RSG
the science of insight

Massport

2022 LOGAN AIR PASSENGER GROUND ACCESS SURVEY

March 7, 2023

55 Railroad Row
White River Junction, VT 05001
802.295.4999
www.rsginc.com

CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

1.1 BACKGROUND AND PURPOSE

The following sections provide an overview of Boston Logan International Airport (to be referenced as the Airport or Logan Airport), a domestic and international airport located in East Boston, Massachusetts.

Overview of Logan Airport

The Massachusetts Port Authority (to be referenced as Massport or the Authority) owns and operates Logan Airport, which served a peak of 42.5 million passengers in 2019 and as of Summer of 2022 had recovered to 85% of its pre-COVID-19 peak activity in December 2019. As New England's largest airport, Logan Airport is a key transportation link for the region and generator of rail, bus, and automobile trips from across the region. To accommodate this demand, Massport works to continuously update its ground access plans and trip reduction strategy.

The Airport is served by two routes of the Massachusetts Bay Transportation Authority's (MBTA) rapid transit system: the Silver Line SL1 bus route brings passengers directly to Airport terminals from Boston's South Station and South Boston Waterfront and the Blue Line rapid transit line serves Airport Station, connected to the terminals by shuttle buses. Other ground transportation options serving Logan Airport include high-occupancy vehicle (HOV) modes like Massport's Logan Express bus service, scheduled buses and vans, water transportation via the MBTA ferry system and commercial water taxis, courtesy shuttle buses, and charter buses. The Airport is also served by private automobiles, taxis, rental cars, ride apps (Uber and Lyft), limos, and private vans. Short-term and long-term parking, including the Central Garage, Terminal B Garage, and Economy Garage, is also provided by Massport for automobile users, in addition to off-airport options operated by third parties.

Massport prioritizes a shift towards more sustainable modes of transportation and away from drop-off/pickup modes—primarily private vehicles and some taxi, limo, and ride app trips—as these options can often generate up to four trips per airport passenger when drivers need to travel to pick-up locations and to another destination from their drop-off location, also known as "deadhead" trips. A more detailed list of strategies in place to aid in trip reduction will be presented later in this report, but notable initiatives include centralized ride-app pick-up in the Central Parking Garage to reduce deadhead trips and free service on the MBTA Silver Line SL1 and the Back Bay Logan Express buses departing from Logan Airport.

1.2 CURRENT GROUND ACCESS INITIATIVES

Massport employs a wide range of strategies to reach its trip reduction and sustainability goals. A selection of these initiatives is described below.

Improvements to Public Transit Access

The Authority is working with the MBTA to improve public transit service from the Airport, including:

- Massport is in the process of purchasing new dual-mode buses for service on the MBTA Silver Line SL1 and is committed to working with the MBTA to enhance service and expand service hours where possible.
- Massport also financially supports the MBTA Silver Line SL1 through subsidies for service to the airport. In addition to helping offset operating costs, this allows free boarding at all four airport terminals to provide free inbound service to South Station where passengers can connect to MBTA's rapid transit network.

Improvements to Logan Express

Massport runs express bus services between multiple Boston suburbs, Back Bay, and the Airport's terminals. Recent and upcoming changes include:

- Reinstituting Back Bay service. During the COVID-19 pandemic, service between Logan Airport and Boston's Back Bay—the only Logan Express service serving the urban area of Boston—was discontinued. This service was reintroduced in October 2022.
- Online ticketing is available for this service and for a limited time, buying online includes a 25% discount. The base price of tickets between Logan Airport and any of the four existing stations besides Back Bay is $12 one-way for an adult and the current promotion brings the price down to $9.
- "Ticket to Skip" expedited security has been introduced for passengers on Logan Express's buses running from Back Bay. Massport continues to evaluate the impact of Ticket to Skip and is exploring other improvements to customer convenience and service for all Logan Express services to grow ridership.

Improvements to Ride App Access and Pricing

As ride apps such as Uber and Lyft continue to grow in popularity, Massport regularly coordinates with rideshare companies on their current operations and pricing to help mitigate their impact. These mitigation efforts include:

- Consolidating ride app operations at dedicated areas. This removes vehicles from the terminal curb to reduce congestion. In addition, centralized operations promote vehicle

"rematch," where drivers making a drop-off are more easily able to pick-up passengers. This results in fewer "deadhead" trips to or from Logan Airport.

Parking Rates and Reservation System

Logan Airport has implemented two parking reservation systems allowing passengers to ensure a spot is available while optimizing the use of parking spaces close to terminal entrances. Parking at the airport reduces the number of trips generated by each group of air passengers to two, compared to pick-up and drop-off which requires four vehicle trips—with vehicles needing to travel from the airport after a drop-off and to the airport before a pick-up. The parking reservation system includes:

- A limited number of parking spots are available for the general public to reserve through Advance Parking Reservation. Online discounts are available on a limited basis to encourage parking over pick-up and drop-off during periods of low garage utilization.
- Logan Airport's Parking PASSport Gold program allows frequent flyers to enroll in an annual membership that provides access to dedicated areas in Central Parking and the Terminal B Garage close to terminal elevators and also for the ability to use touchless payment when exiting Logan Airport. Annual enrollment and higher parking fees apply.

Roadway and Circulation Infrastructure

In addition to the above initiatives, Massport has several capital projects underway or recently finished to improve circulation and reduce congestion on terminal roadways:

- Terminal B to C Roadways - Massport is working to reconfigure roadways around Terminals B and C to create more curb space, improve traffic flow and reduce queuing on roadways, and reduce interactions between vehicles and pedestrians and between merging vehicles.
- Terminal B to C Connector—on the airside of the terminals, Massport has constructed a connection between Terminals C and B within the sterile area, reducing the number of passengers walking through garages and along the terminal curb to transfer between the terminals.

1.3 SURVEY OBJECTIVES

The primary objectives of the 2022 survey were as follows:

- *Examine ground access mode share*. This survey is the primary means of estimating the proportion of air passengers arriving at the Airport using a variety of mode choices. In combination with other metrics, this is a fundamental tool for developing future policies.

- *Update existing data and assess changing behaviors.* Due to the absence of a ground access survey since 2019, before the ongoing COVID-19 pandemic, the effect of changing behaviors on travel patterns is not yet fully understood. Beyond the simple necessity of ensuring that up-to-date information is available, this survey allows Massport to better understand how travel patterns have changed due to public health guidance and personal attitudes as the pandemic subsides.
- *Provide information on air passenger characteristics.* The results of this survey provide a profile of air passengers—crucial given the shift in business travel generated by the pandemic—and help Massport to understand what influences passengers' mode choices.
- *Develop the Mode Choice Model and Simulator (MCMS).* The results of the Revealed and Stated Preference sections of the report will be used to build a model that predicts mode share changes in response to a set of policy variables, measuring passenger sensitivity to price and time changes, as well as other mode-specific amenities.

In comparing the results of this study with prior triennial and other ad hoc surveys, trends in ground access can be more clearly identified. This information supplies Massport with valuable insights to be used in operational and capital planning. Continue to section 1.5 for a brief summary of important results.

1.4 SUMMARY OF SURVEY ADMINISTRATION

Like the 2018 and 2019 surveys, this survey was fielded at airport terminal gates using touchscreen tablet devices.

The fielding of this survey lasted 23 days, from May 9th to May 31st, and 4,224 surveys were collected, across 437 flights. After data cleaning processes, the survey consists of 4,093 usable records.

1.5 SUMMARY OF SURVEY RESULTS

Mode	Spring 2016	Fall 2018	Spring 2019	Spring 2022	Absolute Δ '22 Vs. '19	Relative Δ '22 Vs. '19
Private Vehicle – Drop-Off	21.3%	18.4%	21.2%	25.4%	4.2%	19.8%
Private Vehicle – Parked On-Airport	11.4%	8.3%	9.3%	7.4%	-1.9%	-20.4%
Private Vehicle – Parked Off-Airport	1.8%	1.7%	1.5%	1.2%	-0.3%	-17.8%
Rental Vehicle	10.9%	13.6%	10.7%	16.2%	5.5%	51.4%
Taxicab	9.8%	5.7%	3.9%	2.8%	-1.1%	-27.9%
Ride App (Uber, Lyft)	14.4%	25.4%	29.5%	27.7%	-1.8%	-6.1%
Other Car Service/Shared Ride Van	8.1%	5.9%	5.3%	3.3%	-2.0%	-37.6%
Logan Express	5.2%	4.6%	3.8%	4.1%	0.3%	7.9%
MBTA Blue Line*	3.1%	1.9%	1.5%	1.0%	-0.5%	-34.5%
MBTA Silver Line SL1	3.3%	1.9%	1.8%	2.0%	0.2%	12.3%
Other Scheduled Bus	4.5%	2.4%	4.5%	3.7%	-0.8%	-18.0%
Hotel/Courtesy Shuttle	3.3%	3.4%	2.6%	2.5%	-0.1%	-3.8%
Charter Bus	1.5%	1.9%	2.6%	0.5%	-2.1%	-82.3%
Water Ferry/Taxi	0.2%	0.2%	0.1%	0.3%	0.2%	216.7%
Other	1.1%	2.2%	0.9%	1.9%	1.0%	108.1%

**The MBTA Blue Line was shut down during most of the survey in 2022, shuttle buses replaced train service*

TABLE 1. SUMMARY OF PRIMARY MODE CHOICES

The following is a discussion of primary mode choice and how it compares to past ground access surveys at the Airport, as shown in Table 1 above. Primary mode is defined as the mode used by passengers to arrive at the terminal (i.e., the last mode used in a passenger's trip to the airport). The results shown have been weighted following the procedure discussed in section 2.2.

The ground access mode comparison focuses on the studies conducted in Spring 2016 and Spring 2019. Seasonal changes in travel patterns and mode use limit the applicability of a direct comparison between this study and the study conducted in Fall 2018. The spring studies in 2016 and 2019 were also earlier in the year, in April, compared to May for the 2022 survey. Travel to Boston in May is influenced by college graduation season and so may have some differences from April travel, such as increased rental car usage.

The MBTA Blue Line was closed between Airport Station and downtown Boston for most of the 2022 study period for construction on the tunneled sections of the line. This reduced the share of air passengers using the Blue Line and therefore affected the shares of air passengers using other modes.

- Ride app share has nearly doubled since 2016, the first year this mode was reported, growing from 14.4% of passengers to 27.7%, but this represents a slight decrease from 2019's mode share of 29.5%.
- The mode share of taxis has declined by almost three quarters since 2016, falling from 9.8% to 2.8%.
- Private vehicle use for pick-up and drop-off has grown to represent more than a quarter of passenger trips to the airport, increasing from 21.2% in 2019 to 25.4% in 2022, a 19% increase. On-airport parking, however, has fallen from 9.3% to 7.4% across the same period, a 20% decrease. The relative growth of leisure travel is likely a significant contributor to the rise in share of private vehicle drop-off, as this report and prior reports confirm that most leisure travelers arriving by private vehicle are dropped-off.
- Logan Express ridership has grown since 2019 but has not recovered to 2016 levels. Logan Express dropped first from 5.2% in 2016 to 3.8% in 2019 but has since grown to 4.1%. Logan Express service to Back Bay was suspended during the 2022 survey period, which made this option unavailable for passengers within the City of Boston and its inner suburbs.
- Mode share for the Blue Line has continued to decline since 2016, from 3.3% in 2016 to 1.5% in 2019 and further to 1.0% in this study The Blue Line was shut down between the Airport and Downtown Boston for most of the 2022 survey period, significantly reducing the Blue Line's mode share.
- The Silver Line SL1's mode share has grown from 1.8% in 2019 to 2.0% today, but has not recovered to the 3.3% share seen in 2016.
- Rental vehicle use has grown in comparison to earlier surveys. Rental vehicle mode share dropped by a very small margin between 2016 and 2019, from 10.9% to 10.7%, but increased sharply to 16.2% in the 2022 survey. As noted above, the May timing of the 2022 survey captured more travel to Boston for college graduations, which may be linked to higher rental car usage.
- Resident and non-resident shares of air passengers have approached parity since 2016; 2016 and 2019 studies showed upwards of 60% of passengers consider Boston the "home" end of their trip, but in 2022, residents comprised only a slim majority of air passengers, at 50.7% residents and 49.3% non-residents.
- Business travel also dropped sharply compared to prior surveys, from 38.1% of travelers in 2016 and 39.6% in 2019 to just 18.8% in 2022. Changes in business travel patterns and internal regulations introduced at many companies since the beginning of the COVID-19 pandemic are likely significant factors in this decrease.

- Finally, non-resident leisure travelers were the only one of four market segments to experience growth since prior surveys. Non-resident leisure travelers increased from 18.5% in 2016 to 39.4% of air passengers in 2022. Resident leisure travel dropped somewhat from 43.4% to 39.1% across the same period, but resident business travel dropped more substantially from 18.1% to 8.5% and non-resident business travel dropped from 20.0% to 10.2%

1.6 ORGANIZATION OF THIS REPORT

The following chapter details the survey methodology, including information about questionnaire design, sampling, and weighting. Chapter 3 summarizes survey results, focusing on changes among key metrics, and Chapter 4 explores these results in further detail. Finally, Chapter 5 provides conclusions regarding survey results and recommendations for future surveys.

2.0 SURVEY METHODOLOGY

This chapter details the methodology used for the 2022 iteration of Logan Airport's Air Passenger Ground Access Survey. This includes information about the development and design of the questionnaire, sampling, administration of the survey, data cleaning, weighting, and creation of the survey database.

Some key elements of the procedure used in this study include:

- Only passengers departing from Logan Airport were surveyed, and only those sitting in the areas surrounding each gate; connecting passengers were ineligible.
- A robust and representative sampling plan of flights was created to accurately represent the flights departing from the Airport over the survey period.
- Questionnaires were designed to be self-completed on tablets connected to the internet and were distributed to all eligible passengers assembled in the gate areas surrounding selected flights. Completed questionnaires were received from most passengers before boarding and departure.
- Passengers unable to complete their survey before departing were handed a postcard with a unique link to allow them to complete the survey on their personal devices.
- Boarding counts provided by airline gate agents were used to help weight the sample to originating passengers.

2.1 QUESTIONNAIRE DESIGN

The survey consisted of two primary parts: 1) an origin-to-airport section describing the respondent's trip to the Airport, also known as revealed preference (RP), and 2) a stated preference (SP) survey. The origin-to-airport section included details of the Airport access trip, including origin address (full addresses, street corners, and landmarks were considered valid), type of origin place (e.g., work, home, hotel), trip purpose, mode of transportation, parking costs, time of day, party size, length and location of stay, frequency of travel using Logan Airport, and demographic information.

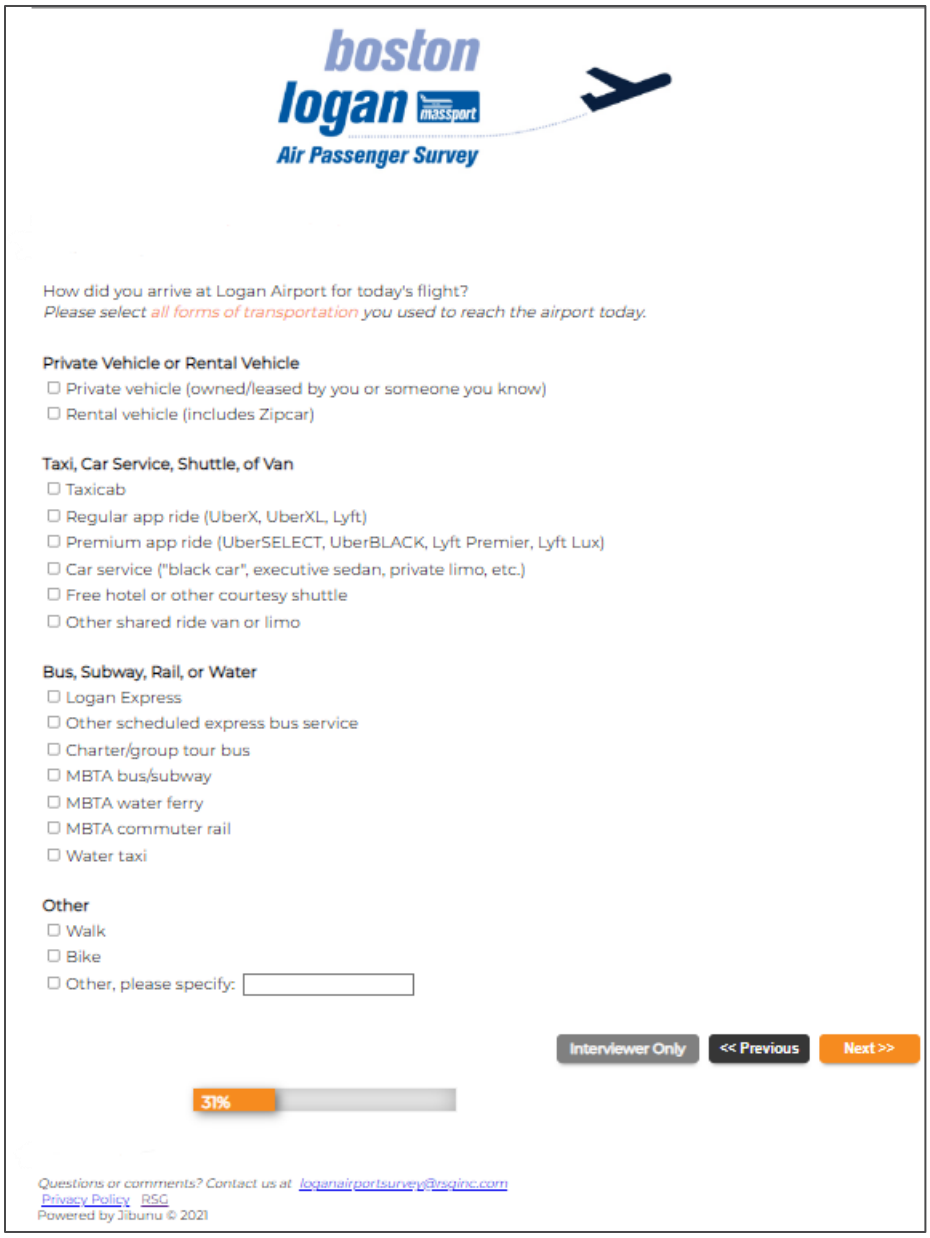

FIGURE 1. SCREENSHOT OF ORIGIN-TO-AIRPORT QUESTION

The SP section of the survey used the detailed data obtained by the origin-to-airport section to customize a set of hypothetical choice experiments. Each experiment represents a mode choice that a respondent would have to make for a given trip and the survey captured a respondent's mode choice under a range of travel times, costs, etc. In order to determine what choices are shown to respondents, a set of experiments are created using a statistically-based efficient

experimental design; this design ensures that a choice model can be estimated from the survey data and minimizes the number of required responses. This experimental design comprised 48 designs, each with 10 unique blocks of six experiments each, for a total of 2,880 experiments. Each respondent was randomly assigned to one of the 10 blocks. Each of the six experiments from the block presented between five and 16 mode options that could be selected by respondents. An example of this is shown below in Figure 1. Only viable mode options were shown to a respondent; for example, if the respondent did not have a car available, they were not shown the option to drive a private vehicle. The modes that a respondent was shown on the screen in the SP experiments were determined using the following logic:

- Superseding all other logic, each respondent was always shown the mode they indicated as the mode used for their trip to the Airport as an option they could select.
- All respondents who mentioned a car was available for this trip were shown private vehicle drop-off and parking options, including Logan Express drop-off and parking if originating outside the MBTA subway service area.
- All respondents except those originating beyond Interstate 495 were shown taxi and ride app options.
- All respondents had limousine available as an option.
- Respondents' originating from within the MBTA subway service area were shown the MBTA Blue Line, MBTA Silver Line SL1, MBTA Ferry, and water taxis.
- Respondents originating outside of the MBTA subway service area could select rental car, Logan Express, and other scheduled bus service.
- Respondents from the South Shore also had the MBTA ferry available as an option.

For each alternative presented, several associated trip characteristics were displayed. Core characteristics included travel time, cost, and, if applicable, headways and shuttle bus transfers. Additional considerations like electric vehicle (EV) availability/parking, availability of garage parking, and remote check-in or "ticket to skip" (expedited security) were included for some modes. Across all the scenarios, the respondent was presented with different levels of each attribute—each attribute varied independently of the others—and was asked to choose their preferred alternative.

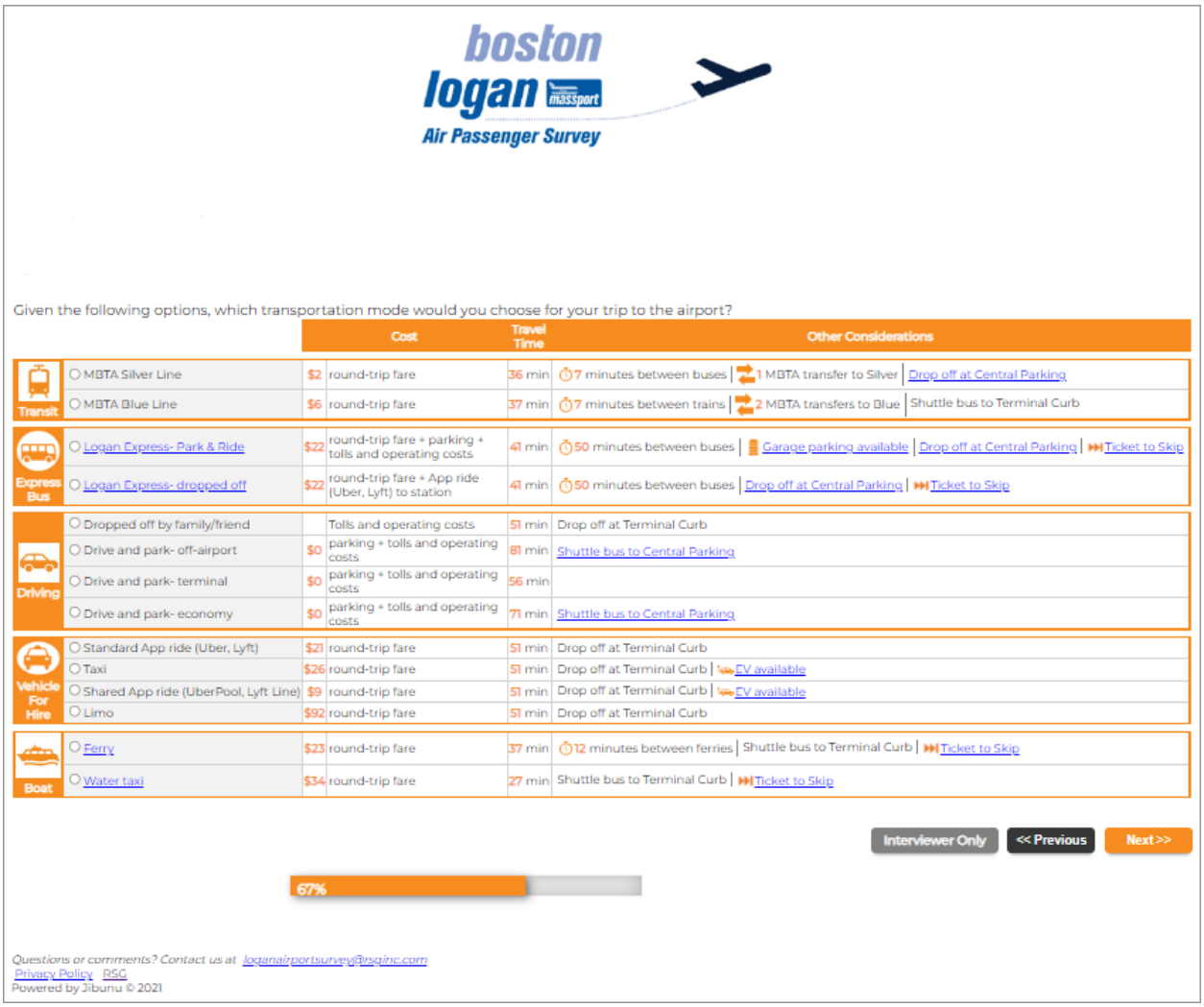

FIGURE 2. SCREENSHOT OF STATED PREFERENCE EXERCISE

In case the respondent wanted more information about an attribute in the SP experiment, highlighting an attribute revealed further details, which often included a picture with an additional description.

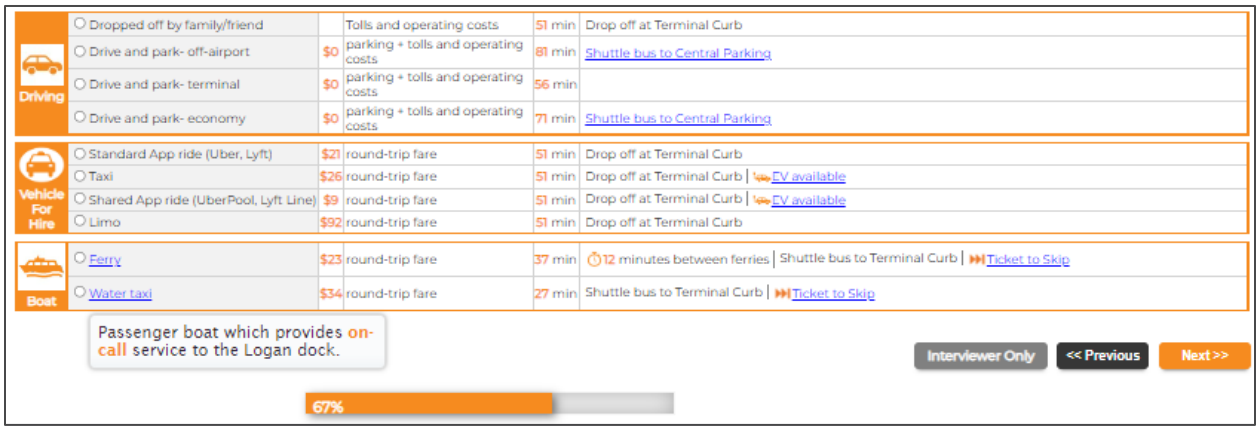

FIGURE 3. EXAMPLE OF EXPLANATORY "POP-UP"

2.2 SAMPLE DESIGN AND SELECTION OF SAMPLE FLIGHTS

The air passenger survey was conducted over three weeks beginning on May 9th, 2022 and ending May 31st, 2022. Surveying occurred seven days per week during this period and was conducted each day in two shifts: an “AM” shift and a “PM” shift. AM shifts ran from 8:00 a.m. through 4:00 p.m.—with some days starting early to allow for the surveying of morning flights—and PM shifts ran from 2:00 p.m. through 10:00 p.m. Survey staff surveyed four departures per eight-hour shift, to ensure a wide distribution of departure times within each shift.

Flights were sampled proportional to air passenger volumes within the following classifications:

- **Flight type:** Domestic commuter, domestic non-commuter, and international. Commuter flights were defined as those for which the marketing airline was different than the operating airline (e.g., a United Airlines flight operated by Republic Airlines), usually short-haul flights to nearby cities like New York, Philadelphia, and Washington, DC. The difference between domestic non-commuter and international was determined by destination.
- **Day of week:** Weekday and weekend. “Weekdays” consisted of Monday through Thursday. Friday was included under “weekend” because prior surveys have shown that a major portion of business travel for the week finishes on Thursday, with Friday flights serving primarily leisure travelers.
- **Time of day:** Morning, midday, afternoon, and evening. Periods were defined as follows to line up with previous studies: “Morning” was 5:00 a.m.-8:59 a.m., “Midday” 9:00 a.m.-1:59 p.m., “Afternoon/Evening” 2:00 p.m.-6:59 p.m., and “Night” 7:00 p.m. onwards.

- **Airline:** JetBlue, Southwest, legacy carriers, and others. Legacy carriers (American, Delta, and United) were grouped together due to their similar operating and pricing strategies. JetBlue and Southwest, the other two major airlines at the Airport, remained separate, while all others were grouped as “other.” Terminal was not chosen as an additional criterion because airlines at the Airport provide a near-perfect proxy for the distribution of passengers across terminals, but this sampling plan was devised to ensure that every terminal was surveyed over at least two full days during the fielding effort and reached its approximate share of the population of flights departing from the airport.
- **Plane Size:** Small, medium, and large. Small flights were defined as less than 100 seats, medium as 100-199 seats, and large as 200 or more seats.

For each survey date, one or more terminals were selected—lining up with AM and PM surveyor shifts—and flights within these terminals were randomly selected. After selecting flights, RSG manually inspected each shift to ensure enough spacing between flights across the eight-hour period. Any selection that did not allow enough time between flights was swapped for another flight until daily schedules were spaced sufficiently. RSG continued to iterate the final flight list to ensure the distribution closely matched that of segment targets. Where variances were observed in this process, flights in overrepresented segments were swapped with other similarly timed/located flights in underrepresented segments. As collected survey totals are likely to deviate from the targets, survey data was weighted by the segments above to more closely reflect the real distribution of passengers originating at Logan Airport.

In all, 437 flights were sampled. In line with the number of completed surveys received in 2018, a completion target of 6,000 surveys was set. Load factor was assumed to be 80% and the proportion of passengers originating at Logan Airport was assumed to be 75%, both in line with previous surveys. Seating capacity averaged 132 seats across all flights, and a response rate of 29% was assumed based on response rates from 2018. RSG set a goal of 23 completes per flight, or just over 10 completes per person for a team of two surveyors. RSG evaluated that at least 260 flights were needed to ensure adequate completions.

Characteristics of the sample

By analyzing Logan Airport flight departure data for May 9th–May 31st, RSG segmented total air passenger flight seats for each of the criteria detailed in the section above.

In total, RSG surveyed 437 flights. Table 2 shows the sample segment characteristics compared with the flights that ended up being surveyed — some flights were unable to be surveyed due to cancellation or significant delay — and the total population of flights across the survey period.

Segment		% of surveyed flights	% of all flights
Day of Week	Weekday	62%	64%
	Weekend	38%	36%
Flight Type	Domestic Commuter	17%	15%
	Domestic Non-commuter	71%	73%
	International	11%	12%
Airplane Size	Large	9%	13%
	Medium	62%	67%
	Small	30%	19%
Time of Day	Morning	25%	1%
	Midday	27%	27%
	Afternoon/Evening	31%	51%
	Night	16%	21%
Airline Classification	Legacy	50%	45%
	JetBlue	27%	38%
	Southwest	3%	3%
	Other	20%	14%

TABLE 2. CHARACTERISTICS OF SAMPLED FLIGHTS COMPARED TO ALL FLIGHTS

2.3 SURVEY EXECUTION

The survey was administered every day across the study period, and fieldwork was conducted by two subcontractors: the Central Transportation Planning Staff (CTPS) — an organization associated with the Boston region's Metropolitan Planning Organization (MPO) — and market research firm Boston Research Group.

Preparations for survey administration

Twenty-one surveyors from the two subcontractors participated in survey fieldwork, including five supervisors. All members of the survey team were badged by the Massport Security and Badging Office to allow them access to the departure gate areas of the Airport.

All surveyors that were able to attend participated in a training session on the first day of fielding at Logan Airport. This training session was conducted to familiarize staff with airport security processes, the objectives of the survey, survey procedures, and the survey itself.

Massport informed airline station managers about the timing of the survey in advance of the fielding and requested that they ask staff to cooperate with surveyors to ensure boarding numbers were available from gate agents for future weighting. Surveyors also carried authorization letters from Massport explaining the project and the nature of their involvement in case of any suspicion from airline staff or security personnel.

Daily schedules for up to six teams — three each in the morning and evening — were prepared by RSG for distribution by supervisors to survey staff. Each schedule identified four unique flights to be surveyed, and a list of backup flights were prepared for supervisors in case of flight delays or cancellations. Surveyor teams were determined by supervisors, with at least two surveyors per team in all cases.

Survey process

The survey was administered as follows:

The team of interviewers approached passengers waiting to board selected flights at departure gates within the secure area of the terminals in the Airport. Each potential respondent was screened to ensure that they were on the sampled flight, that they were beginning their air travel at the Airport (i.e., were not connecting passengers), and that they were willing to participate. If a passenger was not eligible or not willing to participate in the study, then interviewers thanked them and approached the next person. Eligible participants willing to participate were handed a tablet, which allowed them to complete the survey on their own. Each surveyor had three or four tablets that he or she distributed to departing passengers.

Each interviewer team remained at designated gate areas until the departing flight prepared to board, at which time interviewers collected the tablets from respondents. If a participant was not finished with the survey but was willing to complete it at a later point, then the interviewer selected a “Continue Later” button on the bottom of the survey page, which allowed them to record the respondent’s email address. Similarly, for late-arriving passengers (i.e., those arriving less than 10 minutes prior to boarding), interviewers were instructed to only obtain an email address after the screener question confirmed a passenger’s eligibility. RSG then distributed email invitations to these respondents. Emailed invitations contained a unique survey link for the respondent to continue the survey where they had left off.

Technical challenges

In the first three days of fielding, issues were encountered where flights scheduled to be surveyed either did not exist or had a departure time drastically different than initially known. This was determined to have been due to an outdated initial flight data pull from Massport, and with their cooperation, updated flight information was used to re-sample flights in accordance with the procedure outlined earlier.

2.4 SAMPLE WEIGHTING

The responses collected across the study period required weighting to represent the 1.3 million passengers originating at Logan Airport during the survey period. As noted in the sampling plan, flights were sampled and surveyed based on aircraft seats to approximate the share of

originating Logan Airport passengers across various categories, including time of day; airline, and whether the flight was commuter, domestic, or international. While the sampling was conducted as much as possible according to plan, load factors, various logistics (e.g., COVID-19 and difficulty staffing morning shifts), and response rates inherently varied across flights and therefore weighting was required. Additionally, to get a more accurate picture of the originating passengers at Logan Airport, the counts of originating and connecting passengers on each flight were obtained from gate agents and were used to help build weights to bring the sample in line with the proportion of originating passengers, rather than simply using the number of available airplane seats (Table 3).

Time Group	Load Factor	Connecting Rate	Flights	Seats	Total Passengers	Connecting Passengers	Originating Passengers
5 AM – 2 PM	95.8%	4.9%	5,967	764,485	732,586	35,936	696,650
2 PM – 7 PM	93.0%	4.9%	3,541	451,143	419,804	20,325	399,479
7 PM – 12 AM	82.4%	4.9%	1,823	283,316	233,689	11,346	222,343
Total	92.5%	4.9%	11,331	1,498,944	1,386,079	67,607	1,318,472

TABLE 3. LOAD FACTOR AND OTHER FLIGHT CHARACTERISTICS BY TIME OF DAY DURING THE SURVEY PERIOD

Once all the data were compiled as above, two factors were calculated for each survey record to develop the “Party Expanded” expansion weight included in the survey dataset:

- Party Factor - the number of originating passengers represented by the survey record. It was based on the party size reported by the respondent, with some caveats:
    - If the person was a transit user, then the party size question was not asked in the survey, so instead the average party size for the transit mode from 2018 was used, and,
    - If the respondent reported that multiple people in their party answered the survey and the reported party size was two or more, the value of the Party Factor was halved to account for these additional survey responses. We divided by two as it was assumed that it was unlikely that everyone in a large party would take the survey. RSG determined it was most likely that only two people would take the survey based on the small number of multiple responses from parties.
- Party Weight - the total originating passengers for the weighting group (combinations of airline type, aircraft size, and time of day) divided by the total party members in that weighting group. These party members represent the sum of all passengers who were surveyed or who were represented via a survey by someone else in their party, which is shown as “Total Party Members” in Table 4.

- Party Expanded - Each individual survey record's expansion weight is referred to as "Party Expanded" in the survey dataset. Party Expanded is the Party Factor for the survey record multiplied by the Party Weight for the weighting group associated with the survey record. The sum of Party Expanded values calculated in the survey dataset equals the total number of originating passengers for the survey period, which is 1.3 million passengers.

Segment	Weighting Characteristic	Flights	Originating Passengers	# of Flights	Respondents	Total Party Members	Party Weight
Airline	JetBlue	3,024	359,268	164	1,582	2,298	156.3
	Legacy	6,199	663,858	195	1,735	2,461	269.8
	Other	1,752	246,679	61	669	1,022	241.4
	Southwest	356	48,667	12	107	166	292.3
Airplane Size	Large	931	198,291	57	651	9,889	200.6
	Medium	7,257	961,900	304	2,834	4,102	234.5
	Small	3,143	158,281	71	608	856	184.9
Time Group	Afternoon/Evening	3,541	399,479	221	1,934	2,876	138.9
	Morning/Midday	5,967	696,650	122	1,305	1,868	372.8
	Night	1,823	222,343	89	854	1,203	184.8

TABLE 4. INPUTS AND OUTPUTS PRODUCED IN THE WEIGHTING PROCESS

2.5 CREATION OF FINAL SURVEY DATABASE

As described earlier, the raw data provided by the survey went through a robust cleaning process to create the final database used for analysis and model building. 4,224 respondents participated in the survey across 437 flights. From this:

- Nine responses were removed due to mismatching dates and flights which were unable to be reconciled,
- 128 responses were removed due to their origin or arrival mode indicating a likely connecting flight,
- 38 responses had answers to individual questions removed due to illogical answers, impossible answers that did not impact the integrity of the entire record but could not be recoded, or answers with any sort of derogatory intent,
- And after removing these responses, 4,093 responses remained.

Data cleaning screened for several potential issues:

- Erroneous origins: some answers under "Other" in arrival mode and origin type alerted us that the respondent arrived on a connecting flight, which was designed to be excluded from the analysis.

- Unreasonable origin locations: even if respondents did not mark a connecting flight as their arrival mode or origin type, some origins were located well outside of Logan which may indicate a misunderstanding of the survey.
- Impossible flights: while cleaning, several records were discovered that seemed to be in a terminal that was not surveyed on a given day. Most of these records were able to be reconciled and recoded.
- Answers in “Other”: similar to above, some answers under “Other” were able to be quickly reassigned to one of the existing modes, e.g., “Friend picked me up” when “Private Vehicle (owned/leased by someone you know)” was an option. Answers like these were reassigned to existing categories where they lined up.
- Various illogical answers: throughout the survey, some answers and results may not have made sense or were impossible but did not impact the integrity of the entire survey record. In these cases, illogical responses were recoded to a missing value, and only the individual answers were excluded from analysis.
    - Vehicle occupancy, a key metric, was cleaned so that answers above 15 were removed, as 15-passenger vans are the largest commonly available non-commercial vehicles and are often available from rental car providers.

Consistent with previous surveys, only a small number of surveys were completed online later; 98.4% of surveys were conducted in the Airport.

The final sample of 4,093 responses equates to 9.4 completes per flight, a somewhat lower level of productivity than achieved in earlier passenger surveys. However, the lower probability could be attributed to COVID-19-related hesitancy, either to use a tablet used by others or to interact with others generally in a public area. In an era of increased knowledge of how diseases spread, concerns about interacting with strangers in public, and more awareness of public health, this somewhat lower level of survey productivity may be helpful to recalibrate expectations and adjust sampling methods.

3.0 SUMMARY OF RESULTS

This chapter provides a comparison of key results from the 2022 survey with the prior three iterations—Spring 2016, the Fall 2018 Parking Freeze Amendment Study, and the Spring 2019 study performed by Mark Kiefer Consulting. Residents were classified as those respondents who answered that Logan Airport was the "home" end of their trip, and Business passengers were classified as those who indicated that business was the primary purpose of their trip.

With some questions posed only to a subset of respondents based on answers to earlier questions in the survey (e.g., transit users were not asked whether/where they parked their car), and with questions like arrival and return mode including a large number of options, there is greater potential for sample error. With small numbers of survey responses representing smaller segments of the air passenger population—like those who arrived at the Airport by ferry or water taxi, which was only 0.3% of passengers—survey answers may not always accurately reflect the preferences and travel behavior of certain segments of the air passenger population.

All results tables in this section and following sections have been weighted following the procedure discussed previously in section 2.2.

Table 5 compares the share of passengers classified as residents and non-residents across the four surveys. In contrast to previous studies, this survey found residents to comprise only a slim majority of air passengers, at 50.7%. While methodological differences between the studies conducted by RSG and Mark Kiefer Consulting may partially explain the differences, the change from a sizable majority of residents (63.7% in 2019) to a much smaller majority is notable regardless.

Residency	Share Estimate				Absolute Δ 2019-2022	Relative Δ 2019-2022
	Spring 2016	Fall 2018	Spring 2019	Spring 2022		
Resident	61.5%	54.4%	63.7%	50.7%	-13.0%	-20.4%
Non-Resident	38.5%	45.6%	36.3%	49.3%	13.0%	35.8%

TABLE 5. SHARE OF RESIDENTS AND NON-RESIDENTS AMONG AIR PASSENGERS

Table 6 compares the share of passengers classified as business and non-business travelers across the four surveys. While all four studies show a clear majority of passengers flying for non-business purposes, there is a pronounced increase in 2022, likely related to shifting behaviors in the COVID-19 and post-COVID-19 eras.

Residency	Share Estimate				Absolute Δ 2019-2022	Relative Δ 2019-2022
	Spring 2016	Fall 2018	Spring 2019	Spring 2022		
Business	38.1%	32.6%	39.6%	18.4%	-21.2%	-53.5%
Non-Business	61.9%	67.4%	60.4%	81.6%	21.2%	35.1%

TABLE 6. SHARE OF BUSINESS AND NON-BUSINESS TRAVELERS AMONG AIR PASSENGERS

Table 7 compares the share of passengers assigned to four market segments, constructed as combinations of residency status and travel purpose. Unsurprisingly — based on the data presented before — both segments containing passengers traveling primarily for business have contracted, while Non-Resident Non-Business has experienced pronounced growth. Resident Non-Business has contracted almost imperceptibly from what was found in the Spring 2019 survey; this share has grown when compared to the Fall 2018 study, but this may be an effect of different seasonal travel patterns.

Residency	Share Estimate				Absolute Δ 2019-2022	Relative Δ 2019-2022
	Spring 2016	Fall 2018	Spring 2019	Spring 2022		
Resident Business	18.1%	19.1%	21.3%	8.7%	-12.6%	-59.2%
Resident Non-Business	43.4%	35.3%	42.4%	42.1%	-0.3%	-0.1%
Non-Resident Business	20.0%	13.5%	18.3%	9.7%	-8.6%	-47.0%
Non-Resident Non-Business	18.5%	32.1%	18.0%	39.5%	21.5%	119.4%

TABLE 7. SHARE OF MARKET SEGMENT AMONG AIR PASSENGERS

Finally, Table 8 compares share estimates among different arrival modes across the four studies. Most modes experienced some level of reduction in 2022, with five modes growing their share: private vehicle drop-off, rental vehicles, Logan Express, the MBTA Silver Line SL1, and water taxis / the MBTA Ferry. As noted earlier, water transportation represents a very small fraction of passenger trips to the Airport and is thus sensitive to sample error.

Mode	Share Estimate				Absolute Δ 2019-2022	Relative Δ 2019-2022
	Spring 2016	Fall 2018	Spring 2019	Spring 2022		
Private Vehicle – Drop-Off	21.3%	18.4%	21.2%	25.4%	4.2%	19.8%
Private Vehicle – Parked On-Airport	11.4%	8.3%	9.3%	7.4%	-1.9%	-20.4%
Private Vehicle – Parked Off-Airport	1.8%	1.7%	1.5%	1.2%	-0.3%	-17.8%
Rental Vehicle	10.9%	13.6%	10.7%	16.2%	5.5%	51.4%
Taxicab	9.8%	5.7%	3.9%	2.8%	-1.1%	-27.9%
Ride App (Uber, Lyft)	14.4%	25.4%	29.5%	27.7%	-1.8%	-6.1%
Other Car Service/Shared Ride Van	8.1%	5.9%	5.3%	3.3%	-2.0%	-37.6%
Logan Express	5.2%	4.6%	3.8%	4.1%	0.3%	7.9%
MBTA Blue Line*	3.1%	1.9%	1.5%	1.0%	-0.5%	-34.5%
MBTA Silver Line SL1	3.3%	1.9%	1.8%	2.0%	0.2%	12.3%
Other Scheduled Bus	4.5%	2.4%	4.5%	3.7%	-0.8%	-18.0%
Hotel/Courtesy Shuttle	3.3%	3.4%	2.6%	2.5%	-0.1%	-3.8%
Charter Bus	1.5%	1.9%	2.6%	0.5%	-2.1%	-82.3%
Water Ferry/Taxi	0.2%	0.2%	0.1%	0.3%	0.2%	216.7%
Other	1.1%	2.2%	0.9%	1.9%	1.0%	108.1%

**The MBTA Blue Line was shut down during most of the survey in 2022, shuttle buses replaced train service*

TABLE 8. MODE-SHARE AMONG AIR PASSENGERS

4.0 DETAILED RESULTS FOR 2022

This chapter explores detailed results for the 2022 ground access survey. This section will provide a summary profile of passengers responding to the survey first, followed by information concerning ground access modes, disability status, terminal waiting times, and finally, modes used upon returning to Logan Airport.

4.1 PROFILE OF PASSENGERS

As discussed earlier, residents and non-residents represent nearly equal shares of passengers flying in and out of Logan Airport, a notable change from previous years showing a more sizable majority of residents arriving at and departing from the airport. This may reflect changes driven by the COVID-19 pandemic, but prior Spring surveys may also have been resident heavy due to their inclusion of school vacations for spring break.

Business travel — overall and among both residents and non-residents — has faced a precipitous decline, with market share down by around half across all three categories. Travel restrictions, public safety measures, updated company travel policies, and personal preferences contributed to the drop in business travel in the initial stages of the COVID-19 pandemic. The rapid adoption of remote working during this time—enabled by development of cloud-based and business conferencing technologies—seems to have altered travel patterns, even as widespread vaccination has made travel significantly safer.

Non-business travel accordingly represents a larger share of travel than in previous studies. In addition to the general decline of business travel over this period, “revenge travel” — post-COVID-19 pandemic leisure trips originally planned during the period of the pandemic — and the timing of the survey close to college graduations which attract visitors may have contributed to this increase.

Residency	Share Estimate				Absolute Δ 2019-2022	Relative Δ 2019-2022
	Spring 2016	Fall 2018	Spring 2019	Spring 2022		
Resident Business	18.1%	19.1%	21.3%	8.7%	-12.6%	-59.2%
Resident Non-Business	43.4%	35.3%	42.4%	42.1%	-0.3%	-0.1%
Non-Resident Business	20.0%	13.5%	18.3%	9.7%	-8.6%	-47.0%
Non-Resident Non-Business	18.5%	32.1%	18.0%	39.5%	21.5%	119.4%
Subtotal—Resident	*61.5%*	*54.4%*	*63.7%*	*50.7%*	*-13.0%*	*-20.4%*
Subtotal—Non-Resident	*38.5%*	*45.6%*	*36.3%*	*49.3%*	*13.0%*	*35.8%*
Subtotal—Business	*38.1%*	*32.6%*	*39.6%*	*18.4%*	*-21.2%*	*-53.5%*
Subtotal—Non-Business	*61.9%*	*67.4%*	*60.4%*	*81.6%*	*212%*	*35.1%*

TABLE 9. SHARE OF MARKET SEGMENTS AMONG AIR PASSENGERS, WITH SUBTOTALS

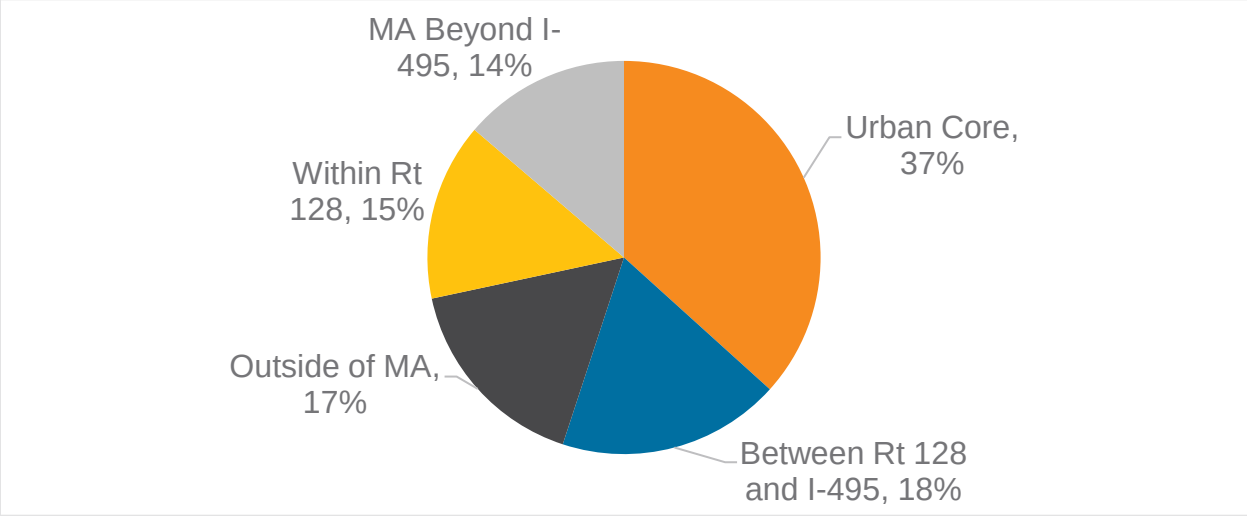

Figure 4 summarizes the origins of surveyed passengers flying out of Logan Airport, with the "Urban Core" comprising the cities of Boston, Cambridge, Somerville, and Brookline; 37% of passengers come from this region, but a sizable portion of passengers originate from further beyond the Boston region. Many passengers will drive from areas across the Northeast, with passengers from out-of-state and parts of Massachusetts outside of the outer belt formed by Interstate 495 comprising 31% of passengers.

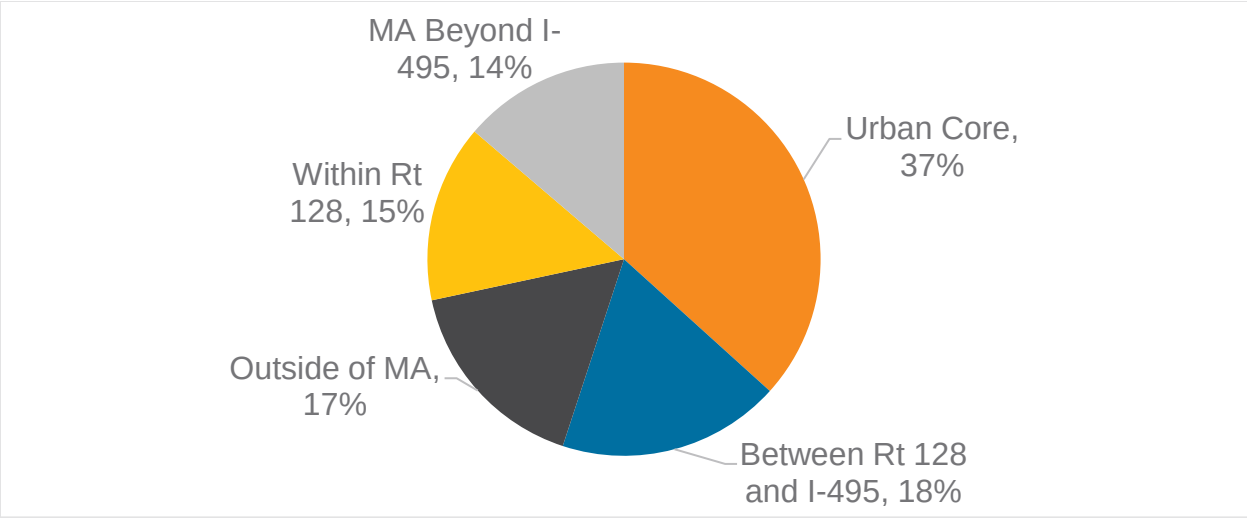

FIGURE 4. PIE CHART OF ORIGINS OF AIR PASSENGER (BY ZONE)

Figure 5 below shows the density of survey responses with origins in Massachusetts towns. As

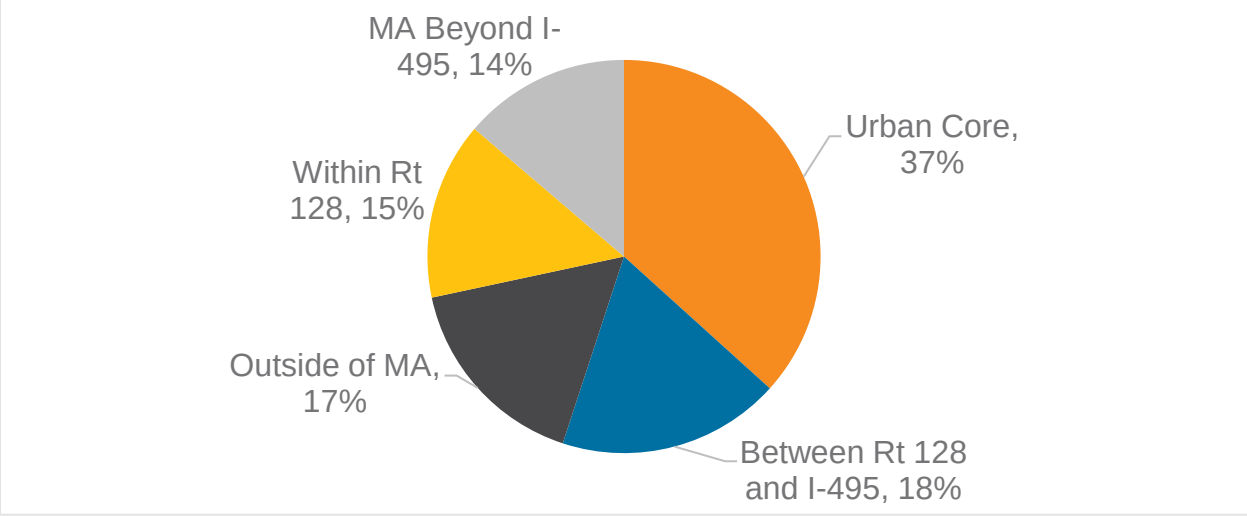

Figure 4 above also shows, most passengers arrived from Boston and its nearby suburbs, but there was also a high concentration of survey respondents from other cities and towns within Interstate 95/Route 128. Outside of this belt, some larger suburbs along major highways, such as Framingham, Wellesley, Natick, Weymouth, and Reading contributed a proportionally high number of respondents, alongside secondary cities further from Boston like Lowell and Worcester.

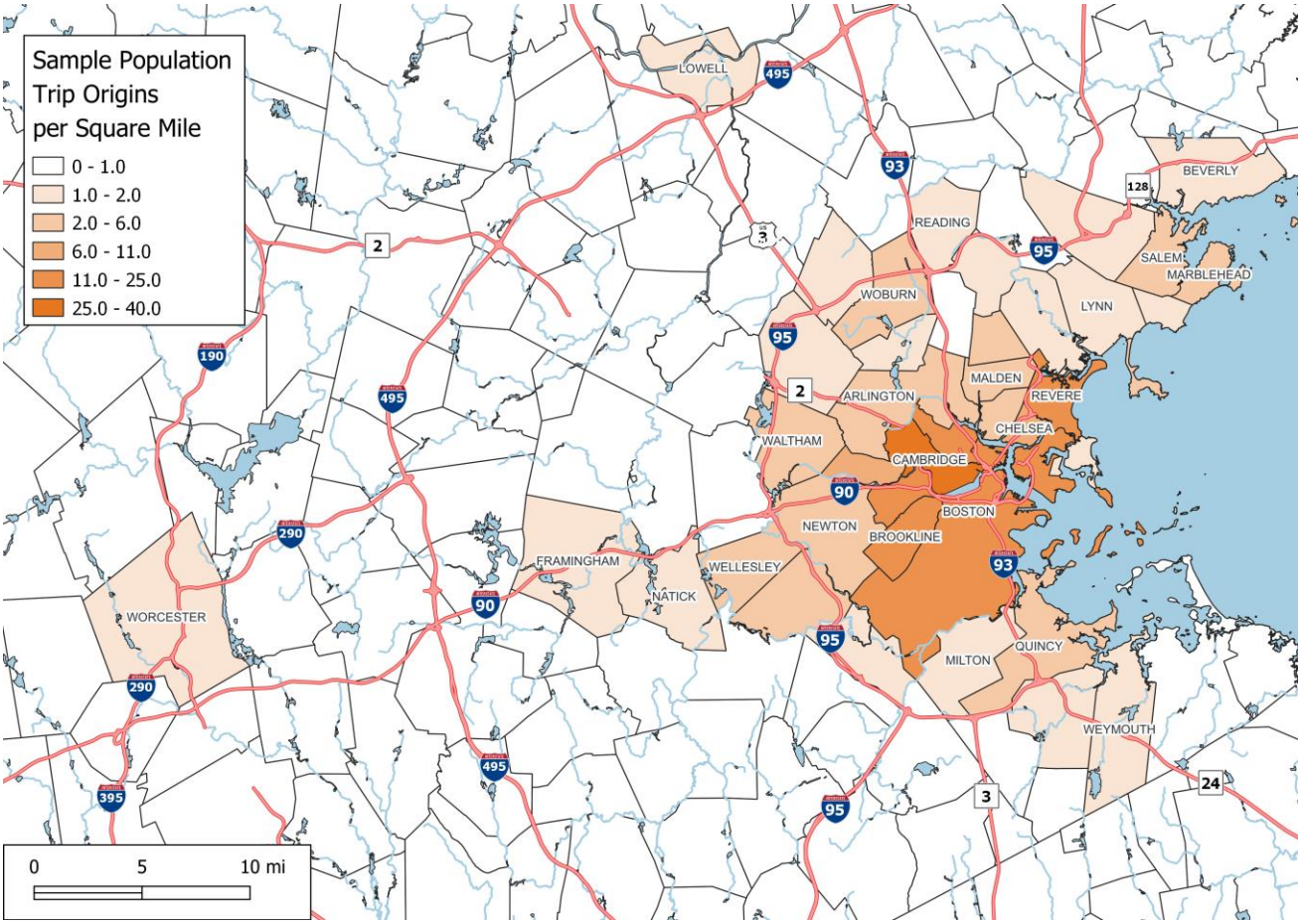

FIGURE 5. MAP OF SURVEY DENSITY BY TOWN

Approximately 17% of the Airport's market travels from other states.As shown in Figure 6, most passengers come from Eastern New England, with 3% coming from Maine, 8% from New Hampshire, and 3% from Rhode Island, but a small share comes from even further afield. Around 1% each come from Vermont and Connecticut, with slightly over 1% listing their origin as either New York or New Jersey.

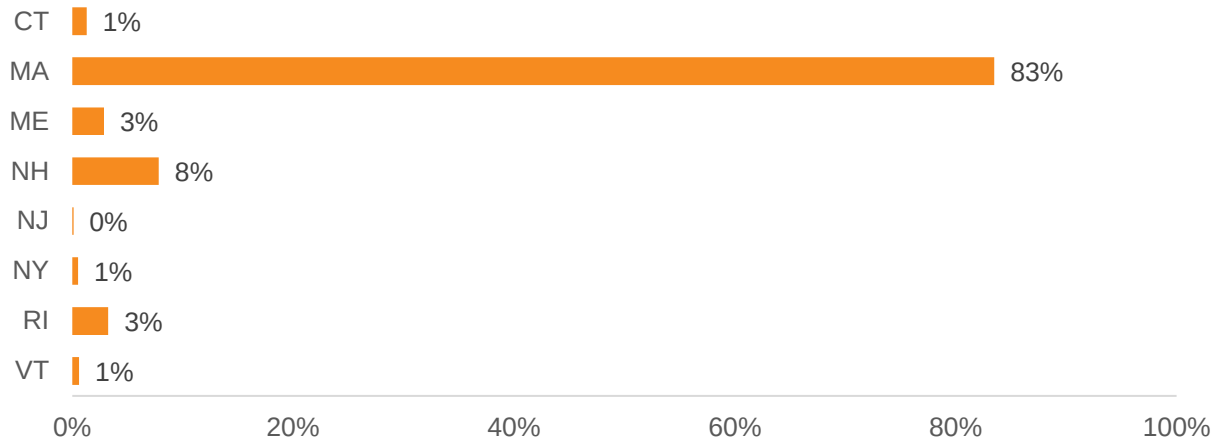

FIGURE 6. STATE OF ORIGIN FOR AIR PASSENGERS

Women made up a slightly larger proportion of surveyed passengers than men, as shown in

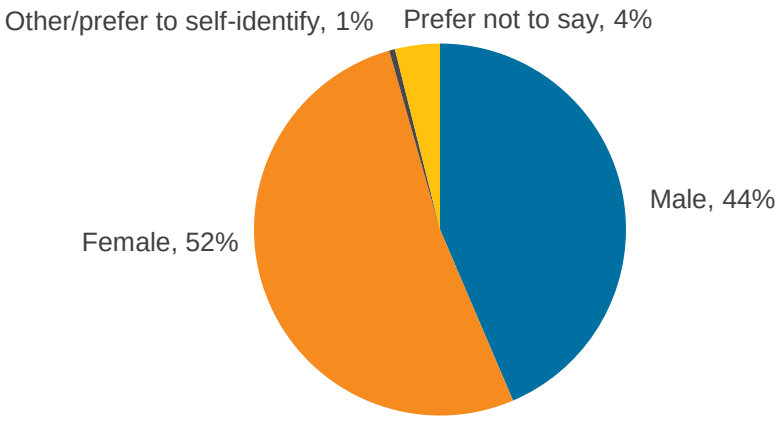

Figure 7. A small number of respondents preferred to self-identify their gender, and a slightly larger share preferred not to say.

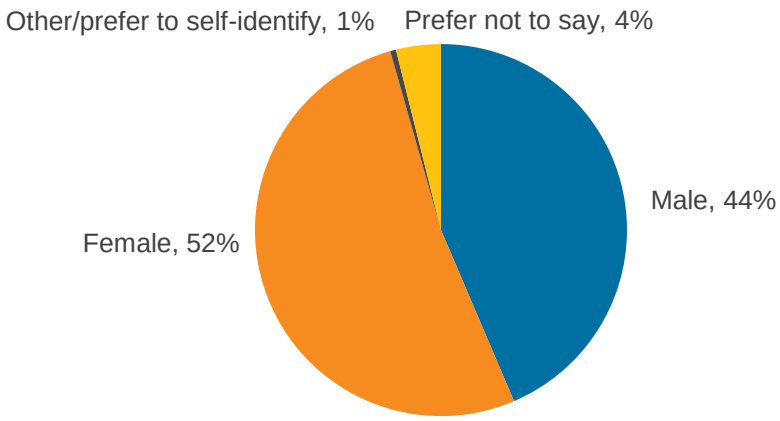

FIGURE 7. GENDER DISTRIBUTION OF AIR PASSENGERS

As seen below in Table 10, the distribution of genders between market segments varied. Residents and non-residents within each travel purpose group remained fairly consistent, while men were over-represented among business travelers and women were similarly over-represented among leisure travelers.

Gender	Resident Business	Resident Non-Business	Non-Resident Business	Non-Resident Non-Business	All passengers
Male	57%	38%	59%	43%	44%
Female	39%	58%	34%	54%	52%
Other/prefer to self-identify	0%	1%	1%	0%	1%
Prefer not to say	4%	3%	4%	3%	4%

TABLE 10. GENDER AND MARKET SEGMENT AMONG AIR PASSENGERS

As seen below in Figure 8, average age remained fairly consistent across market segments. There was no significant difference in average or median age between business and non-business or resident and non-resident travelers.

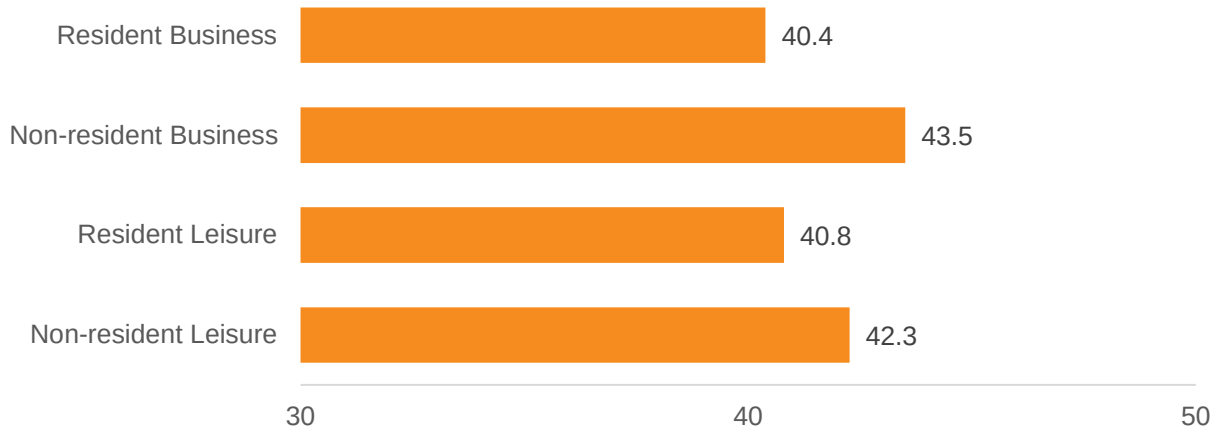

FIGURE 8. AVERAGE AGE OF AIR PASSENGERS BY MARKET SEGMENT

When looking at the distribution of age groups between these segments—as seen in Figure 9—more interesting patterns emerge. The youngest and oldest of the age groups, under 18 and 18–24 on one end and 65 and over on the other, are more prevalent among non-business travelers, unsurprisingly, as many travelers in these age groups are either not yet employed or are retired, respectively. The distribution of other groups among non-business travelers is very similar between these two segments, and the distribution of all groups closely follows overall figures. Early and mid-career professionals are more heavily represented among resident business travelers, with 25 to 44-year-olds making up 56% of this segment, as opposed to 35-43% elsewhere. Conversely, more senior professionals are more heavily represented among non-resident business travelers, with 45 to 54-year-olds comprising 25% of travelers within this segment, compared to 11–14% among the three other segments.

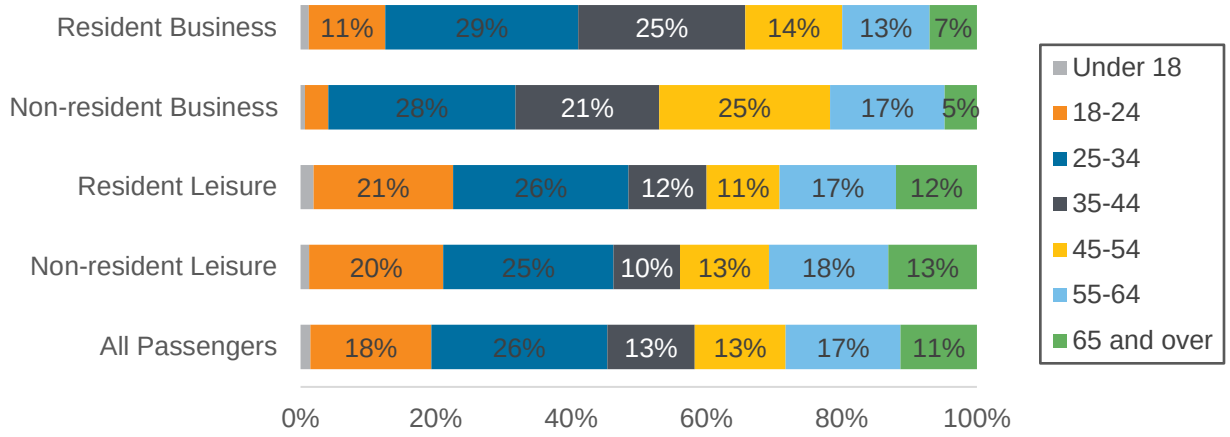

FIGURE 9. DISTRIBUTION OF AGE GROUPS BY MARKET SEGMENT

As expected, when comparing air travelers with the general population of a region, the incomes of surveyed passengers at Logan Airport are higher than that of the region it serves. As illustrated in Figure 10, just over half of all respondents indicated that their household's income was $120,000 or higher. In contrast, in the Boston-Cambridge-Newton Metropolitan Statistical Area—the US Census Bureau's definition of Greater Boston— only 47% of households had incomes greater than $100,000, and only 17% of households had incomes more than $200,000, lower than the 25% among survey respondents.[1]

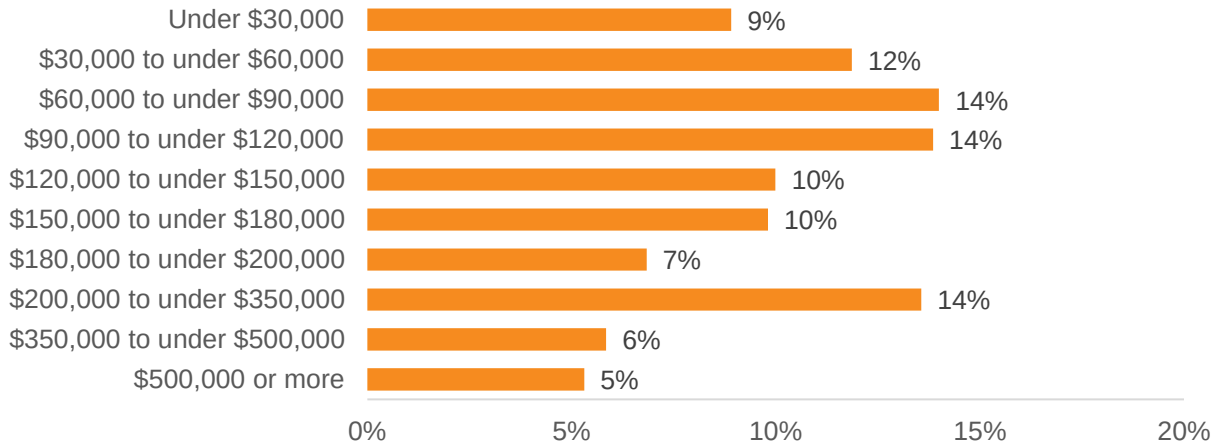

FIGURE 10. HOUSEHOLD INCOME OF AIR PASSENGERS

[1] U.S. Census Bureau (2020), American Community Survey, 5-Year Estimates.

Table 11 explores the distribution of income across market segments, with income ranges aggregated for analysis. Broadly, non-resident non-business travelers indicated the lowest annual household incomes among the four market segments identified. Resident non-business travelers came in slightly higher and more concentrated at the median classification. Business travelers — resident and non-resident — consistently indicated higher household incomes than non-business travelers.

Income	Resident Business	Resident Non-Business	Non-Resident Business	Non-resident Non-business	% of all Passengers
Under $60,000	13%	23%	14%	22%	21%
$60,000-$119,999	20%	30%	16%	31%	28%
$120,000-$199,999	29%	25%	35%	26%	27%
$200,000-$499,999	29%	18%	26%	17%	19%
$500,000 or more	9%	5%	9%	3%	5%

TABLE 11. HOUSEHOLD INCOME OF AIR PASSENGERS WITHIN MARKET SEGMENTS

4.2 GROUND ACCESS MODE

As seen in Table 12, the dynamics of mode choice at Logan Airport are complex. Riders have the option of public HOV modes—two rapid transit connections, the Massport Logan Express bus service from Boston-area suburbs and Boston's Back Bay, and MBTA-operated ferries — as well as numerous private commercial automobile and HOV options and personal vehicle modes common to most American airports.

Unsurprising given their rapid growth in the last decade, ride apps (e.g., Uber and Lyft) represent a sizable proportion of passenger ground access trips to the Airport, comprising nearly a third of the total. This increases further for business travelers, with 31.2% of resident business travelers and a full 40.8% of non-resident business travelers utilizing these services. Given the gradual migration of travelers from taxis to ride apps over the past decade, it is notable that taxis continue to make up a larger share of trips by business travelers compared to leisure travelers to and from the Airport. Taxis make up 4.1% of air passenger trips for resident business travelers and 6.4% of non-resident business travelers and are these groups' sixth and fourth most popular modes, respectively. Unlike ride apps, taxis have direct access to the terminal curb, which may contribute to their continued use.

On-airport parking (in either the Terminal B Garage, Central Parking, or the Economy Parking Garage) of private vehicles was highest among resident business travelers, representing just under a quarter of trips to the airport for this segment. With private vehicles seldom available to non-residents, parking is generally not an option for these passengers. The higher cumulative price of long-term parking relative to other modes may make it cost-prohibitive for many travelers, but business travelers able to reimburse travel expenses may value its convenience and choose to undertake this expense due to reimbursement.

Pickup/drop-off by private vehicles comprises a much larger share of trips by resident non-business travelers than by other travelers, as residents are more likely to have local friends and family and lack the option of reimbursement of expenses provided to business travelers; pickup/drop-off represents a more attractive mode choice for this segment due to greater convenience and lower cost. This high level of use among non-business travelers paired with the growth of non-business travel noted earlier likely plays a significant role in the growth of pick-up and drop-off as compared to previous surveys. The high number of trips generated by pick-up and drop-off represents a challenge for Logan Airport as air travel continues to recover and may require further study to determine appropriate strategies to temper growth in the share of this mode.

Mode	Resident Business	Resident Non-Business	Non-Resident Business	Non-Resident Non-Business	Total
Private Vehicle-Drop-Off	20.9%	36.2%	8.4%	19.1%	25.4%
Private Vehicle-Parked On-Airport	22.0%	12.0%	1.0%	0.9%	7.4%
Private Vehicle-Parked Off-Airport	1.5%	2.4%	0.0%	0.3%	1.2%
Rental Vehicle	1.3%	1.9%	26.6%	32.2%	16.2%
Taxicab	4.1%	1.7%	6.4%	2.9%	2.8%
Ride App (Uber, Lyft)	31.2%	21.7%	40.8%	30.1%	27.7%
Other Car Service/Shared Ride Van	4.9%	4.5%	5.4%	1.2%	3.3%
Subtotal - Automobiles	*85.8%*	*80.4%*	*88.5%*	*86.6%*	*84.1%*
Logan Express	4.9%	6.8%	1.3%	1.6%	4.1%
MBTA Blue Line*	0.5%	1.0%	0.2%	1.2%	1.0%
MBTA Silver Line SL1	1.7%	1.9%	1.4%	2.4%	2.0%
Other Scheduled Bus	4.3%	5.9%	0.2%	2.1%	3.7%
Hotel/Courtesy Shuttle	0.3%	1.8%	4.0%	3.2%	2.5%
Charter Bus	0.0%	0.6%	1.3%	0.2%	0.5%
Water Ferry/Taxi	0.0%	0.2%	0.1%	0.6%	0.3%
Subtotal—HOV and Transit	*11.7%*	*18.3%*	*8.6%*	*11.3%*	*14.0%*
Other***	2.5%	1.3%	2.9%	2.1%	1.9%

**The MBTA Blue Line was shut down during most of the survey, shuttle buses replaced train service*

TABLE 12. MODE SHARE BY MARKET SEGMENT AMONG AIR PASSENGERS

Logan Express is more popular for the resident non-business segment than other segments, more than double the share of resident business and non-resident non-business trips, and maintaining a significantly greater mode share than for non-resident business travelers. Given this service's low level of familiarity among non-residents, as seen below in Table 13, this is unsurprising, and its comparatively low cost — only $12.00 one–way for an adult, and $9.00 for those who purchase tickets in advance online at the time of the survey — may make it especially appealing for more typically budget-conscious leisure travelers.

Level of familiarity with Logan Express	Resident Business	Resident Non-business	Non-resident Business	Non-resident Non-business	Overall
Yes, I have used this service before	35%	30%	9%	15%	22%
Yes, but I have never used this service	34%	31%	11%	14%	22%
No	31%	39%	81%	71%	55%

TABLE 13. LEVEL OF FAMILIARITY WITH LOGAN EXPRESS BY MARKET SEGMENT

Unique among many US airports, the Logan Express service operated by Massport provides express bus connections from various Boston suburbs direct to Logan Airport, with trips on this service making up just under 5% of all passenger ground access trips to the Airport. Buses run from four suburban terminals: Braintree on the South Shore, Framingham in the MetroWest region, Woburn along Interstate 95/Route 128 just north of Boston, and Peabody on the North Shore. Service also formerly ran from a station in the Back Bay area of urban Boston but was discontinued during the COVID-19 pandemic and through the survey period but was reintroduced in October 2022.

Logan Express from Peabody was the least used service, with only 9% of Logan Express users. 24% of users originated at Woburn station, followed by 29% at Framingham and 38% at Braintree.

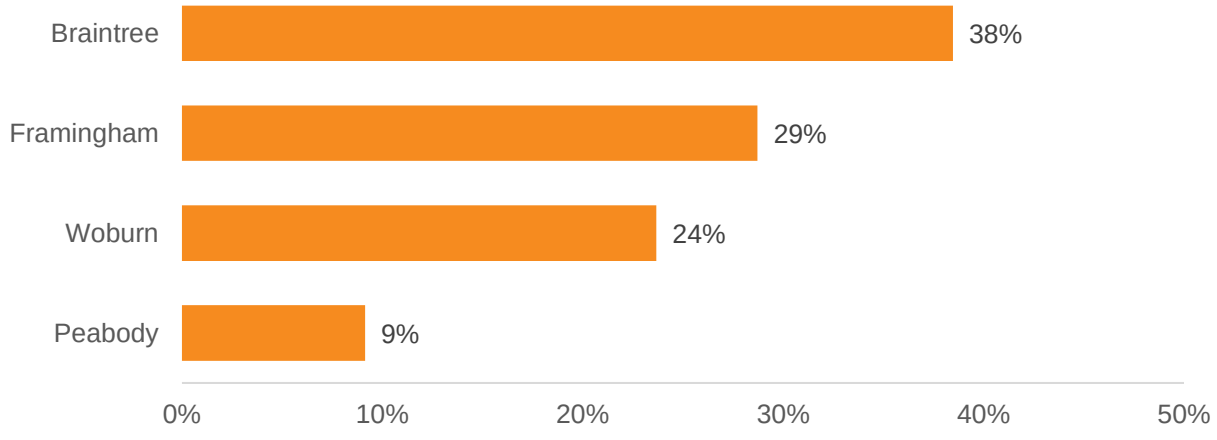

FIGURE 11. BOARDING LOCATION OF LOGAN EXPRESS USERS

The 2022 survey also asked passengers about the ways in which private vehicles are used to reach the Airport, which can vary significantly between markets. As illustrated in Table 14, temporary parking that may be associated more with dropping off a family member, e.g., parking for 30 minutes at the terminal to walk a family member to security before a long trip. Off-airport

parking and planned use of the Economy Parking Garage both represented small shares of private vehicle use across segments. Use of overflow parking was negligible across all groups, as was the case for unplanned use of the Economy Parking Garage.

Three behaviors represented most trips across all groups: drop-offs, terminal parking, and rental car drop-off. While these were uniformly more prevalent than other choices, their shares relative to each other varied between market segments. Passenger drop-offs made up over half of all trips by private vehicle overall with heavy use among non-business travelers. Nearly two thirds of resident non-business travelers arriving by private vehicle were dropped off, and the share of non-resident non-business travelers using private vehicle drop-off remained just under the average across all groups at 52%; use among business travelers made up a sizable proportion of drop offs, but still markedly less than half of all trips by private vehicle. These figures represent a significant increase since 2019. Such a change could be attributed to COVID-19 related changes in behavior, with passengers more hesitant to use modes shared with other passengers or drivers such as transit and ride-for-hire. The increase in private vehicle drop-off could also be linked to the higher share of leisure travelers in this survey relative to 2016 and 2019.

Terminal parking was largely limited to residents, with access to private vehicles for non-residents inherently limited. A significant proportion of resident business travelers arriving by private vehicle chose to park at a terminal garage, representing 42% of private vehicle users, but only 21% of resident non-business travelers arriving by private vehicle parked at a terminal.

Just as terminal parking was disproportionately represented among residents, and especially resident business travelers, rental car use similarly made up a large share of private vehicle use among non-residents. Given availability of private vehicles to residents — either directly as owners or through friends and family — higher representation of this choice among non-residents is unsurprising, and, as as discussed previously and shown in Table 12, represents a significant proportion of all passengers in these segments, not just those using private vehicles to reach the Airport. As compared to pick-up and drop-off, rental car use generates fewer trips per passenger, as arriving at the Airport requires returning the rental car for use by another customer, thus producing only one inbound and one outbound trip per passenger or group of passengers.

Parking Status	Resident Business	Resident Non-business	Non-resident Business	Non-resident Non-business	Overall
Dropped off	43.9%	67.6%	35.4%	47.0%	55.1%
Temporarily parked at terminal	2.9%	3.7%	5.3%	2.3%	3.2%
Parked at terminal	44.2%	19.3%	4.4%	4.6%	14.3%
Parked in economy parking (preferred economy)	4.0%	3.6%	1.0%	0.1%	2.0%
Parked at the airport in economy parking (directed to)	0.3%	0.4%	0.0%	0.0%	0.2%
Parked in an overflow lot	0.2%	0.0%	0.0%	0.0%	0.0%
Parked in a lot off airport	3.2%	4.5%	0.9%	1.0%	2.7%
Returned to the Rental Car Center	1.2%	0.8%	53.1%	45.1%	22.5%

TABLE 14. HOW PRIVATE VEHICLES WERE USED TO TRAVEL TO LOGAN AIRPORT

As illustrated in Figure 12, a plurality of passengers parking at Logan Airport parked for two to four days, with the next highest share remaining parked for slightly longer durations of five to nine days. A sizable portion of private vehicle users parking at Logan Airport parked for under a day: 27%, or more than a quarter of those parking at the Airport. Passengers parking for under 4 hours are classified as pick-up/drop-off for mode choice in this report and by Massport, but figures for those parking for short durations are included here.

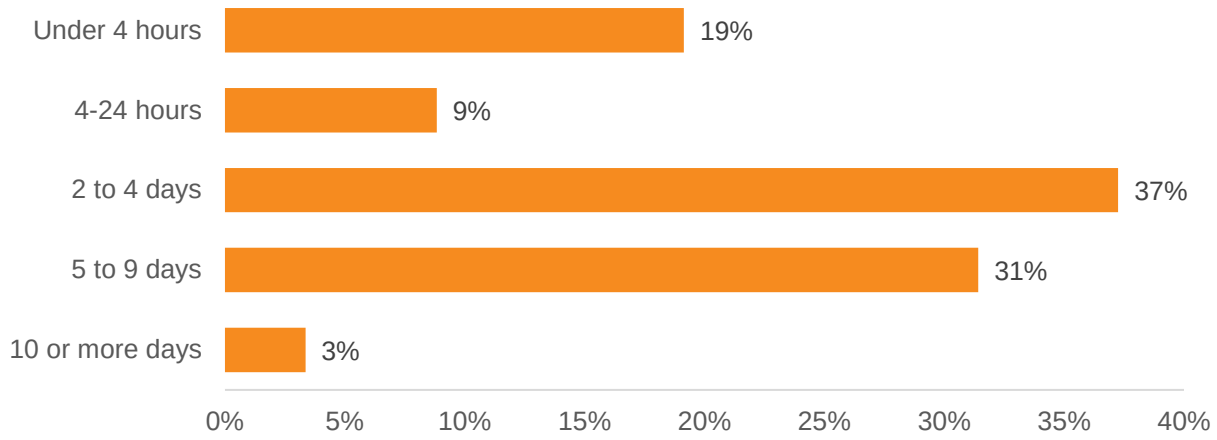

FIGURE 12. PARKING DURATION OF AIR PASSENGERS

As illustrated in

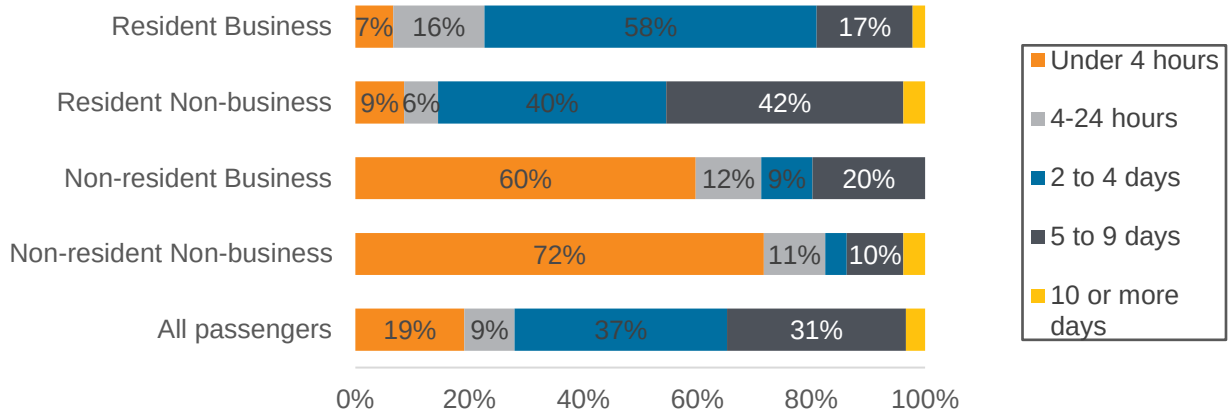

Figure 13, average parking duration varied by market segment and residency. Shares of residents parking for under 4 hours or for 4-24 hours were similar for both business and non-business travelers. Concerning longer durations, resident non-business travelers were almost three times as likely to park for 5 or more days when compared to resident business travelers, and resident business travelers were more likely than resident non-business travelers to park for 2 to 4 days.

Only a small number of non-resident travelers indicated that they parked at the airport, so parking duration figures for non-residents are likely affected by significant sample bias. Durations of under 4 hours (which account for the majority of non-resident responses) are assumed to represent short-term parking during pick-up/drop off by friends or family.

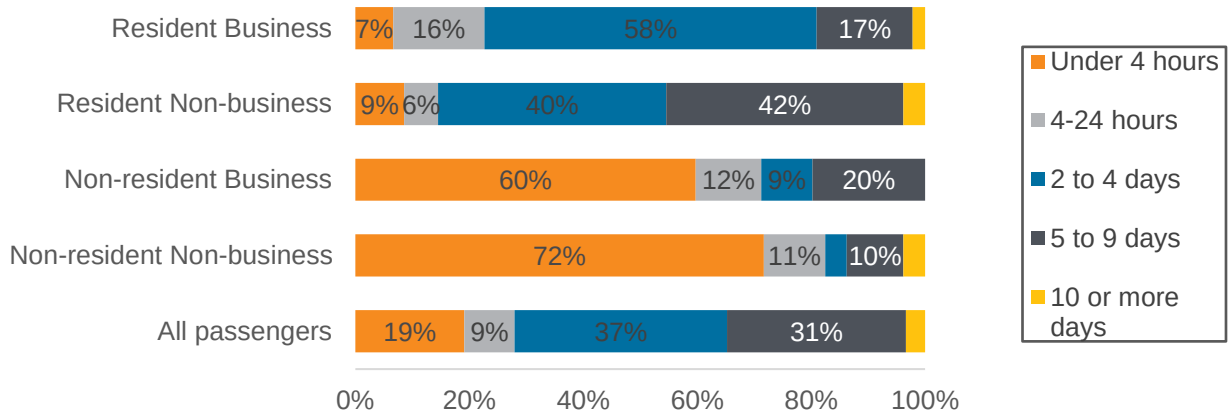

FIGURE 13. PARKING DURATION OF AIR PASSENGERS BY MARKET SEGMENT

A large majority of air passengers parking at Logan Airport do not own an electric vehicle (EV), as illustrated in Figure 14. Less than 1% of respondents indicated that they owned an EV and were able to park in a charging spot, with a further 2% of EV owners choosing not to park in one. Of those asked, 1% were unfortunately unable to find a charging spot at the airport.

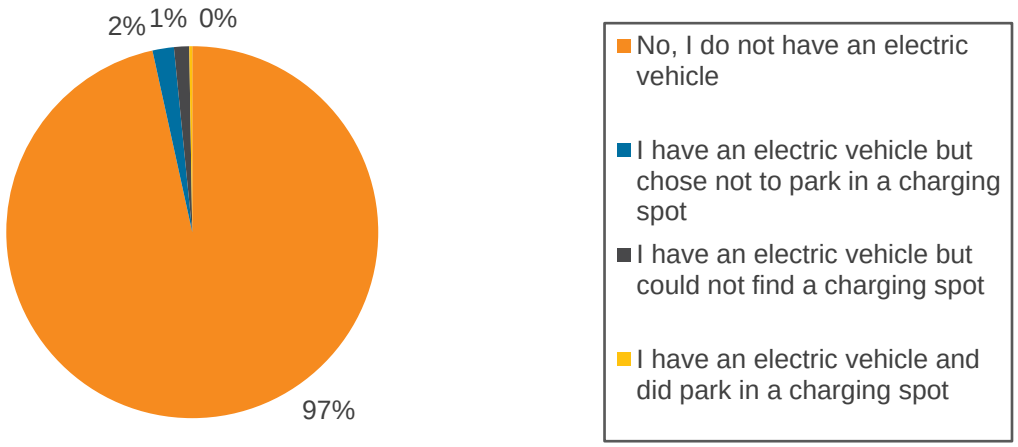

FIGURE 14. EV PARKING BEHAVIOR OF AIR PASSENGERS PARKING AT LOGAN AIRPORT

A slightly larger proportion of air passengers parking at Logan Express's Framingham location reported that they owned an EV, as shown in Figure 15. The share of these respondents indicating that they were unable to find a charging spot is roughly equivalent to the share of respondents parking at Logan Airport who gave the same response, but the share of

respondents indicating that they chose not to park in a charging spot is much higher, at 12%. Only a small sample of respondents was asked this question, so answers here may be prone to sample error.

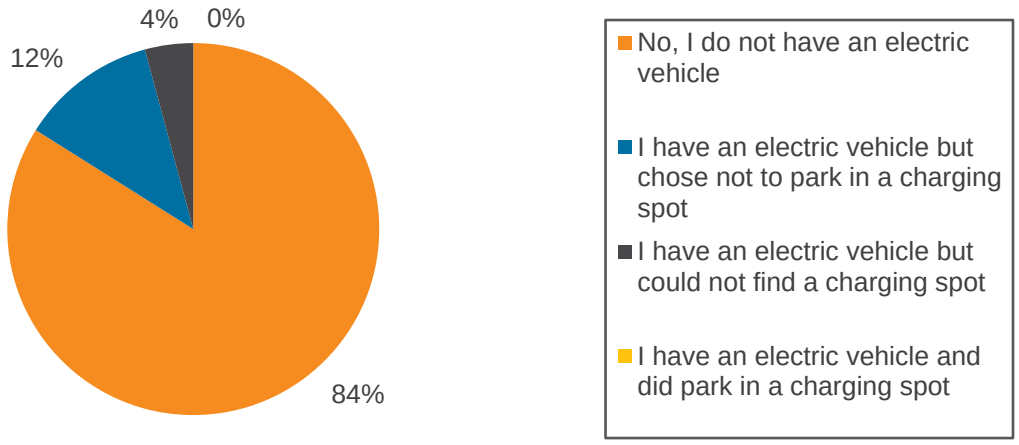

FIGURE 15. EV PARKING BEHAVIOR OF AIR PASSENGERS PARKING AT LOGAN EXPRESS FRAMINGHAM

With few exceptions, mean occupancy for each mode clustered around 2 air passengers. Private vehicle use for pickup and drop-off was the mode choice with the lowest average occupancy, at only 1.5 passengers per party, while rental vehicles had comparatively high occupancy, at 2.2 passengers per party. Party size questions were not asked of all respondents, so the average occupancy of some other modes has been omitted due to low sample size. Low sample size for some of the modes included may also affect the accuracy of their average occupancy figures.

Mode	Number of Valid Party Size Responses	Mean Occupancy
Private Vehicle (drop off)	1012	1.5
Private Vehicle (parked at airport)	251	1.7
Private Vehicle (parked off airport)	33	1.9
Rental vehicle (includes Zipcar)	454	2.2
Taxicab	3	-
Ride App (Uber, Lyft)	693	1.6
Other Car Service	43	2.0
Other	18	1.7

TABLE 15. AVERAGE OCCUPANCY AND PERCENT OF HIGH OCCUPANCY TRIPS BY MODE

A majority of air passengers arriving by all modes arrived in vehicles with at least one other air passenger in their party. Use of private vehicle for pick-up and drop-off was the mode with the lowest percentage of passengers arriving in a vehicle with 2 or more air passengers, at 57%. While still a sizable majority of passengers arriving by this mode, at least two thirds of passengers arriving by each of the other modes arrived in a party of 2 or more air passengers.

Mode	Number of Valid Party Size Respondents	Percent travelers in one person parties	Percent travelers in 2+ person parties
Private Vehicle (drop off)	1012	43.0%	57.0%
Private Vehicle (parked at airport)	251	29.2%	70.8%
Private Vehicle (parked off airport)	33	20.3%	79.7%
Rental vehicle (includes Zipcar)	454	14.7%	85.3%
Taxicab	3	-	-
Ride App (Uber, Lyft)	694	32.5%	67.5%
Other Car Service	43	19.7%	80.3%
Logan Express	42	20.9%	79.1%
MBTA Blue Line*	1	-	-
MBTA Silver Line SL1	4	-	-
Other Scheduled Bus	17	13.7%	86.3%
Hotel or Courtesy Shuttle	24	11.5%	88.5%
Charter Bus	2	-	-
Water Ferry or Water Taxi	3	-	-
Other	18	29.7%	70.3%

**The MBTA Blue Line was shut down during most of the survey, shuttle buses replaced train service*

TABLE 16. PERCENTAGE OF AIR PASSENGERS ARRIVING IN SINGLE AND MULTIPLE AIR PASSENGER PARTIES

Mean party size across market segments remained below 2 passengers, but with large variation between them. Air passengers not traveling for business, resident and non-resident, had larger average party sizes at 1.8 and 1.9 respectively, and large majorities of passengers in both of these groups arrived in parties of two or more air passengers, at 74.5% (residents) and 75.2% (non-residents). Business travelers had lower average party sizes, but with a larger difference between residents and non-residents. Resident business travelers had an average party size of only 1.2 air passengers, and only 30.2% arrived in parties of two or more air passengers, indicating that most resident business travelers traveled alone. While not as high as among non-business travelers, non-resident business travelers had an average party size of 1.5 air passengers, and a slight majority of 52.7% of non-resident business travelers arrived in parties of two or more air passengers. .

Market Segment	Mean Party Size	Percent HOV (2+ passengers)
Resident Business	1.2	30.2%
Resident Non-Business	1.8	74.5%
Non-Resident Business	1.5	52.7%
Non-Resident Non-Business	1.9	75.2%

TABLE 17. MEAN PARTY SIZE AND PERCENT OF PASSENGERS ARRIVING IN PARTIES OF TWO OR MORE AIR PASSENGERS BY MARKET SEGMENT

4.3 HIGH OCCUPANCY VEHICLE SHARE

The analysis described above presenting party size by mode was used, along with data from the 2019 Air Passenger Survey, for modes where respondents were not asked about party size, to estimate a High Occupancy Vehicle (HOV) share for ground access to Logan. The HOV share was computed as the proportion of ground-access trips taken by public transit or shared ride modes (including shared ride van or limo, courtesy shuttle, charter bus, or water taxi), as well as trips made by taxi, ride app, or other car services where vehicle occupancy is larger than one.

The share of ground access trips made by HOVs was 38.4% in 2022, under this definition, as shown in Table 18. A majority of taxi passengers, ride app passengers, and passengers arriving by other car services like limos arrived in high-occupancy vehicles, but an increase in the proportion of passengers being dropped off and using rental cars reduced the overall HOV share in comparison to 2019.

Mode	Weighted number of passengers	%HOV	Weighted number of HOV passengers	HOV Mode share
Private Vehicle (drop off)	335,237	0.0%	0	0.0%
Private Vehicle (parked at airport)	97,434	0.0%	0	0.0%
Private Vehicle (parked off airport)	16,264	0.0%	0	0.0%
Rental vehicle (includes Zipcar)	213,909	0.0%	0	0.0%
Taxicab	37,235	56.0%	20,852	1.6%
Ride App (Uber, Lyft)	365,217	67.6%	247,061	18.7%
Other Car Service	43,710	80.4%	35,128	2.7%
Logan Express	53,441	100.0%	53,441	4.1%
MBTA Blue Line*	12,987	100.0%	12,987	1.0%
MBTA Silver Line SL1	26,690	100.0%	26,690	2.0%
Other Scheduled Bus	48,826	100.0%	48,826	3.7%
Hotel or Courtesy Shuttle	32,416	100.0%	32,416	2.5%
Charter Bus	6,052	100.0%	6,052	0.5%
Water Ferry or Water Taxi	4,176	100.0%	4,176	0.3%
Other	24,878	0.0%	0	0.0%
All modes	**1,318,472**		**506,589**	**38.4%**

**The MBTA Blue Line was shut down during most of the survey, shuttle buses replaced train service*

TABLE 18. ANALYSIS OF HIGH-OCCUPANCY MODE USE

4.4 DISABILITY STATUS

Among other demographics, the survey inquired about various challenges that passengers may encounter at Logan Airport, regardless of a formal disability.

Figure 16 summarizes the incidence of disabilities and other challenges reported by passengers among the population surveyed. Just over 4% of passengers identified themselves as a person with a disability, and a substantial number of passengers indicated additional challenges, in combination with or separate from status as a person with disabilities. Around 2% of passengers indicated that they sometimes or always require some sort of mobility assistance, something which can limit transportation options to and from the Airport.

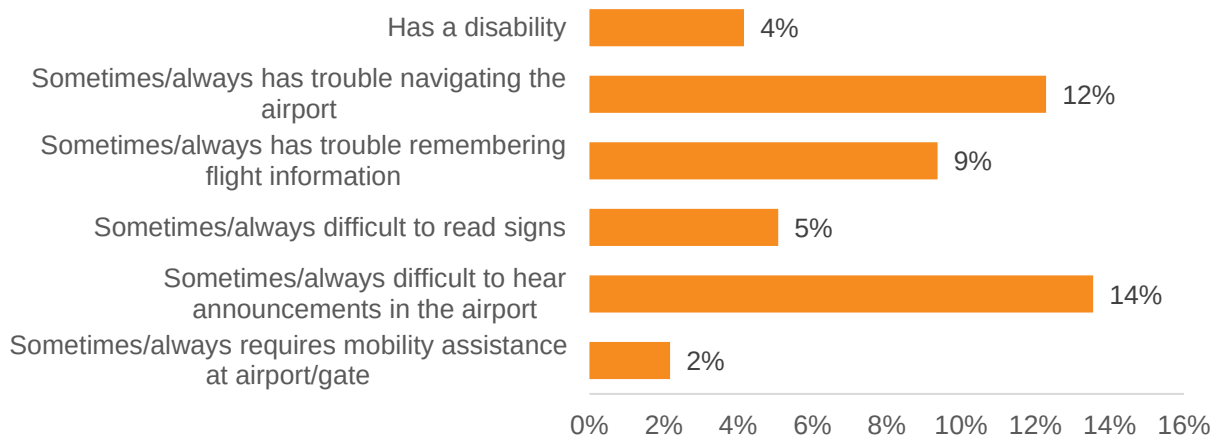

FIGURE 16. DISABILITY STATUS OF AIR PASSENGERS

Passengers indicating any sort of disability or challenge reported arrival mode preferences similar to the overall population, with some slight variation; this group was somewhat less likely to park off-airport, use ride apps, or use transit and was somewhat more likely to use a taxi, get dropped off, use Logan Express, or arrive via charter bus. Respondents self-identifying as having a disability were markedly more likely to park at the airport or use taxis but much less likely to use ride apps, and passengers requiring mobility assistance were much less likely to park at the Airport but much more likely than the general survey population to arrive via charter bus or use private scheduled bus services. Since the number of passengers reporting a disability or that they required mobility assistance was a small segment of those surveyed, results for these groups should be interpreted with caution.

Mode	I am a person with a disability	Passengers requiring mobility assistance	Passengers indicating any disability or other challenge	All Passengers
Private Vehicle (drop-off)	29.4%	20.6%	26.1%	25.4%
Private Vehicle (parked at airport)	4.4%	1.1%	7.2%	7.4%
Private Vehicle (parked off airport)	0.0%	1.5%	0.6%	1.2%
Rental vehicle (includes Zipcar)	16.1%	15.2%	16.2%	16.2%
Taxicab	5.3%	3.3%	3.8%	2.8%
Ride App (Uber, Lyft)	20.1%	29.4%	23.6%	27.7%
Other Car Service	6.2%	5.5%	3.3%	3.3%
Logan Express	4.1%	4.4%	6.9%	4.1%
MBTA Blue Line*	1.4%	0.0%	0.9%	1.0%
MBTA Silver Line SL1	3.3%	1.8%	1.5%	2.0%
Other Scheduled Bus	1.6%	7.8%	4.5%	3.7%
Hotel or Courtesy Shuttle	3.0%	1.9%	2.8%	2.5%
Charter Bus	3.2%	7.2%	1.2%	0.5%
Water Ferry or Water Taxi	0.7%	0.0%	0.5%	0.3%
Other	1.4%	0.4%	1.0%	1.9%

**The MBTA Blue Line was shut down during most of the survey, shuttle buses replaced train service*

TABLE 19. MODE CHOICE BY DISABILITY STATUS OF AIR PASSENGERS

4.5 TERMINAL WAITING TIMES

Only about 4% of air passengers surveyed arrived at the Airport less than an hour prior to their flight, as shown in Figure 17. The largest fraction of passengers — around a quarter — arrived between 90 and 119 minutes before their scheduled departure time, with another 23% arriving between 120 and 149 minutes prior to departure.

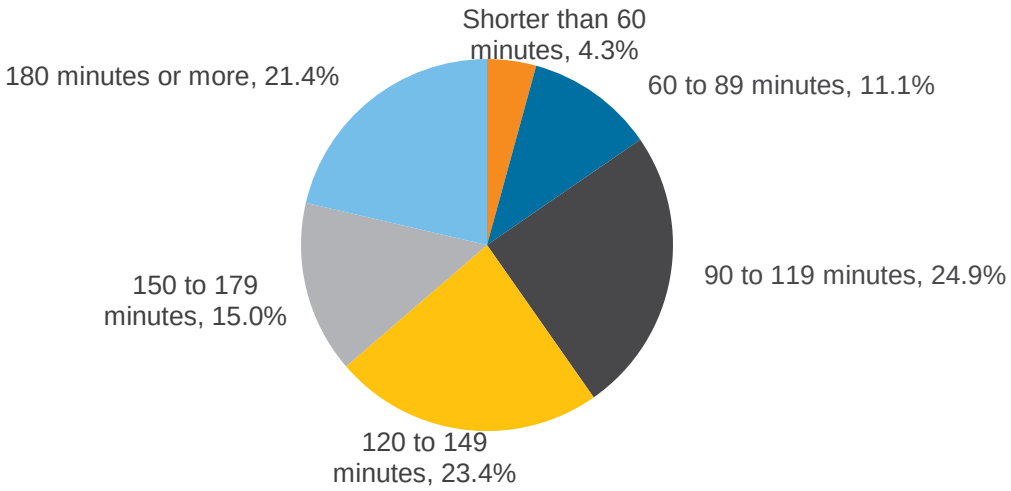

FIGURE 17. WAITING TIME AT TERMINAL AMONG AIR PASSENGERS

4.6 EGRESS MODE

Table 20 below summarizes the egress mode choices provided by surveyed passengers; for residents this was defined as the mode they expect to use upon their return, and for non-residents, this was defined as the mode they used to depart from Logan Airport when they arrived in Massachusetts. Just under 4% of respondents did not know what they planned to use or had used. As with the mode used to travel to the Airport, private vehicles overall made up the largest single share of passengers — private vehicles were not able to be broken into separate classes as with arrival mode due to survey mechanics — followed by ride apps. Apart from the lower share of passengers indicating public transit as their mode, mode share closely mirrored arrival mode.

Mode	Resident Business	Resident Non-business	Non-resident Business	Non-resident Non-business	Overall
Private vehicle (owned/leased by you or someone you know)	43.8%	50.3%	7.4%	22.4%	35.0%
Rental vehicle (includes Zipcar)	0.3%	1.0%	24.4%	32.7%	15.3%
Taxicab	6.9%	1.7%	11.7%	5.2%	4.4%
Ride App (Uber, Lyft)	28.3%	19.9%	42.6%	27.7%	25.8%
Other Car Service	5.6%	4.4%	3.5%	0.9%	3.1%
Logan Express	5.4%	6.8%	3.0%	1.4%	4.3%
MBTA Blue Line*	0.3%	0.7%	0.0%	1.0%	0.7%
MBTA Silver Line SL1	0.5%	0.5%	0.9%	1.0%	0.7%
Other Scheduled Bus	3.6%	5.1%	0.2%	2.4%	3.5%
Hotel or Courtesy Shuttle	0.0%	1.8%	1.4%	1.8%	1.6%
Charter Bus	0.0%	0.1%	0.4%	0.1%	0.1%
Water Ferry or Water Taxi	0.0%	0.0%	1.0%	0.4%	0.2%
Other	2.4%	1.2%	1.7%	1.3%	1.4%
Don't know	2.9%	6.6%	1.6%	1.7%	3.9%

**The MBTA Blue Line was shut down during most of the survey, shuttle buses replaced train service*

TABLE 20. EGRESS MODE OF AIR PASSENGERS

4.7 ATTITUDES

In addition to questions about demographics and their trips to and from the airport, respondents were asked to rate whether they agreed with a number of attitudinal statements concerning transportation options at the airport and sustainability goals. As illustrated in Figure 18, majorities of respondents indicated that they agreed or strongly agreed that they would consider purchasing an EV in the near future, that they thought shifting from gas-powered cars to EV's is important to combat climate change, that it is important for public facilities to provide charging stations for EV's, and that they would prefer to travel in a private vehicle over public transportation.

Responses to other statements were more mixed, with neutral opinions comprising a large share of each. Around 40% of respondents indicated they neither agreed nor disagreed that they would be more likely to use ride apps, taxis, or to rent a car if EV options were prevalent, suggesting that environmental issues may not play a significant role in whether respondents choose to use these modes.

Respondents did not indicate high levels of disagreement with many statements. Only the questions about buying a self-driving car if it were available or and whether they would be more likely to use a limo if EV options were more prevalent had 40% or more of responses indicating

disagreement or strong disagreement.

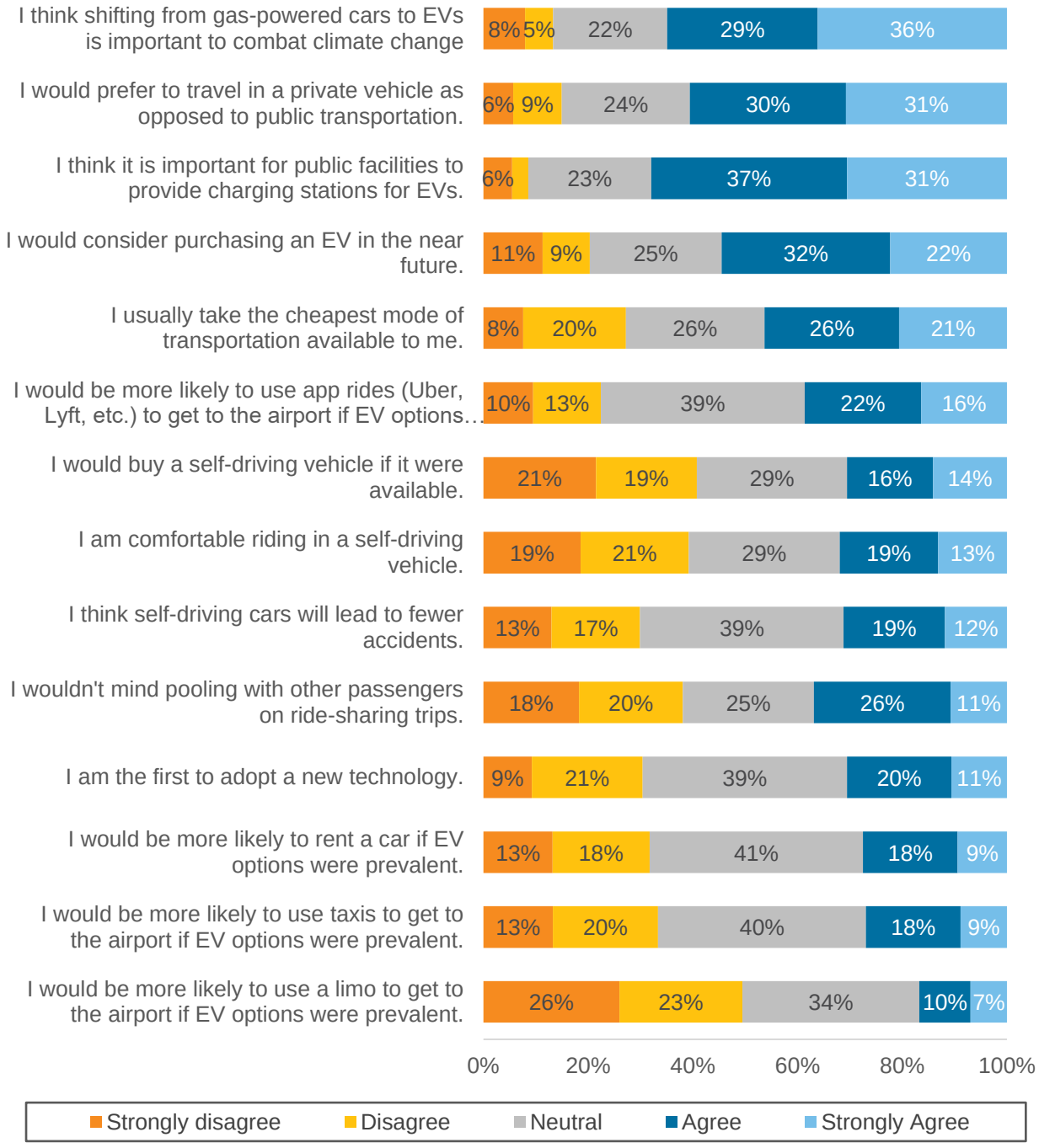

FIGURE 18. RESPONDENT OPINIONS ON VALUE STATEMENTS

As illustrated in Figure 19 below, the share of residents and non-residents indicating that they agreed or strongly agreed with the statements in question did not differ much. In only three cases did the difference amount to 5% or more; 25% of residents and 30% of non-residents agreed or strongly agreed that they would be more likely to rent a car if EV options were more prevalent, 23% of residents and 30% of non-residents agreed or strongly agreed that they would be more likely to use taxis if EV options were more prevalent, and 36% of residents and 41% of non-residents agreed or strongly agreed that they would be more likely to use ride apps if EV options were more prevalent.

In contrast, business and non-business travelers held more varying opinions on the attitudinal statements, as shown in Figure 20. Only 33% of business travelers indicated that they usually take the cheapest mode of transportation available to them, as compared to 49% of non-business travelers. Overall, more business travelers indicated that they would be more likely to use a variety of modes if EV options were more prevalent as compared to non-business travelers, with 43% indicating they would be more likely to use ride apps, 34% that they would be more likely to use taxis, 22% that they would be more likely to use a limo, and 30% that they would be more likely to rent a car.

Business travelers tended to agree with statements favoring advanced technologies as they were more likely than non-business travelers to agree or strongly agree that they are the first to adopt new technology, would buy or be comfortable riding in a self-driving vehicle, and that they think self-driving cars will lead to fewer accidents. Interestingly, while business travelers were more likely than non-business travelers to agree or strongly agree that they would consider purchasing an EV, non-business travelers were more likely to agree or strongly agree that shifting from gas-powered cars to EV’s is important to combat climate change.

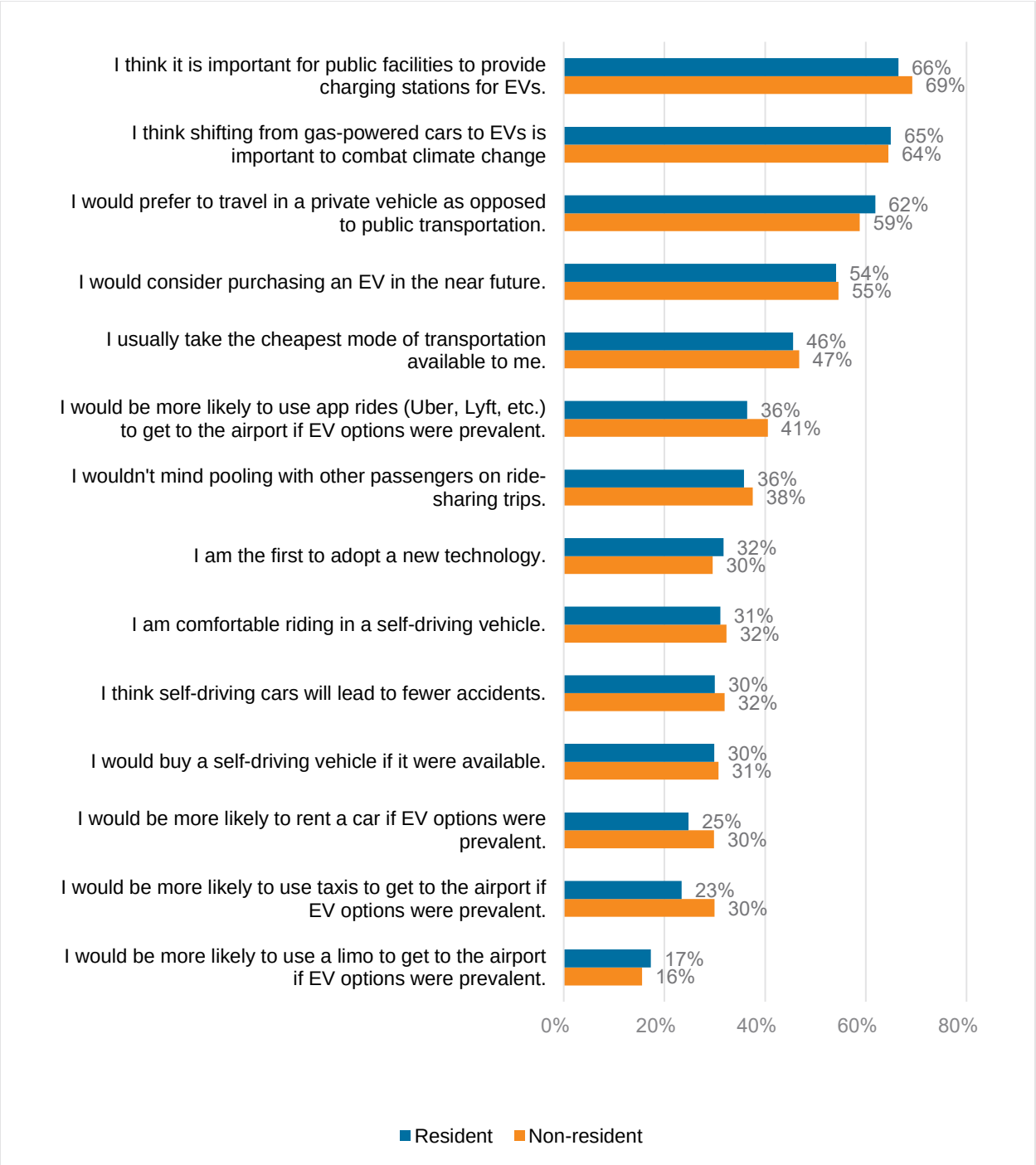

FIGURE 19. RESIDENT AND NON-RESIDENT ATTITUDES TO VALUE STATEMENTS

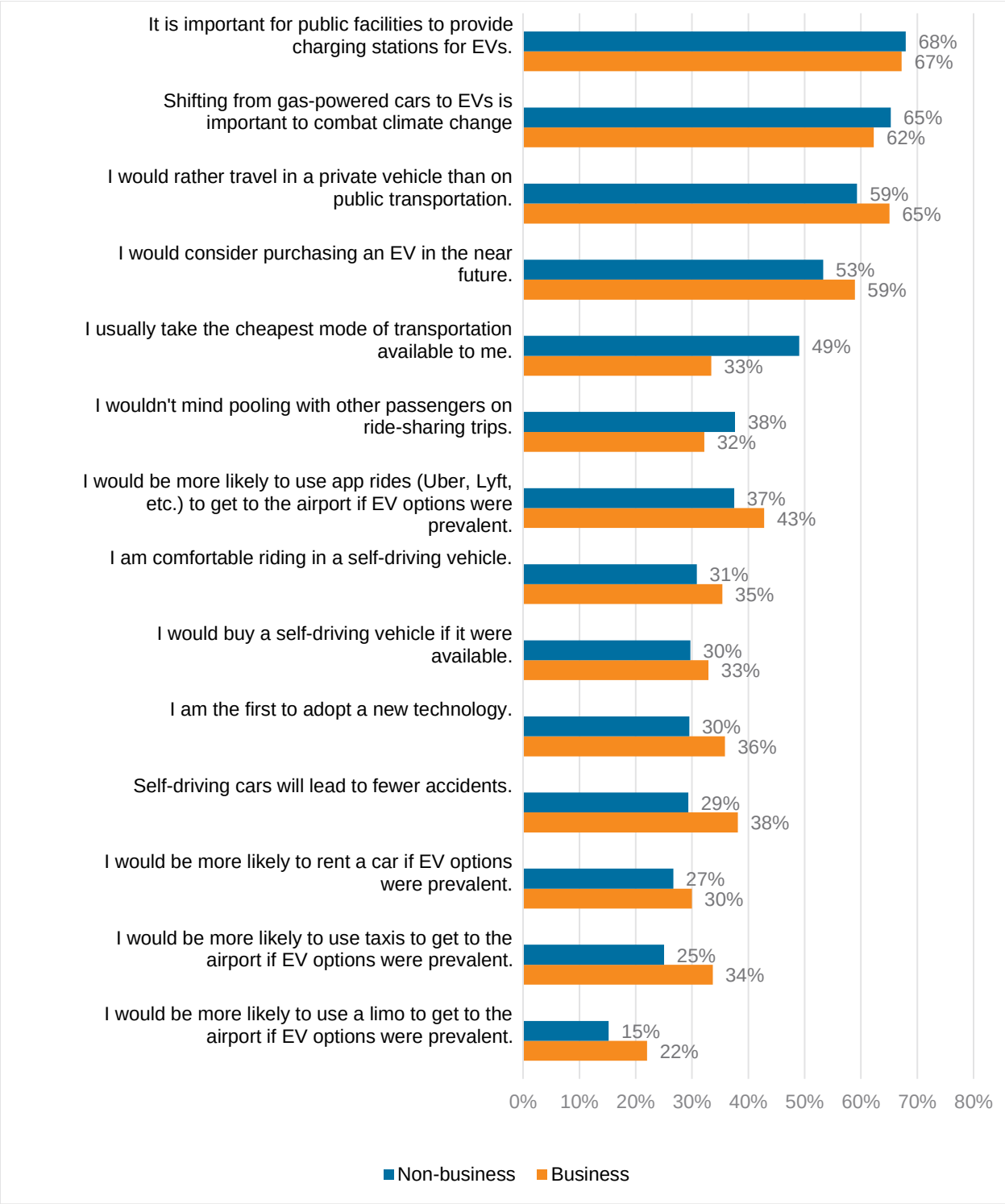

FIGURE 20. BUSINESS AND NON-BUSINESS TRAVELER ATTITUDES TO VALUE STATEMENTS

5.0 CONCLUSIONS AND RECOMMENDATIONS

The 2022 Air Passenger Ground Access Survey was conducted at Logan Airport from May 9—May 31, 2022. A total of 437 flights were sampled comprising a sample of 4,224 responses. This total was under the target of 6,000 completed surveys but is not surprising considering challenges administering the survey in the COVID-19 era.

Sampling processes, the programmed questionnaire, and survey methodology all closely matched earlier iterations of the surveys conducted in 2018 and 2019, but as the first study since the beginning of the COVID-19 pandemic, some difficulties were expected. Survey staff reported high levels of hesitancy or disinterest from passengers at gates, some of which was likely influenced by a desire to socially distance when in high-traffic public spaces and an aversion to using tablets previously used by other passengers. Additionally, high rates of delays and cancellations across the study period impacted productivity, as the time needed to contact supervisors, select a new flight, navigate the terminal, and situate oneself for surveying reduced productivity.

In contrast to past studies, non-business travel experienced made up a significantly larger share, a change that was expected due to changing patterns of business travel since the beginning of the COVID-19 pandemic. Non-resident travel outpaced resident travel for the first time among the four surveys used for comparison, the cause of which is unclear. Other demographics — including nearly equal numbers of men and women, and higher incomes among air passengers than the region as a whole — remained consistent with prior surveys

Mode share exhibited changes since 2019 and 2018. Ride app market share leveled off somewhat, remaining just below its share in 2019 at 28.4%. Public transit modes generally saw a decrease in mode share, but some of this was likely due to the shutdown of the Blue Line during most of the survey period. Finally, pick-up and drop-off at the terminal curb and rental vehicles grew by large margins, both absolute and relative to the 2019 study. All other modes experienced a reduction in mode share, with charter bus use experiencing the most pronounced decline relative to its share in 2019.

5.1 LESSONS LEARNED

In addition to the results described above, there were also a number of issues identified during the design, administration, and analysis of the 2022 survey that may warrant consideration in planning subsequent iterations of the survey. In this section, these issues are summarized in three categories:

Survey Administration

The two most significant survey administration issues faced in 2022 were staffing and changes to the flight schedule. Unfortunately, not much could have been done to compensate for the productivity impacts of delayed and cancelled flights without potentially decreasing the breadth of the survey; a change in time allocated to each flight would have limited the number of flights available to be surveyed during each shift.

Regarding staffing, ensuring adequate staffing levels across survey days was difficult, and the availability of surveyors made it challenging to survey flights scheduled to take off before 9:00 a.m. In addition to the hesitancy towards the survey noted among respondents earlier, lack of staffing availability significantly impacted productivity, and future surveys may require additional staff to ensure good coverage through the week to mitigate a loss in productivity.

As with prior surveys, surveyors were unable to obtain boarding numbers for all flights, due in part to challenges with gate agent availability.

Questionnaire Design

The design of the questionnaire for the 2022 survey generally followed the design of 2018 and 2019's questionnaires, with some important changes. MBTA buses and subways were collapsed into one category, private vehicle use was broken into several segments (e.g., parked at airport or pick-up/drop-off), and walking and biking were given dedicated categories. While collapsing MBTA buses and subways entails a small amount of additional work for those performing the analysis and recoding later, it may reduce the burden placed on respondents when presented with mode options. As respondents can select which lines they used after the main mode-choice question, this approach may offer benefits in flexibility and decreased burden while still ensuring adequate information was collected.

Based on both the comments left at the end of the survey and comments conveyed directly to surveyors, the size of the stated preference exercise presented issues fitting onto the screen of the tablets used. Additionally, the presence of minor changes to the options presented — layout, colors, and alternatives remained the same through the six exercises — created confusion for some respondents, with many believing that their answer was not taken by the survey and that the screen had simply reloaded. Changing colors and other aspects of the stated preference screen to ensure the respondent knows the screen has changed to a new experiment should be employed for the next survey.

5.2 RECOMMENDATIONS

Taking the above into consideration, the following improvements are recommended for future iterations of the Air Passenger Survey at Logan Airport:

1. *Adjust sampling and staffing to reflect difficulties encountered by staff in the wake of the COVID-19 pandemic*. Execution of the 2022 survey invalidated earlier assumptions about response rates and ability to ensure adequate coverage of departing flights. While the average of 35 completed surveys per flight found by Mark Kiefer Consulting in 2019 could be, in part, due to a less complex, shorter survey than in 2022, the reduction in productivity may require higher levels of staffing to ensure adequate coverage and a sufficient number of responses.
2. *Consistency in definitions*. Variance in certain summary statistics likely arises from multiple factors, but to ensure comparability of surveys, certain variables — e.g., what constitutes a resident or non-resident —questions should maintain a standard structure and key variables should be defined consistently.
3. *Improve user experience in stated preference exercises*. Some respondents reported confusion related to the stated preference exercise. The number of attributes for each mode, while important for learning which amenities passengers value, may need to be decreased to create a more streamlined exercise, and showing different colors for each screen of the state preferences could improve respondent understanding of the survey.
4. *Better understanding college students' home and school locations.* Given the fact that many Boston area colleges ended their terms during the study period—May 5th for Harvard University, May 13th for Boston University, and May 18th for the Massachusetts Institute of Technology, for example—it is likely that a large portion of surveyed air passengers were students at Boston area educational institutions returning home after finishing classes. Students were roughly evenly divided between how many answered they were residents versus non-residents, not much different than overall figures, but it's unclear which residence they were referring to, as many students have multiple residences. This may have contributed to an inaccurate picture of whether a student should be classified as a resident or non-resident of the area. In the future, surveys may want to ask more explicitly whether respondents are students at local colleges and universities and where they live for school versus where their non-school residence is located, especially if conducted in the Spring, as the dynamics of students returning to their families at the end of the school year may have an impact on how they answer the survey.