East Bronx Shared E-Scooter Pilot

Final Report

NYC
Eric Adams
Mayor

NEW YORK CITY
DOT
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Commissioner

Commissioner's Letter

As the nation's largest city transportation agency, New York City DOT keeps a robust and diverse transportation network running. Unfortunately, as the transportation network has been built out over time, too often the network has prioritized automobile movements at the expense of other transportation modes. This is a particular challenge for New Yorkers who live in the outer boroughs -- including areas not currently serviced by Citi Bike -- who face more limited transportation options.

That is why under Mayor Eric Adams, NYC DOT has been committed to expanding sustainable modes of transportation while reimagining the use and design of our streetscape -- including through the expanded use of micromobility. The East Bronx Shared E-Scooter Pilot, which began during the summer of 2021, expanded mobility options to residents, providing an innovative, convenient, and sustainable transportation mode. From Soundview to Wakefield, thanks to e-scooters from three different companies, residents availed themselves of a completely new form of transportation that got them from point A to point B -- or to subways, bus stops, and ferry transit hubs. Over 1.3 million safe rides later, the pilot has been a great success.

This one-year East Bronx Shared E-Scooter Pilot report both evaluates the pilot program and proposes recommendations for the future of shared micromobility in New York City. The East Bronx pilot not only provided meaningful mobility options to residents and visitors of a historically underserved community, it helped New Yorkers reduce their dependency on automobiles and try a new, active way of getting around. And thanks to strong safety protocols and new safety infrastructure which DOT built out during the pilot, including a great new protected bike lane on Bronxdale Avenue (see photo, inset) that I have ridden myself, we have also seen the safe adoption of this new mode in the East Bronx.

I want to offer my special thanks to the great team at DOT who helped oversee the implementation of this pilot, including Interim Bronx Borough Commissioner Keith Kalb, Executive Director of Bikeshare and Shared Mobility John Frost, Director of Policy and Dockless Programs Lily Gordon-Koven, and Micromobility Policy Analyst Irene Figueroa-Ortiz.

I am dedicated to expanding mobility options across New York City and building an equitable, accessible, vibrant micromobility landscape. Every New Yorker should have multiple convenient transportation options, and the East Bronx Shared E-Scooter Pilot has made that a reality for thousands. I remain eager and as committed as ever to "Get Stuff Done", and DOT will continue to work alongside our state and local representatives to expand safe and efficient forms of mobility into even more communities across our great city.

Ydanis Rodriguez, Commissioner
NYC Department of Transportation

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Executive Summary

In August 2021, the New York City Department of Transportation (DOT) launched a shared electric scooter (e-scooter) pilot program in the East Bronx, mandated by Local Law 74 of 2020. The purpose of the pilot program was to test the viability of shared e-scooters in New York City (NYC) neighborhoods not currently served by Citi Bike, the city's bike share system.

This document serves as the legislatively required evaluation of the pilot program. The evaluation investigates five areas of the e-scooter pilot: mobility, equity, accessibility, safety, and operator performance. The report describes the 2021-2023 shared e-scooter pilot, evaluates its first year of operation, and proposes recommendations for the future of shared micromobility in New York City.

The pilot goals are to:

- **Create strong safety requirements that align with the City's Vision Zero policy goals;**

- **Assess the transportation utility of shared e-scooters with a sufficient service area and fleet size;**

- **Develop operational and parking restrictions to minimize sidewalk clutter and maintain the public right of way; and**

- **Evaluate operators' business viability and ability to comply with pilot requirements.**

During the first year, the shared e-scooter pilot program had robust ridership and a strong safety record. These findings stem from an analysis of data collected by the operators that have been shared with DOT, in addition to surveys conducted by DOT of e-scooter riders and non-riders.

Key findings:

- **Mobility**

  - **Shared e-scooters were widely used.** Over 86,000 rider accounts completed over 1,000,000 trips in twelve months. The pilot averaged over 2,800 trips per day. Weekdays saw higher ridership than weekends and warmer months saw significantly higher trips than cooler ones.

  - **Popular shared e-scooter routes connected to transit.** Ridership was high on commercial corridors and near MTA transit, including subway stations, bus and ferry stops. Shared e-scooters provided "last-mile" connections.

- **Safety**
  - **The shared e-scooter pilot has a strong safety record.** No fatalities were reported. Most crashes where severity was indicated resulted in minor injuries or no injury.
  - **DOT safety requirements resulted in a safer service.** DOT-required safety features include in-app safety training and a "beginner mode" for new riders with slow speeds and an overnight riding prohibition.
- **Operations & Data**
  - **The limitations of the operators' technology affect the quality of service.** Shared e-scooter operator GPS is currently too imprecise to implement some policies effectively. Creating a system that consistently provides high quality user experience and upholds rules has proven to be resource intensive and an iterative process.
  - **The Mobility Data Specification (MDS) is helpful for program management.** MDS provides a good basis for managing micromobility systems but is not sufficient for all of New York City's needs. DOT required operators to provide additional data to ensure high standards of service and safety.
- **Parking**
  - **Parking corrals reduce clutter and obstructions.** Corrals are successful in creating a more organized streetscape along busy corridors across the pilot.
  - **Sidewalk obstructions remain an area for improvement.** During DOT inspections, 24 percent of all inspected e-scooters were improperly parked.
- **Equity**
  - **Participating low-income riders made good use of the system.** Discounted pricing participants completed an average of 25 trips versus the system-wide average of 11 trips. Knowledge of and participation in the discounted program, however, was low.
- **Community Reception**
  - **Community groups and institutions were receptive, even when issues arose.** Many community groups and institutions reached out to DOT and e-scooter operators to address problems. When issues arose for specific groups, they could usually be addressed through a variety of geofencing, corral, or operation restrictions.

After ten months of successful shared e-scooter service, DOT expanded the pilot program to a larger area of the East Bronx on June 22, 2022. In November 2022, DOT plans to issue a solicitation for ongoing shared e-scooter and other micromobility services. The timeline of this procurement aims to ensure continuous post-pilot program service in the East Bronx while allowing for potential future expansion of the service to other communities. An ongoing program will build on the success of the pilot while rectifying its shortcomings. Looking forward, DOT will adjust safety measures and develop new strategies to mitigate sidewalk riding and underage riding among other behavioral issues. Technology can also reduce instances of poor riding behavior. Operators will be incentivized to increase the accuracy of vehicles' GPS technology. Furthermore, the long-term program will continue to require operators to share MDS data while asking for additional, complementary data. Finally, public outreach efforts to promote affordable pricing and accessible vehicles did not lead to the expected participation levels. DOT will work diligently with operators in finding effective ways to reach the initiative's target audience and increase enrollment.

In planning for the future of shared micromobility in New York City, DOT will consider and act in the context of the financially uncertain and rapidly evolving micromobility-share industry. As operators face higher capital costs and pressure to show profitability, it is difficult to forecast whether future vendors will be willing or able to offer the same services, in the same places, on the same terms as those that are offered by the current pilot participants.

Service Area

Location: East Bronx, NYC

Phases: 2

Duration: 2 years

Phase 1

Launch Date: August 17, 2021

Fleet Size: Up to 3,000 shared e-scooters

Neighborhoods: Baychester, Eastchester, Edenwald, Olinville, Wakefield, Williamsbridge, Woodlawn, Allerton, Bronxdale, Indian Village, Morris Park, Pelham Gardens, Pelham Parkway, and Van Nest

Phase 2

Launch date: June 22, 2022

Fleet Size: Up to 6,000 shared e-scooters across both phases

Neighborhoods: Parkchester, Soundview, Unionport, Castle Hill, Clason Point, Country Club, Edgewater Park, Schuylerville, and Throggs Neck

Service Area

Map 1: East Bronx Pilot Zone

E-Scooter Operators & Vehicle Models

Figure 1: Shared E-Scooter Operators & Vehicles

Bird Three

Lime Gen4

Astro Standing & Cosmo Seated Scooters

Introduction

Background

A shared e-scooter system is a fleet of electric motorized scooters (e-scooters) available for shared use on the street, typically utilizing a pay-as-you go model. E-scooters fall under the micromobility umbrella, defined as lightweight and low-speed personal transport vehicles. Shared e-scooters are commonly deployed as dockless fleets, which means that vehicles do not need to be parked at a station or other fixed location.

Shared e-scooter operators and local governments can track the location of the individual devices and apply self-enforced operation restrictions on the vehicles using Global Positioning System (GPS) technology. Operators can program devices to stop or slow down as they enter restricted areas, also known as geofencing. Users largely gain access to the vehicles through an application on their smartphone. They are typically charged a fee for unlocking the select vehicle and then an additional fee per minute for operating the vehicle until the ride ends.

New York City was among the last large American cities to allow shared e-scooter services, in part because e-scooters remained illegal in New York State until 2020. The first shared e-scooter service was launched in Santa Monica, California in 2017, and by the following year, these devices were operating in 65 U.S. cities.[1] As these services continue to expand, cities are taking steps to assess their potential effects on road safety and accessibility, to help inform policies and operations.[2]

New York State (NYS) legalized the use of electric bikes and electric scooters in 2020. The state legislation set a statewide e-scooter speed limit of 20 MPH and specifically prohibited shared e-scooters in Manhattan. These changes to the State's Vehicle and Traffic Law were followed by two bills in the New York City Council. In July 2020, the Council passed Local Law 72, which allowed the operation of e-scooters in the City by removing local prohibitions on the operation of these devices. In addition, Local Law 74 of 2020 mandated that the New York City Department of Transportation (DOT) establish a shared e-scooter pilot program. The law outlined conditions that guided DOT's program design and development.

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1. Irfan, U., 2018. Electric scooters' sudden invasion of American cities, explained. Retrieved from https://www.vox.com/2018/8/27/17676670/electric-scooter-rental-birdlime-skip-spin-cities.

2. Shaheen, S., Cohen, A., Randolph, M., Farrar, E., Davis, R., & Nichols, A. (2019). Shared Mobility Policy Playbook. Retrieved from https://escholarship.org/uc/item/9678b4xs

These requirements included:

- ■ **Duration:** The pilot program should exist for no less than one year and no more than two years.

- ■ **Locations:** Priority should be given to neighborhoods currently underserved by Citi Bike, NYC's bike share system.

- ■ **Reporting:** DOT must complete a report regarding the progress of the pilot program. The document should include a determination on future shared e-scooter programs and any recommended changes to local law regarding e-scooters.

- ■ **Accessibility safeguards:** Participating operators must have in place and implement protocols to keep paths of travel, curb ramps, and other accessibility features unobstructed for people with disabilities.

- ■ **Accessible vehicles:** The program should make accessible electric scooter options available for use by people with disabilities.

Before the shared e-scooter pilot, DOT conducted a Dockless Bike Share Pilot in the Rockaways, Queens; North Shore, Staten Island; and Fordham, Bronx in 2018 and 2019. Four operators participated in the pilot: JUMP, Lime, Citi Bike, and Pace. After early results illustrated ongoing operational and technological challenges with dockless bikes and contraction of the micromobility industry, DOT planned to launch a second dockless bike share program on Staten Island in 2020. Ultimately, business disruptions and operational challenges relating to the COVID-19 pandemic led to the cancelation of the program. The agency's experience with dockless bike share informed the development of the shared e-scooter pilot, including the agency's strong safety, operational, and parking requirements.

In advance of the shared e-scooter pilot, DOT met with several peer cities to understand local government experiences managing shared e-scooter programs. DOT conducted research on best practices relating to shared micromobility services and held an industry day where operators and relevant industry stakeholders shared their perspectives on how to design a successful pilot. This informed how DOT structured the pilot, including the size of the pilot area and fleet.

About this Evaluation

DOT examined both quantitative and qualitative data to assess the impact of the shared e-scooter pilot. The agency required operators to share anonymized trip data, which allowed DOT to analyze vehicle usage. It also helped the agency monitor program compliance. Trip data used in this report captures activity from August 17, 2021 to August 31, 2022. DOT required operators to share data according to Mobility Data Specification (MDS) standards, a data sharing framework used by some public agencies across the United States.[3] To protect user privacy, the agency did not receive any personally identifiable information associated with the trip data.

DOT also conducted community surveys, performed field inspections, and engaged with the public, stakeholders, and elected officials through on-street tabling, virtual meetings, and demonstration events. Between September 2021 and May 2022, DOT conducted a survey collecting input from shared e-scooter riders and non-riders on their experience with Phase 1 of the pilot program. The agency promoted the survey, available in both English and Spanish, via social media, email, flyers, street intercepts, and in-app push notifications. DOT received 1,696 completed surveys.

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3. Open Mobility Foundation. 2022. About MDS. Retrieved from https://www.openmobilityfoundation.org/about-mds/.

Shared E-Scooter Pilot

Program Goals

Informed by previous experience with dockless micromobility, lessons learned from other cities, and the guidance of Local Law 74 of 2020, DOT designed a pilot to advance the following goals:

1. Provide meaningful mobility options to residents of and visitors to the East Bronx;

2. Create a safe environment for new mobility options complying with local laws;

3. Assess the transportation utility of shared e-scooters;

4. Maintain orderly public spaces and sidewalks clear of obstructions; and

5. Evaluate the viability of e-scooter share operators as long-term partners.

Site Selection

DOT sought to identify a pilot zone that reflected the diversity of the city, was expansive enough to provide a meaningful area to test the service, and met legislative goals. The pilot zone also had to be outside of Manhattan, as required by state law. The agency also wanted to identify a pilot zone that did not overlap with the current Citi Bike service area. DOT selected the East Bronx based on population density, existing transit options, and bike infrastructure. The service area was broken into two phases. This approach enabled a gradual rollout of the shared system, starting with Phase 1, located in the northern section of the service area. On June 22, 2022, ten months after the pilot launch, DOT expanded the pilot south to include Phase 2.

The phased implementation allowed DOT to closely monitor impacts on local communities and address any issues in a timely manner. Phase 1 deployed up to 3,000 e-scooters a day and Phase 2 doubled the maximum number of e-scooters to 6,000.

Figure 2: Key Statistics About Pilot Zones

	Phase 1	Phase 2	Total Pilot Area
Population[4]	342,814	256,875	599,689
Race/Ethnicity[5]	Hispanic/Latino - 119,927 (35.0%) Black/African American - 147,414 (43.0%) White - 42,907 (12.5%) Asian - 18,168 (5.3%) Other - 14,398 (4.2%)	Hispanic/Latino - 136,204 (53.0%) Black/African American - 56,459 (22.0%) White - 27,190 (10.6%) Asian - 26,681 (10.4%) Other - 10,341 (4.0%)	Hispanic/Latino - 256,131 (42.7%) Black/African American - 203,873 (34.0%) White - 70,097 (11.7%) Asian - 44,849 (7.5%) Other - 24,739 (4.1%)
Median Age[6]	38.6 years	35.9 years	37.5 years
Household Income[7]	Mean household income: $70,543 Median household income: $54,463	Mean household income: $65,054 Median household income: $47,213	Mean household income: $68,286 Median household income: $51,653
Commute to Work[8]	Mean travel time: 46.9 minutes Public transportation - 78,505 (52.0%) Car, truck, or van - 57,465 (38.0%) Walk - 8,639 (5.7%) Other - 6,454 (4.2%)	Mean travel time: 45.5 minutes Public transportation - 53,612 (53.4%) Car, truck, or van - 36,863 (36.7%) Walk - 5,378 (5.4%) Other - 4,543 (4.5%)	Mean travel time: 46.3 minutes Public transportation - 132,117 (52.5%) Car, truck, or van - 80,495 (32.0%) Walk - 14,017 (5.6%) Other - 10,997 (4.3%)
NYCHA Residents[9]	15 developments 22,839 residents	10 developments 14,414 residents	25 developments 37,253 residents

4. U.S. Census Bureau. September 16, 2021. 2020 Decennial Census Redistricting Data. Retrieved from https://data.census.gov/cedsci/all?q=&y=2020&d=DEC%20Redistricting%20Data%20%28PL%2094-171%29

5. U.S. Census Bureau (2021)

6. U.S. Census Bureau. December 10, 2020. 2019 American Community Survey 5-Year Data. Retrieved from https://data.census.gov/cedsci/all?y=2019&d=ACS%205-Year%20Estimates%20Detailed%20Tables

7. U.S. Census Bureau (2020)

8. U.S. Census Bureau (2020)

9. "NYCHA Development Data Book," NYC Open Data, accessed on August 17, 2022, https://data.cityofnewyork.us/Housing-Development/NYCHA-Development-Data-Book/evjd-dqpz.

East Bronx E-Scooter Pilot Zone

Phase 1

Phase 2

Legend:
- 🟧 University
- 🔴 Hospital
- 🔵 Subway Stop
- — Bike Lane
- — Subway
- ⬛ BID
- ⬛ NYCHA
- 🟧 E-Scooter Pilot Zone
- 🟦 Planned Citi Bike Area

Map labels: Van Cortlandt Park, Woodlawn, Wakefield, Eastchester, Pelham Bay Park, Edenwald, Co-Op City, Norwood, Williamsbridge, Baychester, Bedford Park, Olinville, Botanical Garden, Belmont, Pelham Gardens, Bronx Park, Pelham Parkway, Bronx Zoo, Morris Park, Pelham Bay, West Farms, Van Nest, Westchester Square, Country Club, Parkchester, Schuylerville, Unionport, Soundview, Castle Hill, Edgewater Park, Ferry Point Park, Throggs Neck, Soundview Park, Hunts Point, Clason Point

Map 2 shows the neighborhoods served by the different phases of the pilot program. Phase 1 encompasses Baychester, Eastchester, Edenwald, Olinville, Wakefield, Williamsbridge, Woodlawn, Allerton, Bronxdale, Indian Village, Morris Park, Pelham Gardens, Pelham Parkway, and Van Nest. Phase 2 includes Parkchester, Soundview, Unionport, Castle Hill, Clason Point, Country Club, Edgewater Park, Schuylerville, and Throggs Neck.

E-Scooter Operators

In October 2020, DOT issued a call for e-scooter operators to declare their interest in participating in the pilot program, known formally as a Request for Expressions of Interest (RFEI), that led to the selection of three operators: Bird, Lime, and Veo. The companies were selected based on their experience in other cities, safety records and requirements, operations, accessibility, equity, community outreach, and consumer and labor policies. Bird and Lime provide stand-up e-scooters while Veo offers both stand-up and seated e-scooters. In addition to these devices, each company made available an electric scooter option for people with ambulatory disabilities. Figure 3 illustrates each company's standard e-scooter models, deployed on the street.

Figure 3: Shared E-Scooter Operators & Vehicles

Bird Three

Lime Gen4

Astro Standing &
Cosmo Seated Scooters

Figure 4: Operator Pricing

	BIRD	Lime	veo
Regular Price			
Cost to Unlock	$1*	$1	$1
Additional cost per minute	$0.39**	$0.30***	$0.39
Discounted Price			
	$5 per month for unlimited 45-minute rides, $0.39 per minute afterwards	Free 30-minute rides, $0.04 per minute afterwards	$5 per month for unlimited 30-minute rides, $0.20 per minute afterwards
Discounted Eligibility			
	NYCHA, SNAP, Pell Grant, other forms of state and federal assistance	NYCHA, Fair Fares, Pell Grant, any form of local, state, or federal assistance	NYCHA, SNAP

*Temporarily changed to $1.25 from April 18 to August 26, 2022
**Temporarily changed to $0.35 from April 18 to August 26, 2022
***Changed in May 2022 to $0.38

Pricing

All participating operators use a similar pay-as-you-go model with an unlock fee for each ride and a per-minute fee. A ten-minute ride on a shared e-scooter costs just under five dollars. DOT does not dictate pricing but does require operators to provide a discount for low-income New Yorkers. New Yorkers who receive local, state, or federal assistance programs are eligible for discounted e-scooter rates.

Operators are also required to provide access to the system for unbanked New Yorkers and those without a smartphone. These options include cash payments and access to the service through mobile texting. Figure 4 details standard and discounted pricing. In May 2022, Lime increased its price from $0.30 per minute to $0.38 per minute, coming closer to the price of Bird and Veo at $0.39 per minute. Operators also provided a variety of membership plans for more frequent riders.

Community Outreach

DOT and the e-scooter operators conducted extensive community outreach to inform the design and implementation of the pilot program. Prior to the pilot program launch, DOT and operators met with local stakeholders, elected officials, community boards, and community advocates. DOT also collected input through an online feedback portal. Since the launch of the pilot program, DOT and the operators have held on-street engagements across the service area and operators are required to provide monthly shared e-scooter demonstrations and safety training.

Online Feedback Portal

Program Design for Success

The pilot program allowed DOT to assess shared e-scooter operators' performance and ensure that they align with the City's Vision Zero and equity goals. In its agreement with the operators, DOT put in place provisions to address safety, accessibility, and equity issues witnessed in the early deployment of shared e-scooters in other American cities. The following sections outline key components of the pilot program design.

Safety

As a national leader in Vision Zero -- a commitment to eliminating traffic fatalities and serious injuries -- New York City knows that serious crashes are preventable and not inevitable. To further the City's Vision Zero goals, DOT capped the vehicle speed at 15 MPH and mandated operators include the following in-app features to safeguard user and public safety:

- **Mandatory age verification: While the minimum legal age to ride an e-scooter in NYC is 16 years old, all the participating operators require users to be at least 18 years old. Operators are required to verify age through a form of official identification and are required to accept alternative forms of identification such as IDNYC.**

- **Safety quiz for new riders: New users must learn about the program rules, including parking rules, and pass a quiz demonstrating that they understand these rules before using the service.**

- **"Beginner Mode": New riders are limited to a maximum speed of 10 miles per hour during their first three trips. Additionally, riders may not begin any of their first three trips during overnight hours.**

The operators were also required to put in place rider accountability and account sharing prevention policies to ensure riders do not use shared e-scooters with multiple riders at once or allow children under the age of 18 to ride a shared e-scooter. As a condition for participating in the pilot program, operators must host monthly community outreach events including free helmet give-aways and in-person lessons. To support the program, DOT convenes a Safety Committee that meets regularly with companies and amends contract safety requirements as needed.

Operations & Data

DOT established operational restrictions based on location or weather conditions, featured in Figure 5. These pilot program rules are enforced through a combination of geofencing technology and regular oversight of the shared system using Mobility Data Specification (MDS) tools.

DOT required robust data sharing to enable the agency to monitor whether the e-scooter operators are complying with the terms of the pilot program. This data allowed DOT to identify operational problems, such as uneven distribution of devices across the pilot zone. The e-scooter operators share trip data with DOT following MDS standards.

As part of the solicitation process, DOT contracted a third-party data manager, Blue Systems, to aggregate, process, and visualize fleet, trip, and user data. Using MDS, DOT can enforce operational and parking requirements, fleet levels, and geographic boundaries. DOT accesses the information via direct feeds from the operators and through an online interface provided by Blue Systems. This tool has played an instrumental role in empowering DOT to oversee the shared fleet and enforce pilot program regulations.
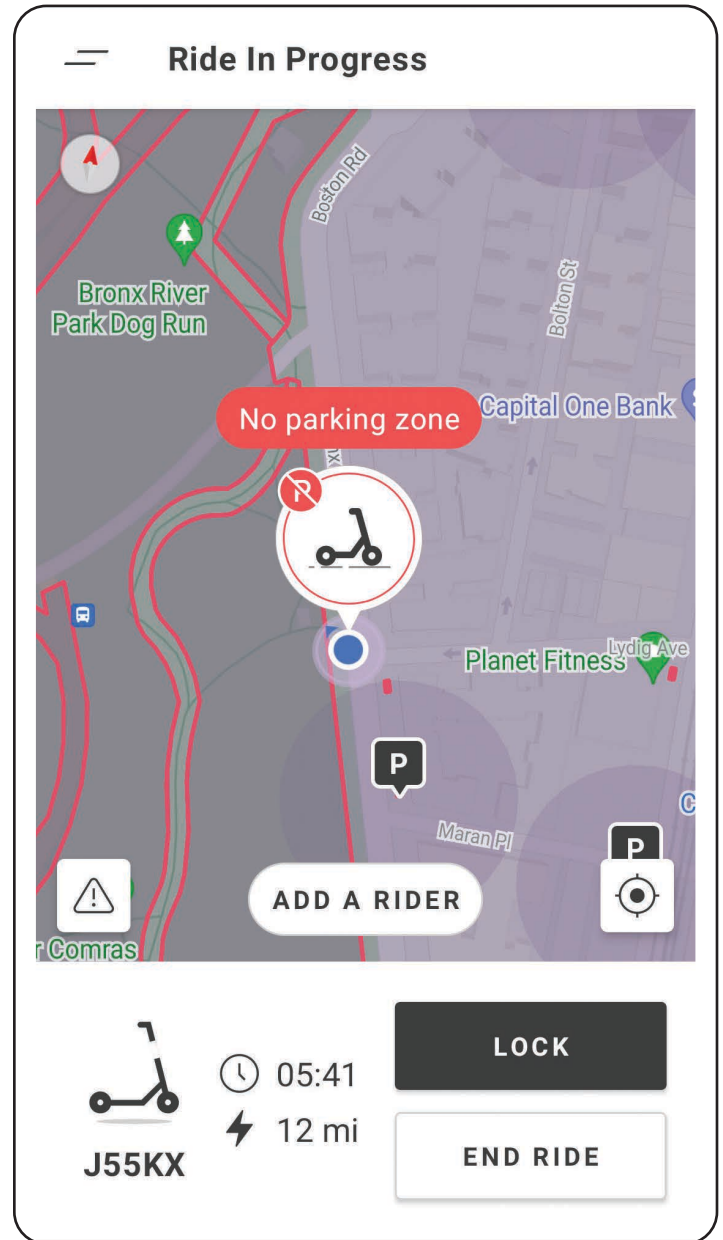
Figure 5: Operational Restrictions

	Slow Zones	No Ride Zones	Temporal Restrictions
Description	Bounded areas where e-scooter speeds are capped below the 15-MPH limit	Bounded areas where e-scooters cannot be ridden (motor cuts off when vehicles cross boundary)	Limited overnight riding or restricted riding during inclement weather
Examples	Greenways in public parks	Jacobi Medical Campus and Co-Op City interior roads	Hurricane Henri and January 7th snowstorm

Parking & Infrastructure

Maintaining a clear path of travel for pedestrians is instrumental in guaranteeing street safety for all, particularly for people with disabilities and limited mobility. DOT develops planning and design strategies that promote orderly sidewalks with well-defined and unobstructed travel paths. DOT created mandatory parking corral zones on busy corridors in the service area. In these zones riders cannot end a trip unless their e-scooter is inside a corral. Sited by DOT with community input and installed and maintained by the operators, these parking corrals can be found in the sidewalk furniture zone[10] or in the curbside lane. Approximately 90 corrals were installed along White Plains Road and Bronx Boulevard and in Westchester Square in Phase 1, and 40 corrals were installed along Westchester Avenue and East Tremont Avenue in Phase 2.

Outside mandatory corral zones, riders may park e-scooters in the sidewalk furniture zone (also referred to as the free-floating parking zone). Riders may not block driveways, curb cuts, or the pedestrian path of travel, including pedestrian ramps, and may not park on the roadbed or on private property. These parking rules are communicated to riders via in-app training and to the larger community during outreach events. Improperly parked e-scooters can be reported directly to the operators or to 311. Operators are required to rectify improperly parked e-scooters.

Parking Corral on the Sidewalk	Parking Corral in the Roadbed

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10. The furniture zone is the segment of the sidewalk between the curb and the pedestrian path of travel where street furniture and amenities, such as bike racks, light poles, and benches, are installed.

In anticipation of increased micromobility usage, DOT prioritized nine street improvements within the pilot service area, which included 12 lane miles of protected bike lanes. Map 3 shows the location of each project and Figure 6 provides more information. While capacity and resource constraints related to the COVID-19 pandemic delayed the start of projects across the city, DOT expects to complete the majority of these projects in 2022.
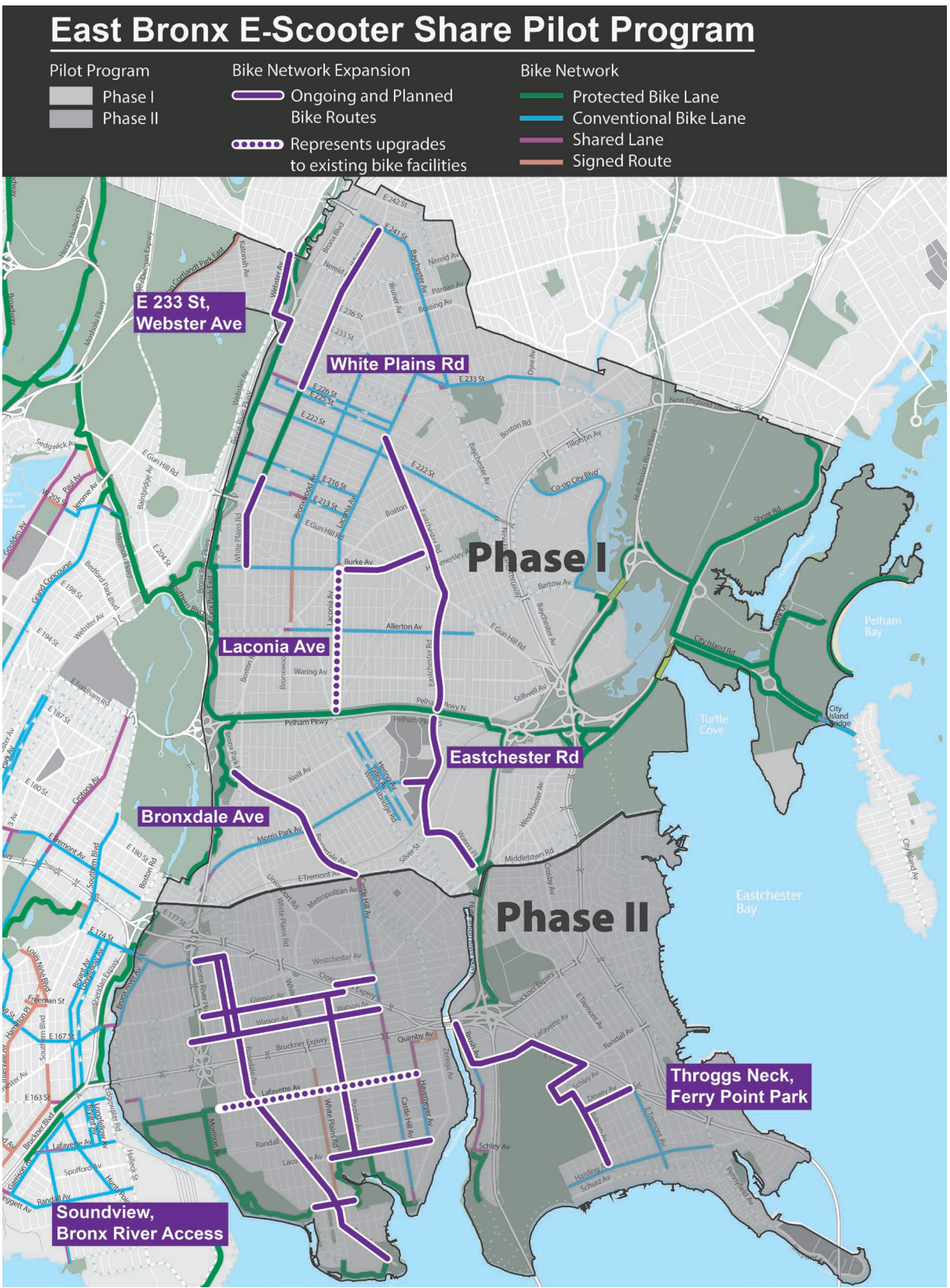
Map 3: Bike Network Development

East Bronx E-Scooter Share Pilot Program

Figure 6: Bike Network Development in the Pilot Area

Bike Network Development in the Pilot Area		
Project Name	*Type and Mileage*	*Status*
E 233rd Street	Protected bike lane (PBL) -- 1.9 miles Conventional bike lane (CBL) -- 0.1 miles	Installed in 2022
Bronxdale Avenue	PBL -- 2.1 miles	Anticipated completion in 2022
Lafayette Avenue	PBL -- 2.6 miles	Anticipated start in 2023
Eastchester Road	CBL -- 4.5 miles & Shared Bike Lane (SBL) -- 0.5 miles	Anticipated completion in 2022
Laconia Avenue	PBL -- 0.1 miles & CBL -- 1.8 miles	Anticipated start in 2023
White Plains Road, Burke Avenue to E 216th Street	PBL -- 1.2 miles	Anticipated completion in 2022
White Plains Road, E 226th Street to 241st Street	PBL -- 1.6 miles	Installation started in 2022
Soundview Avenue	PBL -- 2 miles & SBL -- 0.5 miles	Anticipated start in 2023
Soundview Bike Network	CBL -- 5.9 miles & SBL -- 3 miles	Anticipated start in 2023

Equity

DOT is committed to advancing equity in transportation by focusing investment on historically underserved populations. The site selection and program design explicitly intended to provide equitable access to this new form of urban mobility. DOT aims to advance equity by:

- **Requiring all e-scooter operators to provide discounted pricing options for low-income New Yorkers**

- **Requiring companies to provide accessible scooter devices for residents with ambulatory disabilities**

- **Requiring companies to host monthly community engagement events to promote discounted pricing and accessible vehicles**

- **Providing promotional materials in multiple languages**

- **Prohibiting binding arbitration or class action waiver provisions in the rider's terms of service**

- **Barring the use of gig labor or "fleet managers" in the operation of the system**

Accessible E-Scooters

DOT is committed to ensuring that its infrastructure and services are accessible to all New Yorkers regardless of disability status. DOT established an accessibility working group composed of members of the disability community, the Mayor's Office of People with Disabilities, advocacy groups, DOT staff, and the three operators. Their input shaped the accessibility components of the program, which include accessible e-scooter devices by request. Figure 7 illustrates the accessible devices available to the public as part of the pilot program. Bird offers two types of accessible devices: a wheelchair attachment and an electric vehicle with a basket on the bar. Lime offers an electric vehicle with a basket on the bar and Veo offers a wheelchair attachment.

Each company established its respective processes for community members to request the devices, which are delivered to and picked up from requestors' homes or preferred drop-off addresses. DOT also hosted a design competition for operators to develop a wheelchair-accessible scooter prototype that can be deployed on-street. DOT staff and members of the disability community provided input at each stage of the design competition process. As of Fall 2022, DOT is evaluating the competition submissions, as well as all accessibility options and features, for possible deployment in an additional pilot project or incorporation into any future micromobility initiatives.

Figure 7: Accessible E-Scooter Vehicles

Product	Rio Firefly Attachable Device	Lime Able Accessible Vehicles	Electric Adaptive Wheelchair
Pricing	Free	Free	Free

Product	Scootaround Motorized Wheelchair
Pricing	$5/day

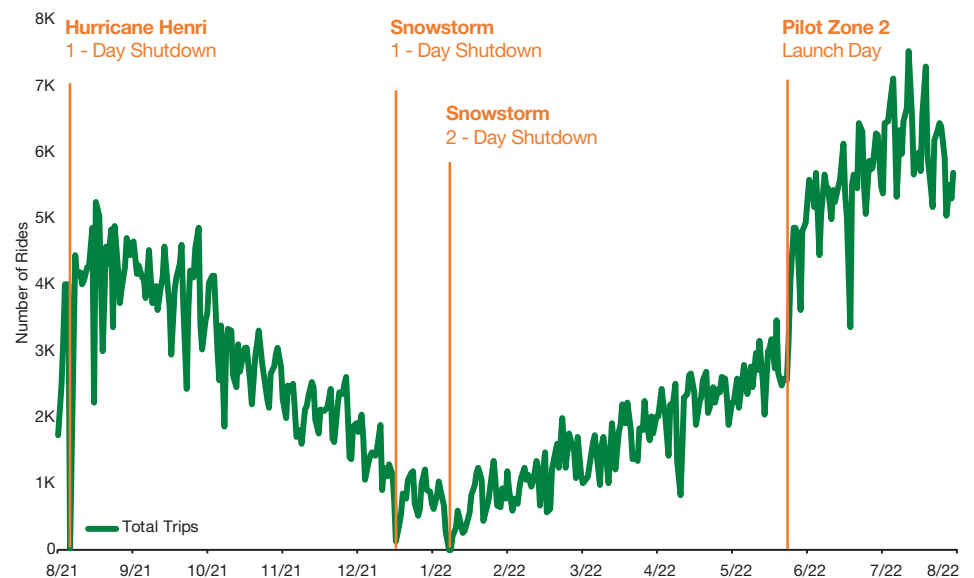# Shared E-Scooter System: What We Learned
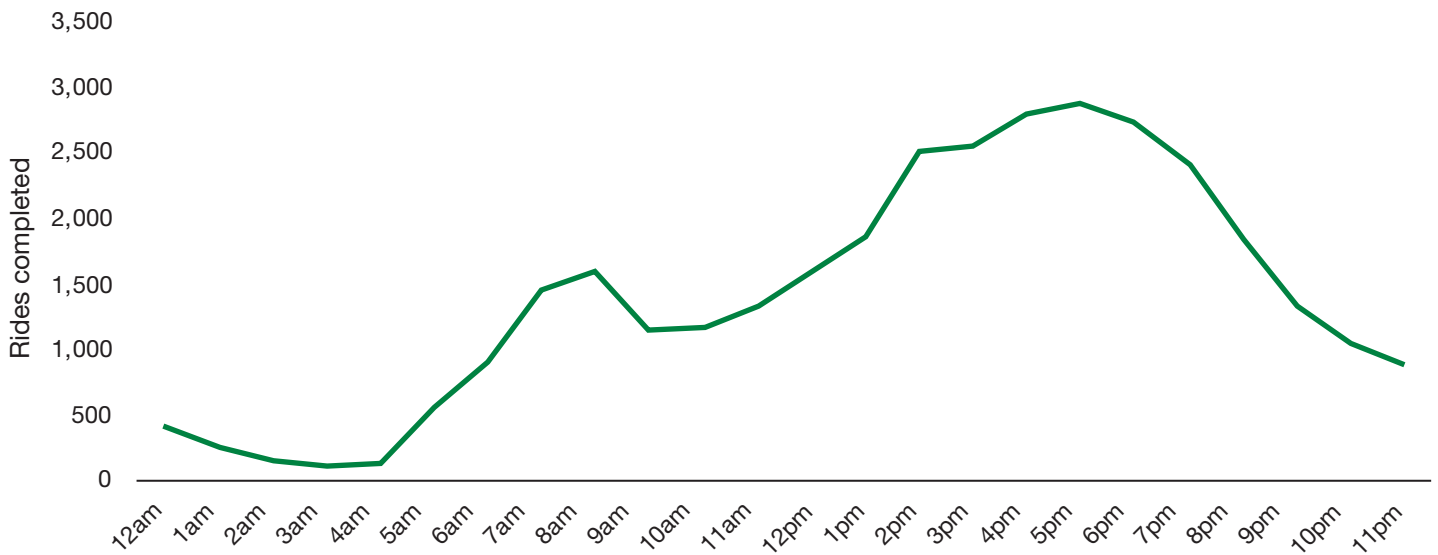
Mobility

Ridership

During the first year of the pilot, users took 1,067,571 rides, approximately 2,809 rides per day. Ridership was highest in the warmer months with four months breaking 100,000 trips: September and October 2021 and July and August 2022 (which also coincided with the expansion of the service area and increase in fleet size). Peak riding season (May to October) saw a median 4,046 trips per day with a total of 799,357 rides. The low riding season (November to April) had a median 1,396 trips per day with a total of 268,214 rides. Figure 8 shows daily ridership trends across the first twelve months of service.

Figure 8: Ridership by Day

Riders showed a preference for weekday rides over the weekend with average weekday ridership of 2,913 trips and average weekend ridership of 2,548 trips. The evening peak on an average Wednesday was nearly twice as high as the average morning peak. Average Wednesday rides peaked at 8:00am with 1,588 rides and at 5:00pm with 2,865 rides. The large difference between the morning and evening peaks implies that shared e-scooter riders are using the system differently than bike share or transit, where peak ridership between the morning and evening commutes is typically even. The difference may also reflect changing commute behaviors as a result of the COVID-19 pandemic. A majority of survey respondents (61 percent) reported using shared e-scooters a couple of times each month or each week, while 17 percent of respondents reported using shared e-scooters every day.

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Ridership was fairly even across the three operators. Lime recorded the highest share of trips (41 percent), following by Veo (33 percent) and Bird (26 percent). Lime's success may partially be based on having a lower price than Veo and Bird for the first several months of the pilot. Lime had the lowest per-minute pricing of the three operators until May of 2022, when the company increased its per minute price from $0.30 to $0.38. This increase brought their pricing to near parity with Veo and Bird, which were both charging $0.39 per minute. In May 2022, Bird lowered its cost per minute to $0.35 and added an additional $0.25 flat fee per ride, bringing Bird's total flat fees to $1.25 per ride. Figure 10 shows the cost for an average ride under the regular pricing structure during the first twelve months of the pilot.

Figure 10: Average Ride Cost by Operator

	BIRD	lime	veo
Average ride duration	11 minutes	12 minutes	9 minutes
The cost of a pay-as-you-go trip before tax between August 2021 and May 2022	$5.29	$4.60	$4.51
The cost of a pay-as-you-go trip before tax after pricing changes in May 2022	$5.10	$5.56	$4.51

Trips per vehicle per day is a common metric used to measure vehicle activity in shared vehicle systems. For the first twelve months of the pilot, there was a median of one trip per vehicle per day. Lime had the highest median trips per vehicle per day (1.3), followed by Veo (1.0) and Bird (0.8). In other shared e-scooter systems, trips per vehicle per day ranges from less than one to four.[11]

The average trip took nine minutes and 28 seconds and was 1.06 miles long, slightly shorter than the average Citi Bike trip (10 minutes and 1.6 miles long) during the same months. These patterns reflect national trends from a 2019 survey of shared micromobility trips that showed the average shared e-scooter trip was 12 minutes and one mile long.[12] The average trip distance of just over one mile indicates shared e-scooters may be complementing transit and solving the "first/last mile problem," the distance a commuter needs to travel between their primary transportation mode and their destination.

Seated versus Stand-Up Scooter

As part of the pilot, DOT hoped to understand whether riders use seated and standing shared e-scooters differently. The average seated shared e-scooter trip was nine minutes and 1.5 miles long. Standing shared e-scooters, meanwhile, traveled an average of 10 minutes and 10 seconds and 0.9 miles per trip. Veo provided both standing and seated shared e-scooters while Lime and Bird provided only standing shared e-scooters. Seated models had a higher average utilization rate of 1.4 trips per vehicle per day than standing models with an average of 0.9 trips per vehicle per day.
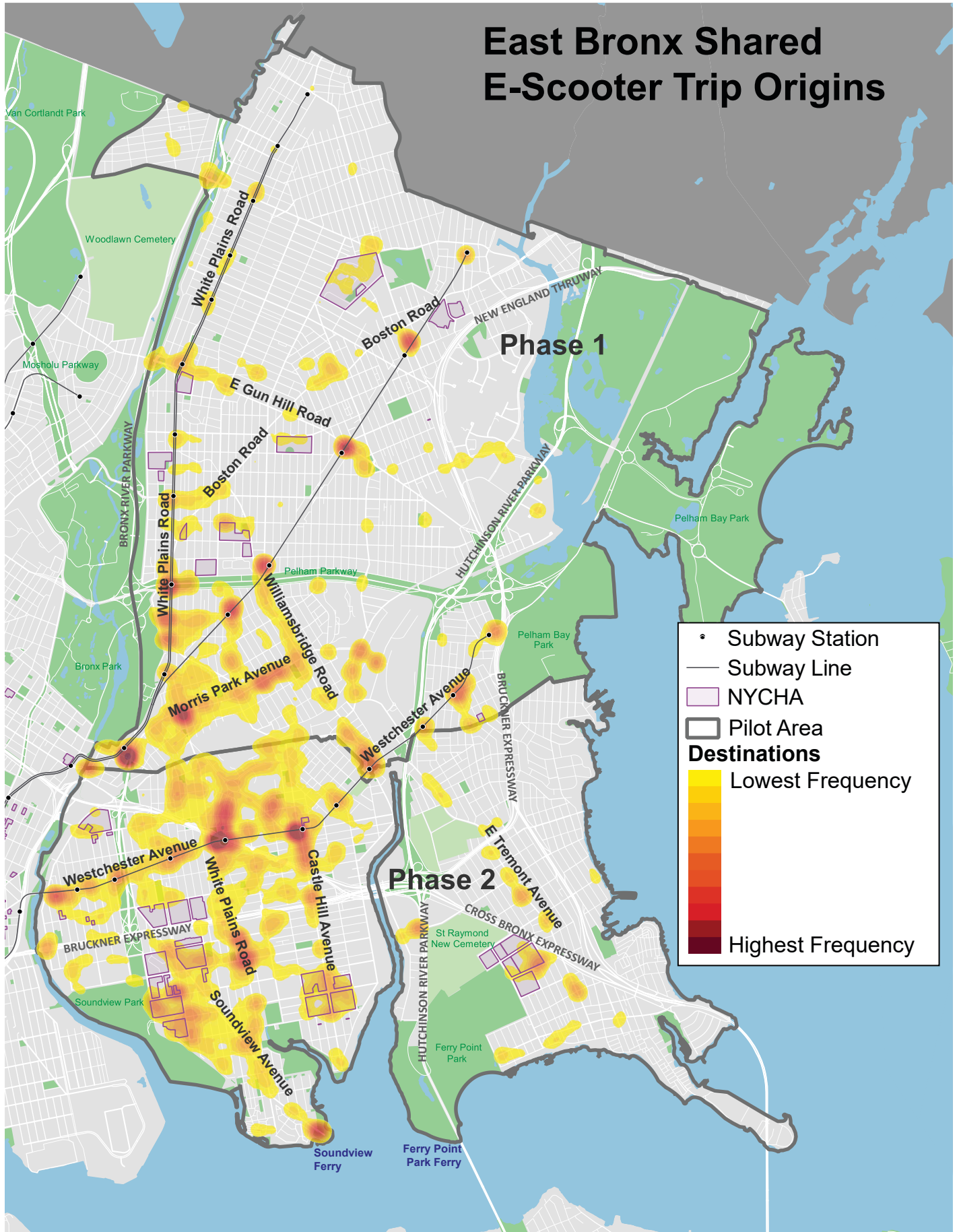
Where are Riders Going?

Four neighborhoods saw nearly half of all trip starts during the first twelve months of the pilot. Van Nest-Morris Park-Westchester Square had the highest share of all trip starts with 15 percent, followed by Williamsbridge-Olinville (12 percent), Pelham Parkway (11 percent), and Eastchester-Edenwald-Baychester (10 percent). Highlighting early successes in Phase 2, the Soundview-Castle Hill-Clason Point-Harding Park neighborhood at the southern end of the service area had the highest share of trip starts in July 2022 with 13 percent of the month's trips. In addition, as visualized in Map 4 and Map 5, some of the highest ridership corridors connected riders to MTA transit service and commercial activities.

Morris Park Avenue, a commercial corridor in the Morris Park neighborhood, had the highest number of e-scooter trips. The corridor has a conventional bicycle lane in both directions as well as access to the 2 and 5 subway lines and two buses. The eastern end of Morris Park Ave is home to Yeshiva University, Albert Einstein College of Medicine, the Montefiore Medical Center, and the Jacobi Medical Center. Other corridors with high trip volumes included White Plains Road, Boston Road, East Gun Hill Road, and Williamsbridge Road. Of these three roads, only a portion of White Plains Road has a bike facility, highlighting potential demand for additional infrastructure improvements on major corridors. The first month of service in Phase 2 showed that Castle Hill Ave, White Plains Road, Westchester Avenue, and East Tremont Avenue are popular routes in the southern section of the service area.
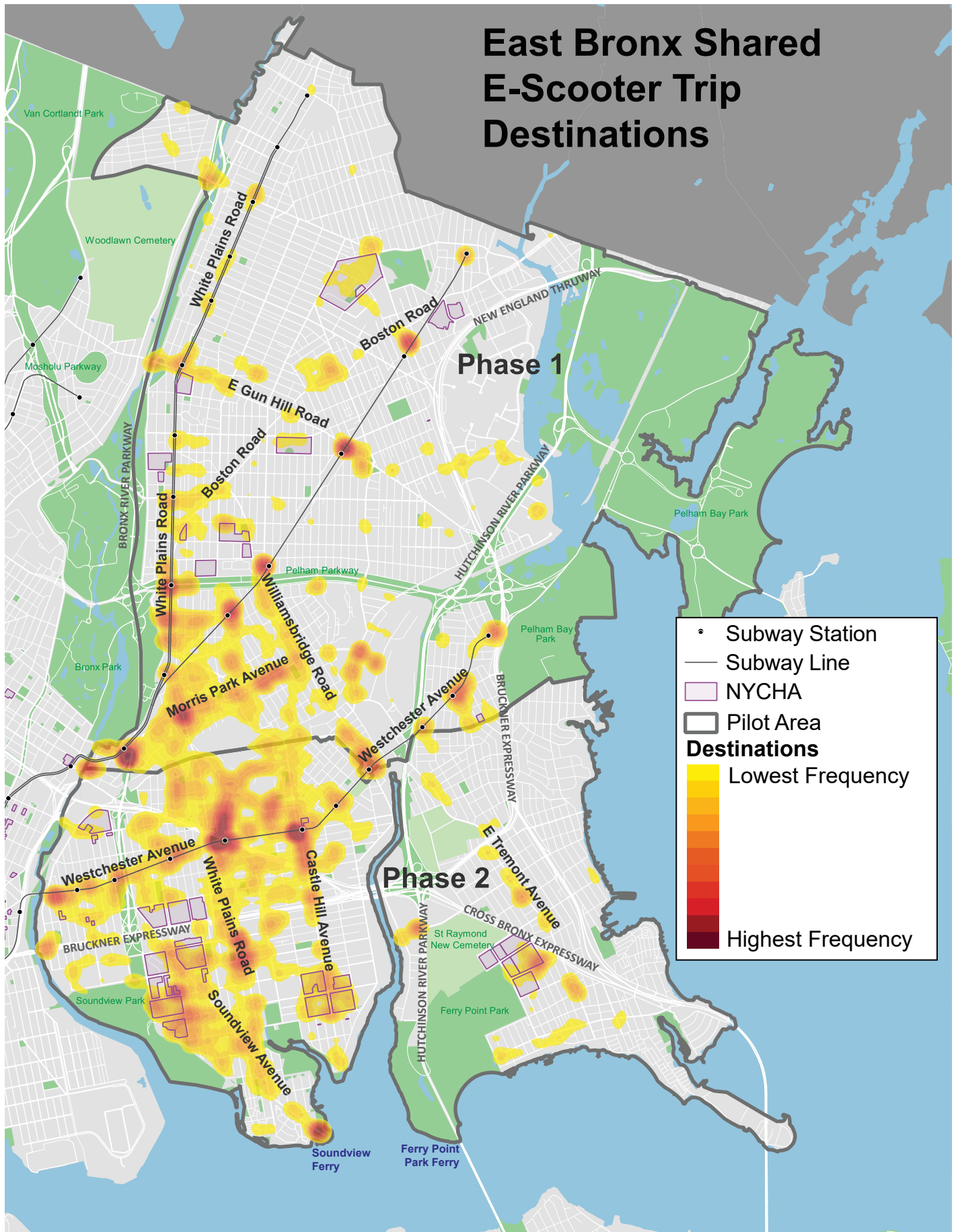
11. Better Bike Share Partnership. 2020. 136 Million Trips in 2019. Retrieved from https://nacto.org/wp-content/uploads/2020/08/2020bikesharesnapshot.pdf
12. Better Bike Share Partnership. 2020. 136 Million Trips in 2019. Retrieved from https://nacto.org/wp-content/uploads/2020/08/2020bikesharesnapshot.pdf

East Bronx Shared E-Scooter Trip Origins
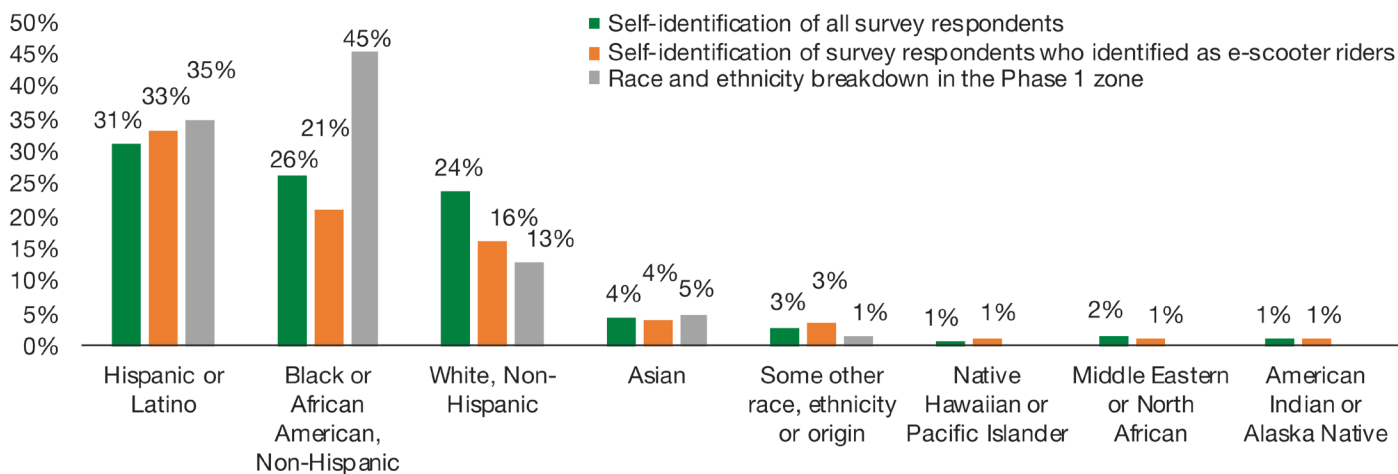
East Bronx Shared E-Scooter Trip Destinations

Trip Purpose & Mode Shift

DOT conducted a community survey of users and non-users to better understand trip patterns and purposes. Of over 500 respondents who reported using a shared e-scooter at least once, the top trip purposes were riding to or from transit (bus, subway, train); shopping, errands, or appointments; and recreation or fun. When asked how they would have completed their trips if shared e-scooters were not available, the most common responses were forms of active and public transportation: walking (67 percent) and bus (50 percent).[13] Shared e-scooters were less likely to replace motor vehicle trips. Thirty-five percent of riders surveyed said their shared e-scooter trip replaced a taxi or ride hail (e.g. Uber, Lyft) trip while 34 percent of respondents reported shared e-scooter trips replaced personal car or carshare trips. When responding to this question, survey respondents could have selected all applicable options, so responses to this question exceed 100 percent.

Who Rides Shared E-Scooters?

The survey provided demographic insights into the ridership not available through the trip data. Of riders who provided their ZIP code, 65 percent live in the Bronx, indicating that most riders are residents of the area as opposed to tourists or New Yorkers from other boroughs. The typical rider was male (56 percent), with a median age of 32 and an household income of less than $50,000 a year (54 percent). Thirty-four percent of respondents were Hispanic or Latino, mirroring the Phase 1 population, where 35 percent of residents identify as Hispanic or Latino.[14] Non-Latino Black or African-American respondents were substantially underrepresented in the survey results. Figure 11 illustrates how the community's racial and ethnic makeup compares with the shared e-scooter ridership based on responses to the e-scooter survey. The household income level of riders who completed the survey mirrors the Phase 1 population. Fifty-four percent of respondents reported an income of less than 50,000 dollars per year, compared to forty-six percent of households in Phase 1.

Figure 11: Comparison of Racial and Ethnic Background of E-Scooter Riders versus Population in the Phase 1 Zone.[15]

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13. DOT's 2021-2022 e-scooter survey asked riders to identify the top two types of trips for which they utilized e-scooters; therefore, the sum of the responses exceeds 100 percent.

14. According to the 2015-2019 American Community Survey (ACS); It is worth noting that the 2015-2019 ACS measured racial, ethnicity, and income data using different classifications than the ones in the e-scooter survey. For example, the 2015-2029 ACS measured income data at household level while the e-scooter survey asked respondents to report their income level. These differences complicate a direct comparison across the surveys.
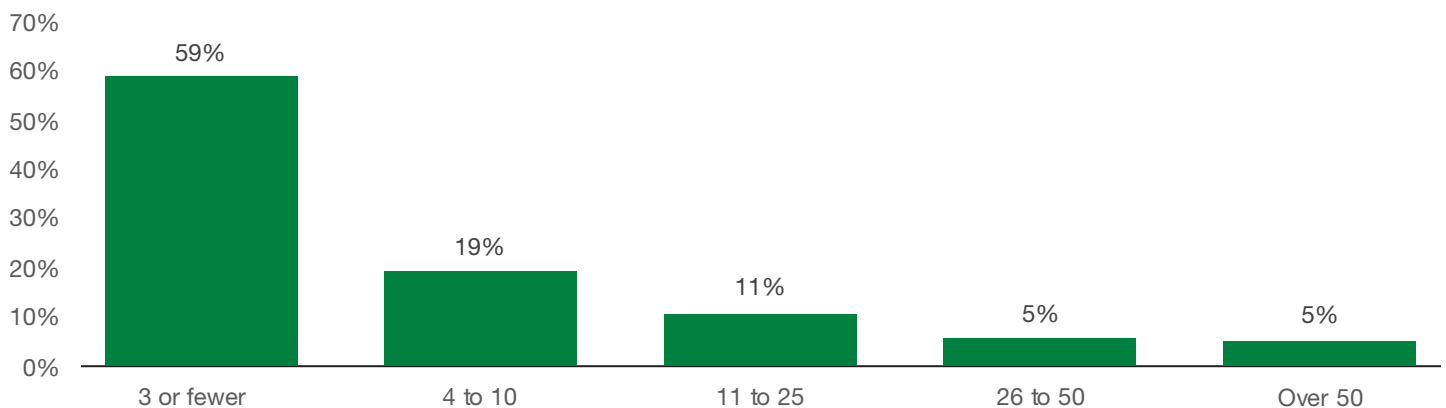
15. Data was retrieved from the 2021-2022 DOT's e-scooter survey & 2015-2019 American Community Survey (ACS).

In the first twelve months of the pilot, over 86,000 unique rider accounts were created across the three e-scooter operators. Account creation was highest in September 2021, the first full month of the pilot. It is important to note that an individual may have accounts with more than one shared e-scooter operator and the number of unique riders is likely lower than the number of unique rider accounts. Only 13 percent of respondents to DOT's rider survey reported that they had only used one of the three operator's shared e-scooters.

A majority of rider accounts (59 percent) completed three or fewer trips. The required Beginner Mode for new users limits speed and hours of operation for a rider's first three rides. It is important to note that many riders have likely created accounts on more than one of the three operator's apps and completed rides on more than one operator's vehicles. The small percentage of rider accounts who completed more than 50 trips implies that relatively few riders are incorporating shared e-scooters into their regular travel patterns. Figure 12 illustrates the distribution of users based on the number of trips completed.

Figure 12: Percentage of Trips Completed by Unique User Accounts

Riders' Preferences

DOT's survey asked riders about their preferences regarding shared e-scooter operators. Of respondents who had taken at least one shared e-scooter trip, 73 percent reported using Lime while 55 percent reporting using Bird and 45 percent reported using Veo. Riders did not express a strong preference for which company they used. Twenty-five percent of riders reported no preference among companies, 23 percent preferred Veo, 21 percent preffered Lime, and 19 percent preferred Bird. Top factors informing rider preference included availability of vehicles, comfortable ride, ease of app usage, and pricing.

Safety

DOT relies on reporting from the operators and the New York City Police Department (NYPD) to understand crash and injury patterns. There were 152 reported crashes in the first twelve months of the pilot, a rate of 1 reported crash per 8,075 trips. Six of these were classified as major crashes (requiring admission to a hospital). Most crashes where severity was indicated (70 percent) resulted in minor injuries (no visit to the hospital or doctor) or no injury. There were no fatal crashes.

Studies of shared e-scooter programs in other cities showed that crashes often occurred when riders were less experienced and were single-vehicle crashes, meaning the shared e-scooter riders did not collide with another vehicle. DOT's Beginner Mode requirements may explain the comparatively even rate of crashes across users with various levels of experience. Riders with three or fewer trips accounted for 17 percent of crashes where experience was noted while the median level of rider experience was 18 trips. However, 80

percent of crashes with available details did not include a collision with a motor vehicle, pedestrian, bicycle, or other vehicle type. Findings show a low crash rate overall. Moving forward, improvements to the crash reporting process are needed to better understand crash patterns.

Rider Behavior

DOT conducted regular field observations throughout the pilot to understand rider behavior. Staff observed a variety of riding habits, outlined below, that may negatively impact rider safety. These observations were episodic in nature and will require further study. What is clear from these observations is that current technologies and operator policies alone cannot adequately ensure safe riding behavior.

- **Sidewalk riding: DOT regularly observed users riding on sidewalks, a violation of program rules. Preliminary investigations indicate that sidewalk riding may result from riders not knowing where e-scooters should be ridden, a lack of or insufficient infrastructure, and a desire to ride directly to destinations (including sidewalk parking corrals, which are more numerous than roadway corrals). Nearly half of all riders who responded to DOT's e-scooter survey (44 percent) reported riding on the sidewalk, with 30 percent reporting feeling safer riding on the sidewalk than in the street and 14 percent not knowing that sidewalk riding was prohibited.**

- **Multiple riders: Operator policies prohibit multiple riders from sharing a single e-scooter; however, DOT and community members observed several instances of multiple riders, including adults and children riding together.**

- **Underage riding: DOT and community members witnessed multiple instances of underage riding. While age is difficult to verify through observation, staff noted multiple instances of adults unlocking shared e-scooters for children.**

- **Helmet usage: Helmet usage is strongly encouraged by DOT and operators, but not required. Operators are required to distribute free helmets and encourage usage on their apps. Despite these efforts, staff observed little helmet usage by shared e-scooter users. Only 22 percent of riders who responded to DOT's survey reported wearing a helmet most of the time or always and 19 percent reported wearing a helmet sometimes.**

Operations & Data

Geofencing and GPS Accuracy

Effective shared e-scooter services require a high level of GPS precision to enforce a variety of operational and parking restrictions. DOT found that current technologies were are not precise enough to accurately enforce geofencing policies (including slow speed zones, parking restrictions, and no ride zones) or reflect the exact location of a shared e-scooter. Shared e-scooter operators generally claim that their technology has a precision of one meter (three feet) or less; however, DOT's on-street observations and MDS monitoring illustrated that precision was typically greater than one meter. Due to the level of inaccuracy, DOT and its third-party data vendor (Blue Systems) used an iterative approach: identifying areas and policies with high levels of inaccuracy, making incremental changes to geofences, and testing in the field and through MDS to improve efficacy.

Overall, GPS technology has not worked as suggested by industry operators and in some instances successful policy outcomes are reliant on good user behavior. New technologies are being developed across the micromobility landscape that could address some of these issues, including camera positioning systems, augmented reality, and a variety of parking solutions. Further industry investment and integration into these technologies will be necessary for operators to better meet their promised levels of service.

Data

The Mobility Data Specifications (MDS) provides a good base for shared micromobility regulators, but does not address all of New York City's specific needs. In addition to data received through MDS, DOT required much more data to provide deeper insight into the operations and use of shared e-scooters. Included in these requirements was a unique, anonymized user ID number assigned by providers to each user. This data point allows the agency to implement crucial safety requirements and understand enrollment, riders' level of experience, and frequency of usage.

In addition, DOT and Blue Systems developed several tools and calculations in order to manage the pilot and enforce service level agreements (SLAs). These included:

- **Data latency and quality.** DOT established a data latency standard to ensure that data is received at regular intervals and is of high quality. DOT will continue to work to increase the consistency and quality of data it receives to ensure that the program can be effectively managed.

- **Speed violations.** DOT and Blue Systems worked together to develop a method to calculate speed based on location data sent through MDS.

- **Beginner mode violations.** Beginner mode violations including speed violations (10 MPH for first 3 trips) and overnight riding (no overnight trips during first 3 trips).

- **Scooter Maintenance.** DOT and Blue Systems are developing an automated check for contractually required regular e-scooter maintenance checks.

- **Stationary scooter/dwell time.** DOT and Blue Systems are developing an automated check for e-scooter dwell time -- the time that devices stay in one location without a user trip or being rebalanced by the operator.

Parking & Infrastructure

Parking

Sidewalk accessibility is central to DOT's Vision Zero mission. Dockless micromobility should not impede safe travel for pedestrians or persons with disabilities. As part of the program design, DOT identified corridors with high pedestrian volumes and limited sidewalk widths to enforce designated parking zones, known as parking corrals. All e-scooter rides within these highly trafficked zones must end in parking corrals, reducing the likelihood of e-scooters blocking the path of travel. Even though parking corrals are limited to specific areas of the pilot, they model proper parking behavior that riders can replicate elsewhere.

Since the pilot began, DOT has conducted regular on-street inspections of the shared e-scooter fleet to identify parking patterns and address sidewalk accessibility issues. Between August 2021 and August 2022, DOT inspected 13,970 e-scooters and examined the rate at which devices were improperly parked. DOT staff found that 24 percent of shared e-scooters inspected were illegally or incorrectly parked, with 1,410 or 10% of these instances being e-scooters that blocked the pedestrian path of travel. While there appears to be a community learning curve on e-scooter parking rule compliance that has been improving over time, these significant rates of sidewalk obstruction remain a challenge and will be the focus of DOT action as the program continues. E-scooter riders and non-riders had the opportunity to report blockage concerns via DOT's e-scooter survey. Among non-riders, more than half of respondents reported concerns about shared e-scooters tipped over or blocking the right of way (54 percent). Thirty percent of riders reported that they had difficulty finding a place to park the e-scooters or that they find the parking rules confusing.

Among riders, limited availability of e-scooters on the street was the top issue encountered (39 percent), followed by maintenance and parking-related issues. Thirty-one percent reported vehicle maintenance issues such as a flat tire, stiff brakes, vandalism, or other problems. According to DOT field inspections, 91 percent of e-scooters had no visible defects and only one percent appeared to have been vandalized. The accessibility section of this report details the parking concerns highlighted by survey respondents. Of the survey respondents who selected an open answer (18 percent), the top concerns included lack of or deficient street infrastructure (bike lanes), problems with the vehicles' GPS, acceleration issues, and a limited service area.
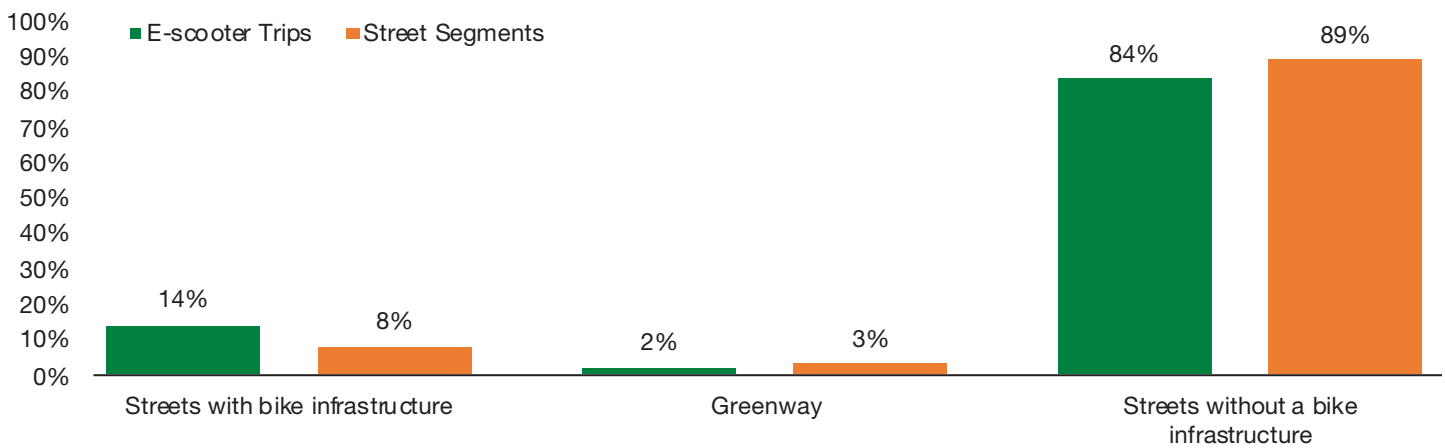
Legal Parking Locations

Legal Parking Locations		
Roadway Corral	Sidewalk Corral	Parking in the Furniture Zone

E-scooters parked in parking corral on the roadbed.

E-scooters parked in a parking corral on the sidewalk.

E-scooters parked in a free-floating parking zone on the sidewalk.

Infrastructure

Most of the ridership data available was collected during Phase 1 of the pilot program. For this reason, DOT took a close look at travel patterns within the Phase 1 area to examine if access to bike infrastructure influenced route choice. Although only 8 percent of the streets within the Phase 1 area have a dedicated bike lane, 14 percent of all e-scooter trips took place on streets or roads with bike facilities. The high ridership on Morris Park Avenue, a corridor with a dedicated bike lane, may be driving this higher share of trips on routes with dedicated bike lanes. Overall, access to a dedicated bike lane had a modest effect on riders' preferred routes.

Responses to DOT's e-scooter survey revealed that many e-scooter riders (44 percent of survey respondents) rode on sidewalks, sometimes in lieu of dedicated bike lanes or because they did not feel safe riding on the street (30 percent of survey respondents). DOT is committed to expanding the bike network in the East Bronx so that active and prospective riders feel safe and comfortable riding on the street. In 2022, DOT began or completed the installation of 2.8 miles of protected bike lanes on White Plains Road, 1.9 miles of protected and 0.1 miles of conventional lanes of East 233rd Street, 4.5 miles of conventional bike lane and 0.5 miles of shared bike lane on Eastchester Road, and 2.1 miles of protected bike lanes on Bronxdale Avenue. The agency will begin installation of bike improvements on Laconia Avenue and Soundview Avenue in 2023.

Figure 13: Bike Infrastructure and Shared E-scooter Usage in Phase 1

Equity

DOT is committed to promoting equitable practices and projects that address the needs of New York City's diverse communities. Central to the shared e-scooter pilot was providing affordable mobility options to all New Yorkers. DOT did not dictate operator pricing but required operators to provide discounted pricing for low-income riders. Figure 4 on page 14 details discounted pricing and eligibility by company.

Although riders who utilized discounted pricing represented a small share of overall ridership, they used shared e-scooters at a higher rate than riders paying standing pricing. Between August 2021 and August 2022, affordable membership riders constituted 1.9 percent of all unique user accounts but took 3.8 percent of all e-scooter trips. Affordable membership riders completed an average of 25 trips compared to the overall average of 11 trips per rider.

Affordable membership riders were underrepresented compared to the eligible population in the service area. Seven percent of the population in the Phase 1 area reside in NYCHA developments and 21 percent are SNAP recipients. DOT's community survey found that 68 percent of riders who responded did not know about the discounted pricing available, including 30 percent who reported they were eligible for the discounts. Survey results and underrepresentation show the need for improvements to affordable membership deployment, likely including additional outreach and ensuring that the enrollment process is fast and simple.

As shown in Figure 10 on page 23, the average ride cost is between four and six dollars for riders paying standard fares. Only 32 percent of survey respondents reported that shared e-scooters were affordable for daily or regular use without a discounted price in addition to having to pay for another mode of transportation to complete their journeys. An additional 20 percent reported that shared e-scooters were affordable for regular use as a replacement for another form of transit. These findings show that current shared e-scooter pricing models may limit the mode's potential ability to solve the first/last mile problem.
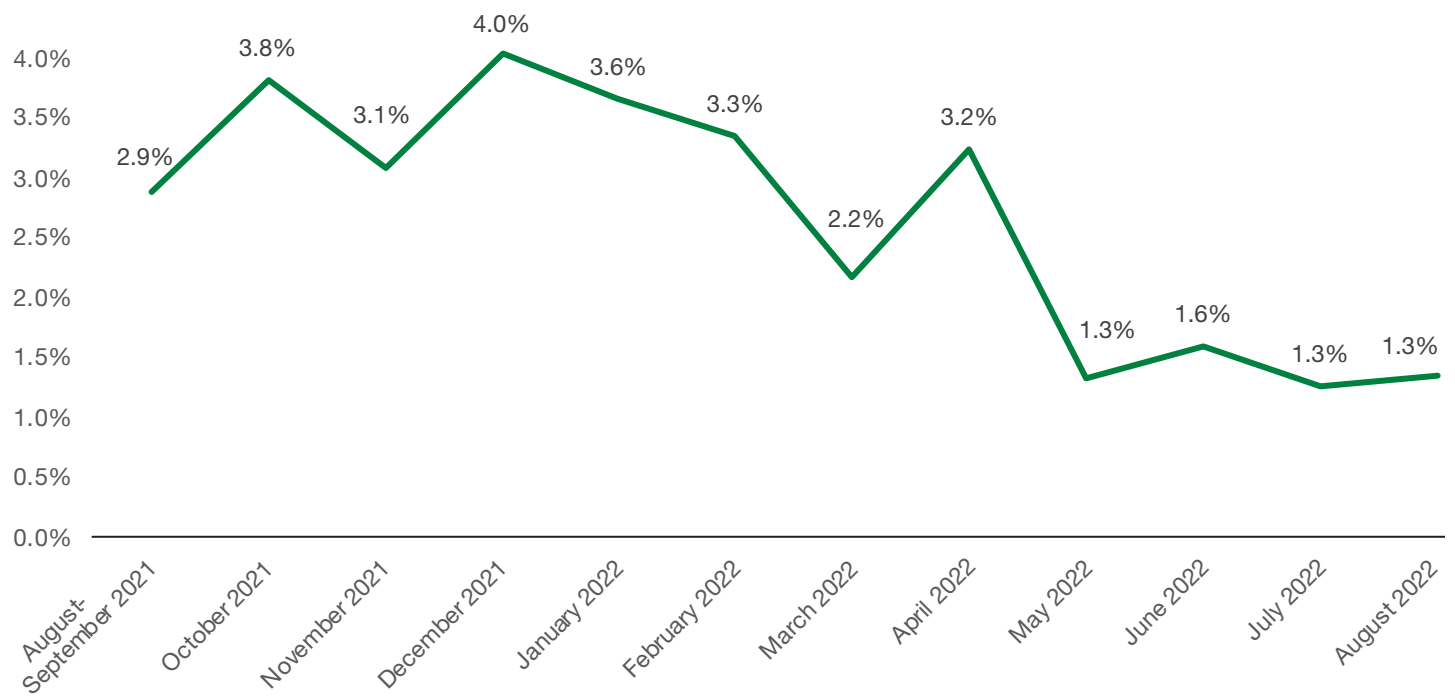
Accessible E-Scooters

With the mission of expanding the program to New Yorkers with ambulatory disabilities, the operators offered wheelchair accessible e-scooter vehicles for residents of the pilot zones. Between August 2021 and August 2022, 15 accessible devices were delivered to East Bronx residents. Bird deployed three Rio Firefly attachable devices and nine motorized wheelchairs, while Lime deployed three LimeAble accessible vehicles. Veo did not deploy any accessible vehicles; however, many survey responses indicated that riders with mobility limitations preferred riding on Veo Cosmo seated e-scooters. Older adults, people with medical conditions, and people recovering from medical procedures used accessible vehicles to complete everyday trips that may have been difficult to accomplish otherwise.

Community Response

Community members expressed initial excitement about the pilot during pre- and post-launch outreach. Many residents were particularly excited that their neighborhood would be the first in New York City to experience shared e-scooters. DOT reviewed 24,821 complaints from riders and community members through the operators' customer service portals and 311. Figure 14 shows all these complaints as a share of the total number of rides. As with many new programs, there was an early learning curve for shared e-scooter riders and the community regarding where users are allowed to park and ride shared e-scooters. Over the first twelve months of the pilot, the number of complaints received declined as riders and community members learned more about the program and its requirements. The majority of complaints from riders related to issues with GPS inaccuracy or failure and shared e-scooters not functioning as the rider expected. Many complaints from non-riders related to the location of parked shared e-scooters. DOT will continue to monitor community input and work with stakeholders to address concerns.

Figure 14: Complaints Received as a Percentage of Total Rides

Looking Forward

DOT plans to continue to provide shared micromobility services in the East Bronx when the pilot ends in 2023. The agency plans to release a Request for Proposals (RFP) for shared micromobility services in Fall 2022. As the shared micromobility industry continues to evolve, DOT hopes to support financially self-sustaining services that increase multimodal travel options, further the City's environmental and equity goals, and foster an unobstructed public realm. Geographies and scale of future shared e-scooter and e-bike programs will be based on RFP responses as well as land use, existing transit and bike infrastructure, and community requests.

Based on this report's findings, DOT intends to:

- Continue to monitor the safety record of shared e-scooters and adjust safety requirements, including new user quizzes and Beginner Mode, as needed

- Explore tools to mitigate poor riding behavior, including underage riding, multiple riders using a single vehicle, and sidewalk riding, and to increase helmet usage among riders

- Continue to utilize MDS while requiring operators to share additional data to complement MDS

- Continue to utilize a third-party data aggregator to monitor usage and evaluate operator compliance

- Incentivize operators to improve their technology to improve compliance and accurately enforce geofencing policies

- Explore alternative parking solutions to reduce sidewalk clutter and improve user compliance

- Continue to install new bike infrastructure that accommodates shared micromobility

- Work with operators to provide affordable shared micromobility to all New Yorkers, including increasing awareness of discounted pricing options and ensuring the sign-up process for discounted pricing is simple and quick

- Incentivize operators to design and provide accessible vehicles, informed by comprehensive understanding of disability community needs

- Continue to evaluate offerings from the shared micromobility industry through future pilots and programs

- Ensure community outreach is central to service area expansion

- Examine the accessible design competition submissions, as well as all accessibility options and features, for possible deployment in an additional pilot project or incorporation into any future micro-mobility initiatives

- Re-evaluate how the agency connects the disability community to accessible micromobility vehicles and programming

The future of shared micromobility in New York City -- and of free-floating dockless micromobility services in particular -- in New York City will evolve in tandem with the private sector micromobility-share industry. Services like NYC's e-scooter share pilot which rely on private companies are exposed to shifts in shared micromobility markets which may impact service provision and reliability. The shared micromobility sector is in flux, with some operators struggling to achieve profitability. As DOT aims to adopt the shared e-scooter program long-term, the agency will use a flexible approach to try to account for industry instability. Based on the findings in this report, DOT will continue to seek to make these services available to New Yorkers while maintaining its strong commitments to public safety, rider and worker protections, equity and affordability, meaningful transportation utility, and responsible usage of the public right-of-way.