APPENDIX C

Ridership Study

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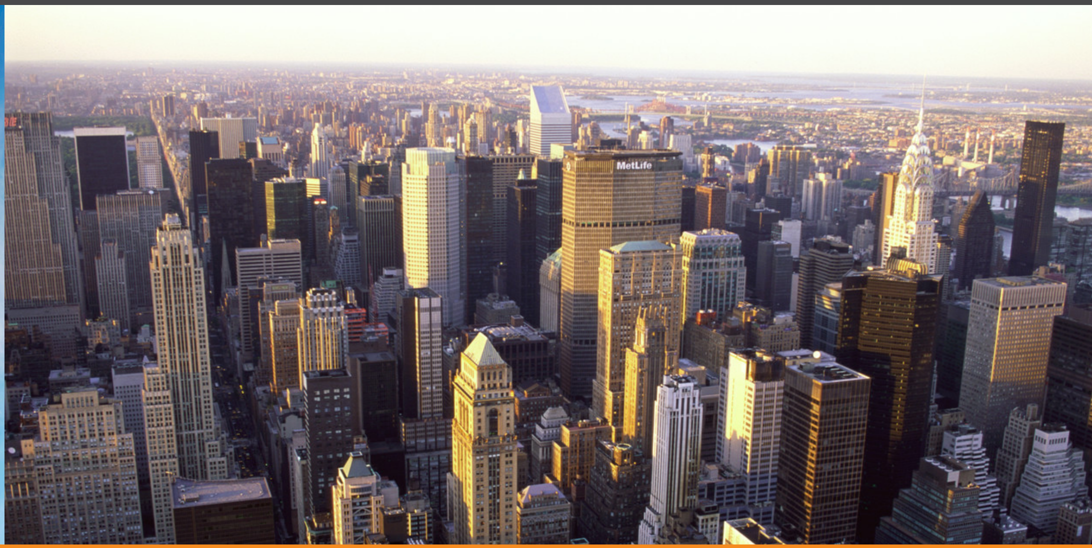
Federal Aviation Administration

LaGuardia Access Improvement Project EIS Ridership Forecast and Forecast Review

Report | August 10, 2020



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LIST OF ABBREVIATIONS

ACRP	Airport Cooperative Research Program
AIC	Akaike Information Criterion
BIC	Bayesian Information Criterion
BPM	Best Practice Model
EWR	Newark Liberty International Airport
EIS	Environmental Impact Statement
FAA	Federal Aviation Administration
JFK	John F. Kennedy International Airport
LGA	LaGuardia Airport
LIRR	Long Island Rail Road
MNL	Multinomial Logit
MTA	Metropolitan Transportation Authority
NYC	New York City
NYCT	New York City Transit
TAZ	Transportation Analysis Zones
TCRP	Transit Cooperative Research Program
TNC	Transportation Network Company
US	United States
VTT	Value of Travel Time
WP	Willets Point

1.0 INTRODUCTION

This report documents the methodology and results of the ridership forecast for the Federal Aviation Administration (FAA) Environmental Impact Statement (EIS) of the proposed LaGuardia Airport (LGA) Access Improvement Project. The proposed AirTrain would connect LGA with the regional transit system via both the New York City Transit (NYCT) subway and Long Island Rail Road (LIRR) at Willets Point.

The study team (comprised of Ricondo and RSG) reviewed the ridership forecasts prepared by the Port Authority of New York and New Jersey (Port Authority). This review included an examination of survey data, network data, and model assumptions; it also included development of an independent forecast.

In accordance with FAA Order 1050.1F, which states: “The FAA must independently evaluate any information or analysis submitted by an applicant before using it to support a NEPA review”, ridership estimates for the Proposed Action were prepared. The study team’s modeling effort was conducted to establish an independent analysis and produce independent forecasts apart from the Port Authority’s forecasts. Using these two forecasts, the FAA established a range of potential AirTrain ridership levels for analysis in the EIS.

To develop the forecast, the study team employed a multinomial logit (MNL) model estimated using LGA ground access survey data. The Study Team also reviewed the Port Authority’s forecast model, which was based on previous studies of air passengers in the region and benchmarked against ground access studies at other airports. The study team chose to estimate a new model on LGA data to have LGA-specific values of time, cost and mode preference. Additionally, the study team used similar underlying data as those used in the Port Authority ridership forecasts, however, the analysis used a MNL model rather than a switching model. The study team used a MNL model to allow for probabilities of choosing all current and all new modes for a given respondent.

The study team’s main findings are as follows:

- The Port Authority model approach is reasonable, including reasonable use of transportation network data, survey data, and assumptions for model coefficients.
- The study team’s model employs a different approach than the Port Authority model and forecasts approximately 30 percent less air passenger ground access share than the Port Authority model.
- LGA has a good rail access market as demonstrated by a larger share of trips to Manhattan than John F. Kennedy International Airport (JFK). However, taxi is a more

competitive mode to LGA than to JFK due to LGA's proximity to Manhattan, so LGA AirTrain shares are anticipated to be somewhat lower than JFK's 2019 ridership.

- The proposed AirTrain service via the LIRR would provide reliable time certain access to LGA with travel times that are often better than current conditions. The proposed AirTrain service via the 7 Subway Line may not provide faster average travel times than the current subway-to-bus options. However, due to general preference for "premium transit," (which is associated with improved reliability, being easier for passengers to understand how to use the system, and comfort) the study team expects there to be a market of air passengers that prefers AirTrain.

Table 1 compares air passenger ground access forecasts from the study team and the Port Authority by forecast year. The Port Authority did not report 2026 or 2031 forecasts; the study team interpolated these using a straight-line method between the Port Authority's 2025 and 2045 forecasts for use in the EIS.

TABLE 1: AIR PASSENGER FORECAST COMPARISONS

	Study Team 2026	Study Team 2031	Port Authority 2026[1]	Port Authority 2031[1]
Daily AirTrain Air Passengers	9,173	9,891	13,167	14,173
Daily AirTrain Employees	3,945	4,908	3,945	4,098
Daily AirTrain Total	13,117	13,989	17,112	18,271
Annual AirTrain Air Passengers (millions)	3.3	3.6	4.8	5.1
Annual AirTrain Employees (millions)	1.4	1.5	1.4	1.5
Annual AirTrain Total (millions)	4.8	5.1	6.2	6.7

1 The study team interpolated the 2026 and 2031 forecasts between the Port Authority's 2025 and 2045 forecasts using a straight-line method.

SOURCE: RSG.

2.0 REVIEW OF PORT AUTHORITY MODEL

This chapter reviews the Port Authority model for future LGA AirTrain ridership. The study team's analysis in this chapter relies on the Port Authority's report titled "AirTrain LGA: LGA Ground Access Mode Choice Model and AirTrain Ridership Forecast 2025-2045" (The Port Authority of New York & New Jersey 2018) as well as additional data files provided by the Port Authority. The study team reviewed the data input for the models and the models themselves, which included a review of the following:

- The skim matrices (skims) that comprise the times and costs of the assumed transportation network. Skim data are generated from a travel demand model and represent the various levels of service between two zones, including travel time, cost and other transit attributes.
- The survey data that reflect the population of air passengers traveling to and from LGA.
- The model structure, specification, and assumptions.

The study team's main conclusions from this review, discussed in more detail in this chapter, include the following:

- The skims represent a reasonable interpretation of New York City region travel times and costs and are appropriate for use in this type of modeling.
- The model estimation and application dataset comprises a combination of survey data sources and weighted-to-known-control totals, which is reasonable for this type of application.
- The Port Authority applied a switching incremental logit model; the time and cost parameters were asserted based on previous analysis of regional airport ground access behavior and benchmarked against other relevant literature and studies. The Port Authority model used mode constant relationships obtained from the analysis of a similar model for JFK to assert constants for the attractiveness of the LGA AirTrain.

The study team's findings support the reasonableness of the Port Authority's model.

2.1 SKIMS

The Port Authority model uses skims from the New York Best Practice Model (BPM). These skims include detailed time and cost information for highway travel and transit travel for bus-only, subway (with bus connections), and commuter rail (with subway and bus connections) itineraries between over 4,000 transportation analysis zones (TAZs) and LGA. Time and cost information was included for both directions in four time periods: AM Peak (6:00 a.m.–10:00 a.m.), Midday (10:00 a.m.–4:00 p.m.), PM Peak (4:00 p.m.–8:00 p.m.), and Night (8:00 p.m.–6:00 a.m.).

The study team analyzed these skims to ensure that, in general, travel times and time-of-day differences aligned with expectations of reasonableness. The study team checked to ensure that the times made sense in context with one another and were in a reasonable range compared to times that were expected. In short, these data are a reasonable representation of travel in the New York City area and are appropriate for use for modeling purposes.

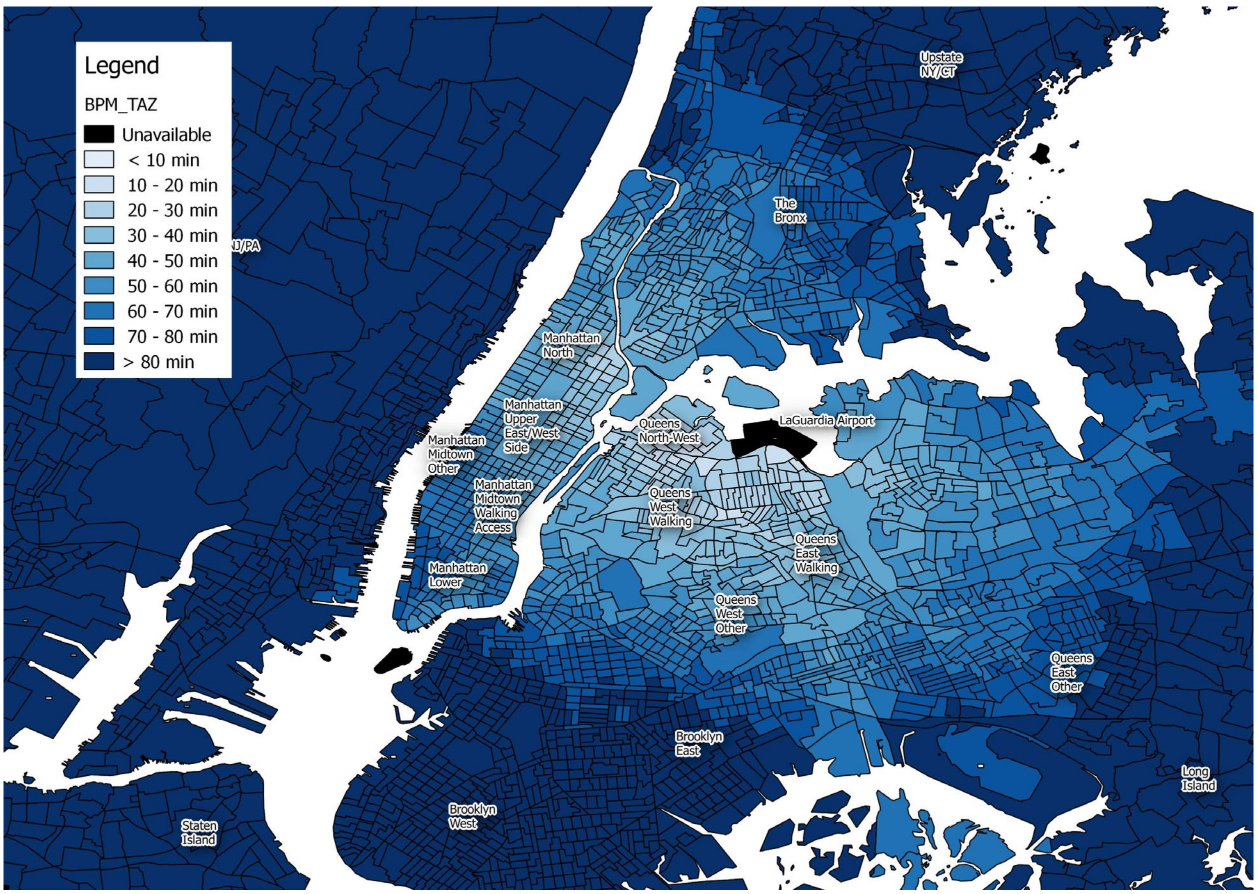
Time and Cost Analysis

To understand the validity of times and costs in the BPM skims, the study team created maps and visually inspected them to see if they were consistent with the understanding of the New York City transit and highway network. In a complex region with significant variation in travel times throughout the day and across days, it is difficult to pick precise travel times between regions. That said, the results of the study team's investigation found travel times were within an expected and reasonable range.

Transit Times

As an example of the variation in bus-only travel times by region, Figure 1 shows BPM bus travel times to LGA in the AM Peak for each TAZ. This map shows the quickest bus travel times are in the region of Queens closest to LGA, as one would expect. An area of relatively quicker bus travel times exists in upper Manhattan, representing the M60 route. Bus travel times lengthen farther away from the Airport and exceed 80 minutes from New Jersey, South Brooklyn, points north of the Bronx, and Long Island. These bus times are generally reflective of transit times for bus travel to and from LGA.

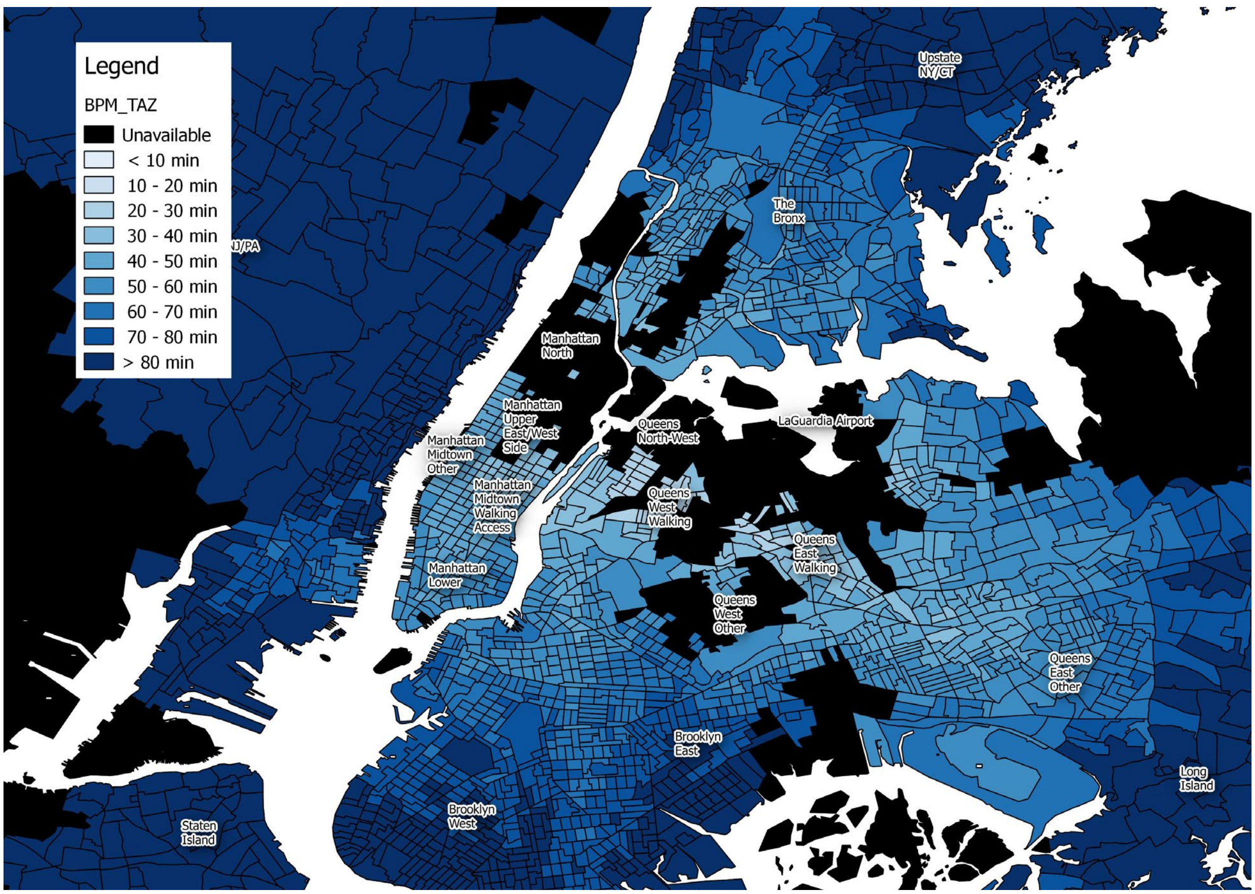
FIGURE 1: BUS-ONLY TRAVEL TIMES TO LGA, BY TAZ (AM PEAK)



SOURCE: RSG.

As an example of subway travel to LGA, Figure 2 shows the BPM subway travel times to LGA in the AM Peak for each TAZ. All subway travel times also include time on a connecting bus, as the subway does not connect directly to LGA. In this figure, the black zones represent subway trips that were unavailable in the BPM skims, meaning that mode was not considered as an option from those zones. Much of the unavailability in the surrounding areas in Queens and in Upper Manhattan are areas where a bus-only trip makes more sense than a subway-bus trip. Where subway is available, it is fastest from the subway corridors in Queens and from Midtown Manhattan. This is an expected result based on general knowledge of the subway network.

FIGURE 2: SUBWAY-TO-BUS TRAVEL TIMES TO LGA, BY TAZ (AM PEAK)

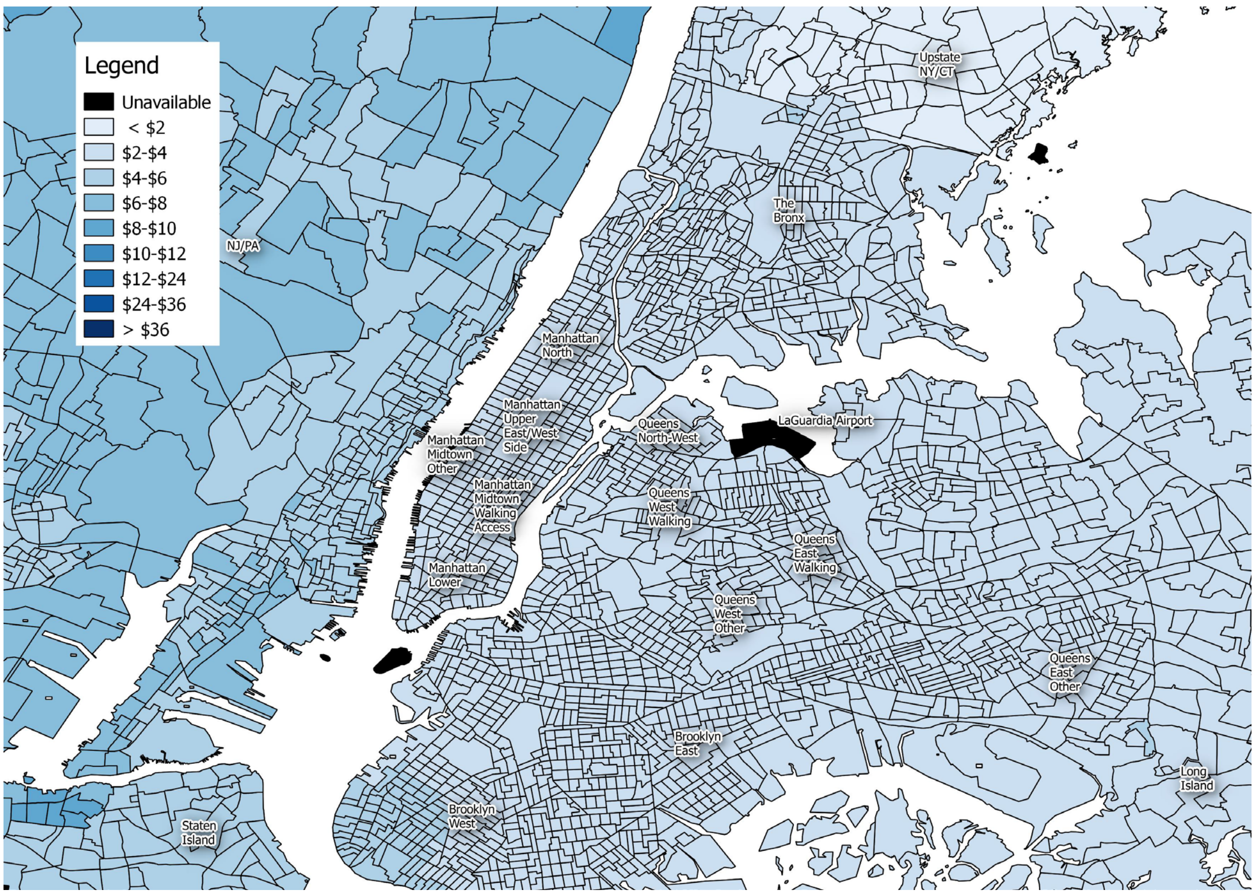


SOURCE: RSG.

Transit Costs

Figure 3 depicts the BPM bus fares to LGA in the AM Peak. Overall, fares within New York City are between $2 and $4, or the cost of a single bus ticket, while fares from New Jersey are more expensive; this is attributable to the need to transfer from New Jersey Transit to buses operated by MTA NYCT.

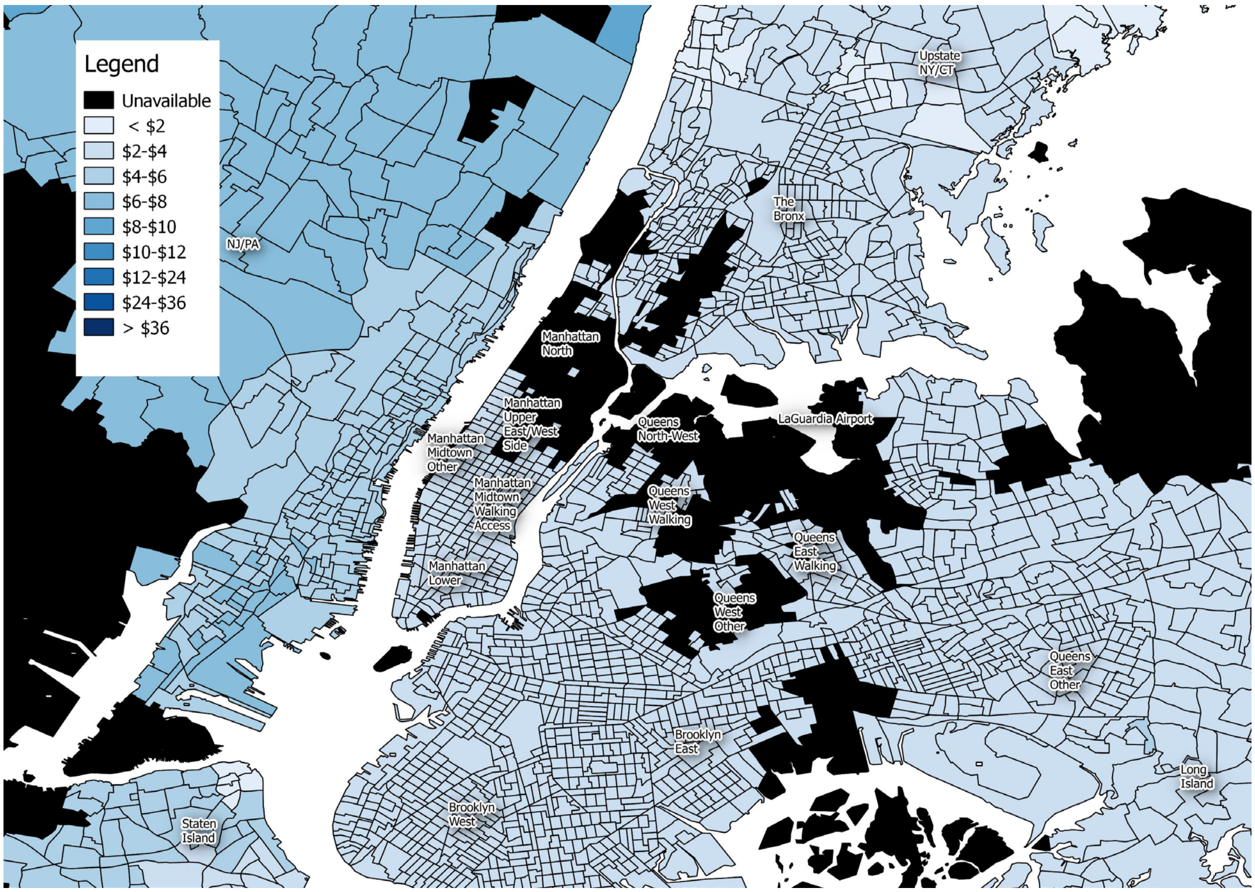
FIGURE 3: BUS-ONLY FARES TO LGA, BY TAZ (AM PEAK)



SOURCE: RSG.

Figure 4 depicts the BPM subway fares to LGA in the AM Peak. Overall, fares within New York City are between $2 and $4, or the cost of a single subway ticket, while fares from New Jersey are more expensive; this indicates the need to transfer from New Jersey Transit to the subway operated by NYCT. The black zones again represent subway trips that were unavailable in the BPM skims, meaning that mode was not considered as an option from those zones.

FIGURE 4: SUBWAY-TO-BUS FARES TO LGA (AM PEAK)

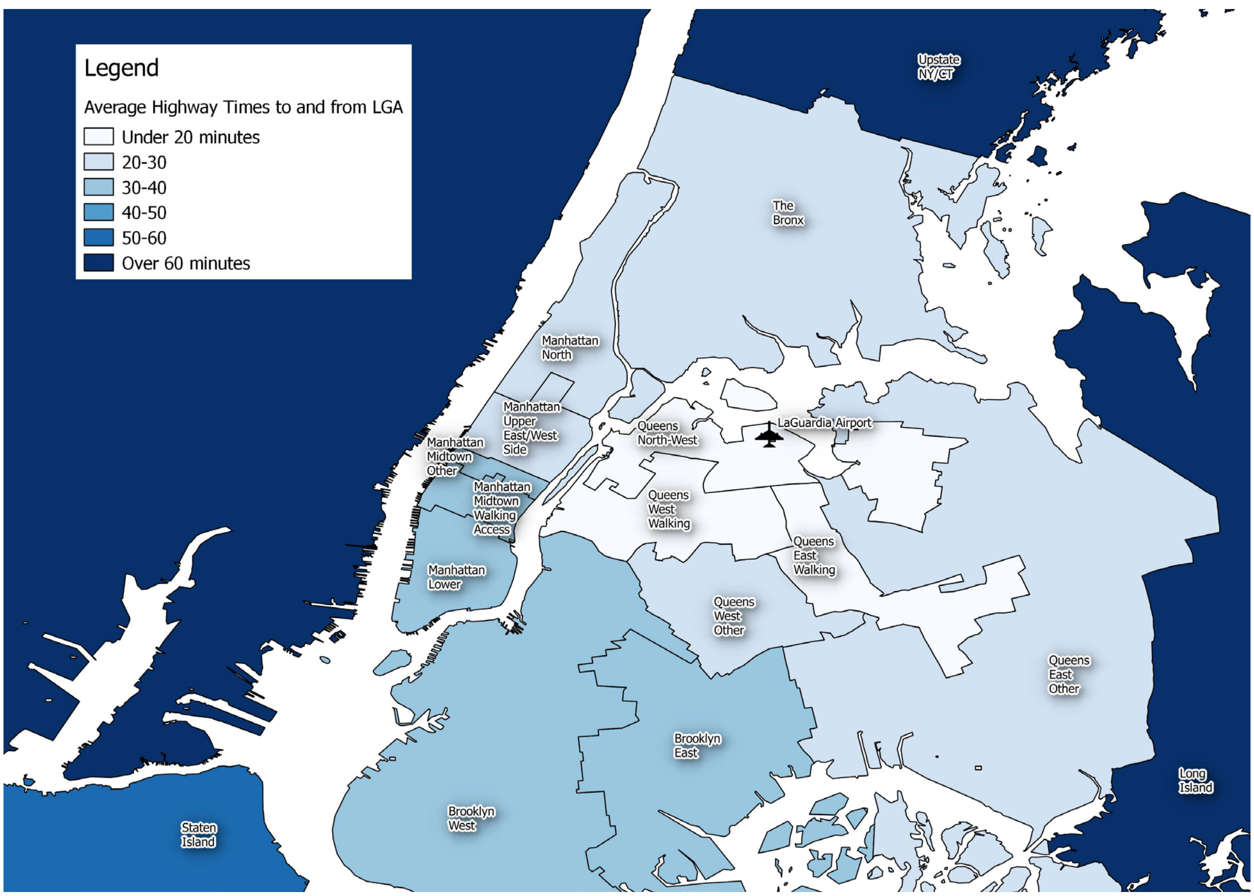


SOURCE: RSG.

Highway Times

In the BPM skims used in the Port Authority model, highway times are the basis for travel times for all nontransit modes, including drive and park, drop-off, taxi, New York City Airporter, and shared ride/van (with a multiplier to account for additional pickups and drop-offs). The Port Authority used real-time taxi information obtained from the New York City Taxi and Limousine Commission instead of the times given in the BPM. These times were obtained by the study team, but only for TAZs where surveys were available. To best present these, Figure 5 shows the average highway times from a zone structure that was used for analysis for the LGA forecast. This zone structure includes all five boroughs, with Brooklyn, Queens, and Manhattan separated into smaller areas as well as three zones outside of the city. The average highway times in all time periods and directions are lowest in northern Queens, over 30 minutes from Lower Manhattan, and over 60 minutes from New Jersey, Upstate New York, and Long Island.

FIGURE 5: AVERAGE HIGHWAY TIMES IN BPM SKIMS BETWEEN LGA AND NEW YORK CITY-AREA ZONES



SOURCE: RSG.

Time-of-Day Variation

The BPM skims (used for both the Port Authority model and the study team's model) include unique travel times to and from LGA from over 4,000 zones in 4 time periods. The sheer volume of unique times precludes a simple comparison by time of day, but the study team notes that the time-of-day differences generally make sense in the context of travel to and from LGA. In particular the study team notes the following:

- BPM highway travel times from Manhattan to LGA is faster than average in the AM Peak and slower than average in the PM Peak. This makes sense as the AM Peak is the reverse-peak direction for this movement.
- BPM highway travel times from LGA to Manhattan is slower than average in the AM Peak and faster than average in the PM Peak. This also makes sense as the PM Peak is the reverse-peak direction for this movement.
- BPM highway travel times, as should be expected, are faster than average in the nighttime period in both directions.
- Transit skims are only available in the BPM skims for AM Peak and Midday. The PM Peak and Night skims were set as AM Peak and Midday skims, respectively, but in the opposite direction.

In general, the skims used by the Port Authority are reasonable by time of day.

2.2 SURVEY DATA

The study team compared the weighted survey data (which was provided by the Port Authority in a dataset titled lga_2017_survey_expanded) to the published information in the 2017 Annual Port Authority traffic report for LGA. While differences exist, the study team's analysis confirms that the weighted dataset used by the Port Authority for model estimation purposes produces numbers that are reasonably consistent with other known data about LGA passengers. The study team observed the following:

- The dataset used for estimation and application is a reasonable dataset to use for this type of work.
- Based on the study team's understanding of available survey data for LGA, this dataset is the only available option suitable for ground access modeling work.
- The survey data are appropriately weighted. The weighted survey totals are close to targets that they were weighted to, according to documentation provided by the Port Authority.

According to the Port Authority ridership forecast (The Port Authority of New York & New Jersey 2018), the data were weighted primarily to total inbound passengers by terminal, outbound passengers by terminal, and connecting passengers. Secondarily, these data were weighted to trip purpose and mode share (with mode totals being gleaned from sources like parking counts and number of taxi vehicles dispatched).

The study team compared the weighted and unweighted survey totals from this dataset to the published information in the 2017 Annual Port Authority traffic report for LGA. This analysis confirms that the weighted dataset used for estimation produces numbers reasonably consistent for model estimation and application.

Table 2 lists the number of connecting passengers in both the estimation dataset and the Port Authority traffic report. The number of connecting passengers in the estimation dataset is slightly higher than the traffic report: 12,160 compared to 11,503. The total number of passengers (on an average day) with a local origin and destination, which is important for ground access modeling purposes, is 68,909 compared to 69,506. Importantly, the difference between the unweighted and weighted totals of connecting passengers show that this number was weighted correctly.

TABLE 2: COMPARISON OF ESTIMATION DATASET AND PORT AUTHORITY TRAFFIC REPORT, BY CONNECTION STATUS

Passenger Type	Estimation Dataset Unweighted		Estimation Dataset Weighted		Port Authority Annual 2017 Traffic Report	
Local Origin and Destination	4,496	95.8%	68,909	85.0%	69,506	85.8%
Connecting Passengers	196	4.2%	12,160	15.0%	11,503	14.2%
Total	**4,692**	**100.0%**	**81,069**	**100.0%**	**81,009**	**100.0%**

SOURCE: RSG.

Table 3 shows the breakdown of business versus leisure travelers in the weighted and unweighted estimation datasets. The weighting process increased the number of business travelers but not to 32.3 percent, which was reported in the Port Authority traffic report. However, the weighted total of 27.4 percent meets reasonableness expectations, especially considering that trip purpose was a secondary variable in the weighting scheme.

TABLE 3: COMPARISON OF ESTIMATION DATASET AND PORT AUTHORITY TRAFFIC REPORT, BY TRIP PURPOSE (INCLUDING DEPARTING, ARRIVING AND CONNECTING PASSENGERS)

Trip Purpose	Estimation Dataset Unweighted		Estimation Dataset Weighted		Port Authority Annual 2017 Traffic Report	
Business	1,109	23.6%	22,227	27.4%	26,166	32.3%
Nonbusiness	3,583	76.4%	58,843	72.6%	54,843	67.7%
Total	**4,692**	**100.0%**	**81,069**	**100.0%**	**81,009**	**100.0%**

SOURCE: RSG.

Table 4 shows the weighted and unweighted mode share for air passengers with local origins and destinations from the estimation dataset. Known parking, taxi, and other counts were used by the Port Authority team as control data, but these data were also given lower priority to exactly match targets than the passenger counts previously noted. Table 4 shows that mode shares do change after the weighting effort, but not by a large amount. This observation means that the surveys used to develop the estimation dataset likely already had a reasonable distribution of mode shares.

TABLE 4: WEIGHTED AND UNWEIGHTED AIR PASSENGER MODE SHARES IN ESTIMATION DATASET

Mode	Estimation Dataset Unweighted		Estimation Dataset Weighted	
Drop-Off	1,014	22.6%	13,864	20.1%
Auto Park (Short Term)	136	3.0%	3,754	5.4%
Auto Park (Long Term)	18	0.4%	682	1.0%
Auto Park (Off Airport/Shuttle)	46	1.0%	1,017	1.5%
Rental Car (On Airport)	108	2.4%	1,329	1.9%
Rental Car (Off Airport)	156	3.5%	4,004	5.8%
Taxi/TNC	2,302	51.2%	35,378	51.3%
Shared Ride/Van	124	2.8%	2,096	3.0%
Hotel Shuttle	64	1.4%	1,746	2.5%
NYC Airporter	192	4.3%	787	1.1%
Bus-Only	149	3.3%	1,851	2.7%
Subway + Bus	143	3.2%	1,903	2.8%
LIRR + Bus	44	1.0%	498	0.7%
Total	**4,496**	**100.0%**	**68,909**	**100.0%**

NOTES: LIRR – Long Island Rail Road NYC – New York City TNC – Transportation Network Company

Totals may not add due to rounding.

SOURCE: RSG.

2.3 MODEL SPECIFICATION AND ASSUMPTIONS

The Port Authority model is a switching model that uses asserted coefficients for time and cost parameters, based on regional-specific airport models that include LGA and literature. The model also comprises alternative specific constants that were calibrated so that the model would reproduce known current shares at LGA. The model was segmented by purpose and residence location (New York City area residents or visitors) using the four standard airport model segments: business resident, leisure resident, business visitor, and leisure visitor.

The value-of-travel-time (VTT) assumptions used are within the expected range for values of time for airport access studies. The assumption that business travelers would have a higher VTT than leisure travelers makes sense on a general level.

The Port Authority based the alternative specific constants on a previous combined airport choice and ground access model that was developed and applied to JFK in 2016. The Port Authority then recalibrated all current LGA mode constants so the base case would match current access mode shares to LGA. The study team reviewed the relationships between alternative specific constants and found these made intuitive sense, including taxi having the highest alternative specific constant and visitors having lower bus and subway coefficients than residents.

The Port Authority switching model was applied using a sample enumeration approach. In a switching model application, each individual survey respondent either chooses to stay on their current mode or switch to a “new” mode. New modes include subway-AirTrain, LIRR-AirTrain, auto drop-off at Willets Point, and taxi (including TNC) to Willets Point.

Available new modes generally depended on the current ground access mode; for example, only the current auto drop-off mode could switch to dropping off at Willets Point. Generally, as stated in the Port Authority report, estimation of the switching model requires “a duration-panel survey where both the current (after the improvement) and previous (before the improvement) choices are observed for respondents” (The Port Authority of New York & New Jersey 2018).

The alternative specific constants the Port Authority set for the new modes, which could not be calibrated to current LGA shares as those modes do not yet exist and are asserted. In the Port Authority report, these AirTrain constants were calibrated based on the 2016 JFK ground access survey to be comparable to the JFK mode shares (JFK has an AirTrain and thus has data for these “new” modes at JFK). This is a logical way to understand what LGA passengers might do since it is information about air passengers in the same city. However, LGA passengers may have different preferences for modes, different trip purposes, income profiles and different origins than JFK passengers. LGA serves a primarily domestic market, while JFK serves a larger international market in addition to domestic flights.

The study team made the following observations of this switching model:

- First, the subway-bus constant is the same as the subway-AirTrain constant for three of the four segments, implying that given equal times and costs, these alternatives would be considered as equal.
- Second, the LIRR-bus constant is more valuable than the LIRR-AirTrain constant in three of four segments, implying that given equal times and costs, LIRR-bus would be slightly preferred over LIRR-AirTrain.

The study team finds the Port Authority model specification and assumptions to be reasonable for an airport ground access study. The skims (network data) used for the model are appropriate. In addition, the sample enumeration dataset used to apply the model is appropriate and weighted in a reasonable way to represent LGA ground access travelers. Moreover, the model is based on well-researched values of time and a structure from a nearby airport (JFK) which, is an effective modeling approach.

The Port Authority model uses asserted level-of-service time and cost parameters and assumes transferability of these parameters from other airports within the region.

3.0 COMPARATIVE RIDERSHIP AT OTHER AIRPORTS

This chapter explores demand for rail transportation services between LGA and Manhattan using higher-level data. It reviews general market demand for rail access to airports and compares rail shares from other airports.

3.1 UNDERSTANDING LAGUARDIA AIRPORT TRANSIT MARKET STRENGTH

This section demonstrates that LGA is one of the most downtown-oriented airports in the United States, which makes it a prime candidate for a successful ground access transit option. A comparison of recent ground access studies at the other New York City-area airports and a handful of national airports came to a similar conclusion (Table 5). This table shows that LGA sends the highest portion of its passengers to Manhattan compared to all other New York City airports, and it sends a higher portion of its passengers to downtown when compared to a selection of airports with transit connections in the United States.

TABLE 5: SHARE OF GROUND ACCESS/EGRESS TRIPS WITH TRIP ENDS IN DOWNTOWN REGIONS

Airport	Downtown	Source	Share of Downtown Trip Ends
LGA	Manhattan	2017 Weighted Model Estimation Dataset (Port Authority)	48.3%
JFK	Manhattan	2017 Weighted Model Estimation Dataset (Port Authority)	42.5%
DCA	District of Columbia	2015 Washington-Baltimore Regional Air Passenger Survey	37.5%
ORD	Downtown Chicago and North Side	2015 ORD Ground Access Study (RSG)	31.2%
SFO	Central San Francisco	2014-2015 Bay Area Airports Ground Access Study	29.4%
EWR	Manhattan	2017 Air Passenger Survey (Port Authority)	19.4%

NOTES: DCA – Ronald Reagan Washington National Airport
EWR – Newark Liberty International Airport
JFK – John F. Kennedy International Airport
LGA – LaGuardia Airport
ORD – O'Hare International Airport
SFO – San Francisco International Airport

SOURCES: See "Source" Column.

3.2 RAIL SHARE AT OTHER US AIRPORTS

Table 6 shows the market shares by segment at the two other New York City-area airports, both of which offer rail access via an AirTrain system. To facilitate comparisons with rail access at other airports, the study team excluded AirTrain trips that were drop-offs at JFK and Newark Liberty International Airport (EWR) and examined only trips that access the AirTrain via rail.

At JFK, "AirTrain with Rail" includes transfers from the LIRR or E, J, and Z subway lines at Jamaica Station, or the A subway line at Howard Beach Station. JFK has a 21 percent share to Manhattan and a 15 percent share overall based on the unweighted 2016 AirTrain survey (administered by TNS for the Port Authority) dataset. The Port Authority-published rail/subway shares between 2012 and 2018 range from 10.7 percent to 17.1 percent.

For Newark Liberty International Airport, the "AirTrain with Rail" category includes transfers from New Jersey Transit, Amtrak, and Port Authority Trans-Hudson trains. Based on the 2017 Air Passenger Survey (Port Authority), Newark has a strong share to Manhattan (24 percent) but a low overall share (7 percent); this difference is likely because Newark's overall market is more spread out and less transit oriented.

TABLE 6: MANHATTAN VS. OVERALL RAIL TRANSIT SHARE TO OTHER NEW YORK CITY-AREA AIRPORTS

Airport	Origin	Res.-Biz	Res.-Non-Biz	Non-Res.-Biz	Non-Res.-Non-Biz	2017 Totals
JFK	Downtown (Manhattan)—42.5% of origins	27%	26%	18%	19%	21%
JFK	All Origins—100% of origins	11%	15%	16%	15%	15%
EWR	Downtown (Manhattan)—19.4% of origins	15%	25%	15%	33%	24%
EWR	All Origins—100% of origins	6%	9%	3%	7%	7%

NOTES: EWR – Newark Liberty International Airport JFK – John F. Kennedy International Airport

SOURCES: RSG, JFK data from the 2016 JFK AirTrain Survey (Port Authority, unweighted), EWR data from the 2017 EWR Air Passenger Survey (PANYNJ).

Table 7 shows rail ground access shares from airports in Chicago, Washington, DC, and San Francisco. Among these airports and the other New York City-area airports, shares to downtown areas range from 15 percent to 31 percent, while overall shares range from 7 percent to 15 percent. The LGA AirTrain share would be expected to fall within this range.

TABLE 7: DOWNTOWN VS. OVERALL RAIL TRANSIT SHARE TO AIRPORTS OUTSIDE NEW YORK CITY

Airport and Mode	Origin	Res. Biz	Res. Non-Biz	Non-Res. Biz	Non-Res. Non-Biz	Total
ORD Blue Line Rail	Downtown	26%	43%	22%	32%	31%
ORD Blue Line Rail	All Origins	10%	20%	10%	15%	15%
SFO (BART Rail)	Downtown	13%	22%	17%	17%	17%
SFO (BART Rail)	All Origins	10%	13%	10%	11%	11%
DCA (Metro Rail)	Downtown	11%	16%	9%	12%	15%
DCA (Metro Rail)	All Origins	13%	24%	11%	16%	12%

NOTES: BART – Bay Area Rapid Transit; DCA – Ronald Reagan Washington National Airport; ORD – O'Hare International Airport; SFO – San Francisco International Airport

SOURCES: RSG, ORD data from 2015 CTA O'Hare Airport Access Study Air Passenger Origin-Destination Survey (RSG), SFO data from 2014-2015 Bay Area Airports Ground Access Study, DCA data from 2015 Washington-Baltimore Regional Air Passenger Survey.

O'Hare International Airport is at the high end of the range (31 percent to downtown and 15 percent overall), particularly from resident and nonbusiness market segments. However, the Chicago Transit Authority Blue Line goes directly to the terminals (one-seat ride) and has a relatively small surcharge over the regular subway fare only in one direction, making it more desirable than the two-seat ride with additional cost proposed at LGA. San Francisco International Airport is at the lower end of the range (17 percent to downtown and 11 percent overall). San Francisco's Bay Area Rapid Transit has struggled with a partly one-seat/two-seat ride service and relatively poor headways. At Ronald Reagan Washington National Airport, Metrorail, which provides a one-seat ride to downtown, is also on the lower end of the range (15 percent to downtown and 12 percent overall). There has been significant variation over the decades. Since 2014, ridership has been declining, often due to unreliable service (Kimbrough 2019). In addition, with Ronald Reagan Washington National Airport so close to downtown, taxis and transportation network companies (TNCs) are a competitive option. Ronald Reagan Washington National Airport, like LaGuardia, serves a primarily national market and is the closest airport to downtown in its respective metro area.

3.3 COMPARISON OF TAXI/TRANSPORTATION NETWORK COMPANY MARKET WITH JOHN F. KENNEDY INTERNATIONAL AIRPORT

Taxi and for-hire vehicles (including TNC like Uber and Lyft), comprise the largest mode share to both JFK and LGA airports. Taxi is more competitive to LGA from Manhattan than to JFK, primarily due to the airport's proximity to Manhattan. Table 8 shows average highway travel times (from BPM skims) from a range of zones in the New York City area. Most notably, highway travel times from Manhattan to JFK are nearly twice of those to LGA. As a result, taxi times and costs are both more favorable to LGA, while the time and cost of the AirTrain option is not significantly better than other modes, unlike JFK. For this reason, the rail to AirTrain mode share at LGA may end up being different than the rail share to JFK.

TABLE 8: COMPARISON OF AVERAGE HIGHWAY TRAVEL TIMES BETWEEN LGA, JFK, AND THE NEW YORK CITY REGION (FROM BPM SKIMS)

Zone	JFK (minutes)	LGA (minutes)	Ratio
Manhattan Lower	52	29	1.8
Manhattan Midtown Walking Access	53	29	1.8
Manhattan Midtown Other	49	30	1.7
Manhattan Upper East/West Side	51	27	1.9
Manhattan North	46	21	2.1
Queens West Walking	32	10	3.1
Queens West Other	28	18	1.5
Queens East Walking	22	13	1.7
Queens East Other	20	22	0.9
Queens North West	32	9	3.6
Brooklyn East	25	31	0.8
Brooklyn West	35	34	1.0
The Bronx	46	25	1.8
Staten Island	50	51	1.0
Long Island	57	57	1.0
Upstate New York/Connecticut	97	78	1.3
New Jersey/Pennsylvania	82	63	1.3

NOTES: JFK – John F. Kennedy International Airport LGA – LaGuardia Airport

SOURCE: RSG.

4.0 MODELING APPROACH

Airport Cooperative Research Program Synthesis Report 5 (Gosling 2008) shows that given the different passenger profiles at each airport, there is a variation in statistically estimated parameters from other airports. To that end, the study team estimated a model on LGA survey data. The LGA survey data that the Port Authority has collected permitted statistical estimation of parameters of LGA-specific mode choice models.

The study team estimated an MNL model using the 2017 LGA ground access survey data. The study team used assumptions for times and costs, including using BPM skims for the model network from the Port Authority's model. Additionally, the study team's MNL model allows for probabilities of choosing all current and all new modes for a given respondent.

4.1 MODEL ESTIMATION ASSUMPTIONS

Network

The estimated model uses BPM skims for time and cost for all modes and replaces BPM highway travel times with actual taxi travel times in the same fashion. The study team coded modes as not available in each zone when that mode's in-vehicle travel time was zero. In addition to this, availabilities for subway, bus, LIRR, New York City Airporter, and taxi were limited to a certain radius around LGA for model estimation only (Table 9). This avoided the effect of extreme outliers, since it is unlikely that subway, for example, would be a viable option for passengers traveling from Connecticut, New Jersey, or outer Long Island. Extreme outliers can cause a model to be disproportionately impacted by a few individuals with irregular behavior. Because a model is designed to represent general behavior, removing some extreme outliers allows the model to be a better fit for more typical behaviors. All of the distances in Table 9 were tested in the model estimation process and varied with the goal of arriving at a model reflecting general travel choices. While it is still possible to take some of these modes from greater distances, cutting off the availabilities at these distances led to model results that were the best fit for the data.

TABLE 9: UNAVAILABILITY CONDITIONS FOR MODES USED IN MODEL ESTIMATION

Mode	Availability Condition
Drop-Off	Always available
Auto Park	Unavailable to nonresidents
Rental Car	Not included as a mode option because these travelers likely need the rental car for other reasons and would not switch under any conditions
Taxi/TNC	Unavailable to distances greater than 60 miles
Shared Ride/Van	Unavailable to distances greater than 40 miles
Hotel Shuttle	Not included as a mode option, as it is available in limited circumstances; because they are free, travelers are unlikely to change modes
NYC Airporter	Unavailable to distances greater than 25 miles
Bus-Only	Unavailable where bus in-vehicle time is zero and to distances greater than 15 miles
Subway + Bus	Unavailable where subway in-vehicle time is zero and to distances greater than 25 miles
LIRR + Bus	Unavailable where rail in-vehicle time is zero and to distances greater than 40 miles

NOTE: LIRR – Long Island Rail Road NYC – New York City TNC – Transportation Network Company

SOURCE: RSG.

Survey Dataset

The dataset used for model estimation was titled “lga_2017_survey_expanded.” This dataset was a cleaned dataset provided by the Port Authority that included records from the 2017 departing passenger survey, the 2017 arriving passenger survey, and the 2017 employee survey.

The Port Authority had already cleaned and weighted this dataset to reflect current passenger totals. Records had been duplicated, with the assumption that each respondent would take the same mode in the opposite direction (but using a known opposite direction time of day). The departure survey included 1,891 records, while the dataset used for model estimation included 1,737 departing survey records, meaning 154 records had been cleaned and removed.

The study team joined the trip duration (number of days in New York or away from New York and used to calculate parking costs) variable onto this dataset from the 2017 departing passenger survey. The study team also imputed missing trip durations using a random forest algorithm, a widely used method for data imputation in these cases. To test the effect of the imputation algorithm, the study team tested the models using the median trip duration for all missing trip lengths resulting in no meaningful difference.

Exclusions

Table 10 shows the steps taken to go from the "lga_2017_survey_expanded" dataset to the dataset used for model estimation. These steps are further explained as follows:

- Only the departing direction was used, so each respondent's choice was only counted once. Only the departing passenger dataset was used because the arriving passenger dataset did not include a trip duration variable, which is needed for calculating parking costs.
- Rental car and hotel shuttle were excluded from the modeling process, assuming shares would remain the same. This was done because the choice to rent a car is likely made for different reasons than airport access. Further, hotel shuttles are a mode only available in certain cases.
- Availabilities for subway, bus, LIRR, New York City Airporter, and taxi/TNC were limited to a certain radius around LGA because having these modes available for long distances represents an unlikely choice; having these unrealistic options in the choice set does not make sense for modeling purposes. In all cases, any time a mode was chosen that was not available, the study team removed it from the model estimation dataset.
- Finally, to avoid the strong effects of extreme outliers, the study team removed several records where the chosen travel time was much higher than the minimum possible travel time or where the chosen cost was much higher than the minimum possible cost. Because the dataset represents choice of real people, some of their choices are bound to be entirely irrational. It is a standard data cleaning protocol to remove these outliers so that the model is based on rational records.

TABLE 10: DETAILED DESCRIPTION OF RECORDS EXCLUDED FROM MODEL ESTIMATION

Description	Note	Records removed	Records remaining
Original dataset	lga_2017_survey_expanded (provided by Port Authority)	–	6,414
Use only departing direction	Departure and arrival are duplicated records, also removes connecting passengers	3,305	3,109
Use only passengers	Removes employees	861	2,248
Use only departing air passenger dataset	Arrival dataset was missing some needed variables	511	1,737
Subway chosen and not available	Unavailable to distances greater than 25 miles	0	1,737
LIRR chosen and not available	Unavailable to distances greater than 40 miles	3	1,734
Bus only chosen and not available	Unavailable to distances greater than 15 miles	3	1,731
Remove all hotel shuttle	Not included as a choice in the model	17	1,714
Auto Park chosen and not available	Unavailable to nonresidents	20	1,694
Remove all rental car	Not included as a choice in the model	90	1,604
NYC Airporter chosen and not available	Unavailable to distances greater than 25 miles	7	1,597
Taxi/TNC chosen and not available	Unavailable to distances greater than 60 miles	10	1,587
Shared Ride/Van chosen and not available	Unavailable to distances greater than 40 miles	2	1,585
Chosen travel time 2.71 times higher than minimum travel time	Mostly NYC Airporter, some Bus-Only and LIRR. Half outside NYC, Bronx, Staten Island	29	1,556
Chosen cost is $50 higher than minimum possible cost	All Drive Park and taxi. Mostly from outside NYC, Bronx, Staten Island	78	1,478

NOTES: LIRR – Long Island Rail Road NYC – New York City TNC – Transportation Network Company

SOURCE: RSG.

4.2 ESTIMATED MODEL

Model Statistics

Table 11 and Table 12 show the goodness of fit and sample sizes of the estimated model. The estimation dataset included 1,478 individuals following the exclusions discussed previously and the adjusted Rho-square value is 0.4393. In similar models, adjusted Rho-square values tend to range between 0.2 and 0.5, so this indicates a decent model fit.

TABLE 11: GOODNESS OF FIT MEASURES

Measure	Value
Number of individuals	1478
Number of observations	1478
Log-Likelihood (start)	-2766.239
Log-Likelihood (0)	-2766.239
Log-Likelihood (final)	-1520.06
Rho-square (0)	0.4505
Adj. Rho-square (0)	0.4393
AIC	3102.12
BIC	3266.37
Estimated parameters	31
Time taken (hh:mm:ss)	00:01:24.8
Iterations	52

NOTES: AIC – Akaike Information Criterion BIC – Bayesian Information Criterion

SOURCE: RSG.

TABLE 12: SEGMENT SAMPLE SIZES

Segment	Sample Size
Resident-Business	103
Resident-Leisure	416
Visitor-Business	253
Visitor-Leisure	706
Total	**1,478**

SOURCE: RSG.

Coefficients

Table 13 shows the model coefficients and travel time and cost parameters. The model has several shift and multiplier variables. Shift variable coefficients apply to a certain segment and are added to the base coefficient for that segment; multiplier variable coefficients are multiplied by the base coefficient for the indicated segment.

TABLE 13: MODEL COEFFICIENTS (UNCALIBRATED CONSTANTS)

Coefficient Name	Coefficient	Std. err.	t.ratio(0)	Rob.std. err.	Rob.t.ratio (0)
Drop-Off Constant (utils)	0.000	–	–	–	–
Auto Park Constant (utils)	0.321	0.409	0.780	0.401	0.800
Auto Park Business Shift (utils)	0.157	0.689	0.230	0.676	0.230
Auto Park Constant (Long Term) (utils)	-1.877	0.621	-3.020	0.626	-3.000
Auto Park Business Shift (Long Term) (utils)	0.000	–	–	–	–
Auto Park Constant (Off Airport) (utils)	-0.110	0.424	-0.260	0.420	-0.260
Auto Park (Off Airport) (utils)	1.009	0.587	1.720	0.569	1.770
Rental Car Constant (utils)	0.000	–	–	–	–
Taxi/TNC Constant (utils)	1.754	0.188	9.340	0.190	9.220
Taxi/TNC Business Shift (utils)	0.901	0.190	4.740	0.196	4.590
Taxi/TNC Visitor Shift (utils)	0.337	0.240	1.400	0.241	1.400
Shared Ride/Van Constant (utils)	-1.357	0.447	-3.030	0.435	-3.120
Shared Ride/Van Business Shift (utils)	0.731	0.426	1.720	0.431	1.700
Shared Ride/Van Visitor Shift (utils)	0.421	0.510	0.830	0.483	0.870
Hotel Shuttle Constant (utils)	0.000	–	–	–	–
NYC Airporter Constant (utils)	0.782	0.448	1.750	0.463	1.690
NYC Airporter Business Shift (utils)	-0.560	0.510	-1.100	0.517	-1.080
NYC Airporter Visitor Shift (utils)	-1.124	0.542	-2.080	0.541	-2.080
Bus-Only Constant (utils)	0.250	0.355	0.700	0.354	0.710
Bus-Only Business Shift (utils)	-0.046	0.446	-0.100	0.443	-0.100
Bus-Only Visitor Shift (utils)	-1.405	0.461	-3.050	0.464	-3.030
Subway + Bus Constant (utils)	-0.114	0.309	-0.370	0.299	-0.380
Subway + Bus Business Shift (utils)	-0.141	0.386	-0.370	0.386	-0.370
Subway + Bus Visitor Shift (utils)	-0.644	0.373	-1.730	0.359	-1.800
LIRR + Bus Constant (utils)	-0.480	0.818	-0.590	0.753	-0.640
LIRR + Bus Business Shift (utils)	0.858	0.708	1.210	0.680	1.260
LIRR + Bus Visitor Shift (utils)	-0.455	0.972	-0.470	0.866	-0.530
Travel Time Beta (minutes)	-0.048	0.010	-4.630	0.010	-4.670
Travel Time Business Multiplier (multiplier)	1.000	–	–	–	–
Travel Time Visitor Multiplier (multiplier)	0.442	0.174	2.550	0.162	2.720
Cost Beta (dollars)	-0.042	0.006	-6.850	0.005	-7.860
Cost Business Multiplier (multiplier)	1.000	–	–	–	–
Cost Visitor Multiplier (multiplier)	0.929	0.175	5.320	0.159	5.830
Cost Missing Income Multiplier (multiplier)	1.436	0.338	4.250	0.300	4.780
Cost Missing Income Business Multiplier (multiplier)	0.414	0.320	1.290	0.210	1.980
Cost Missing Income Visitor Multiplier (multiplier)	0.684	0.260	2.630	0.240	2.850
Cost Income Elasticity (unitless)	-0.269	0.060	-4.450	0.056	-4.790

NOTES: LIRR – Long Island Rail Road NYC – New York City TNC – Transportation Network Company

SOURCE: RSG.

Table 14 shows the coefficients for the four segments based on the shift and multiplier variables. For each mode specific constant, the business shift constants are added to the base constant for business travelers and the visitor shift constants are added to the base constant for all visitors. For example, asc_drivepark has a coefficient of 0.321; however, for business travelers, there is the shift_business_asc_drivepark variable of 0.157. That variable is then added to the asc_drivepark variable to obtain a resident-business alternative specific constant of 0.478. The multiplier variables work the same way, but they are multiplied by the base coefficient. For example, the travel time variable (b_tt) with the value of -0.048 is multiplied by the mult_visitor_b_tt variable with a value of 0.442 to get the visitor cost variable value; this creates a travel time variable for visitors of -0.021.

TABLE 14: MODEL REWORKED, BY SEGMENT (UNCALIBRATED CONSTANTS, RELATIVE TO DROP-OFF)

Coefficients	Resident (Business)	Resident (Leisure)	Visitor (Business)	Visitor (Leisure)
Auto Park (Short Term)	0.48	0.32	–	–
Auto Park (Long Term)	–	-1.88	–	–
Auto Park (Off Airport)	0.90	-0.11	–	–
Taxi/TNC	2.66	1.75	2.99	2.09
Shared Ride/Van	-0.63	-1.36	-0.20	-0.94
NYC Airporter	0.22	0.78	-0.90	-0.34
Bus-Only	0.20	0.25	-1.20	-1.15
Subway + Bus	-0.26	-0.11	-0.90	-0.76
LIRR + Bus	0.38	-0.48	-0.08	-0.94
TIME	-0.048	-0.048	-0.021	-0.021
COST	-0.042	-0.042	-0.039	-0.039
Income Elasticity	-0.269	-0.269	-0.269	-0.269
VTT at $90,000 income ($/hr.)	$67.69	$67.69	$32.23	$32.23

NOTES: LIRR – Long Island Rail Road NYC – New York City TNC – Transportation Network Company
VTT – Value of Travel Time

SOURCE: RSG.

Analysis of Mode Specific Constants

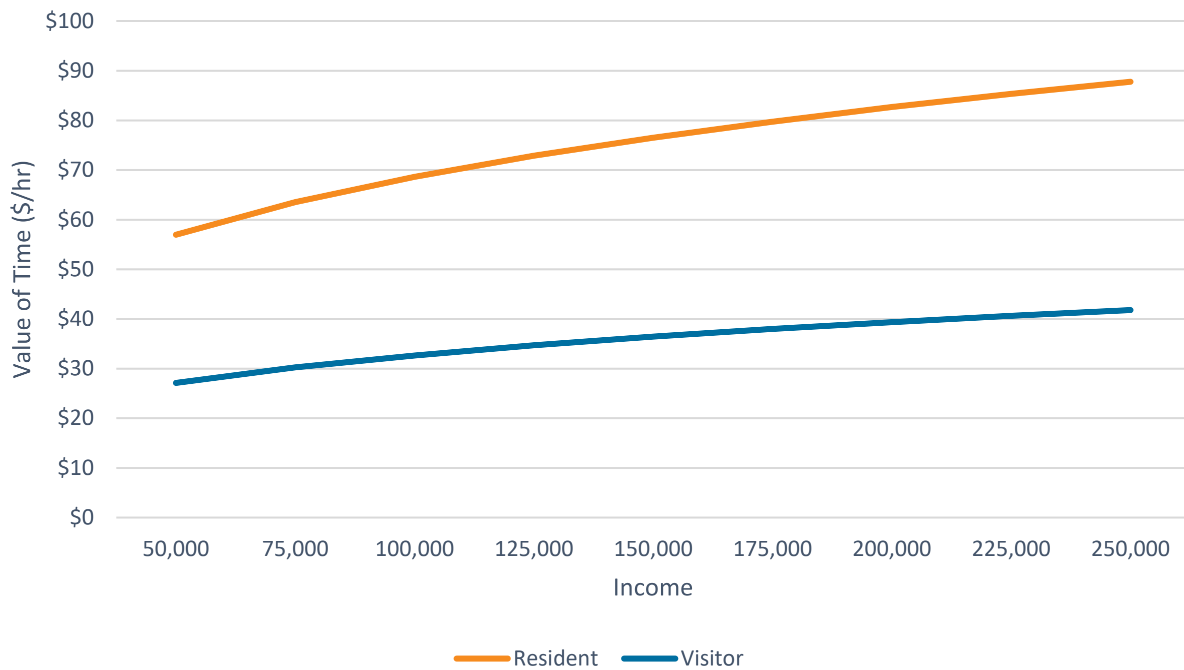
An analysis of mode specific constants in the model (Table 13) revealed the general preferences among passenger segments at LGA. For example, visitors have a negative shift for bus (-1.405), subway (-0.644), and LIRR (-0.455); this indicates that visitors are more averse to bus, subway and LIRR than residents. This finding is unsurprising given that visitors are likely less familiar with the transit system than residents. Business travelers have a negative shift on subway (-0.141) and bus (-0.046), but a positive shift on LIRR (0.858); this indicates that business travelers place more value on the comfort and convenience of LIRR compared to visitors and are less likely to prefer subway and bus. Taxi/TNC has the highest alternative specific constant (1.754), indicating a general preference for this mode irrespective of time and cost. Both business travelers and visitors have a positive shift on taxi/TNC (0.901 and 0.337, respectively), meaning that visiting business travelers are the segment that has the biggest relative preference for taxi/TNC, whereas residents traveling for leisure have the smallest relative preference for taxi/TNC. This finding aligns with the study team's expectations.

Values of Time

The VTT that are implied by the study team's model range from approximately $30 to $90 per hour and depend whether the traveler is a resident of the New York City area or a visitor and on their income. The study team tested multipliers that would have created different VTT for business and leisure segments, but this multiplier was found to be insignificant, meaning that the LGA passenger data do not support different VTT for business and leisure travelers.

Figure 6 shows the VTT as a function of income. VTT increases with higher incomes. Values for residents range from a bit over $55/hour at a $50,000/year income to almost $90/hour at a $250,000/year income. Values for visitors range from under $30/hour to over $40/hour. This means that residents have a higher willingness to pay for time savings than visitors, while there is no difference in willingness to pay for time savings between business and leisure travelers.

FIGURE 6: VTT AS A FUNCTION OF INCOME



SOURCE: RSG.

The difference in VTT between residents and visitors, with visitors having a VTT of more than half that of residents, is not an intuitive result. In addition, it would be expected, in this type of model, for business travelers to have a higher VTT than leisure travelers. Both of these issues can be explained when looking at VTT in context with the values of the mode specific constants. Table 15 shows the dollar values of each mode specific constant, relative to the Drop-off mode. These values are obtained by dividing the mode constant by the cost coefficient. Looking at the taxi/TNC constant, we can see that visitors and business travelers still have a willingness to pay, but in their case, it is more oriented towards willingness to pay for the simplicity and ease of understanding a specific mode rather than for time savings.

The taxi constant is higher for visitors than for residents. This implies that while residents have a higher willingness to pay for time savings, visitors have a higher willingness to pay for the taxi/TNC mode.

The taxi constant is also higher for business travelers than for leisure travelers. This implies that while business travelers have the same willingness to pay for time savings as leisure travelers, they have a higher willingness to pay for the taxi/TNC mode.

TABLE 15: DOLLAR VALUES OF MODE SPECIFIC CONSTANTS (UNCALIBRATED)

Value of Alternatives ($) relative to Drop-Off (per trip)	Resident (Business)	Resident (Leisure)	Visitor (Business)	Visitor (Leisure)
Auto Park (Short Term)	$11.31	$7.59	$0.00	$0.00
Auto Park (Long Term)	$0.00	-$44.47	$0.00	$0.00
Auto Park (Off Airport)	$21.28	-$2.61	$0.00	$0.00
Taxi/TNC	$62.90	$41.55	$76.30	$53.32
Shared Ride/Van	-$14.81	-$32.13	-$5.21	-$23.85
NYC Airporter	$5.26	$18.54	-$23.00	-$8.71
Bus-Only	$4.84	$5.93	-$30.61	-$29.44
Subway + Bus	-$6.05	-$2.70	-$22.93	-$19.33
LIRR + Bus	$8.95	-$11.38	-$1.98	-$23.85

NOTES: LIRR – Long Island Rail Road NYC – New York City TNC – Transportation Network Company

SOURCE: RSG.

5.0 ESTIMATED MODEL APPLICATION

The study team applied the estimated model to the survey-based weighted dataset to obtain forecasted mode shares for the base and build scenarios in 2026 and 2031. The study team added a set of new modes that included the AirTrain to the model network as available mode options. Future-year growth was accounted for in both the transportation network (skims) and the survey weighting. This chapter covers the model's growth assumptions and calibration and the addition of constants to reflect the value of the new AirTrain service.

5.1 NETWORK AND PASSENGER APPLICATION DATA

AirTrain Network

The study team incorporated the following new mode options into the model for application purposes:

- Subway + AirTrain.
- LIRR + AirTrain.
- Drop-off + AirTrain.
- Taxi/TNC + AirTrain.

The additional input values needed, but that were not included in the skims, are listed in Table 16.

- For Subway + AirTrain, the study team used subway times and costs to Willets Point from the BPM skims and added AirTrain travel time, wait time, walk time, and AirTrain fare.
- For LIRR + AirTrain, the times and costs used were the sum of the time and cost to access either Penn Station or Grand Central Terminal, the LIRR travel time and cost to Willets Point (Table 16), and AirTrain times and cost. For access to Penn Station or Grand Central Terminal, the study team used the quickest transit access time to Penn Station or Grand Central Terminal. For zones close to Penn Station/Grand Central Terminal, the study team used the quickest walking time between each zone and Penn Station or Grand Central Terminal. Walking times were defined as 15 minutes per mile based on the zone-to-zone distance in the skims.
- For drop-off and taxi/TNC at Willets Point, the study team used the same highway skims for time and cost to Willets Point rather than to LGA and added walk time, wait time, AirTrain time and AirTrain fare. In addition, the study team added several constants to the model to align this option with the study team's expectations of real-life travel behavior:

- First, the study team assigned a large enough penalty to any trips where it was faster to drive to the terminal rather than Willets Point; this essentially made dropping off at Willets Point unavailable.
- Second, the study team included a negative per-mile coefficient so that those driving from farther away would be more likely to choose to drive to the terminal rather than drop-off at Willets Point.
- Third, the study team added a general negative constant to reflect the disutility of adding a second mode to what could be a door-to-door automobile trip.

TABLE 16: INPUTS NEEDED FOR MODEL APPLICATION OF AIRTRAIN MODE OPTIONS

Value	Description
$5	AirTrain Fare
6 min	AirTrain Travel Time
2 min	AirTrain Wait Time (One train every 4 minutes)
7.5 min	Wait time for LIRR - 1/2 of headway of LIRR from Penn Station to WP (4 trains/hr.)
18 min	Time of LIRR from Penn Station to WP
$8.75	Cost of LIRR to WP Peak
$6.50	Cost of LIRR to WP Off-Peak
1 min	Walk time from subway to AirTrain
1 min	Walk time from LIRR to AirTrain
1 min	Walk time from drop-off/Taxi/TNC to AirTrain
-5	Penalizes trips to Willets Point if LGA Terminals are closer
-0.02	Distance constant on Drop-offs; farther drives are less likely to drop-off at WP
1.099	Constant for AirTrain on subway and Rail trips
-1.5	Constant for AirTrain on taxi/TNC and Drop-Off Trips to WP

NOTES: LIRR – Long Island Rail Road LGA – LaGuardia Airport WP – Willets Point
TNC – Transportation Network Company

SOURCE: RSG.

Network Growth Assumptions

The Port Authority provided updated BPM skims for 2025 and 2045 forecasts to reflect an increase in traffic congestion. The study team used these same expansions for the 2025 and 2045 applications of the estimated model. To estimate skim matrices for 2026 and 2031, the study team assumed linear growth between 2025 and 2045 and took the proportionate value for each time and cost parameter between the two, as follows: (2025 Value + (2045 Value – 2025 Value)) * (Year – 2025) / 20. In cases where either the 2025 value or 2045 value was zero, the study team retained the 2025 value. Zero values often indicate availabilities, so this was done so that 2026 and 2031 availabilities were kept the same as 2025.

Passenger Growth Assumptions

FAA acknowledges the current impacts of the recent social response to the COVID-19 public health emergency and the resulting decline in aviation and transit travel demand. At this time, it is impossible to precisely predict future changes to projected ridership and impacts that may result from a COVID-19 public health emergency response of an unpredictable nature and unknown duration. The Proposed Action is planned to commence construction in 2021 and will require under five years to complete. The future ridership analysis presented in this Draft EIS represents a reasonable indication of APM market potential based on pre-COVID-19 aviation and transit travel demand, LGA ground access, and regional land use patterns.

Table 17 shows the total number of passengers and growth factors used for model application purposes. For passenger growth, the study team used the same assumptions as the Port Authority: an increase in air passenger traffic of 12.4 percent for 2025 and 37 percent for 2045 (over 2017 levels).

For the years not directly forecast by the Port Authority (2026 and 2031), the study team used growth factors based on the ratio of yearly enplanements from the given year to 2017 in Table 3-5 of the Port Authority ridership forecast report (The Port Authority of New York & New Jersey 2018). For 2026 the growth factor of 13.5 percent leads to 78,232 air passengers going to or from LGA daily. For 2031 the growth factor of 19.6 percent leads to 82,415 air passengers going to or from LGA daily.

The study team estimated the model on unweighted data; however, the study team applied the model to the weighted “lga_2017_survey_expanded” dataset that included all passenger records and was weighted to the 2017 LGA passenger totals. The study team did not make any modifications to this weighting scheme.

TABLE 17: TOTAL NUMBER OF ARRIVING AND DEPARTING AIR PASSENGERS USED FOR FORECASTS, BY YEAR

Year	Growth Factor	Air Passengers (Arriving + Departing)
2017	0%	68,909
2025	12.4%	77,454
2026	13.5%	78,212
2031	19.6%	82,415
2045	37%	94,405

SOURCE: RSG.

5.2 CALIBRATION

Because not all records were included in the model estimation, the model required calibration when applied to the full dataset to match the targeted mode shares. The study team first applied the uncalibrated model to the full estimation dataset and then iteratively adjusted the mode specific constants, rerunning the model with each iteration, until the resulting mode shares equaled the target shares. After calibration, target shares equaled the weighted total of each mode option as chosen by respondents in the estimation dataset. Table 18 lists the initial mode share from the uncalibrated model and the target shares.

TABLE 18: BASE (2017) UNCALIBRATED MODEL RESULTS COMPARED TO TARGET MODE SHARES

Mode	Uncalibrated Share (2017)	Target Share (2017)
Drop-Off	17.3%	20.1%
Auto Park (Short Term)	4.1%	5.4%
Auto Park (Long Term)	0.9%	1.0%
Drive Park (Off Airport)	1.4%	1.5%
Rental Car	7.7%	7.7%
Taxi/TNC	56.4%	51.3%
Shared Ride/Van	1.9%	3.0%
Hotel Shuttle	2.5%	2.5%
NYC Airporter	2.0%	1.1%
Bus-Only	2.1%	2.7%
Subway + Bus	2.9%	2.8%
LIRR + Bus	0.7%	0.7%

NOTE: LIRR – Long Island Rail Road NYC – New York City TNC – Transportation Network Company

SOURCE: RSG.

Table 19 presents the table of coefficients with the calibrated constants, including the AirTrain constant and a drop-off to Willets Point constant. The existing mode alternative specific constants have been changed due to calibration. A segmented view of the calibrated model is presented in Table 20.

TABLE 19: MODEL WITH CALIBRATED CONSTANTS

Variable Name	Coefficient
Drop-off Constant (utils)	0.000
Auto Park Constant (utils)	0.979
Auto Park Business Shift (utils)	0.157
Auto Park Constant (Long Term) (utils)	-1.757
Auto Park Business Shift (Long Term) (utils)	0.000
Auto Park Constant (Off Airport) (utils)	-0.092
Auto Park (Off Airport) (utils)	1.009
Rental Car Constant (utils)	0.000
Taxi/TNC Constant (utils)	1.447
Taxi/TNC Business Shift (utils)	0.901
Taxi/TNC Visitor Shift (utils)	0.337
Shared Ride/Van Constant (utils)	-1.090
Shared Ride/Van Business Shift (utils)	0.731
Shared Ride/Van Visitor Shift (utils)	0.421
Hotel Shuttle Constant (utils)	0.000
NYC Airporter Constant (utils)	0.021
NYC Airporter Business Shift (utils)	-0.560
NYC Airporter Visitor Shift (utils)	-1.124
Bus-Only Constant (utils)	0.313
Bus-Only Business Shift (utils)	-0.046
Bus-Only Visitor Shift (utils)	-1.405
Subway + Bus Constant (utils)	-0.371
Subway + Bus Business Shift (utils)	-0.141
Subway + Bus Visitor Shift (utils)	-0.644
LIRR + Bus Constant (utils)	-0.678
LIRR + Bus Business Shift (utils)	0.858
LIRR + Bus Visitor Shift (utils)	-0.455
Travel Time Beta (minutes)	-0.048
Travel Time Business Multiplier (multiplier)	1.000
Travel Time Visitor Multiplier (multiplier)	0.442
Cost Beta (dollars)	-0.042
Cost Business Multiplier (multiplier)	1.000
Cost Visitor Multiplier (multiplier)	0.929
Cost Missing Income Multiplier (multiplier)	1.436
Cost Missing Income Business Multiplier (multiplier)	0.414
Cost Missing Income Visitor Multiplier (multiplier)	0.684
Cost Income Elasticity (unitless)	-0.269
AirTrain Shift for Subway and Rail (utils)	1.099
AirTrain Shift for Drop-off and taxi/TNC	-1.5

NOTES: LIRR – Long Island Rail Road NYC – New York City

TNC – Transportation Network Company

SOURCE: RSG.

TABLE 20: MODEL REWORKED, BY SEGMENT (CALIBRATED CONSTANTS, RELATIVE TO DROP-OFF)

Coefficients	Resident (Business)	Resident (Leisure)	Visitor (Business)	Visitor (Leisure)
Auto Park (Short Term)	1.14	0.98	–	–
Auto Park (Long Term)	–	-1.76	–	–
Auto Park (Off Airport)	0.92	-0.09	–	–
Taxi/TNC	2.35	1.45	2.69	1.78
Shared Ride/Van	-0.36	-1.09	0.06	-0.67
NYC Airporter	-0.54	0.02	-1.66	-1.10
Bus-Only	0.27	0.31	-1.14	-1.09
Subway + Bus	-0.51	-0.37	-1.16	-1.01
LIRR + Bus	0.18	-0.68	-0.27	-1.13
TIME	-0.048	-0.048	-0.021	-0.021
COST	-0.042	-0.042	-0.039	-0.039
Income Elasticity	-0.269	-0.269	-0.269	-0.269
VTT at $90,000 Income ($/hr.)	$67.69	$67.69	$32.23	$32.23

NOTES: LIRR – Long Island Rail Road   NYC – New York City   TNC – Transportation Network Company

VTT – Value of Travel Time

SOURCE: RSG.

5.3 AIRTRAIN CONSTANT

To forecast the new AirTrain mode, the study team assigned the new modes an alternative specific constant. Because these modes do not currently exist, the study team could not estimate these values using a model. Alternative specific constants represent the value of the difference in preference for a mode that is unexplained elsewhere in the model. In the structure of this model, the study team needed to adjust the subway-bus and rail-bus constants by adding a certain amount to arrive at a subway-AirTrain and rail-AirTrain constant value. This difference is hereafter called the *AirTrain constant*. This section details the study team's process to select an AirTrain constant. The AirTrain constant represents the difference in preference for AirTrain over bus as a connection from subway or rail if travel time and cost are equal.

If time and cost are equal, the AirTrain could be preferred over a bus connection for the following reasons:

- Reliability (real and perceived).
- Comfort (easier transfer, potentially more comfortable vehicle).
- Potentially easier to understand.

To arrive at a value for the AirTrain constant, the study team first reviewed several sources related to the value of premium transit services and previous New York City-area airport studies. Following that review, the study team analyzed previous studies and conducted a sensitivity analysis on the model (both are described in the following sections). The results from both analyses informed the value of the AirTrain constant to be added to both rail modes (subway and LIRR).

In addition, the model also needed a constant for the new auto-AirTrain modes (drop-off-AirTrain and taxi/TNC-AirTrain). In these cases, one would expect a transfer to AirTrain would not be preferred compared to the current alternative of getting dropped off directly at the terminal; as a result, the AirTrain shift for these modes should be negative.

Exploring the Value of Premium Transit Service

This section discusses the value of a premium transit service through analysis of previous New York City-area airport studies, TCRP Report 166, and value of reliability in the proposed AirTrain system. The study team developed a range of values for a transit trip using the AirTrain instead of bus for the final part of the transit journey to LGA.

Research has shown that rail is often valued over bus, particularly if it has "premium features" that set it apart. The premium transit characteristics described in TCRP Report 166 (Outwater, et al. 2014) are reliability, station comfort, onboard amenities, and real-time information. The premium transit characteristics described in other research (Ben-Akiva and Morikawa 2002) include reliability, information availability, comfort, safety from accidents, security from crime, and service availability.

In this context, LGA AirTrain should be viewed as a premium transit service that would be preferred over bus on the transit path to LGA. The subway-to-AirTrain transit path would be more premium than the currently available subway-to-bus transit path. Similarly, the LIRR-to-AirTrain transit path would be more premium than the current LIRR-to-bus option.

Compare to Previous New York City Airport Studies

Two previous studies examine values of time for airport ground access in the New York City region. Studies at JFK (RSG 2006) and Stewart Airport (RSG 2009) estimated the value of delay time to be between $24 and $57 per hour for transit users (Table 21). The data from the Stewart Airport study were collected from air passengers departing from JFK, EWR and LGA to establish demand for transit connections to Stewart from the entire New York region air traveler market. In this table, value of delay can be interpreted as the VTT lost due to unreliability. The reliability ratios (defined as the ratio of the value of reliability to the VTT) are high and show that value of reliability is four to five times higher than VTT, compared to typical reliability ratios of 0.5 to 2.

TABLE 21: VALUE OF DELAY IN JFK AND STEWART AIRPORT ACCESS STUDIES

Study	Segment	Value of Delay ($/hour)	Rail Constant	Reliability Ratio
JFK	Current Mode Transit	$57.12	–	4.54
Stewart	Resident-Business	–	-$32.69	–
Stewart	Resident Nonbusiness	$44.46	-$6.45	5.44
Stewart	Nonresident-Business	–	-$24.44	–
Stewart	Nonresident-Nonbusiness	$24.47	-$5.46	5.20

NOTE: JFK – John F. Kennedy International Airport

SOURCE: RSG, JFK data from JFK Air Passenger Study (2006), Stewart data from West of Hudson Regional Transit Access Study (2009).

The Stewart Airport study also includes rail constants that indicate rail preference over bus within the transit mode. This rail constant serves the same purpose as the AirTrain constant does in the LGA model. In segments without a reliability coefficient, the rail constant is $24–$32 per trip.

Because the value of delay was not estimated for all four segments in the Stewart Airport study, the study team can make a useful comparison between rail constants where value of delay was estimated and rail constants were the value of delay was not estimated (Table 21). Segments with an estimated value of delay have a much lower rail constant ($5–$6 instead of $24-$32), implying that reliability is wrapped into the constant when not explicitly considered.

Comparison to TCRP Report 166

TCRP Report 166 estimated the value of "premium transit attributes" per boarding, essentially putting a constant on different levels of quality of service for urban public transit trips. TCRP Report 166 looked at urban public transportation, so it is not completely comparable to AirTrain, but the concept of premium transit is applicable. Table 22 presents the value of the all premium transit attributes together per boarding from the TCRP report. TCRP Report 166 initially reported these values in terms of minutes of travel time. For this analysis, the study team converted them to dollars using the LGA model values of time to compare with other analyses. This value indicates the additional value added to the trip based on the presence of premium transit attributes, much like the AirTrain constant would. Table 22 shows the value of a more premium transit service ranges from $6 to $33.

TABLE 22: VALUE OF ALL PREMIUM TRANSIT ATTRIBUTES (PER BOARDING)

Segment	Charlotte	Salt Lake City	Chicago
Resident-Business/Commute	$19.44	$14.73	$24.80
Resident Nonbusiness/Noncommute	$32.86	$12.98	$28.18
Visitor-Business/Commute	$9.25	$7.01	$11.91
Visitor Nonbusiness/Noncommute	$15.65	$6.18	$13.42

SOURCE: RSG.

Table 23 shows the value of the reliability component of the premium transit attributes. The value of reliability in these is around $2 to $7 per boarding. Reliability-specific numbers were not available in TCRP Report 166 for Salt Lake City and for nonbusiness trips in Charlotte.

TABLE 23: VALUE OF RELIABILITY (PER BOARDING)

Segment	Charlotte	Salt Lake City	Chicago
Resident-Business/Commute	$5.18	–	$6.36
Resident Nonbusiness/Noncommute	–	–	$5.22
Visitor-Business/Commute	$2.47	–	$3.03
Visitor Nonbusiness/Noncommute	–	–	$2.23

SOURCE: RSG.

Reliability Analysis of LaGuardia Airport Model

The study team completed one additional analysis that looked at several possible assumptions about the reliability of the proposed AirTrain system compared to the current subway-to-bus transit path. The bus portion of that transit path accounts for some level of unreliability, meaning that a range of actual travel times are possible compared to the scheduled or average travel time. One way this is often considered is by looking at the 95th percentile travel times, which means that 1 out of 20 trips would be as bad or worse than this time. Reliability data for these bus routes does not exist; however, reasonable assumptions can produce a range of values to determine the value of reliability.

The study team assumed the following for this analysis:

- Assume Reliability Ratio = 1 (Value of reliability = VTT).
- AirTrain = 15 minutes of reliability-style time savings. This means, for example, the 95th percentile travel time of subway-AirTrain improves on that of the subway-bus transit path by 15 minutes.

Under these assumptions, the value of reliability for residents is $11–$17 per trip, and the value of reliability for visitors is $6–$8 per trip (Table 24). This value represents only the reliability portion of the premium attributes provided by the AirTrain, so additional value would need to be added to this to represent the other premium transit attributes provided by the AirTrain.

TABLE 24: VALUE OF RELIABILITY PER TRIP USING LGA VALUES OF TIME AND STEWART VALUES OF RELIABILITY

Study	Segment	VTT	Reliability Ratio	Value of Reliability	Minutes Saved by AirTrain	$ Value of AirTrain Reliability
LGA Values of Time	Resident-Business	$67.69	1	$67.69	15	$16.92
LGA Values of Time	Resident-Leisure	$67.69	1	$67.69	15	$16.92
LGA Values of Time	Visitor-Business	$32.23	1	$32.23	15	$8.06
LGA Values of Time	Visitor-Leisure	$32.23	1	$32.23	15	$8.06
Stewart	Resident-Leisure	–	–	$44.46	15	$11.11
Stewart	Visitor-Leisure	–	–	$24.47	15	$6.12

NOTE: LGA – LaGuardia Airport

SOURCE: RSG.

Synthesis of Value of Premium Transit

These values can be summarized as follows:

- From the Stewart study, value of more premium transit service is $24–$32 per trip.
- From TCRP Report 166, the value of premium transit service is $6–$33 per trip.
- If, in the LGA case, AirTrain is more reliable than bus by 15 minutes, then the value of reliability is $6 to $17 per trip (this excludes other premium transit attributes).

Additive constants for the presence of AirTrain in the range of $6 to $33 were determined to be reasonable. Because airport trips are generally valued higher than urban transit trips, the study team recommends the higher end of this range. However, since only a portion of the transit trip is being improved, the study team does not recommend going with the *highest* value. This information was used as background information for the study team's next step.

Derivation of AirTrain Constant

To determine the AirTrain constant, the study team posited the following: "If travel times and costs were exactly equal, what percentage of people would choose subway-AirTrain over subway-bus?" The same question was asked for rail-AirTrain and rail-bus. Research shows that people tend to have a preference for "premium transit" options (Ben-Akiva and Morikawa 2002, Outwater, et al. 2014). It is likely that more people would choose the option to connect to a train rather than a bus; however, if travel times and costs are exactly equal, it is also likely that some portion would still choose the bus.

The study team tested a range of splits from 60 percent AirTrain (40 percent bus) to 75 percent AirTrain (25 percent bus), therefore resulting in a range of reasonable AirTrain constant candidates (Table 25). To calculate a constant for each split, the study team set times, costs, and availabilities equal for subway-AirTrain and subway-bus then ran forecasts iteratively, calibrating the AirTrain constant until the (hypothetical) forecast resulted in the pre-set split between AirTrain and bus.

Sensitivity of AirTrain Constant Value

Table 25 shows the variation of AirTrain constants and values based on the percentage of travelers who would choose AirTrain over bus if AirTrain and bus times and costs were the same. The resulting AirTrain constants assign a value of between $9.61 and $26.03 to the addition of AirTrain to the transit path. This finding aligned with the range found in the study team's comparisons to other studies.

TABLE 25: SENSITIVITY OF AIRTRAIN CONSTANT VALUE

% AirTrain vs. Bus if equal times/costs	60%	65%	70%	75%
AirTrain Constant	0.405	0.619	0.847	1.099
Value of AirTrain Constant	$9.61	$14.66	$20.07	$26.03

SOURCE: RSG.

Final AirTrain Constant

The study team's review of the value of premium transit established a range of $6 to $33 per trip for including the AirTrain as a part of the subway or rail transit path. The sensitivity analysis by the study team resulted in a similar range with values from $9 to $26. As stated above, the study team believes the constant to be toward the higher end of the range based on literature review of similar studies, but not at the very top of the range. The study team chose to use a value of $26.03 for the AirTrain constant and added this value to the subway and LIRR constants for the AirTrain mode options (Table 19).

AirTrain Constant for Automobile Access to Willets Point

The study team anticipated the constant for AirTrain on taxi and drop-off trips to Willets Point would be negative. This expectation was based on the fact that breaking up an automobile trip with a transfer to AirTrain would not be preferred compared to the current alternative of getting dropped off directly at the terminal. Unlike premium transit, comparable literature that would reveal the value of the difference between these two options does not exist.

Considering this, the study team chose the automobile AirTrain shift constant so that it would match the taxi/AirTrain share produced by the Port Authority model. The study team then applied that constant to both drop-off and taxi at AirTrain, assuming the same disutility for the transfer to AirTrain regardless of primary mode. The resulting shift used in the model was -1.5 (Table 19). This produced a small overall share of nonrail access AirTrain passengers—symbolizing that this passenger segment may exist. However, this part of the forecast should be taken as more uncertain than the AirTrain with rail forecasts.

6.0 ESTIMATED MODEL RESULTS

This chapter details the results of the estimated model. The results are shown as air passenger ground access counts and mode shares. All counts are bidirectional, counting air passengers traveling to and from LGA on an average day, except where annual counts are noted. Results are presented for 2026 and 2031.

6.1 FORECAST (BY YEAR)

Table 26 summarizes the forecasted AirTrain mode shares in the two scenario years: 2026 and 2031. The aggregate share of passengers traveling to LGA by rail and AirTrain is expected to be 10.1 percent in 2026, with an additional 1.6 percent expected to connect to the AirTrain by auto modes for a total of 11.7 percent. In 2031, AirTrain with rail share is forecast to be 10.4 percent, with a total AirTrain share of 12.0 percent.

TABLE 26: AIRTRAIN FORECASTED AIR PASSENGER GROUND ACCESS SHARES, BY YEAR

Category	2026	2031
Subway-AirTrain	4.6%	4.8%
LIRR-AirTrain	5.5%	5.6%
Taxi/TNC-AirTrain	1.1%	1.1%
Drop-Off AirTrain	0.5%	0.5%
Rail-AirTrain	10.1%	10.4%
Auto AirTrain	1.6%	1.6%
Total AirTrain	11.7%	12.0%
Total AirTrain Passengers	9,173	9,891
AirTrain Air Passengers Annual (millions)	3.3	3.6

NOTES: LIRR – Long Island Rail Road TNC – Transportation Network Company

SOURCE: RSG.

Air Passenger Forecast 2026

Table 27 presents the full forecast for 2026. Current transit modes lose the highest percentage of their base no-build scenario share to the new AirTrain modes, followed by taxi and drop-off. The current taxi mode loses the most absolute share (dropping 7.0 percent from the base no-build 2026 estimation).

TABLE 27: PASSENGER GROUND ACCESS MODE SHARES (2026 FORECAST)

Mode	Daily Air Passengers	Share	Difference from No-Build	% Difference from No-Build
Drop-Off	13,667	17.5%	-2.7%	-13.4%
Auto Park (Short Term)	4,091	5.2%	-0.2%	-3.7%
Auto Park (Long Term)	754	1.0%	0.0%	-2.4%
Auto Park (Off Airport)	1,062	1.4%	-0.1%	-7.8%
Rental Car	6,054	7.7%	0.0%	0.0%
Taxi/TNC	34,421	44.0%	-7.0%	-13.6%
Shared Ride/Van	1,987	2.5%	-0.4%	-14.1%
Hotel Shuttle	1,982	2.5%	0.0%	0.0%
NYC Airporter	737	0.9%	-0.2%	-18.1%
Bus-Only	1,899	2.4%	-0.5%	-16.3%
Subway + Bus	1,856	2.4%	-0.5%	-18.2%
LIRR + Bus	530	0.7%	-0.2%	-18.0%
Subway + AirTrain	3,628	4.6%	4.6%	–
LIRR + AirTrain	4,293	5.5%	5.5%	–
Taxi/TNC + AirTrain	869	1.1%	1.1%	–
Drop-off + AirTrain	383	0.5%	0.5%	–
Total Air Passengers	**78,212**	**100.0%**	–	–

NOTES: LIRR – Long Island Rail Road NYC – New York City TNC – Transportation Network Company

SOURCE: RSG.

Air Passenger Forecast 2031

Table 28 presents the full forecast for 2031. This forecast maintains the same characteristics as the 2026 forecast, with an expanded air passenger total. This forecast shows a higher overall AirTrain share (12 percent). This is likely due to the increase of travel times built into the future network data, simulating the expected increase in traffic congestion.

TABLE 28: PASSENGER GROUND ACCESS MODE SHARES (2031 FORECAST)

Mode	Daily Air Passengers	Share	Difference from No-Build	% Difference from No-Build
Drop-Off	14,372	17.4%	-2.8%	-13.7%
Auto Park (Short Term)	4,306	5.2%	-0.2%	-3.8%
Auto Park (Long Term)	794	1.0%	0.0%	-2.4%
Auto Park (Off Airport)	1,116	1.4%	-0.1%	-8.1%
Rental Car	6,379	7.7%	0.0%	0.0%
Taxi/TNC	36,016	43.7%	-7.0%	-13.9%
Shared Ride/Van	2,060	2.5%	-0.4%	-14.4%
Hotel Shuttle	2,089	2.5%	0.0%	0.0%
NYC Airporter	774	0.9%	-0.2%	-18.6%
Bus-Only	2,055	2.5%	-0.5%	-16.8%
Subway + Bus	1,996	2.4%	-0.6%	-18.7%
LIRR + Bus	567	0.7%	-0.2%	-18.4%
Subway + AirTrain	3,918	4.8%	4.8%	–
LIRR + AirTrain	4,628	5.6%	5.6%	–
Taxi/TNC + AirTrain	934	1.1%	1.1%	–
Drop-off + AirTrain	411	0.5%	0.5%	–
Total Air Passengers	**82,415**	**100.0%**	**–**	**–**

NOTES: LIRR – Long Island Rail Road NYC – New York City TNC – Transportation Network Company

SOURCE: RSG.

6.2 COST ELASTICITY

Table 29 shows the 2026 AirTrain with rail shares (subway + AirTrain and LIRR + AirTrain) when the combined fare (including the sum of the $5 AirTrain fare plus any LIRR fare or subway fare) is varied up or down by 10 percent. A 10 percent increase in fare leads to a 3.6 percent decrease in AirTrain with rail share, implying an elasticity of -0.36. This means that the rail-AirTrain service is relatively price inelastic (elasticities with an absolute value of less than 1 are inelastic, meaning changes in fares do not appreciably lower demand relative to cost increases and therefore revenues are increased).

TABLE 29: AIRTRAIN WITH RAIL SHARES (2026), VARYING THE COMBINED FARE BY 10 PERCENT

Mode	90% of Cost	100% of Cost	110% of Cost
Subway-AirTrain	4.8%	4.6%	4.5%
LIRR-AirTrain	5.8%	5.5%	5.2%
AirTrain via Rail	10.5%	10.1%	9.8%

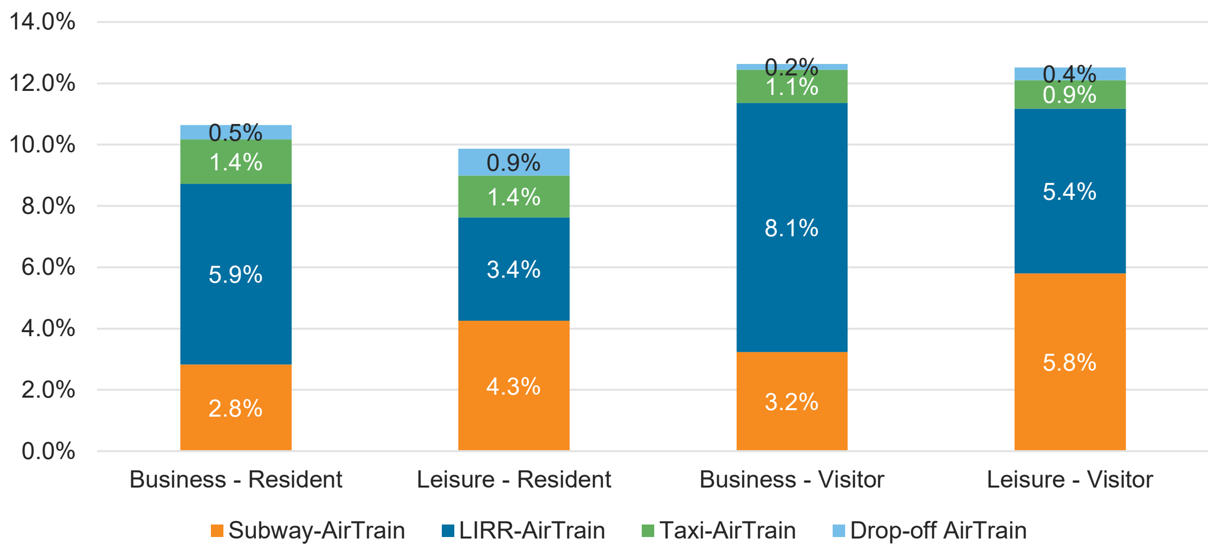
NOTE: LIRR – Long Island Rail Road

SOURCE: RSG.

6.3 PURPOSE

Figure 7 shows AirTrain mode shares sorted by purpose. Visitors have a higher AirTrain share than residents. Further, business travelers are more likely to use LIRR, and residents are more likely to use pickup/drop-off at AirTrain. Visitors (both leisure and business) are more cost sensitive than residents, so it might be expected that they would be drawn to cheaper modes like non-AirTrain transit. However, visitors are also more likely to go to areas better served by transit than residents, which explains visitors' higher AirTrain share.

FIGURE 7: AIRTRAIN SHARES, BY PURPOSE SEGMENT (2026 FORECAST)



NOTE: LIRR – Long Island Rail Road

SOURCE: RSG.

Business share is higher than leisure share because business travelers are more likely to travel to/from transit-accessible zones. When splitting into Manhattan and other geographies, Table 30 shows that leisure travelers have a slightly higher share to/from Manhattan and that leisure travelers have a slightly higher share to/from all Non-Manhattan destinations. However, Table 31 shows that more business travelers go to Manhattan, which has relatively better transit to LGA (54 percent of business travelers go to Manhattan, while only 45.9 percent of leisure travelers go to Manhattan) resulting in an overall higher business traveler share.

TABLE 30: RAIL-AIRTRAIN SHARE TO MANHATTAN AND OTHER DESTINATIONS

	Business	Leisure	All
Manhattan	15.2%	15.3%	15.3%
Not Manhattan	5.2%	5.3%	5.3%
Total	**10.6%**	**9.9%**	**10.1%**

SOURCE: RSG.

TABLE 31: PERCENTAGE OF TRIPS TO MANHATTAN AND OTHER DESTINATIONS

	Business	Leisure	All
Manhattan	54.0%	45.9%	48.3%
Not Manhattan	46.0%	54.1%	51.7%
Total	**100.0%**	**100.0%**	**100.0%**

SOURCE: RSG.

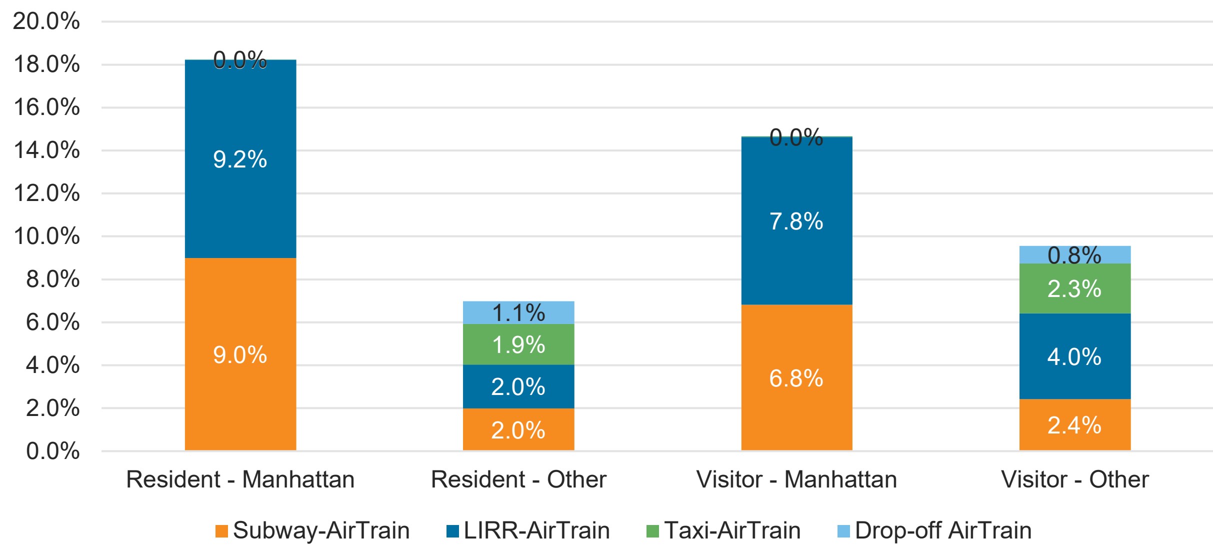
6.4 LOCATION

This section explores the 2026 AirTrain forecast by location of trip ends in the New York City region.

Manhattan Versus Other

As demonstrated in Section 3.2, one would expect a much higher share of AirTrain among those traveling to and from Manhattan compared to those traveling to other points. Figure 8 and Table 32 show the results of the 2026 forecast sorted by location, with Manhattan seeing a higher share than other regions, particularly among residents.

FIGURE 8: AIRTRAIN SHARES, BY LOCATION SEGMENT (2026 FORECAST)



NOTE: LIRR – Long Island Rail Road

SOURCE: RSG.

TABLE 32: AIRTRAIN SHARES, BY MANHATTAN ORIGIN VS. ALL OTHER ORIGINS

Mode	Manhattan	Other	Total
Subway-AirTrain	7.2%	2.2%	4.6%
LIRR-AirTrain	8.1%	3.1%	5.5%
Taxi/TNC-AirTrain	0.0%	2.1%	1.1%
Drop-off AirTrain	0.0%	0.9%	0.5%
Rail-AirTrain	15.3%	5.3%	10.1%
Drop-off AirTrain	0.0%	3.1%	1.6%
Total	**15.3%**	**8.4%**	**11.7%**

NOTE: LIRR – Long Island Rail Road TNC – Transportation Network Company

SOURCE: RSG.

Origin and Destination Zone

Table 33 shows the AirTrain share by region in the estimated model and Table 34 shows the enumerated totals. The study team noted the following:

- The highest shares are from Manhattan.
- The estimated model has much higher drop-off shares than rail shares from East Queens and Long Island (this makes geographic sense, as people coming from points east should have a fast and easy drop-off/pickup ability at Willets Point).
- The rail share from Staten Island is higher than might be expected, at 8.6 percent. The enumerated totals, in Table 34, show this to only be 15 passengers, so it does not have a large effect on the overall share.

TABLE 33: AIRTRAIN SHARE IN STUDY TEAM MNL MODEL, BY ORIGIN/DESTINATION REGION (2026)

Zone	Study Team AirTrain Rail Share	Study Team AirTrain Drop-off Share	Study Team Total AirTrain
Manhattan Lower	16.1%	0.0%	16.1%
Manhattan Midtown Walking Access	17.0%	0.0%	17.0%
Manhattan Midtown Other	16.6%	0.0%	16.7%
Manhattan Upper East/West Side	12.8%	0.0%	12.8%
Manhattan North	9.2%	0.0%	9.3%
Queens North-West	3.2%	0.0%	3.3%
Queens West Walking	7.7%	0.4%	8.1%
Queens West Other	5.2%	4.3%	9.5%
Queens East Walking	2.8%	8.1%	10.9%
Queens East Other	2.0%	7.5%	9.6%
Brooklyn East	10.5%	2.5%	13.0%
Brooklyn West	12.6%	0.4%	13.0%
The Bronx	4.6%	1.7%	6.3%
Staten Island	8.6%	0.0%	8.6%
Long Island	2.6%	6.3%	8.9%
Upstate New York/Connecticut	2.5%	3.0%	5.5%
New Jersey/Pennsylvania	5.3%	0.0%	5.4%
Total	**10.1%**	**1.6%**	**11.7%**

SOURCE: RSG.

1 The 2026 Port Authority numbers were interpolated by Study Team between 2025 and 2045 forecasts

TABLE 34: STUDY TEAM 2026 FORECAST ENUMERATED, BY ORIGIN ZONE

	Study Team Candidate Trips	Study Team AirTrain/Rail Trips	Study Team AirTrain Drop-off Trips	Study Team Total AirTrain Trips
Manhattan Lower	7,244	1,163	3	1,166
Manhattan Midtown Walking Access	14,451	2,453	6	2,459
Manhattan Midtown Other	5,720	951	2	953
Manhattan Upper East/West Side	7,100	908	3	910
Manhattan North	3,242	299	1	300
Queens North-West	1,410	46	1	46
Queens West Walking	1,850	143	7	149
Queens West Other	703	36	30	67
Queens East Walking	775	22	63	85
Queens East Other	3,516	71	265	336
Brooklyn East	1,062	111	26	138
Brooklyn West	7,576	954	30	984
The Bronx	3,557	162	60	223
Staten Island	175	15	0	15
Long Island	7,449	193	469	662
Upstate NY/CT	9,381	233	285	519
NJ/PA	3,000	160	1	161
Total	**78,212**	**7,921**	**1,252**	**9,173**

NOTES: CT – Connecticut NJ – New Jersey NY – New York PA – Pennsylvania

SOURCE: RSG.

Table 35 and Table 36 show market sizes and shares for all four AirTrain feeder modes from each zone. These tables show a higher commuter rail/AirTrain share from Long Island, Upstate New York/Connecticut and New Jersey/Pennsylvania, all expected results.

TABLE 35: AIRTRAIN RIDERS FROM ORIGIN ZONE, BY FEEDER MODE

	Subway-AirTrain	LIRR-AirTrain	Taxi-AirTrain	Drop-off-AirTrain	Market Size
Manhattan Lower	530	633	2	1	7,244
Manhattan Midtown Walking Access	1,110	1,343	5	1	14,451
Manhattan Midtown Other	456	495	2	0	5,720
Manhattan Upper East/West Side	491	417	2	1	7,100
Manhattan North	141	158	1	0	3,242
Queens North-West	18	27	1	0	1,410
Queens West Walking	102	41	5	1	1,850
Queens West Other	25	11	24	6	703
Queens East Walking	7	15	51	12	775
Queens East Other	23	49	201	64	3,516
Brooklyn East	69	42	18	9	1,062
Brooklyn West	506	448	20	10	7,576
The Bronx	56	106	44	16	3,557
Staten Island	12	3	0	0	175
Long Island	0	193	297	172	7,449
Upstate NY/CT	25	208	196	89	9,381
NJ/PA	57	103	0	0	3,000

NOTES: CT – Connecticut NJ – New Jersey NY – New York PA – Pennsylvania

SOURCE: RSG.

TABLE 36: AIRTRAIN SHARE FROM ORIGIN ZONE, BY FEEDER MODE

	Subway-AirTrain	LIRR-AirTrain	Taxi-AirTrain	Drop-off-AirTrain	Market Size
Manhattan Lower	7.3%	8.7%	0.0%	0.0%	7,244
Manhattan Midtown Walking Access	7.7%	9.3%	0.0%	0.0%	14,451
Manhattan Midtown Other	8.0%	8.7%	0.0%	0.0%	5,720
Manhattan Upper East/West Side	6.9%	5.9%	0.0%	0.0%	7,100
Manhattan North	4.4%	4.9%	0.0%	0.0%	3,242
Queens North-West	1.3%	1.9%	0.0%	0.0%	1,410
Queens West Walking	5.5%	2.2%	0.3%	0.1%	1,850
Queens West Other	3.5%	1.6%	3.4%	0.9%	703
Queens East Walking	0.9%	2.0%	6.6%	1.5%	775
Queens East Other	0.6%	1.4%	5.7%	1.8%	3,516
Brooklyn East	6.5%	4.0%	1.7%	0.8%	1,062
Brooklyn West	6.7%	5.9%	0.3%	0.1%	7,576
The Bronx	1.6%	3.0%	1.2%	0.5%	3,557
Staten Island	6.6%	1.9%	0.0%	0.0%	175
Long Island	0.0%	2.6%	4.0%	2.3%	7,449
Upstate NY/CT	0.3%	2.2%	2.1%	1.0%	9,381
NJ/PA	1.9%	3.4%	0.0%	0.0%	3,000

NOTES: CT – Connecticut NJ – New Jersey NY – New York PA – Pennsylvania

SOURCE: RSG.

6.5 RESIDENT AND VISITOR ANALYSIS

The weighted dataset used to estimate the LGA models comprises 33 percent residents and 67 percent visitors, with most of the visitors visiting New York for leisure purposes. This is unsurprising given that New York City is a large tourist destination. As shown in Table 37, only 28 percent of subway/AirTrain passengers in 2026 would be residents and 24 percent of LIRR/AirTrain passengers would be residents. This suggests that visitors are more likely to use the AirTrain than residents but not by extreme amounts, as there are simply more visitors than residents traveling to and from LGA. The model has a negative shift on visitors for transit modes, meaning that all else being equal, visitors would be less likely to use the AirTrain. However, visitors are more likely to be going to destinations better served by the AirTrain (e.g., Manhattan) resulting in a slightly higher share. Table 38 shows that total rail (subway + LIRR) AirTrain share for visitors is 11.2 percent while it is 7.9 percent for residents.

TABLE 37: FORECASTED AIR PASSENGERS, BY MODE AND RESIDENT STATUS (2026)

2026 Forecast	Resident	Visitor	Total	% Residents	% Visitors
Drop-Off	5,994	7,673	13,667	44%	56%
Auto Park (Short Term)	3,453	637	4,091	84%	16%
Auto Park (Long Term)	754	0	754	100%	0%
Auto Park (Off Airport)	1,062	0	1,062	100%	0%
Rental Car	0	6,054	6,054	0%	100%
Taxi/TNC	9,631	24,790	34,421	28%	72%
Shared Ride/Van	364	1,622	1,987	18%	82%
Hotel Shuttle	155	1,827	1,982	8%	92%
NYC Airporter	243	493	737	33%	67%
Bus-Only	946	953	1,899	50%	50%
Subway + Bus	589	1,267	1,856	32%	68%
LIRR + Bus	83	447	530	16%	84%
Subway + AirTrain	1,009	2,619	3,628	28%	72%
LIRR + AirTrain	1,035	3,259	4,293	24%	76%
Taxi/TNC + AirTrain	358	511	869	41%	59%
Drop-Off + AirTrain	201	182	383	53%	47%
Total	**25,878**	**52,334**	**78,212**	**33%**	**67%**

NOTES: LIRR – Long Island Rail Road NYC – New York City TNC – Transportation Network Company

SOURCE: RSG.

TABLE 38: AIR PASSENGER MODE SHARE, BY RESIDENT STATUS (2026)

2026 Forecast	Resident	Visitor	Total
Drop-Off	23.2%	14.7%	17.5%
Auto Park (Short Term)	13.3%	1.2%	5.2%
Auto Park (Long Term)	2.9%	0.0%	1.0%
Auto Park (Off Airport)	4.1%	0.0%	1.4%
Rental Car	0.0%	11.6%	7.7%
Taxi/TNC	37.2%	47.4%	44.0%
Shared Ride/Van	1.4%	3.1%	2.5%
Hotel Shuttle	0.6%	3.5%	2.5%
NYC Airporter	0.9%	0.9%	0.9%
Bus-Only	3.7%	1.8%	2.4%
Subway + Bus	2.3%	2.4%	2.4%
LIRR + Bus	0.3%	0.9%	0.7%
Subway + AirTrain	3.9%	5.0%	4.6%
LIRR + AirTrain	4.0%	6.2%	5.5%
Taxi/TNC + AirTrain	1.4%	1.0%	1.1%
Drop-Off + AirTrain	0.8%	0.3%	0.5%

NOTES: LIRR – Long Island Rail Road NYC – New York City TNC – Transportation Network Company

SOURCE: RSG.

6.6 SENSITIVITY ANALYSIS

Sensitivity of AirTrain Constant

The study team tested model applications with a range of AirTrain constants used for LIRR-AirTrain and subway-AirTrain trips. A range of constants was tested between 0.405 and 1.386. These values translate to valuations of the AirTrain service as a connector to LGA over bus of $9.61 to $32.84 for residents and $10.34 to $35.34 for visitors. In terms of minutes of travel time, this range translates to being worth 9 to 29 minutes for residents and 19 to 66 minutes for visitors. These cost values also fall within the range of expected per-trip values (discussed in Chapter 5.3). The range is consistent with what the study team's model shows for residents, but for visitors the model's values are higher than that range.

The applications of the range of AirTrain constants show a high sensitivity to this value with the overall Rail-AirTrain share ranging from 5.6 percent to 12.8 percent.

TABLE 39: SENSITIVITY AROUND RAIL-AIRTRAIN CONSTANT

AirTrain Constant	0.405	0.619	0.847	1.099	1.386
Cost Value of AirTrain Constant—Resident	-$9.61	-$14.66	-$20.07	-$26.03	-$32.84
Cost Value of AirTrain Constant—Visitor	-$10.34	-$15.78	-$21.60	-$28.01	-$35.34
Time Value of AirTrain Constant—Resident	-9	-13	-18	-23	-29
Time Value of AirTrain Constant—Visitor	-19	-29	-40	-52	-66
Subway-AirTrain Mode Share	2.6%	3.1%	3.8%	4.6%	5.8%
LIRR-AirTrain Mode Share	3.0%	3.6%	4.4%	5.5%	6.9%
Taxi/TNC-AirTrain Mode Share	1.1%	1.1%	1.1%	1.1%	1.1%
Drop-off-AirTrain Mode Share	0.5%	0.5%	0.5%	0.5%	0.5%
Rail-AirTrain Total Share	**5.6%**	**6.7%**	**8.2%**	**10.1%**	**12.8%**
Auto-AirTrain Total Share	1.6%	1.6%	1.6%	1.6%	1.6%
AirTrain Total Share	**7.2%**	**8.3%**	**9.8%**	**11.7%**	**14.4%**

NOTES: LIRR – Long Island Rail Road TNC – Transportation Network Company

SOURCE: RSG.

Sensitivity of Value of Travel Time

The study team recognizes that the VTTs estimated for this study are not considered standard by segment when compared to some of the airport literature. To determine the effect of varying the VTT in the model, the study team tested a range of VTTs to see how much difference they make in this forecast. The study team re-estimated the models with asserted coefficients to change the VTT, including one with the same VTT as asserted by the Port Authority, which has business travelers at $75/hr and leisure travelers at $50/hr.

Changing VTT does have an effect and increases AirTrain share by about 1 percent in absolute value (from 10 percent to 11 percent). That said, the model remains constant driven, as mode preference—irrespective of time and cost—remains a primary driver of mode choice.

To conduct sensitivity tests on VTT, the study team held the resident cost coefficient at its estimated value and fixed the other time and cost coefficients (including the business and visitor cost and time multipliers) to set the desired values of time. The models were then re-estimated with these fixed constants and calibrated to the base-case shares before application. The re-estimation and calibration resulted in changes to the alternative specific constants, giving them stronger or weaker influence, depending on the mode and the VTT changes.

- As VTT increased, LIRR-AirTrain share increased.
- As VTT increased, subway-AirTrain share decreased.
- Overall, raising VTT caused AirTrain share to increase due to individuals with higher VTT choosing the LIRR-AirTrain mode more often.

TABLE 40: AIRTRAIN SHARES FROM VARYING THE ESTIMATED VTT

	Original VTT 20% Higher	Original VTT 10% Higher	Estimated Model	Original VTT 10% Lower	Original VTT 20% Lower
Resident VTT	$81.21	$74.45	$67.68	$60.91	$54.14
Visitor VTT	$38.67	$35.44	$32.22	$29.00	$25.78
Subway-AirTrain Share	4.5%	4.6%	4.6%	4.7%	4.8%
LIRR-AirTrain Share	6.0%	5.7%	5.5%	5.3%	5.0%
Taxi-AirTrain Share	1.1%	1.1%	1.1%	1.1%	1.1%
Drop-off-AirTrain Share	0.5%	0.5%	0.5%	0.5%	0.5%
AirTrain Rail Share	10.4%	10.3%	10.1%	10.0%	9.8%
AirTrain Auto Share	1.6%	1.6%	1.6%	1.6%	1.6%
AirTrain Share	12.0%	11.9%	11.7%	11.6%	11.5%

NOTES: LIRR – Long Island Rail Road VTT – Value of Travel Time

SOURCE: RSG.

Sensitivity to AirTrain Travel Time

The study team recognizes that the actual subway+AirTrain and LIRR+AirTrain travel time may be different than the time estimates used in the study team's model and in the Port Authority model. Sensitivity analysis from the 2026 model runs (Table 41) shows that the model is fairly sensitive to subway+AirTrain and LIRR+AirTrain travel time—with an elasticity with respect to travel time of -1.3. As shown in Table 41, the sensitivity analysis shows that the model performs as expected; if subway+AirTrain and LIRR+AirTrain travel time is 10 perecent faster, a higher share of passengers would occur (approximately 1.63 percent share increase); conversely, if subway+AirTrain and LIRR+AirTrain travel time is 10 perecent slower, a lower share of passengers would occur (2.5 percent decrease).

TABLE 41: AIRTRAIN SENSITIVITY TO PERCENTAGE CHANGES IN AIRTRAIN RAIL TIME

AirTrain Value	90% time	Base (100% Time)	110% time
Subway-AirTrain	5.3%	4.6%	4.0%
LIRR-AirTrain	6.4%	5.5%	4.8%
AirTrain via Rail	11.7%	10.1%	8.8%
AirTrain via Auto	1.6%	1.6%	1.6%
Total AirTrain	**13.3%**	**11.7%**	**10.4%**

NOTE: LIRR – Long Island Rail Road

SOURCE: RSG.

6.7 CONSIDERATION OF CONGESTION PRICING

The study team recognizes that congestion pricing will likely be implemented in New York City, potentially starting in 2021, before the earliest AirTrain forecast year of 2026. However, congestion pricing was not considered in the development of the forecasts in this report because of many uncertainties in how congestion pricing would be implemented. The Port Authority also did not include congestion pricing in the development of their forecasts.

While a congestion pricing plan could affect costs of driving by personal automobile or by hired automobiles (taxi/TNC), the details of the congestion pricing plan have yet to be worked out, making the exact impact on travel between Manhattan and LaGuardia hard to forecast. Recommendations include both variable pricing by time of day and a flat fee regardless of time of day. It is still unclear if taxi/TNCs will be charged under the same plan as personal automobiles or if they will have a different fee structure. Furthermore, even the exact geography of where congestion pricing will take place in Manhattan remains uncertain.

Another interesting factor relating directly to LGA travel is that costs may not increase for certain automobile trips that already pay a toll to get to LaGuardia. For example, travel through the Queens-Midtown tunnel has toll costs that would likely count (at least in part) as congestion charges. The study team expects the same for other currently tolled bridges and tunnels.

While congestion pricing is not included in the model, it is possible that its implementation could affect automobile travel between Manhattan and LaGuardia in both direct and indirect ways. Directly, an increase in cost for private automobile and taxi/TNC trips would likely decrease share on those trips and increase share on competing modes, including transit. Indirectly, congestion pricing could lower automobile ownership in Manhattan, which could lead to a decrease in private automobile trips between Manhattan and LaGuardia. Decreased ownership could lead to a higher reliance on taxi/TNC alongside of a higher reliance on transit. Conversely, if congestion pricing does succeed in reducing congestion, it could make an automobile trip between Manhattan and LaGuardia faster and more reliable and thus more attractive. Because people traveling to or from the airport tend to have less cost sensitivity, trips to or from the airport may be among the types of trips where people are most likely to be willing to pay the congestion charge.

7.0 COMPARISON OF ESTIMATED MODEL AND PORT AUTHORITY FORECASTS

This chapter compares the estimated model forecasts and the Port Authority forecasts for the years 2026, 2031. Because the Port Authority only produced forecasts for 2025 and 2045, the study team interpolated the 2026 and 2031 forecasts by using a straight-line method between the 2025 and 2045 forecasts. The numbers for 2026 and 2031 were calculated as follows: 2025 Value + (2045 Value – 2025 Value) * (Year – 2025) / 20.

7.1 AIR PASSENGERS

Table 42 compares the estimated model forecast for air passengers to the Port Authority forecast for air passengers. The estimated model forecasts 3.3 million air passengers will use the AirTrain in 2026, compared to the Port Authority's forecast of 4.8 million.

TABLE 42: AIR PASSENGER FORECAST COMPARISONS

	Study Team 2026	Study Team 2031	Port Authority 2026*	Port Authority 2031*
Subway-AirTrain	4.6%	4.8%	6.4%	6.6%
LIRR-AirTrain	5.5%	5.6%	7.8%	8.1%
Taxi/TNC-AirTrain	1.1%	1.1%	1.1%	1.1%
Drop-Off AirTrain	0.5%	0.5%	1.4%	1.3%
Rail-AirTrain	10.1%	10.4%	14.3%	14.7%
Auto-AirTrain	1.6%	1.6%	2.5%	2.4%
Total AirTrain	11.7%	12.0%	16.8%	17.1%
AirTrain Passengers	9,173	9,891	13,167	14,173
AirTrain Air Passengers Annual (millions)	3.3	3.6	4.8	5.2

NOTES: LIRR – Long Island Rail Road TNC – Transportation Network Company

SOURCE: RSG.

7.2 EMPLOYEES

The study team did not develop a forecast for employees and instead uses the employee forecast developed by the Port Authority. Table 43 shows the Port Authority employee forecast for 2026 and 2031. These numbers were interpolated by the study team using a straight line between the 2025 and 2045 forecasts provided by the Port Authority. Table 44 summarizes the forecasted employee ridership on the AirTrain and shows 3,945 daily trips and 1.4 million annual trips in 2026.

TABLE 43: UPDATED PORT AUTHORITY EMPLOYEE FORECAST

Mode	Count 2026[1]	Count 2031[1]	Mode Share 2026[1]	Mode Share 2031[1]
Auto Driver (Park at Employee/P10 lot)	4,245	4,409	29.1%	29.1%
Auto Passenger (Park at Employee/P10 lot)	47	49	0.3%	0.3%
Auto Driver (Park Elsewhere)	1,665	1,729	11.4%	11.4%
Auto Passenger (Park Elsewhere)	84	87	0.6%	0.6%
Taxi/TNC	109	115	0.7%	0.8%
NYC Airporter	1	1	0.0%	0.0%
Bus	2,436	2,543	16.7%	16.8%
Subway Plus Bus	1,801	1,858	12.4%	12.3%
LIRR + Bus/Taxi	99	98	0.7%	0.6%
Nonmotorized	146	154	1.0%	1.0%
Auto Driver (Park at Willets Point)	2,265	2,355	15.5%	15.6%
Auto Passenger (Park at Willets Point)	48	50	0.3%	0.3%
Taxi/TNC to Willets Point	47	47	0.3%	0.3%
Subway to AirTrain	777	797	5.3%	5.3%
LIRR to AirTrain	807	849	5.5%	5.6%

NOTES: LIRR – Long Island Rail Road NYC – New York City TNC – Transportation Network Company

1 - The study team interpolated the PANYNJ 2026 and 2031 forecasts between 2025 and 2045.

SOURCE: RSG.

TABLE 44: UPDATED PORT AUTHORITY EMPLOYEE FORECAST SUMMARY

	Port Authority 2026[1]	Port Authority 2031[1]
Rail-AirTrain	10.8%	10.8%
Auto AirTrain	16.1%	16.1%
Total AirTrain	27.0%	27.0%
AirTrain Daily Employees	3,945	4,098
AirTrain Annual Employees (millions)	1.4	1.5

1 - The study team interpolated the PANYNJ 2026 and 2031 forecasts between 2025 and 2045.

SOURCE: RSG.

7.3 TOTAL AIRTRAIN TRIPS

Table 45 and Table 46 compare total AirTrain riders (on a daily and annual basis), including both air passengers and employees. The estimated model forecast predicts 13,117 daily trips and 4.8 million annual trips on the AirTrain in 2026. The Port Authority predicts 17,112 daily trips and 6.2 million annual trips in 2026.

TABLE 45: FORECAST COMPARISON, AVERAGE DAILY AIRTRAIN PASSENGERS

Daily Totals	Study Team 2026	Study Team 2031	Port Authority 2026[1]	Port Authority 2031[1]
AirTrain Air Passengers	9,173	9,891	13,167	14,173
AirTrain Employees	3,945	4,098	3,945	4,098
AirTrain Total	13,117	13,989	17,112	18,271

1 - The study team interpolated the PANYNJ 2026 and 2031 forecasts between 2025 and 2045.

SOURCE: RSG.

TABLE 46: FORECAST COMPARISON, ANNUAL AIRTRAIN PASSENGERS

Annual Totals	Study Team 2026	Study Team 2031	Port Authority 2026[1]	Port Authority 2031[1]
AirTrain Air Passengers (millions)	3.3	3.6	4.8	5.1
AirTrain Employees (millions)	1.4	1.5	1.4	1.5
AirTrain Total (millions)	4.8	5.1	6.2	6.7

1 - The study team interpolated the PANYNJ 2026 and 2031 forecasts between 2025 and 2045.

SOURCE: RSG.

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