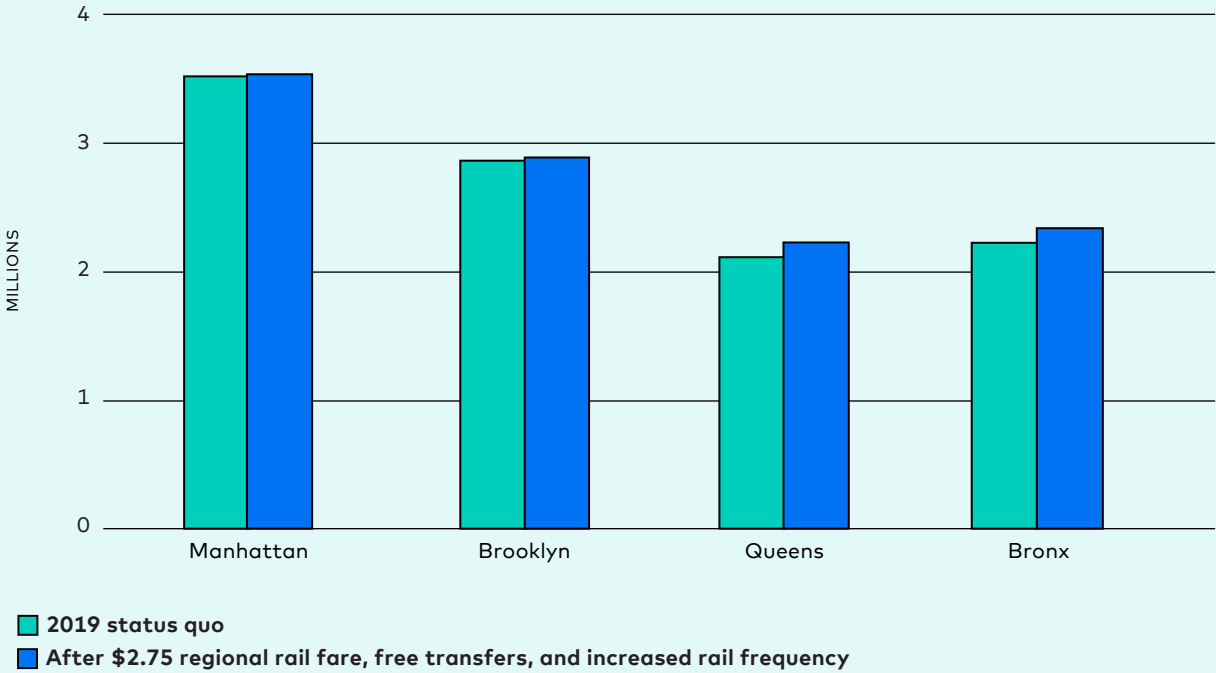


A \$2.75 fare for regional rail trips within city limits and higher frequency service would benefit both low- and moderate-income travelers. For many budget-constrained riders, these changes would completely change the geography of transit. Residents of northeast Queens, southeast Queens, and the central Bronx could affordably access to as many as 2 million additional jobs within an hour's commute. In neighborhoods like Richmond Hill in Queens and Marble Hill in the Bronx, a million additional jobs would be within reach:

In the figures on the previous pages, every point is shaded according to the change in number of jobs reachable from that point, for a \$2.75 fare and 45-, 60-, and 90-minute cutoffs.

These changes would make transit work better as a network, reducing travel times throughout the city, especially in Queens and the Bronx. As Figure 11 illustrates, the average resident in Queens and the Bronx would be able to access over 100,000 additional jobs in an hour (an increase of nearly 5%), helping to close the “transit access gap” with Manhattan residents and Brooklynites.

Figure 11: Jobs accessible within 60 minutes of spending \$2.75 on transit



Avoiding "Transit-Oriented Displacement"



Some of the regional transit reforms we call for would greatly increase access to opportunities and the usefulness of the transportation network. Like other public benefits, this means they could raise real estate values in surrounding communities. This would benefit some residents but increase the risk that others are displaced from their homes, particularly renters.

Transit-oriented development should not lead to "transit-oriented displacement." Researchers at UC Berkeley's Urban Displacement Project have outlined a series of policies that help prevent displacement.³⁰ These include *proactive* policies that help tenants from being subjected to landlord pressure in the first place (like construction of affordable housing and "just cause" or "good cause" laws that restrict landlords' ability to evict tenants) and *responsive* policies that help tenants resist pressure when it happens (like giving tenants the right to legal counsel in housing court):

30 <https://www.urbandisplacement.org/blog/investment-without-displacement-from-slogan-to-strategy/>

Elsewhere in the country, transportation and housing investments are being increasingly linked. In 2020, voters in Austin, Texas, approved Project Connect, a \$7.1 billion plan to expand bus and rail service throughout the city. The plan included \$300 million for affordable housing and anti-displacement policy, which the city has begun spending.

Table 2: Anti-Displacement Policies

Proactive	Protections	Preservation	Production
	Landlord anti-harassment protections	Acquisition/rehabilitation	Inclusionary zoning
	Just cause for evictions ordinances	Community Land Trusts	Targeted tax allocation districts
	Rent regulation	Proactive code enforcement	Public lands for affordable housing
	Tenant counseling	Source of income (voucher) anti-discrimination legislation	Land banking for affordable housing
	Rental assistance		Density bonus
	Supports for renters to become homeowners		Accessory Dwelling Units (ADUs)

Proactive	Protections	Preservation	Production
	Homeownership counseling		Public/social housing
	Mobile home rent stabilization		Housing trust funds (including regional entities)
			Bonds for affordable housing construction
			Impact fees and commercial linkage fees
Responsive	Relocation benefits	Acquisition/rehabilitation triggered by threat of displacement	Right to Return/Preference Policies
	Tenant right to counsel	Right of First Refusal	"Ban the box" policies
	No net loss and one for one replacement	Retain expiring-subsidy units (create supportive financing vehicles) Condominium conversion restrictions	ADU support conditional on renting to voucher-holders
		Vacancy control in rent regulations	
		Single-room-occupancy (SRO) preservation ordinance	

From UC Berkeley's Urban Displacement Project

SCENARIOS

How Regional Transit Would Benefit New York Families

Bronx & Queens



To understand the benefits of fare and schedule changes, imagine how the transit landscape changes for families in three neighborhoods near regional rail stations: Fordham in the Bronx; Bayside in northeast Queens; and Rosedale in southeast Queens.

Fordham, Bronx

Luis and Maya live near the Metro-North station in Fordham. A trip between Fordham and Harlem-125th Street or Grand Central Terminal costs \$7.25 off-peak. During peak periods, the same trip costs \$9.25.

Lowering the fare, implementing free transfers between regional rail and local transit, and increasing frequent service opens up new possibilities for both of them.

Luis works at LaGuardia Airport. Today, he walks to the D train and takes it to 7th Avenue, transfers to the E into Queens, and then switches to the Q70 Select Bus Service, in total a 90-minute trip. With regional rail, he could instead take Metro-North from Fordham to Harlem-125th St. and catch the bus from there, saving 25 minutes.

Maya is a physician's assistant at a hospital in Wakefield, in the Bronx. Today, she takes the Bx12 Select Bus Service to the 2 train at

Fordham to LaGuardia Airport

Current Trip

D to E to Q70



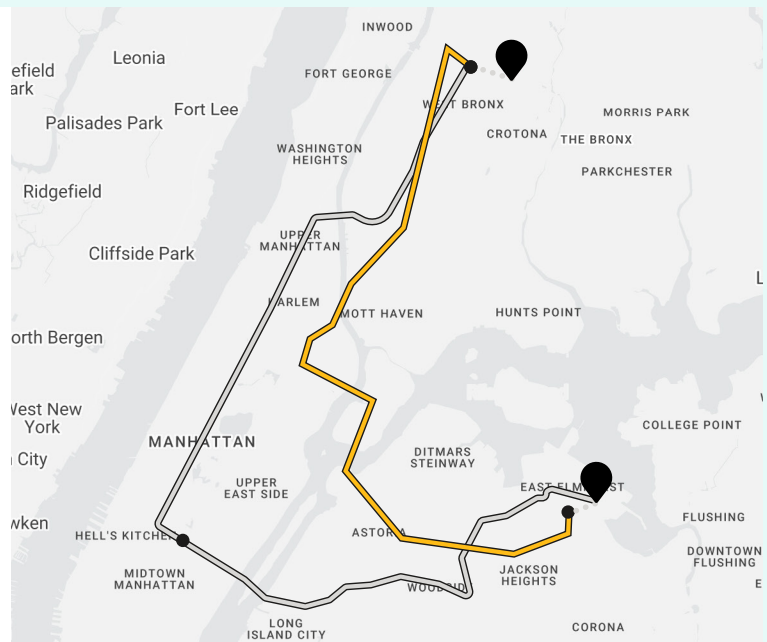
90 minutes

New Trip

Metro-North to M60





65 minutes





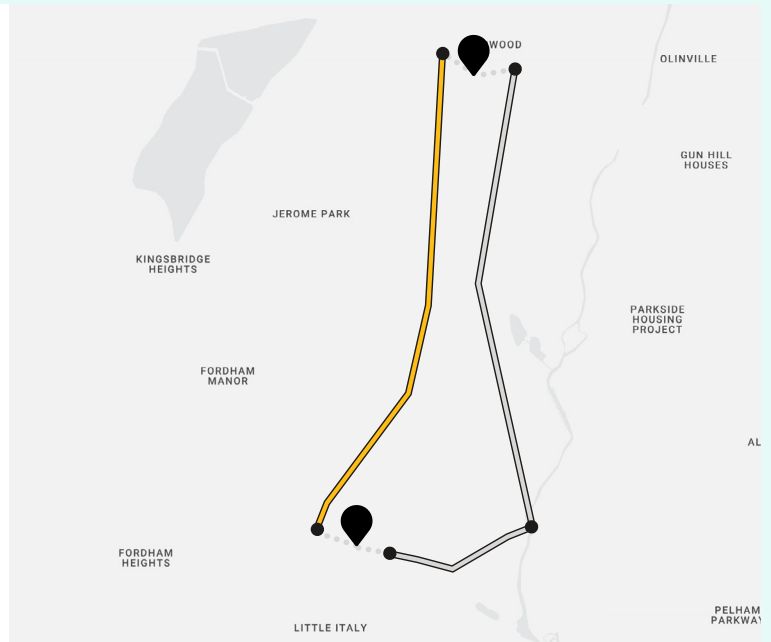
Fordham to Wakefield

Current Trip

 Bx12 to 2
 32 minutes

New Trip

 Metro-North
 22 minutes



Pelham Parkway; on a good day, this trip takes about half an hour, but unreliable bus service sometimes adds up to 10 minutes to her commute. With regional rail, she would have a faster, more reliable one-seat ride on Metro-North’s Harlem Line—but only if service ran more frequently; today, it’s not unusual for there to be an hour or more between trains that operate between Fordham and Wakefield.

Bayside, Queens

Linda and Jamie live in Bayside, Queens.

Linda teaches at a high school in Woodside. Her current transit option is to take the Q13 bus to the 7 train, which normally takes over an hour. With regional rail, she could take the LIRR from Bayside to Woodside, then transfer to the bus—saving 20 minutes on her trip.

Jamie is a student in Sunnyside, Queens. Today, they take the bus to the subway, also about an hour’s trip. Regional rail would reduce this trip to 38 minutes.

Rosedale, Queens

Cecilia and Jeffrey live in Rosedale, Queens.

Cecilia often visits her cousin who lives in East New York. Today, this trip can take 75 minutes, with a long ride on the Q5 bus to the

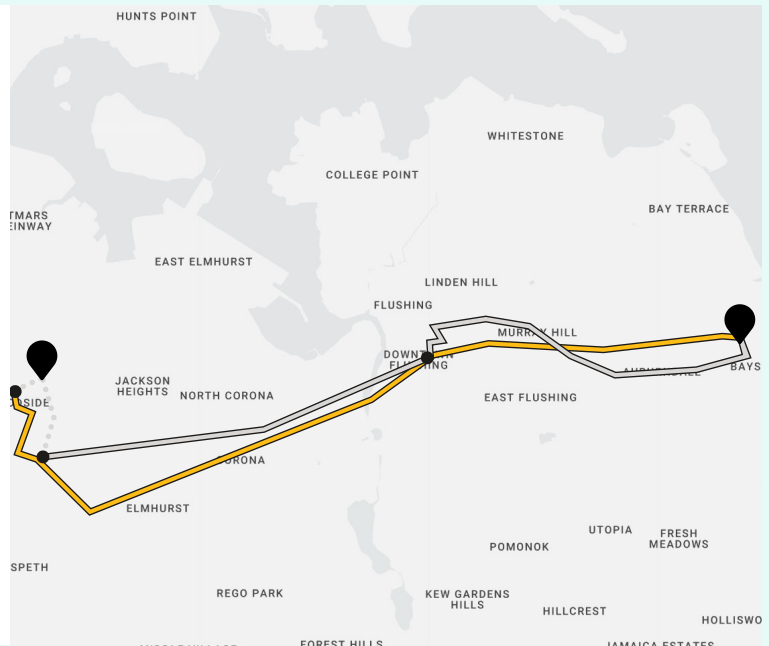
Bayside to Woodside

Current Trip

Q13 to 7
63 minutes

New Trip

LIRR to Q18
42 minutes



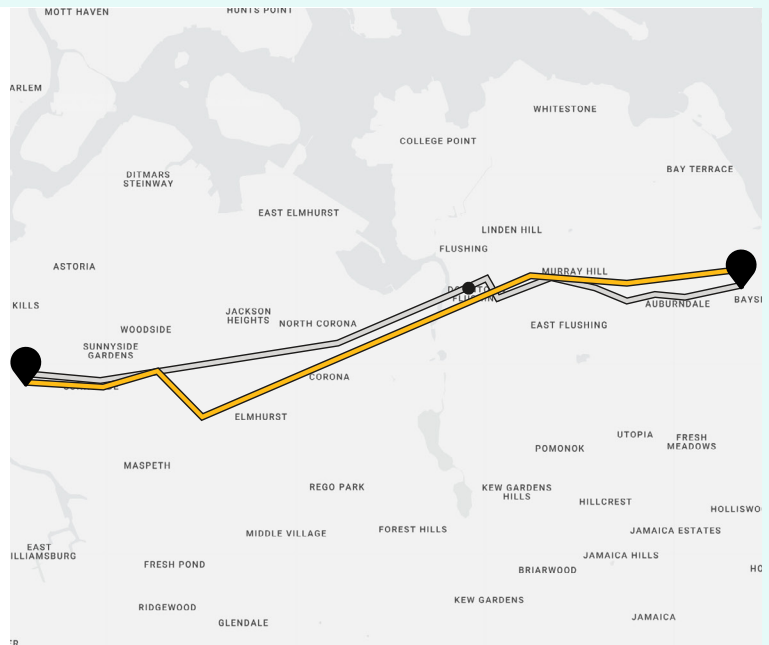
Bayside to Sunnyside

Current Trip

Q12 to 7
63 minutes

New Trip

LIRR to 7
38 minutes



subway station at Jamaica Center–Parsons/Archer, where she catches the J to Broadway Junction. With regional rail, Cecilia could take a much shorter bus ride to the Rosedale LIRR stop, traveling the Far Rockaway line to East New York and cut her trip time nearly in half.

Jeffrey has a job at Forest Hills Stadium. Like Cecilia, his trip starts with a half-hour ride on the Q5 bus. At Jamaica Center, he transfers to the E to Forest Hills. But with frequent regional rail he could walk to the Rosedale LIRR station for a simple train ride to the stadium, transferring across the platform at Jamaica.

These benefits are similar to those expressed by people who already benefit from the regional rail service that New York has. At a 2019 event, Queens resident and business owner Natasha Saunders described how she switched from the subway to the LIRR for her trips into Manhattan “because [she] was showing up to [her] business too late.” For her, taking the LIRR from St. Albans was “a significant change as far as how fast I was able to get into the city. And another thing we so often don’t mention ... my mood also improved... because I wasn’t stuck on the E train in a tunnel for half an hour not knowing why. I was showing up on time. That allowed me to be in a better mood for the day, and to be more productive because of it.”³¹

Another way of visualizing these benefits is to look at how transit travel time would change for people moving from different points of the city. We analyzed travel time changes for people with trip budgets of **\$2.75** and **\$12**.

From Fordham traveling midday, someone with a \$2.75 trip budget (who previously had been completely priced out of the regional rail system) would save up to 10 minutes traveling almost everywhere outside of the Bronx. Some destinations (like LaGuardia and other points served by a transfer to the M60 SBS from Harlem 125th St.) can be reached up to 20 minutes faster. Parts of Brooklyn and Queens that were previously unreachable in a 90-minute trip become accessible.

Travel times are also reduced to destinations north of Fordham; Metro North fares north to Woodlawn are \$3, but \$2.75 with a free transfer to buses with fare integration, which gives travelers additional options riding to Westchester County. Adding frequent service has a relatively small additional impact, corresponding to reduced waiting times—the main travel time savings for someone with a \$2.75 constraint arises from being able to use Metro North and transfer to the bus and subway.

Given a \$12.00 trip budget, time savings benefits from Fordham are more limited since many regional rail trips within the city cost

31 <https://www.pscptv/TransitCenter/1BRKjvvrBAWKw>

Rosedale to East New York

Current Trip

Q5 to J to 2



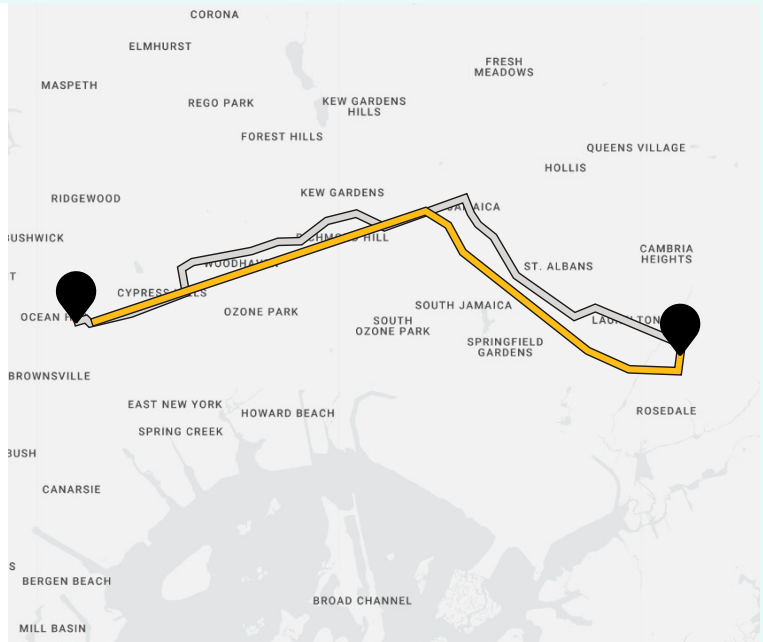
77 minutes

New Trip

Q5 to LIRR



41 minutes



Rosedale to Forest Hills

Current Trip

Q5 to E



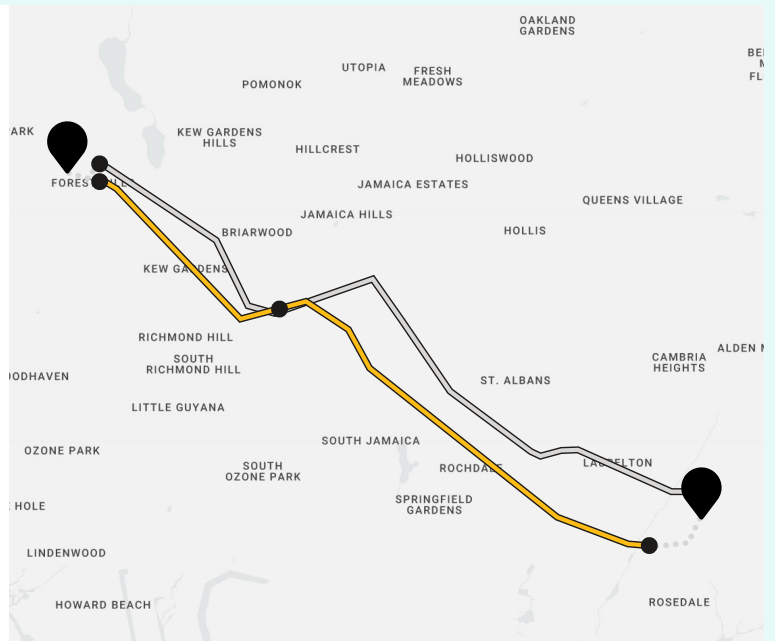
60 minutes

New Trip

LIRR



37 minutes



less than \$12. Fare integration would bring the cost of some potential trips involving Metro-North and the LIRR below the budget. More impact comes from higher frequency service, reducing waiting time and saving passengers up to 10 minutes for most destinations in New York City, and more for destinations in Westchester County.

Travel Time Reductions, A.M. Peak From Fordham

We also examined travel time savings during the morning peak, where a one-way peak ticket from Fordham to Harlem-125th St. or Grand Central cost \$9.75.

Given a \$2.75 budget, the benefits in the A.M. peak are similar to the midday results above, with additional areas of Manhattan and Queens showing up to 20-minute savings.

Given a \$12.00 budget, the benefits of these scenarios are much more substantial in the A.M. peak than midday, because they enable the use of Metro-North to Harlem-125th St or Grand Central in combination with a transfer to the bus or subway. Manhattan destinations that are farther than a 20-minute walk from these stations accordingly show travel time savings.

Similar benefits can be seen from origins in Bayside and Rosedale:

For someone with a \$2.75 budget leaving Rosedale, it takes more than 90 minutes to reach Manhattan or Downtown Brooklyn. Fare integration brings these areas of the city within reach, and speeds up trips to parts of Queens and Brooklyn by more than half an hour.

Figure 12: Travel time reductions, midday from Fordham

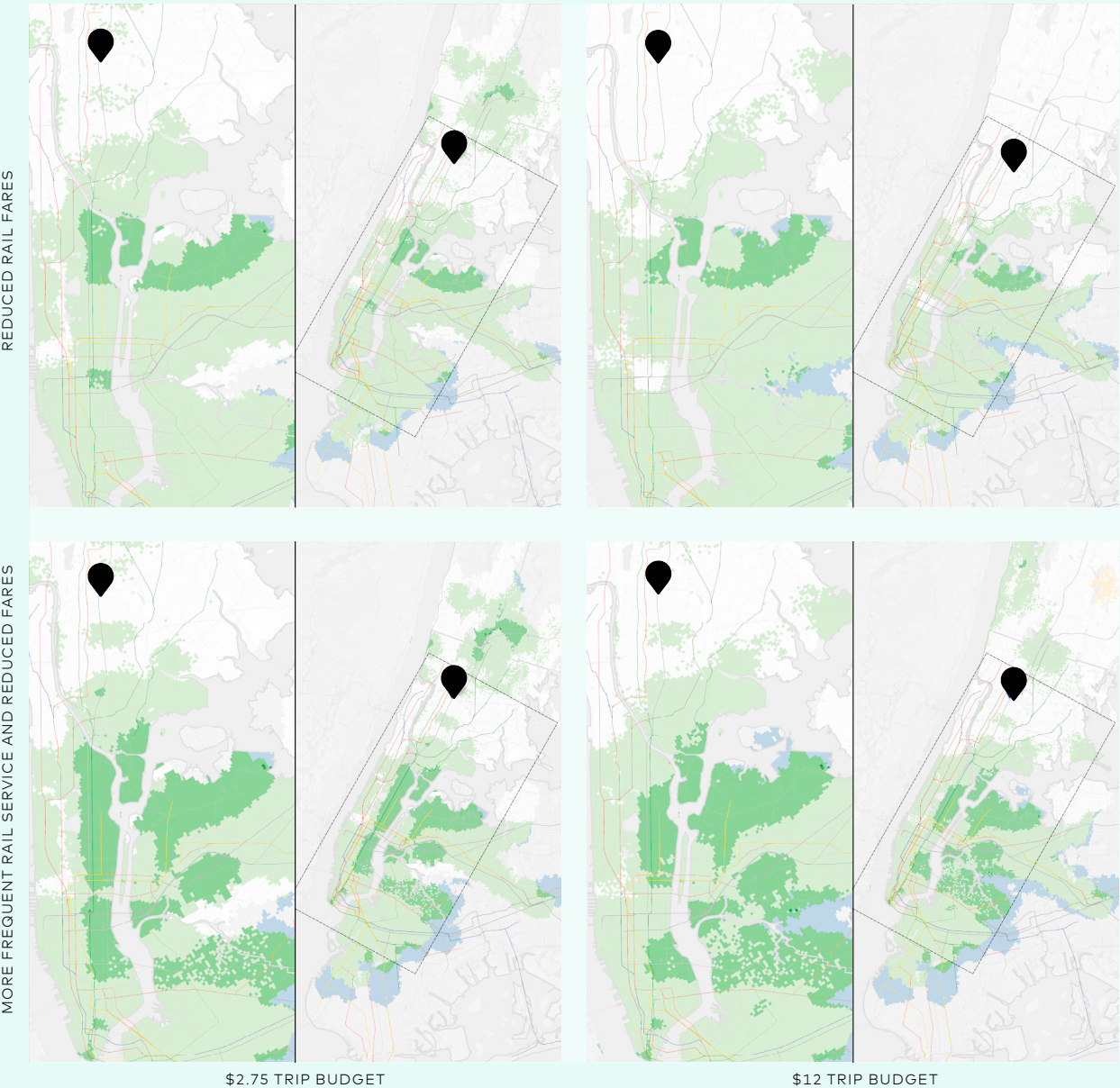


Travel Time

- Previously unreachable within 90 min.
- Over 30 min. faster
- 20-30 min. faster
- 10-20 min. faster
- 1-10 min. faster
- No change
- 1-20 min. slower
- 10-20 min. slower

- Selected origin
- Boundaries

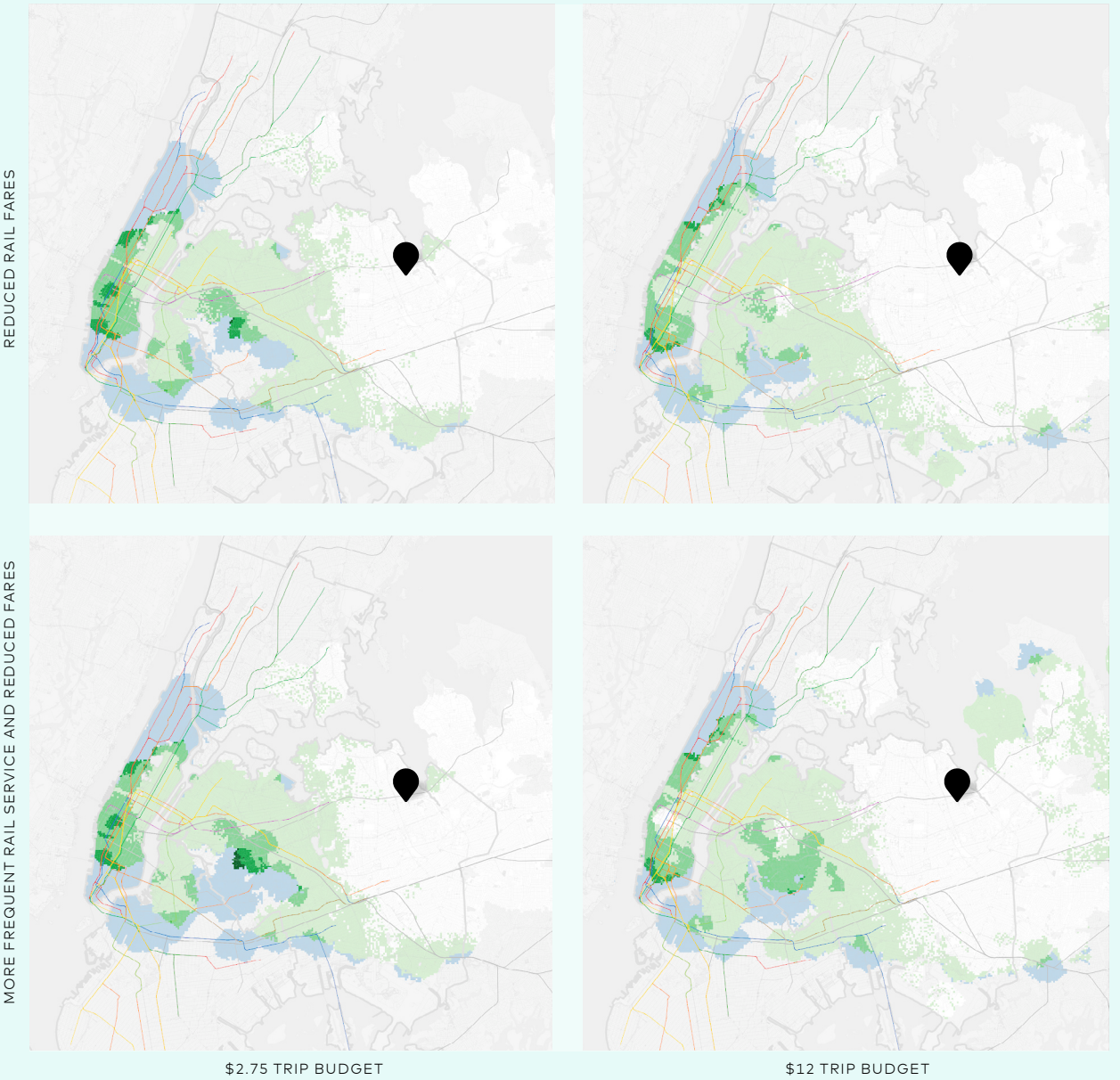
Figure 13: Travel time reductions, a.m. peak from Fordham



Travel Time

- Previously unreachable within 90 min.
 - Over 30 min. faster
 - 20-30 min. faster
 - 10-20 min. faster
 - 1-10 min. faster
 - No change
 - 1-20 min. slower
 - 10-20 min. slower
- Selected origin
- Boundaries

Figure 14: Travel time reductions, a.m. peak from Bayside

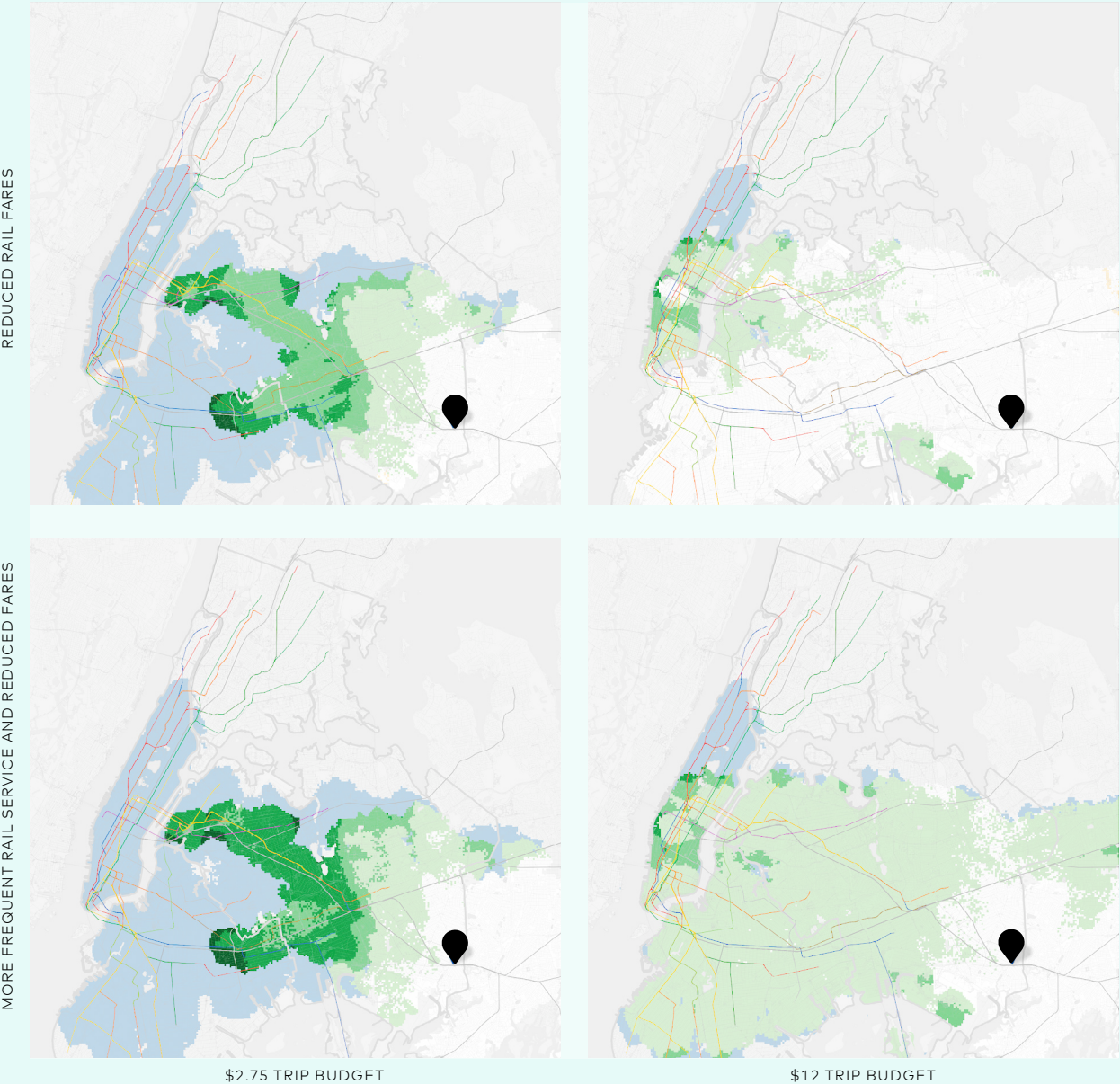


Travel Time

- Previously unreachable within 90 min.
- Over 30 min. faster
- 20-30 min. faster
- 10-20 min. faster
- 1-10 min. faster
- No change
- 1-20 min. slower
- 10-20 min. slower

- Selected origin
- Boundaries

Figure 15: Travel time reductions, a.m. peak from Rosedale

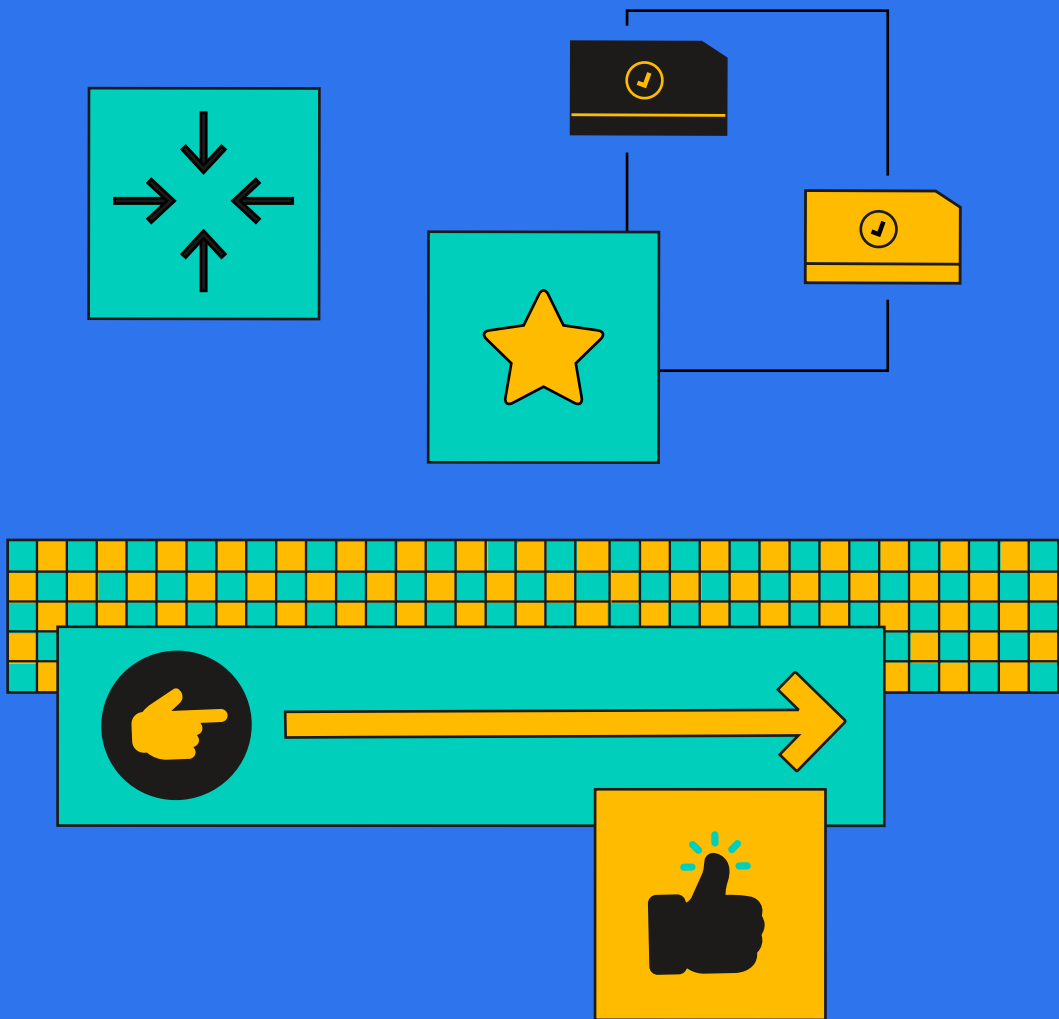


Travel Time

- Previously unreachable within 90 min.
- Over 30 min. faster
- 20-30 min. faster
- 10-20 min. faster
- 1-10 min. faster
- No change
- 1-20 min. slower
- 10-20 min. slower
- Selected origin
- Boundaries



Recommendations



Lower and Integrate Fares

- 1.** Metro-North and LIRR fares should be lowered for trips beginning and ending within New York City’s five boroughs, to the same price as a local transit fare (currently \$2.75).
- 2.** The MTA should adopt free transfers between commuter rail and local transit systems in the region. For trips where local transit and commuter rail would have different fares, this could be handled as a “step-up” transfer. Someone who pays a local transit fare would receive a discount on the commuter rail fare equivalent to their local transit fare.
- 3.** As an interim step toward comprehensive fare integration, the railroads should adopt the “Freedom Ticket” proposal developed by the Permanent Citizens Advisory Committee to the MTA, charging \$5 for trips that begin and end within city limits with transfers to the subway and bus.
- 4.** As the fare changes described above are enacted, they should be accompanied by a reduction in fares for NYC Transit express bus service.

Expand and Integrate Service

- 5.** The opening of East Side Access should come with increased service to railroad stations within NYC city limits.
- 6.** Metro-North and the LIRR should develop a regional rail service program with a goal of providing service at NYC stations at least every 15 minutes during the day. The railroads should identify any infrastructure investments needed to enable such a program and incorporate such investments into the MTA capital program.
- 7.** The Infrastructure Investment and Jobs Act (the “bipartisan infrastructure law” signed into law in 2021) greatly expands federal funding for intercity and commuter rail projects. The MTA should use IIJA funding for capital improvements that would be required to support regional rail service, such as:
 - a.** Lengthening platforms at rail stations in New York City. Metro-North’s Melrose and Tremont stations have platforms that are only long enough to accommodate two railcars. Metro-North’s Marble Hill, University Heights, Morris Heights, Williams Bridge, Woodlawn, Wakefield, and Spuyten Duyvil stations (southbound platforms), and the LIRR’s Murray Hill and Hollis stations have four-car platforms.
 - b.** ADA compliance at rail stations. Several commuter rail stations within New York City are not accessible to people with

disabilities. These include East New York, Kew Gardens, St. Albans, Hollis, Tremont, Melrose, Wakefield, Woodlawn, Williams Bridge, University Heights, Marble Hill, and Spuyten Duyvil.

Coordination With Other Services

- 8.** As regional rail becomes frequent and affordable for NYC residents, it should be identified as such in MTA maps, design, and wayfinding.
- 9.** Frequent, affordable rail service in the outer boroughs will enable better-coordinated planning with local transit. Local bus service can be designed to connect riders with regional rail, instead of providing parallel service.

Regional Governance Reform and Integration

New Jersey Transit service was not analyzed as part of this report, but many of our recommendations are relevant to NJ Transit commuter rail and bus service.

Earlier this year, the Tri-State Transportation Campaign released a report, *From Here to There: Regional Rail for Metro New York*.³² Their report called for several recommendations which we endorse, including:

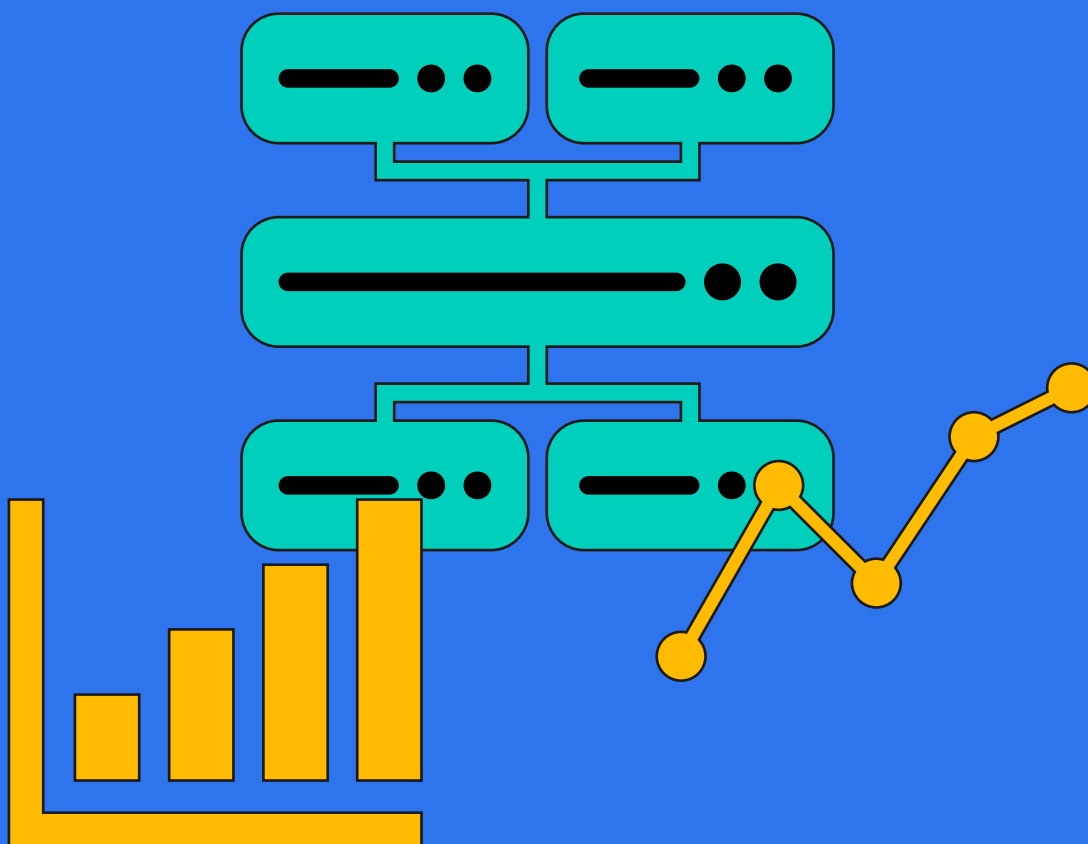
- 10.** Integrated ticketing and fares between Metro-North, LIRR, and New Jersey Transit.
- 11.** Coordinated schedules to allow for convenient transfers between the different railroads in the region.
- 12.** Through-running—that is, infrastructure and operational changes that would allow many more trains to run through Penn Station, providing one-seat rides from one part of the region to another.
- 13.** Electrification of non-electrified rail lines and construction of high-level platforms where they do not currently exist, which would make rail service faster and more reliable.
- 14.** Creation of a “network manager,” an entity that would oversee the coordination and unification of regional transit operations, capital investments, fare policies, and wayfinding.

32 <https://tstc.org/wp-content/uploads/2022/06/Regional-Rail-for-Metro-New-York.pdf>



APPENDIX

Data Sources and Methods



Conveyal Access-to-Opportunity Methodology

The analyses in this report measure *cost- and time-constrained access to destinations*—in other words, the number of destinations that people can get to using transit in a specific amount of time, for a certain amount of money.

Destinations: We measure the total number of jobs accessible, as well as the number of retail jobs and healthcare and social service jobs in New York City, Westchester County, and Nassau County. Jobs data come from the Census Bureau’s 2017 LEHD Origin-Destination Employment Statistics (LODES), while population is from the 2018 5-year American Community Survey.

Travel time: We calculate travel times using Conveyal’s software (specifically, the R5 routing engine³³). This calculation includes walking time, time to exit stations and transfer, waiting time, and time spent in vehicles. Waiting time and in-vehicle time are based on published transit schedules from December 16, 2019, and modifications we made to these schedules to test fare and service changes.

Walking time is based on a pedestrian network extracted from OpenStreetMap; as a simplifying assumption, we apply a 20-minute walking limit for each access/egress/transfer leg. (For example, a trip that involves a 15-minute walk to a bus stop, a 10-minute walk from the bus to a subway station, and an 18-minute walk from the subway to the final destination would be included in results. Any trip involving a 21-minute walk to or from transit would not be.)

Time periods, traveler flexibility, and fare cutoffs: We analyzed two time periods: A.M. peak (7–9 a.m.) and midday (10 a.m.–4 p.m.). In each of these departure windows, the software takes a quasi-random sample of 60 departure times.

We show results that correspond to the *median travel time* sampled within these time windows on that day. In lay terms, this represents a person with modest flexibility—some (but limited) ability to time their departure to avoid the longest waits, for example by timing their departure closer to the schedule, and their own knowledge of when the system is slower. For a detailed explanation of travel time percentiles in access calculations, see the “time percentile” of Conveyal’s methodology.³⁴

We show the number of destinations that can be reached within 45, 60, and 90 minutes. Note that 35% of transit commuters in the New York City Metropolitan Statistical Area have commutes of 45 minutes or less; 55% have commutes of 60 minutes or less; 84% have commutes of 90 minutes or less.³⁵

33 <https://github.com/conveyal/r5>

34 <https://docs.conveyal.com/analysis/methodology#time-percentile>

We also show the number of destinations that can be reached by someone spending \$2.75 (a MetroCard swipe), and \$12 (which represents a high transportation cost burden for a household making the 2020 New York City area median income of \$39,800).³⁶

How We Modeled Frequent Regional Rail

We began with the schedules for Metro-North and LIRR as of March 2020. We then used Conveyal software to modify the runs as follows:

MNR Harlem Line

- Added stops at Fordham and Woodlawn for all trains.
- Added stops at Melrose, Tremont, Botanical Gardens, Williams Bridge, and Wakefield on inbound trains that follow the stopping pattern of trains 314, 326, 330, 684, and 988/688, and outbound trains that follow the stopping pattern of trains 607, 509, 953, 365, 373, 581, 585, and 589.

MNR Hudson Line

- Added stops at Yonkers, Ludlow, Marble Hill, University Heights, and Morris Heights for:
 - Inbound trains that follow the stopping pattern of trains 702, 710, 720, 436, 742, 748, and all off-peak trains that do not stop at those stations. (Some of these trains already serve Yonkers.)
 - Outbound trains that follow the stopping patterns of trains 803, 813, 715, 817, 745, 847, 759, and 881. (Some of these trains already serve Yonkers.)

LIRR Port Washington Branch

- Added stops between Woodside and Auburndale, including a new Elmhurst infill station, Flushing Main Street, Murray Hill, and Broadway, on:
 - Eastbound trains departing Penn Station between 7:01 a.m. and 2:49 p.m.
 - Westbound trains that follow the stopping pattern of trains 421, 351, and 355, and all trains departing Port Washington between 9:40 a.m. and 5 p.m.

LIRR Far Rockaway Branch

- Added stops at Locust Manor, Laurelton, and Rosedale on:

35 From IPUMS USA, University of Minnesota, www.ipums.org.

36 One commonly used measure of transportation cost-burden is whether transportation costs more than 15% of household income (see, for example, Center for Neighborhood Technology, H+T Index, <https://htaindex.cnt.org/faq/#question5>). \$12 per trip, multiplied by two trips per day, for 250 working days a year, is \$6,000—roughly 15% of \$39,800.

- Eastbound trains departing Jamaica between 5:33 a.m. and 10:16 p.m.
- Westbound trains following the stopping patterns of trains 827, 869, 873, 875, 877, and all trains departing Valley Stream between 9:41 a.m. and 6:14 p.m.

LIRR West Hempstead Branch

- Extend midday service to Jamaica and St. Albans.

LIRR City Terminal Zone

- Added an Atlantic–Jamaica shuttle (making intermediate stops) every 30 minutes.
- Added a Penn Station–Jamaica shuttle (making stops at Forest Hills and Kew Gardens) every 20 minutes.

It is important to emphasize that these changes were chosen for ease of modeling the benefits of frequent service; they are not meant to represent a recommended schedule.

Ridership Projections for Service and Fare Analysis

In order to estimate the potential ridership impact of these service and fare changes, we conducted an analysis of Metro-North data and commissioned an analysis of LIRR data. These suggest that fare reductions in concert with better all-day service could grow ridership at rail stations within the city by 40 to 100 percent, translating to systemwide ridership increases on Metro-North of 5-8 percent, and LIRR of up to 22 percent.

(Note that, elsewhere in this report, we recommend eliminating transfer costs between commuter rail and local transit outside of New York City. This would likely increase ridership as well, which we do not account for in these analyses.)

Metro-North

TransitCenter began by obtaining data for the number of boardings at Metro-North stations in 2021, obtained from the agency using Freedom of Information Law requests. These show that boardings that are part of trips beginning and ending within New York City represented 5.6% of inbound boardings in 2021.

These data do not allow us to estimate the same proportion for outbound boardings. So, we make a major simplifying assumption that the proportion of boardings that are part of trips within NYC is similar for inbound and outbound trips.

We then look to transportation economics literature, and apply commonly used elasticity values to estimate the effects of fare and service changes on ridership, as follows:

1. We assume that the average fare paid by riders making trips within New York City decreases by 45%, from \$5/trip to \$2.75. (We use \$5/trip for riders leaving from the Bronx because this is the cost of an individual CityTicket; however, peak fares between the Bronx and Manhattan are much more expensive, while fares for trips within the Bronx are less expensive. More information about how intra-NYC Metro-North trips are distributed would improve this model). We then apply long-run elasticity values of -0.6 to -0.9 (as recommended by Todd Litman), which suggest this would increase boardings at NYC stations by 27 to 40 percent.³⁷
2. We assume that service at NYC stations increases to 413 trains per week in each direction (roughly equivalent to trains arriving 4 times an hour during peak hours, twice an hour during the rest of the day, and hourly late-night). Depending on the station, this represents a service increase of 61-116%. We apply long-run elasticities of 0.7 to 1.1 (again, from Litman), which suggest this would increase boardings at NYC stations by 49 to 77 percent. Note that this would not represent a service increase for Harlem-125th Street.

Applying these elasticities together suggest that Metro-North ridership within New York City would grow by 88 to 146 percent. Assuming no change in ridership outside of NYC, this would translate to a systemwide increase of 5 to 8 percent.

LIRR

We take a different approach to estimate increased LIRR ridership, developed by Rutgers University professor Mike Smart. Starting with boarding data from the publicly available 2016 LIRR ridership report, demographic information from the American Community Survey, and General Transit Specification Feed 2016 data for LIRR, we build a statistical model that accounts for various determinants of ridership. These include the number of trains per day at stations and the difference between LIRR and subway fares, as well as factors like population near stations, parking spaces at stations, and percent of population living in multifamily housing.

This model suggests that, if every LIRR station within NYC was served by at least 59 trains per day in each direction (the same level of service we tested in the Metro-North model described above, roughly

37 <https://www.vtpi.org/tranelas.pdf>

Table 3:

Station	Weekly Inbound Trips (2021)	Fare Reduction	Current Trains/ Week (Oct. 2022)	Scenario Trains/ Week	% service increase	Predicted Inbound Trips		Predicted Increase in Trips	
						Low	High	Low	High
Riverdale	1,057	-45%	241	413	71%	2,013	2,651	90%	151%
Spuyten Duyvil	1,479	-45%	241	413	71%	2,817	3,709	90%	151%
Marble Hill	695	-45%	256	413	61%	1,262	1,635	82%	135%
University Heights	127	-45%	191	413	116%	293	407	130%	220%
Morris Heights	227	-45%	191	413	116%	523	727	130%	220%
Yankees-E153rd	94	-45%	191	413	116%	217	301	130%	220%
Wakefield	1,447	-45%	228	413	81%	2,881	3,848	99%	166%
Woodlawn	3,362	-45%	228	413	81%	6,695	8,940	99%	166%
Williams Bridge	873	-45%	228	413	81%	1,738	2,321	99%	166%
Botanical Garden	1,680	-45%	223	413	85%	3,406	4,573	103%	172%
Fordham	4,648	-45%	283	413	46%	7,801	9,830	68%	111%
Tremont	131	-45%	223	413	85%	266	357	103%	172%
Melrose	180	-45%	223	413	85%	365	490	103%	172%
Harlem-125th St	410	-45%	--	--	--	521	576	27%	41%
Total NYC	16,410					30,796	40,364	88%	146%
Total Non-NYC	270,104					270,104	270,104	-	-
Total	286,514					300,900	310,468	5%	8%

equivalent to trains arriving 4 times an hour during peak hours, twice an hour during the rest of the day, and hourly late-night) and fares were equalized with New York City Transit, ridership at LIRR stations within New York City (other than Penn Station) would increase by 89% and systemwide ridership on the LIRR would increase by 22%.

The model's full specifications are in Table 4. The sources include:

- ACS 2016-2020: American Community Survey 5-year data; aggregated by blocks, block groups or tracts depending on variable.
- Author: These are four binary variables which define whether a station is "Advantageous" (is down-network [nearer Penn Station] from other LIRR stations and has greater service frequency, mostly due to the convergence of multiple LIRR lines—for example, Jamaica Station); a "Vacation Destination" such as stations in the Hamptons; a "Terminal or Major Junction"; or is a "Subway Connection" where riders can transfer to the subway.
- LIRR 2016: LIRR ridership based on fare collection report 2016 (most recent available to public); trains per day based on April 2016 GTFS feed
- LIRR 2022: web lookups for parking and fares.

The model also suggests the following ridership increases associated with intermediate policy changes:

- Setting LIRR fares to the subway fare, with no increase in service: 36% increase in ridership within NYC; 9% increase in systemwide ridership.
- Frequent service at LIRR stations in New York, with no change in fares: 46% increase in ridership within NYC; 12% increase in systemwide ridership.

Table 4: Poisson regression results, annual ridership on LIRR by stop, 2016

Rides	Coefficient	z	P>z	Variable name in Data	Source
At Station				Rides	LIRR 2016
Parking is Available	0.5144	857	***	Parking01	LIRR 2022
Parking Spots	0.0009	2183	***	ParkSpots	LIRR 2022
Trains per Day	0.0176	3236	***	TPD	LIRR 2016
...squared	-0.00002	-1751	***		
Advantageous Station (Network)	0.2513	427	***	Advantageous	Author
Vacation Destination	1.1978	744	***	ZN8	Author
Terminal or Major Junction	1.4297	3801	***	terminal_ junction	Author
Subway Connection	2.5008	537	***	competing	Author
Fare to Penn Station (peak, one-way)	-0.0138	-329	***	Fare_Penn	LIRR 2022
Ratio of LIRR to Subway Fares (select stations)	-0.7768	-550	***	ratio_fare	LIRR 2022
Within 20 Minutes' Drive of Station					
% Households below Poverty	0.1712	1365	***	HHPOV	ACS 2016-2020
Households with no Vehicle	0.000002	-562	***	ZeroVeh	ACS 2016-2020
% Population in Group Quarters	-0.00004	-714	***	Pct Group	ACS 2016-2020
Unemployment Rate	-0.2165	-1364	***	Unempt	ACS 2016-2020
Constant	-1.5597	-1114	***	Population	ACS 2016-2020
LN(population)	1.0				
Pseudo-R-Squared	0.74				
N(stations)	122				

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