University of
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**Healthy
Active
Cities**

E-Scooters in Greater Manchester

Second Interim Report

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January 2022

Transport for
Greater Manchester

Lime

Healthy Active Cities is a research group at the University of Salford that was formed in 2018 to bring together researchers and stakeholders to develop research on transport in Greater Manchester and beyond. The group has a particular interest in sustainable and active travel technologies and practices. It is based across the School of Health and Society and the School of Science, Engineering and the Environment. salford.ac.uk/healthyactivecities

The Sustainable Housing & Urban Studies Unit (SHUSU) is a dedicated multi- disciplinary research and consultancy unit providing a range of services relating to housing and urban management to public and private sector clients. The Unit brings together researchers drawn from a range of disciplines including social policy, housing management, urban geography, environmental management, psychology, social care, and social work. salford.ac.uk/shusu

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Lime's mission is for a future of transport that is shared, electric and zero-emission. As the world's largest and most experienced provider of shared electric vehicles, Lime partners with cities to deploy electric bikes, e-scooters and e-mopeds to spur on a new generation of clean alternatives to car ownership. One of Time Magazine's 100 Most Influential Companies in 2021, Lime has powered more than 250 million rides in more than 200 cities and is the only micromobility operator to provide services across five continents. Lime is the largest micromobility operator in the UK with over 5 million rides delivered across its London e-bike and Greater Manchester and Milton Keynes e-scooter services to date. Lime was also selected to deliver the UK's largest e-scooter trial in London. Contact: salford@li.me or rochdale@li.me Information: li.me/electric-scooter

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E-Scooters in Greater Manchester: Second Interim Report
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1. Introduction

The Healthy Active Cities team at the University of Salford is conducting a study alongside the Department for Transport's e-scooter share scheme trial taking place in Greater Manchester. This Second Interim Report provides an update on data collection and analysis, drawing out themes and implications for subsequent research.

1.1 Overview

The focus of this study is the e-scooter rental trial taking place in Greater Manchester, in Rochdale and Salford. The trial involves the provision of Lime e-scooters for hire and has been expanded over time to cover a large area of Salford (**Figure 1**).

The study comprises a combination of qualitative and quantitative social research methods across online surveys, reference groups and in-depth interviews. It seeks to understand experiences and perceptions in relation to the scooters, to identify who is using and might use the scooters, why (and why not), how, and for what purpose, and to place the scooters within a broader context that takes account of other road users, the wider community, and vulnerable people in particular.

The study has been conducted during a national UK trial of e-scooter rental schemes, with a view to informing the development of national policy on these new vehicles. At the time of the trial, the use of privately-owned e-scooters in any public spaces remains illegal. Whilst there is a clear legal distinction between e-scooters available as part of the approved schemes in the national trial and those owned by individuals, there is a lack of awareness amongst the public on the details of the law.

The use of privately-owned e-scooters on public roads and pavements is clearly evident in Greater Manchester and other urban areas. It is worth noting therefore that it has been difficult to study rental e-scooters in 'isolation' and that public views on the potential use cases of the vehicles and the impact of them on other road and pavement users are shaped by experiences and observations of both legal and illegal use.

When referring to 'e-scooters' in this report, we mean all e-scooters - privately owned and rental scheme - unless we specify one of these categories.

The research is funded by Transport for Greater Manchester and Lime. This report builds upon our first Interim Report, published in May 2021[1].

1.2 Aims

The research will investigate and create an evidence base on:-

- who is using, or considering using, e-scooters and how these groups could be categorised;

- reasons for using e-scooters and potential barriers to (further or more extensive) use;

- journey purposes and other factors motivating use of e-scooters;

- the relationship of e-scooting with other modes of transport and how this may encourage inter-modal travel and drive patronage to more sustainable modes;

- the nature of the e-scooting experience and its relationship with the urban context, including physical infrastructure, traffic and interactions with other road users, pedestrians and cyclists;

- perceptions of e-scooters by users and non-users in relation to convenience, impact, safety, the public realm and interactions with others;

- the distribution of the above factors across demographic groups including gender, ethnicity, socio-economic status and levels of vulnerability and the implications of this for uptake and social inclusion.

- the influence of the Covid-19 pandemic and associated policy responses over use of, and perceptions relating to, e-scooters.

The final project report will provide detailed findings and insights into the implications of the trial for UK policy and the development of micromobility in Greater Manchester and the UK.

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[1] http://usir.salford.ac.uk/id/eprint/60393

1.3 Scope

This second stage of the study is focused on a sample of 199 respondents, a subset of the 741 people who took part in the first stage in March 2021. In addition to the online questionnaire, we have conducted interviews with an additional 19 individuals (bringing the total is 31) and held a further 6 reference groups. The online survey was conducted in July and August and the interviews in August and September. It does not encompass any use within Phase 4 of the Salford trial scheme, which was launched in October 2021. A further round of online surveys, interviews and reference groups, planned for spring 2022 and with recruitment through social media, will provide a more comprehensive and robust picture of usership.

1.4 This report

In Chapter Two of this Second Interim Report, we provide information on the changing spatial scale of the Greater Manchester trial. In Chapter Three we provide an update on data collection, focusing on emergent themes. In Chapter Four we provide concluding thoughts and point to implications for the ongoing research project. We provide detailed appendices that include our methodology, online survey and breakdown of survey results, as well as detailed summaries of the reference groups and interviews.

Trying out Lime e-scooters in Rochdale

2. Changing Context

2.1 National trials

Rochdale and Salford are two areas currently hosting an e-scooter trial scheme as part of the wider set of national trials. These trials aim to provide an evidence base for the potential of e-scooters to influence how people get around, as well as their impact on other road and pavement users. The findings from these trials will be used to guide future policy decisions around whether, and to what extent, to fully legalise e-scooters in the UK.

Some 52 such trials are currently taking place in 48 locations around the UK[2]. The majority of these allow for the rental of e-scooters from on-street locations for short periods during the day, whilst three involve longer term rentals where users can store and charge an e-scooter at home. Some 12 registered e-scooter operators are delivering the trials, including: Beryl, Bird, Dott, Ginger, Lime, Neuron, Spin, Tier, Voi, Wind, Zipp, and Zwings.

2.2 Salford

There have been four phases to the Salford scheme over the last 12 months (**Figure 1**). **Phase 1** of the trial launched on 26th October 2020, where the scooters could be accessed on the University of Salford's adjacent Peel Park and Frederick Road campuses only. In February 2021, **Phase 2** expanded the trial to MediaCityUK with a specific link route connecting MediaCityUK with University of Salford. The route, which ran between Peel Park and MediaCityUK, was a combination of shared pavements, segregated cycling infrastructure and service roads. **Phase 3** was launched in spring 2021, and saw the scheme expand to include the majority of the Salford city zone bordering Manchester, Ordsall and Salford Quays. **Phase 4** was announced in summer 2021 and launched on 18 October 2021. This new phase extends the trial scheme to Eccles, which is a town in Salford that is 3.7 miles west of Manchester city centre. This new phase

of the trial scheme expands the geofence to include multiple transport hubs, including bus and tram links, as well as a major employer in Salford Royal Hospital.

According to Lime's data, as of November 2021, at the time of the data collection for this Second Interim Report and with Phase 1, 2, 3 and 4 active, 41,000 riders have made 150,000 trips covering a combined total of 170,000 miles.

2.3 Rochdale

The trial scheme in Rochdale is smaller in scale and scope when compared with the Salford trial scheme. It has been operating in Rochdale town centre since March 2021 and it currently offers a fleet of 40 to 50 e-scooters. It has not yet expanded at the same rate, or to the same extent, as the Salford scheme has, but there are plans by Lime to develop the scheme further in 2022, with an increase in fleet size and expansion of the service area.

2.4 Regional context

The trials, which are taking place in both Rochdale and Salford, build upon policy recognition across Greater Manchester of the potential value of micromobility in addressing congestion and air quality challenges, as well as bridging the gap between other modes of public transport. The Greater Manchester Transport Strategy 2040 also mentions the potential for e-scooters to provide a flexible means of travel while improving first and last mile intermodal connectivity, and acting as a catalyst for active travel. The e-scooters were also identified as a form of mobility that could maintain social distancing practices in the context of Covid-19. Since then, and at the time of conducting our fieldwork, no parts of the UK are currently under lockdown and there is much freer movement of people generally.

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[2] Lists provided by Zag (https://zagdaily.com/) and Department for Transport were consulted and the providers' Apps were checked to see if hire schemes were current at the time of writing. Two areas (London and Milton Keynes) each have three operators.

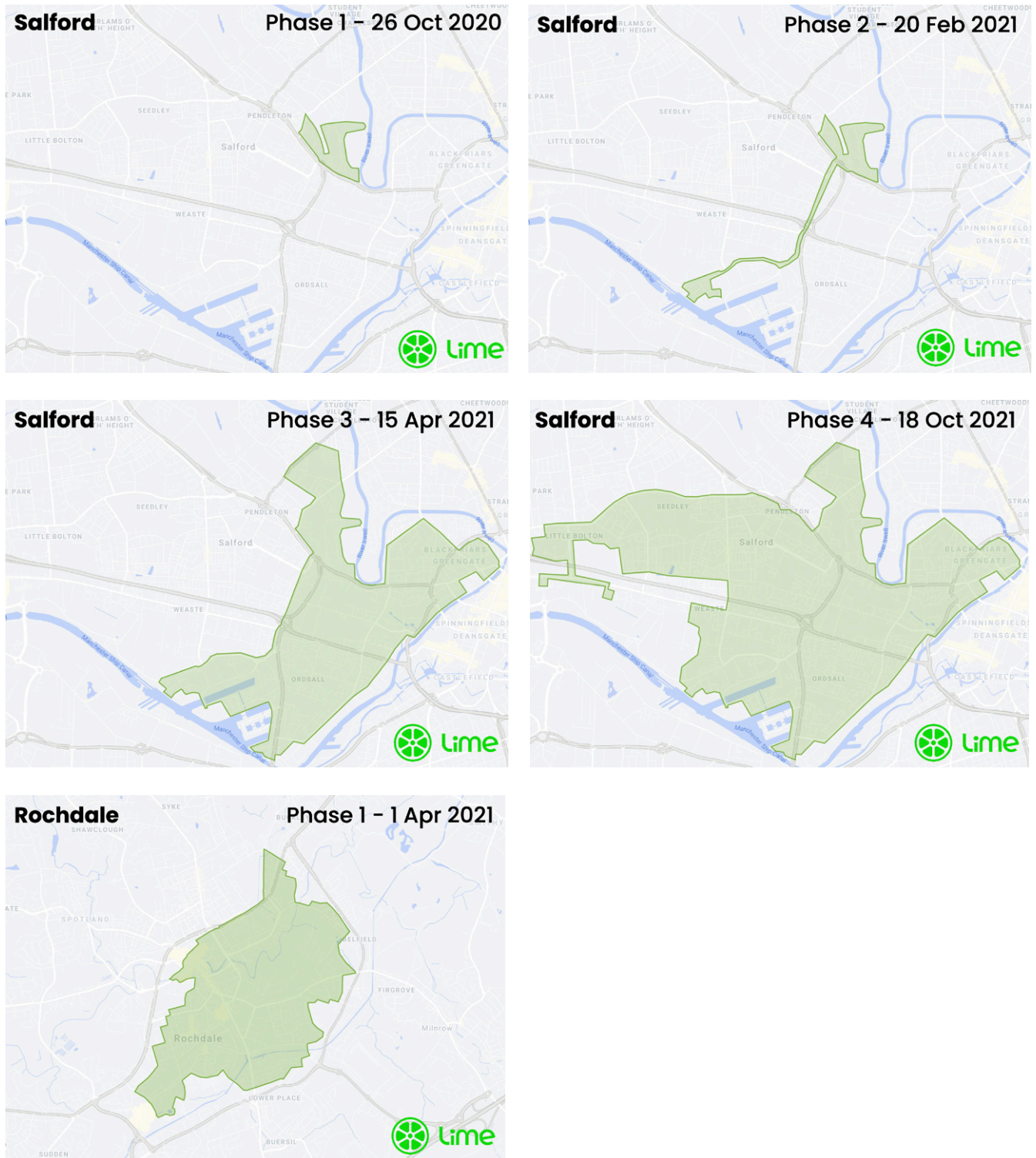## Development of the geofence over time

Figure 1 Maps of the extremities of geofence in Stages 1 to 4 of the Lime trial scheme in Rochdale and Salford

3. Evidence

3.1 Introduction

This chapter presents an update on the fieldwork at a mid-point in our study of the e-scooter share scheme in Greater Manchester. It draws upon our online surveys, interviews and focus groups and seeks to build upon the evidence presented in our first Interim Report.

The summary statistics and quotes presented here reflect individual perceptions derived from each participant's contribution to the research. Taken together, they paint a picture of not only how and why e-scooters are being used but also the way they are perceived by people who have not used them, those potentially consider their use, or those who have interacted with them in shared spaces.

Our second survey was sent only to a subset of Survey 1 respondents, who had consented to take part in further surveys. 199 responses were received. The survey took place in July and August 2021, a point by which many Covid-19 restrictions had been lifted and Phase 3 of the trial, featuring a larger operational area, had commenced. During this time, however, working from home was still

common, many social events had not yet restarted and the majority of University of Salford students were not based on campus. This implies that the potential take-up of e-scooters may still have been relatively low, and we have continued to consider potential use cases to be as important as actual user experiences. That is, we have asked people to envision how they might use e-scooters and to consider how they might be deterred from using them.

Although our study is focused on the Lime e-scooter share trial, we continue to see privately owned e-scooters being used in Greater Manchester and have encouraged respondents to tell us about their experience in concerning these. We considered this to be important not only because this 'other' category of e-scooter use may colour perceptions around e-scooters generally, but also because the way people use privately owned e-scooters provides some insights into how they might use a shared scheme and into the relationship between these two modes of use in a wider mobility system.

At the University of Salford campus launch

3.2 Using e-scooters

Trying out e-scooters

Figures 2 and 3 summarise the responses to questions on reasons for choosing to use an e-scooter and the purpose, if any, of journeys made by e-scooter. We make a distinction between *reason* for choosing to use an e-scooter (such as curiosity, environment, journey time) and the *purpose*, if any, of the journey (such as getting to work, education, or social activities). As other charts in this chapter, they show the percentage of respondents rather than the percentage of trips. For example, **Figure 3** indicates that 7% of respondents have used an e-scooter to get to work: it *does not* show that 7% of e-scooter trips were journeys to work.

The darker segments of the bars in **Figure 3** show the percentages of respondents who *have* made a trip for a particular purpose. The additional percentages in the lighter segments reflect those respondents who indicated that they *would* use an e-scooter for that journey purpose. For example, 12% of our respondents said they had used an e-scooter to get to social occasions and an additional 27% said they would

use an e-scooter for this purpose. Whilst admittedly hypothetical, these 'would' figures are included to give an indication of potential e-scooter use. They could reflect a range of different situations: a respondent currently not working or currently working from home, for example, or a respondent living outside the geofence but who would use an e-scooter if they could.

Echoing the findings presented in our Interim report, **Figures 2 and 3** indicate that the most common reasons for using e-scooters continue to be fun and curiosity. Many participants found themselves trying them for the first time out of curiosity, due to the novelty of the new technology being offered and after seeing the scooters become increasingly prominent in the mainstream media:

> *I think it was because it was something new and I'd read about the e-scooter schemes starting in places where I'm from, like Liverpool and stuff. I think it's just one of the things that you want to try out, see what it's like (Interview 23).*

When asked about their reasons for using the scooters, another participant observed that a lot of people are using them because they find them fun, and noted that this is perhaps an often-overlooked aspect of transport
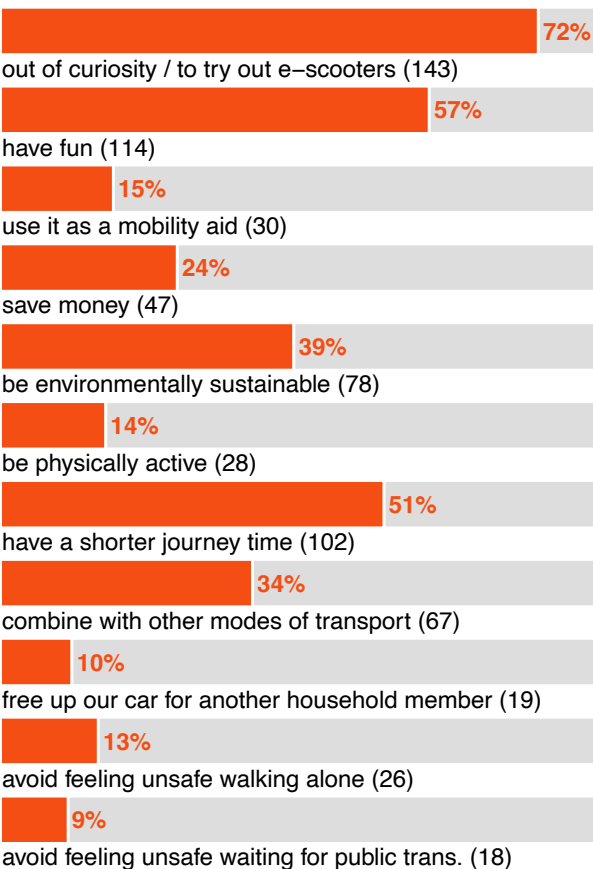
Reason for choosing e-scooter

- out of curiosity / to try out e–scooters (143) — 72%
- have fun (114) — 57%
- use it as a mobility aid (30) — 15%
- save money (47) — 24%
- be environmentally sustainable (78) — 39%
- be physically active (28) — 14%
- have a shorter journey time (102) — 51%
- combine with other modes of transport (67) — 34%
- free up our car for another household member (19) — 10%
- avoid feeling unsafe walking alone (26) — 13%
- avoid feeling unsafe waiting for public trans. (18) — 9%

Figure 2 Actual or potential reasons given for using an e-scooter (Survey 2: Q11, N=199)

Journey purpose

- to get to work (14,70) — 7% / 35%
- to get to education (18,34) — 9% / 17%
- as part of work (for example, to meetings) (9,67) — 34%
- to get to healthcare (including vaccinations) (5,58) — 29%
- to get to sports, cultural or entertainment events (12,59) — 6% / 30%
- to get to shops (24,52) — 12% / 26%
- to visit people to fulfill caring responsibilities (5,28) — 14%
- to get to social occasions (23,53) — 12% / 27%
- to ride for fun or recreation (50,68) — 25% / 34%
- to try out an e–scooter (56,85) — 28% / 43%
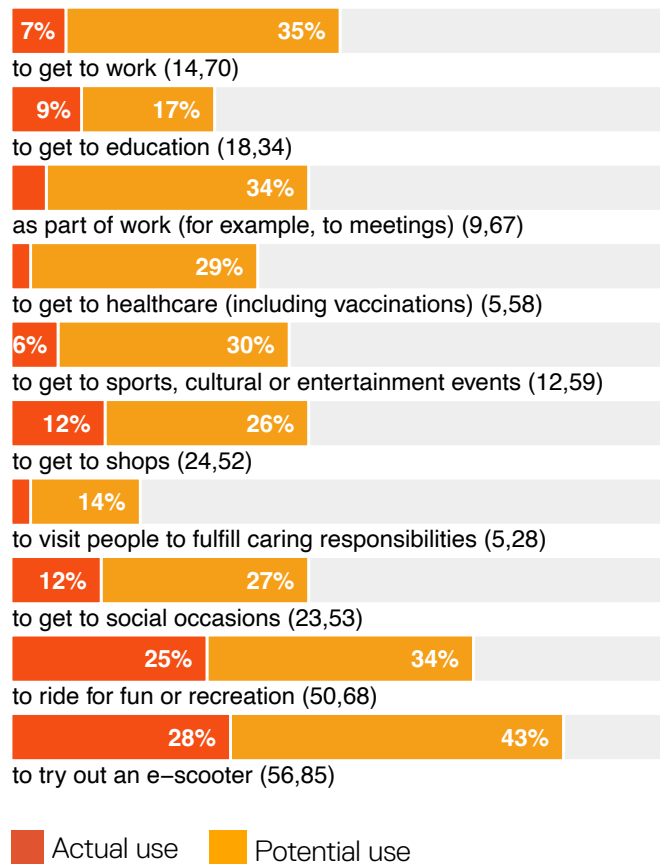
Actual use ■ Potential use ■

Figure 3 The purpose of actual ('have') and potential journeys ('would have') (Survey 2: Q11 N=199)

use. Many participants are positive about the scheme: *'they are fun to use. You get your 12 mile an hour up and you get a bit of wind in your hair'* (Interview 8). This somewhat challenges the traditional view of transport, i.e. designed to get you from A to B, because it is giving the user an actively enjoyable experience:

> *I think a lot of the conversation is about actually the fun of doing it rather than it being a mode of transport, which is quite interesting I think from your perspective of actually is it a usable mode of transport? (FG Community Organisations).*

E-scooters as mobility

One of the key reasons an e-scooter appealed to one of the interviewees as a commuting mode of transport was that it is a low-energy way of getting to work without arriving sweaty or needing to carry additional clothes. In this example, she refers to a privately-owned e-scooter:

> *it's less effort required on it I suppose than cycling because I intended not to be getting to work and things and needing a shower. I thought a scooter is just a quicker and easier way and better for the environment than getting a car. (Interview 26)*

The notion of e-scooters requiring little to no energy from the user is one of the factors that differentiates scooting from cycling and therefore may cause e-scooters to appeal to new audiences.

Participants could envision themselves finding e-scooters useful for making journeys and the most commonly selected benefit in the survey (**Figure 2**) was the potential to get from A to B more quickly. As one participant with experience of using the scooters noted: *'It's just a quicker way of getting from A to B, and zipping through the traffic, and bypassing any traffic jams and things. I can see the attraction of them'* (Interview 16). Similar potential was seen by other participants who had not yet used the scooters, with one participant describing a 'last mile' journey that they usually walk but that the e-scooters could replace, with the advantage of not needing to leave their bike vulnerable to theft:

> *What I can see is it solving that last mile problem. The tram from my house is a mile away and that, I do walk it, but I've cycled it and I've had my bike nicked twice from Brooklands Tram Station. So that's not a really great enticement to want to continue that. (Interview 16)*

Despite some expressing some uncertainty around where they could ride and park them, this participant envisioned themselves using the scooters while working at the university to get around campus faster for meetings: *'I can see myself going around*

the university, so particularly for going over to the library or sports centre, or students' union if I had to go over there' (Interview 20).

For many participants, the e-scooters appealed because they provided a faster alternative to walking. For example, after meeting up with a friend and partly walking home together, one participant described how they would use an e-scooter to finish their journey after saying goodbye to their friend:

> *I go and swim at The Quays and there's been a couple of times where I've gone part of the way home on them, like started walking home with a friend and then he's gone off one way, and I've just got on the scooter to get the rest of the way home just more quickly (Interview 18).*

Another participant described how they have factored the e-scooters into their recreational activities, making the e-scooter journey part of the social occasion, in a way that offers something more than simply walking to their destination:

> *Say for example you were suggesting a pint at the Pint Pot pub, it'd be like, 'All right, well, let's get a scooter down there', so that's the first activity and then we'd sit and have a drink and then maybe, well, obviously, not alcohol, but you know what I mean! (Interview 22).*

Some participants stated they had not used the e-scooter trial scheme in Salford, but they had used other schemes across the UK and Europe. Their examples provide insights into how people could use e-scooters. One participant, for example, shared an experience where her partner had used an e-scooter during a trip to Cambridge after their car had broken down:

> *Basically what happened was our car broke down when we were there so had to get it to the garage - well, it needed seeing to. He got an e-scooter back from the garage to where we were staying. Then he did that return to pick the car up. Got an e-scooter to the garage to pick the car up. It filled those gaps (Interview 19).*

Another participant had the experience of using a Lime e-scooter in Portugal to access a tourist destination that was too far away to walk: *'when I was in Lisbon I was excited to try out the Lime scooter that I saw everywhere, and we actually used it for quite a practical purpose; it was going along the riverside to a destination which was a bit further away than we would have liked to walk'* (Interview 1).

Connecting with public transport

Figure 4 indicates that Survey 2 respondents saw the potential for e-scooters to replace other modes (modal shift) or to be combined with them (trip chaining). The relationship between the modes is similar to that seen in Survey 1. Note that these charts show per-user, rather than per-trip, statistics. **Figure 4A** (left) shows, for example, that 25% of users have made one or more trips by e-scooter that they would otherwise have made on foot: it *does not* show that 25% of e-scooter trips have replaced journeys on foot. As before, the darker segments of the bars show the percentages of people who report having made journeys and the lighter segments show the additional percentages of people who say they would make those journey.

As the geofence continues to expand, so does the opportunity to offer multi-modal transport choices for users. For example, one Salford resident noted the e-scooters offer the potential for commuting between their place of work and the train station: *'Sometimes it's a trek to walk up The Crescent to get the train or something and that might, in the future time, when we're back on the trains, that might be quite a nice option to have' (Interview 28)*. Furthermore, another participant described the potential for e-scooters to allow them to link up with other modes of transport, filling in the gaps between transport hubs: *'if I was then going on from, say I was going from my home to a place in Salford and then going off somewhere else on the bus or whatever or the tram just to do part of a journey*

on the e-scooter. I think it could be good at filling in those gaps' (Interview 19). The ability to connect with public transport nodes expands the potential user base, who are often commuting in and out of the core geofence daily and can supplement their journeys with scooters.

We spoke to one participant who currently owns and uses a personal e-scooter to commute to work every day. While she has not used an e-scooter as part of the trial scheme in Salford and accepting that this kind of private use is currently illegal, she was positive about the e-scooter as a personal form of transport as it allowed her to travel in the most time-efficient way possible:

> *I use my personal electric scooter. I bought it in about February time and I bought it with the intention of commuting on it, because where I work is not far enough away to just try and get the car, but it's also too far to walk and not in a great area…. So, getting there by any other means for instance a bus, it was two buses that would take over an hour round trip. So in comparison to being able to scoot, it's ten to fifteen minutes (Interview 27).*

3.3 Using and sharing spaces

Safety is a multifaceted issue and concerns that relate to safety permeate the perceptions and experiences of the research respondents. Some participants discussed their sense of safety while using an e-scooter, while others talked about experiences as pedestrians and vulnerable people sharing space with e-scooter

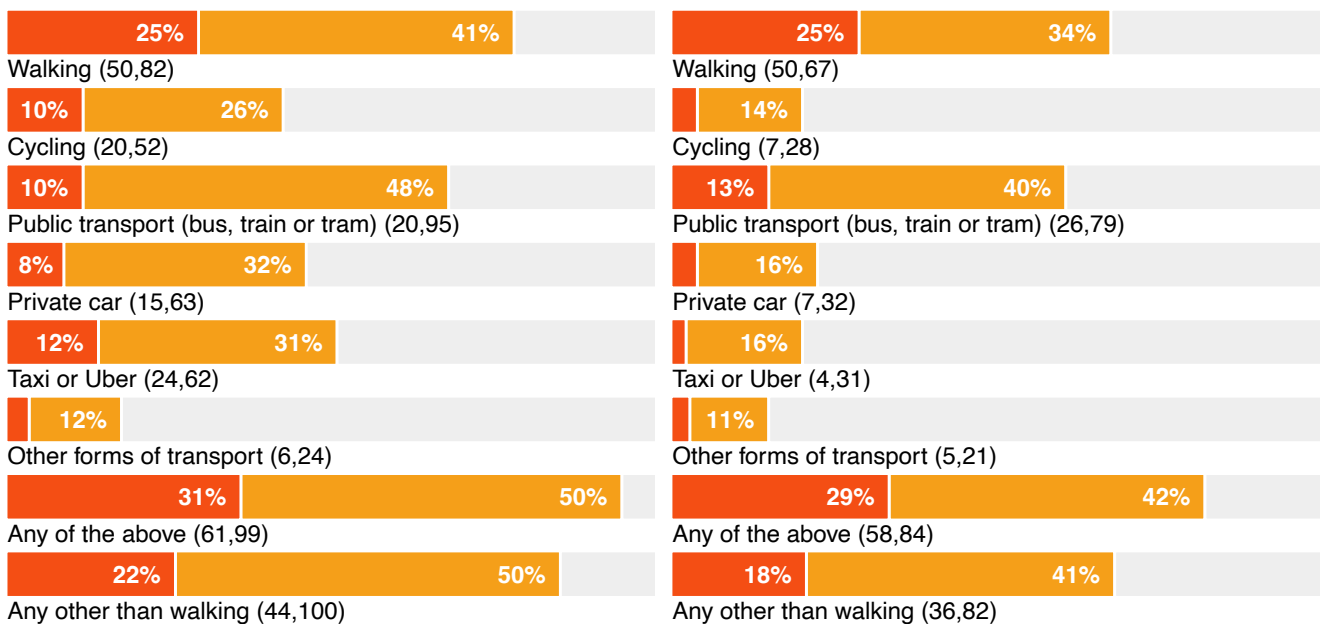## Using e-scooters instead of or in combination with other forms of transport

Figure 4 Actual and potential use of e-scooters instead of (left) or in combination with (right) other modes of transport (Survey 2: Q13, Q14 N=199)

users. In some cases, these concerns related to road safety – i.e. concerns related to danger from collisions with other vehicles – and in others they related to personal safety – i.e. the risk of attack or harassment.

When considering concerns about the safety of e-scooters, it is worth noting that there are differences between models and between privately-owned e-scooters and those that have been deemed suitable for the national trials. Privately-owned vehicles are not subject to the same level of restrictions and standards. Whilst rental scheme vehicles are capped at or below 15.5mph (in Rochdale and Salford they are capped at 12mph), in some cases private vehicles can exceed 50mph. The rental scheme vehicles are also subject to standards and restrictions relating to braking, rider stability, lighting, and audible warnings. They also

employ 'geofencing' which automatically restricts the speed and/or operation of the vehicles in certain areas, such as tram tracks or pedestrianised areas.[3].

As **Figure 5** indicates, when asked, in our first survey, to select the factors that are likely to deter them from using e-scooters, the most frequently selected was 'concern about road safety' and this applies across all age groups. 'Concern about crime and anti-social behaviour' was also prominent. The figure shows a clear relationship between age group and concern about road safety, as age increases, so does the proportion of the sample that identifies road safety as an issue'. **Figure 6** indicates that females are more likely to express concern about road safety and personal safety in this context, as is the case for most of the other factors listed. 'Not knowing which routes to take' and 'Not having a helmet available' could also relate to perceptions of safety.
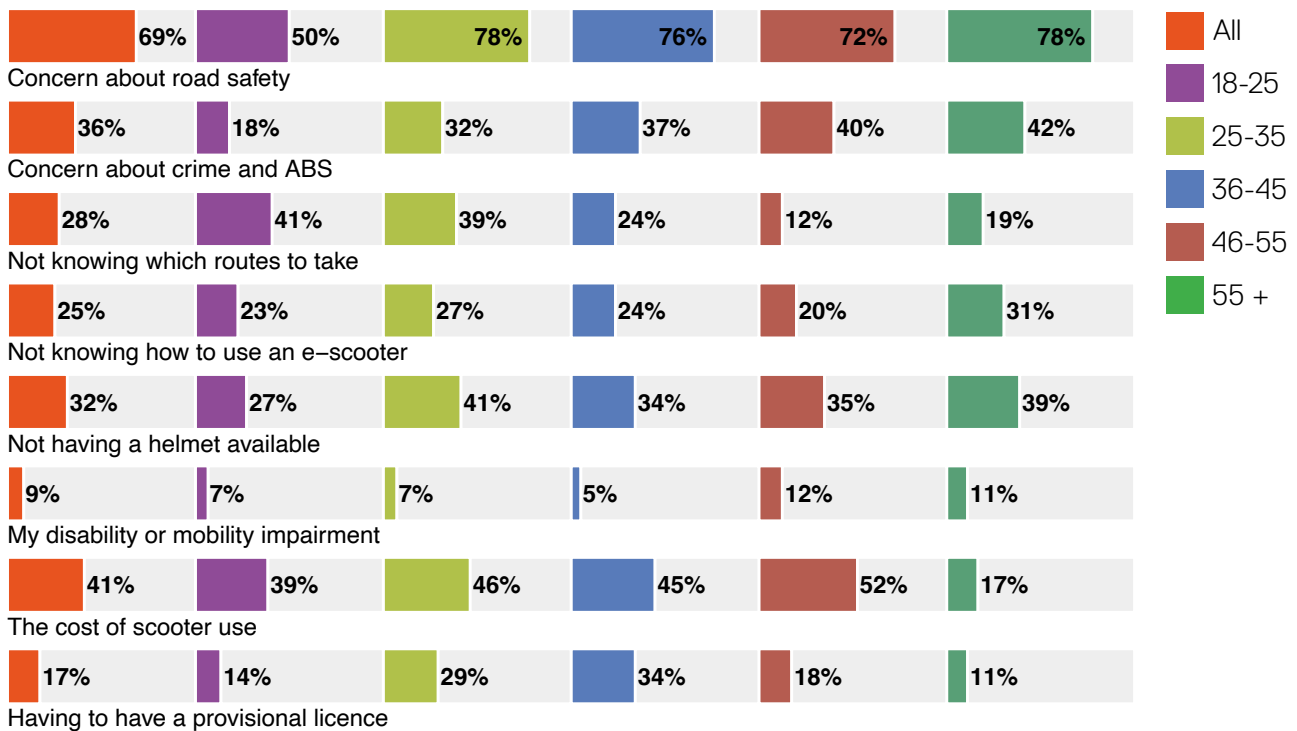
Factors likely to limit use, by age group

Figure 5 Factors 'somewhat likely' or 'very likely' to limit how much respondents use e-scooters, by age group (Survey 2: Q17 N=199)

3 Winchcomb 2021, The Safety Of Private E-Scooters In The UK
https://www.pacts.org.uk/wp-content/uploads/PACTS-The-safety-of-private-e-scooters-in-the-UK-Report-5.0.pdf

While early indications suggest that e-scooters appeal mostly to a younger audience, it is important to recognise the potential impact of e-scooters on older people, whether as users or as pedestrians sharing infrastructure with these new vehicles. Older respondents to Survey 1 were less likely to say that they were 'likely' or 'very likely' to use an e-scooter in the future (**Figure 7).** During a focus group with a group of older residents, when asked about what it would take for them to try e-scooters for the first time, one member of this group expressed some apprehension: *'I suppose my age is the main thing*

that's putting me off! I quite value life and I wouldn't want to injure myself by falling off' (Interview 15). However, with the right provision in place, in this case, the offer of safe and specific training, this older person was not completely opposed to using the scooters: *'if there was a training facility, say at Salford University on a Saturday morning or something, then, yes. So that's what I would say, it would make me change my mind' (Interview 15).* It was recognised that such
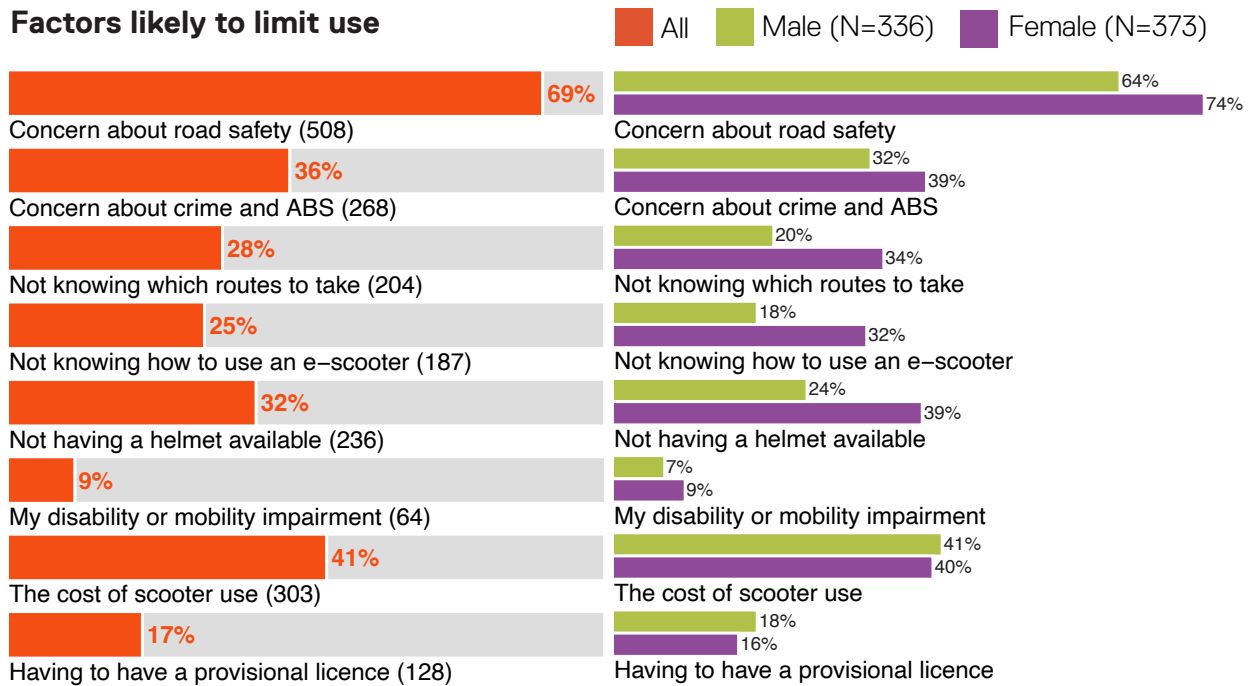
Factors likely to limit use

Figure 6 Factors 'somewhat likely' or 'very likely' to limit how much respondents use e-scooters, by gender (Survey 1: N=741)
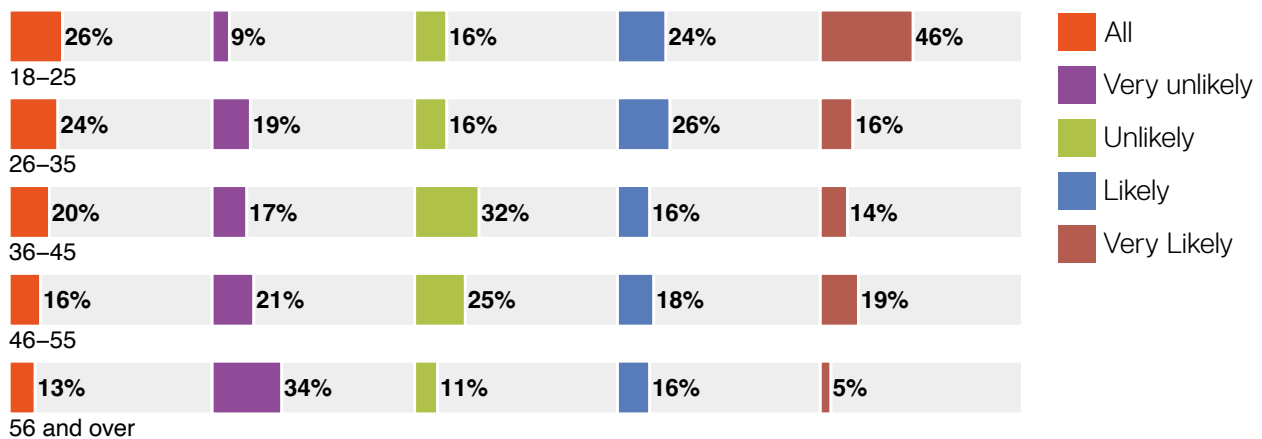

Figure 7 Stated likelihood of using a hire scooter in Salford or Rochdale (Survey 1: Q9 N=730 – 'Don't know' answers removed)

support could help to make the share scheme more inclusive. One focus group participant placed Salford and its e-scooter trial within this wider context:

> *Salford is recognised by the World Health Organisation as an age friendly city... Obviously, your work around the scooter from the perspective of this group is very important because obviously how does that connect and engage, and support older people to age well in the city, or is it a barrier to older people feeling safe in the city? (FG Community Organisations).*

Roads and road users

Mirroring one of the common barriers to cycling uptake, i.e. safety around motor vehicles, the potential of using e-scooters on busy main roads raised concerns about safety:

> *there's also the trepidation about using one on the main road where - or any road actually, where there's a lot of cars around. A lot of cars are driven badly, so even with a helmet you could easily be really clobbered by a car (Interview 24).*

One participant described making a deliberate effort to be seen when using an e-scooter on the road, reflecting concerns for her physical safety on the road: *'I'm always on to the side, always have my Hi-Vis and my helmet on and I think that everyone can see me and I'm just as careful as I can be' (Interview 27).*

Participants expressed fear of using the e-scooters on the road and in traffic, especially in areas where noticeable gaps in the segregated infrastructure were present. Many felt that the cycling infrastructure in Salford is improving but noted that there are still areas in which participants often felt that they had to choose between either scooting in traffic or scooting on the pavement, often opting for the latter out of fears for their physical safety: *'Even though there are bike lanes in most places, they're still not everywhere, and you still end up with bits of journey where you have to go on the road with all the traffic, and I think that definitely puts people off' (Interview 21).*

Participants noted safety concerns relating to e-scooters themselves, referencing, in particular, the small wheels of e-scooters coming into contact with, for example, potholes and other obstacles: *'Not sure about the safety of little wheels going over obstacles & how that would affect you going over the handlebars' (Survey Comments 1).* The speed of the vehicles added to concerns about the potential for injury: *'you see the speed that they go along at 13 miles an hour plus. You think, well, with the potholes on the roads round here, if I came off that with a helmet or not, you could be horrendously injured' (Interview 24).* It is worth noting here that this quote reflects the interviewees perceptions of speed, and that the rental e-scooters in Rochdale and Salford are capped at 12mph, and the

limit set for the trials in England is 15.5mph. As well as safety per se, these observations also relate to the experience of e-scooting and the comfort of the ride:

> *He quite liked it but he said it was quite uncomfortable at times because of the solid wheels and when the road surface was bumpy and potholes and stuff that was quite unpleasant (Interview 26).*

> *The roads in Salford. I know they've got cycle lanes. They're not perfectly smooth in a lot of places. There's quite a lot of potholes. The scooters, generally handle them quite well but you do notice there's - you can get a bit of a jolt and they're quite rickety sometimes (Interview 26).*

Note that although Interviewee 26 mentions solid wheels here, the Lime scooters in Rochdale and Salford have pneumatic wheels.

Concerning these issues, this interviewee highlighted the importance of providing high quality infrastructure on which riders would feel confident:

> *... I would learn to put up with the potential inadequacies of the vehicle itself, of what I've discussed, if I was convinced that there was sufficient infrastructure to make it safe, and I feel the same way about bikes, as well. I'm now pushing on and I do not, I'm not prepared to put up with the danger of close passes and things, and it would be exactly the same on a scooter as it would on the bike, for me. So it would just be about convenience and also, having a safe route which would enable me to make the journey (Interview 16).*

> *No, but I'd really love to use them! I really would, yes, which may surprise you, but it would have to be in a very safe environment. No, I think if somebody came and said, 'Here's a scooter,' you go and try it in this park where there's nobody else about and you can't hurt anybody, and all you have to do is get on it and turn a lever; messing about with apps and things like that, not for me (Interview 15).*

Helmet provision is related to perceptions of safety and risk, and women (**Figure 6**) and older people (**Figure 5**) were more likely to select lack of helmet availability as a factor that would deter them from using an e-scooter in a hire scheme.

> *I'm not going to have a helmet to hand whenever I want to pick up one of these things. I would, if I was going to use it long term (Interview 6).*

> *It's that they say you should wear a helmet and the app says you should wear a helmet but if you're just out and about, you're not going to just have your bike helmet. I guess if you were planning to use it to commute then you would (Interview 9).*

> *I'd have to be provided with a helmet, or I'd have to buy a helmet myself, and I was going to say, a test area where you could go and have training (Interview 15).*

Sharing space with e-scooters

The impact of e-scooters on shared spaces was raised by many participants as a potential source of conflict. Many expressed concerns around e-scooters being used on pavements, how this may affect the pedestrian experience, as well as e-scooters being used in dedicated cycling infrastructure and how this may be received by the wider cycling community.

Many participants, be they users or non-users, expressed concern around the quietness of e-scooters, particularly when combined with their speed. Although e-scooters in the Lime trial have bells, participants reflected on difficulties in hearing the vehicles. For example, participants found it difficult to hear the e-scooters coming up behind them, especially on shared spaces where pedestrians and e-scooters are in close proximity:

> *You don't see them coming up, particularly if they're coming up behind you. They're silent, they're fast, and I am concerned that an elderly person could quite easily not be aware that they're there and suffer a fairly nasty accident from one (Interview 14).*

In talking about the potential risk to older people, one participant recalled an incident with her elderly mother. She was almost hit by an e-scooter user who was turning a sharp corner quickly as they were walking on the pavement:

> *when I was out with my mum that time when someone came and we were walking from a side-street to join another road, they were coming down the pavement. Literally, like, yes, she could have been - she didn't fall over, but it was a very, very near miss of her (Interview 18).*

These tight street corners are often high-risk areas for potential collisions, giving people very little time to react or respond especially if they cannot hear the e-scooter coming: *'If I'm walking along a road and I get to a corner, I'm going to turn the corner. If there's a pedestrian coming towards me, you both stop. If it's a scooter coming round that corner, you're in big trouble' (Interview 15).*

Whilst such risks are clearly of concern in relation to vulnerable road and pavement users in particular, there is scope for the e-scooter rider to mitigate potential danger. One participant, a regular e-scooter user, described steps she takes to ensure she is scooting in a controlled and safe manner when approaching these sharp corners: *'I can brake and I've never ran into anyone and I always reduce my speed enough so that I'm not crashing into anyone if anyone comes round the corner or from a blind spot' (Interview 17).*

One participant felt that the presence of e-scooters on shared spaces can introduce a barrier for older or vulnerable people who may need to decide whether they continue using these spaces, for fear of their safety: *'Actually, it can be a barrier for older people because of the impact of them being on the same space as older people' (FG Community Organisations).*

In our second stage survey, 89 of the 199 (45%) respondents had felt unsafe when walking as a result of an e-scooter rider. 110 (55%) had to move out of the way of an e-scooter rider at some point. (The overlap is 83, i.e. 42% answered that they had both felt unsafe and moved out of the way of an e-scooter rider when walking.) Although a relatively small sample, these figures are quite large proportionally. These figures relate to all e-scooters and therefore reflect experiences around privately-owned and rental e-scooters in Greater Manchester.

Notably, males were more likely to recount feeling unsafe on an e-scooter (**Figure 8**), and females more likely to feel unsafe around e-scooters (**Figure 9**). In relation to age, older people were more likely to say they had felt unsafe around an e-scooter and to report a near miss with an e-scooter rider (**Figure 10**).

Potential clutter in shared spaces

Some participants expressed concerns about the potential for the scheme to contribute to clutter on streets and shared spaces. These concerns seem to stem largely from experiences with a dockless bike share scheme previously operated by Mobike in Greater Manchester. This suffered high levels of vandalism and left a lasting impression on the community, with one participant, for example, asking: *'Are they going to get vandalised like Mobike did?' (Survey 1 Comments).* However, so far there has been a warmer reception to the e-scooters and no indication of a simliar level of vandalism: one participant made the following comparison with Mobike: *'They're easy to find. They're easy to park. They are much better than Mobikes' (Interview 13).*

One participant made a connection between the scooter drop-off points being largely based on the pavement or shared spaces, and how this pavement parking structure may in turn be potentially encouraging people to scoot on the pavement more – as that is where they picked up their scooter, rather than using the appropriate road and cycling infrastructure when it is available: *'how they can just be left anywhere. It sounds a good idea, but I don't know if that helps the riding on the pavement thing because you almost want to prevent on the pavement' (Interview 18).* The Lime rental scheme in Rochdale and Salford uses virtual docks, so that users must return their e-scooters to a mandatory parking bay or risk receiving a fine.

Feelings of safety around and when using (all) e-scooters ■ All ■ Male (N=94) ■ Female (N=101)
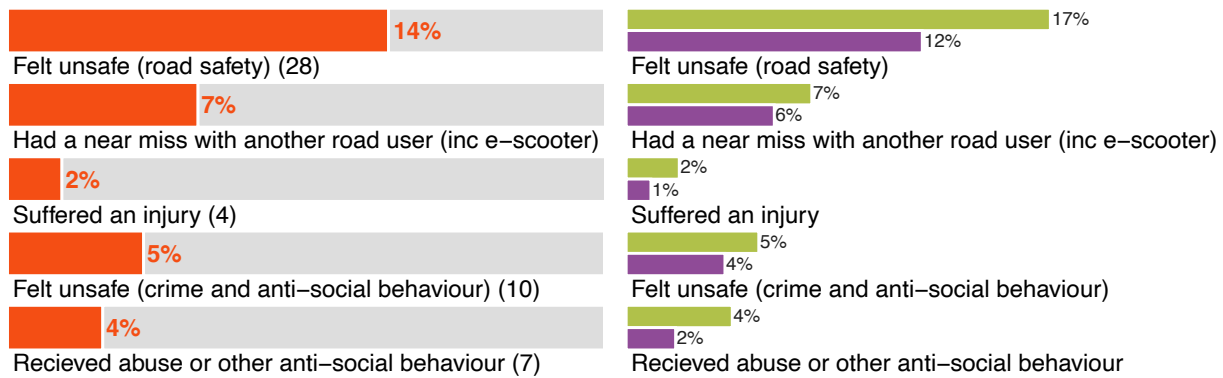

Figure 8 Stated feelings and experiences when using e-scooters (Survey 2: Q20 N=199)
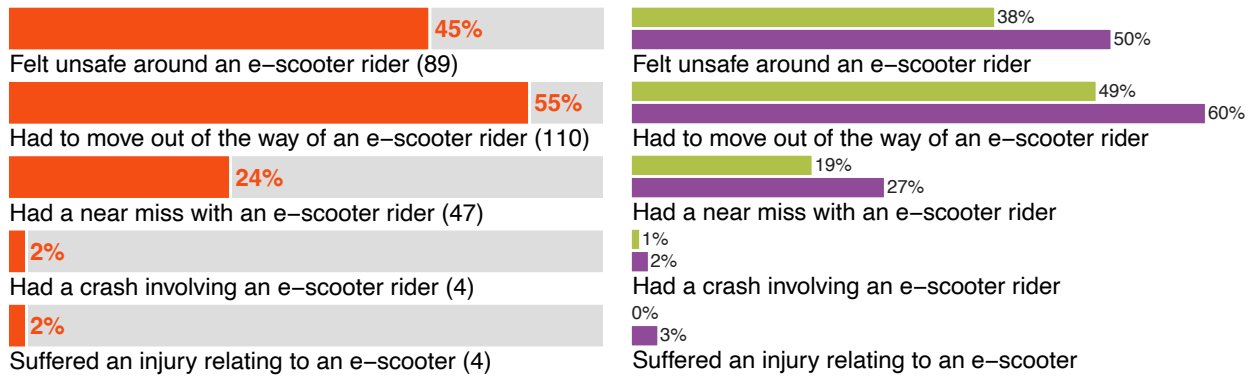

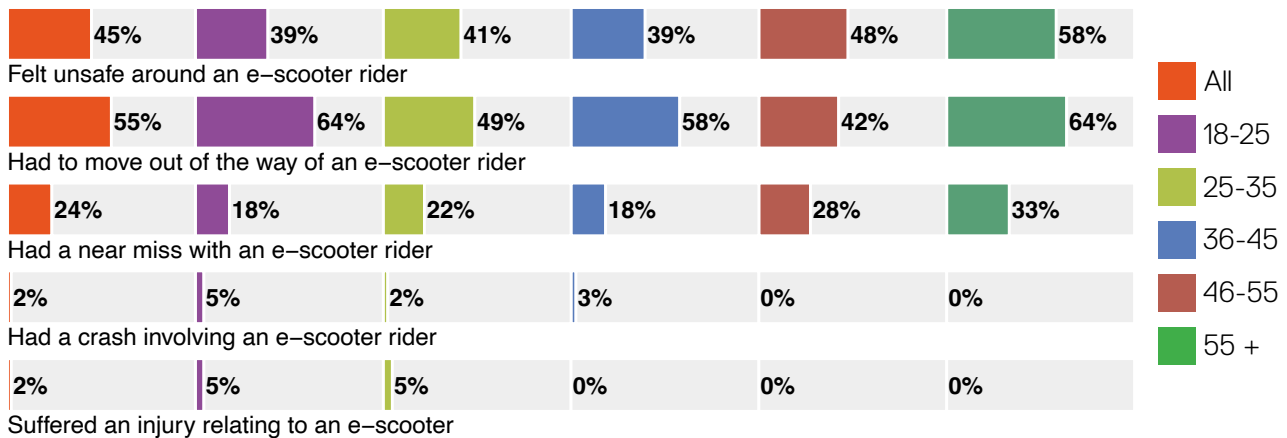**Figure 9** Stated feelings and experiences when walking (Survey 2: Q21 N=199)

Figure 10 Stated feelings and experiences when walking, by age group (Survey 2: Q21 N=199)

Figure 11 indicates relatively high levels of concern about the impact of e-scooters on public spaces. It also indicates that younger people are less likely to express concern, although there does not appear to be a strong correlation with age and concern levels out across the other age groups.

E-scooters and cycles sharing space

Interviewees discussed the impact of e-scooters on shared spaces and ultimately their impact on pedestrians and cyclists. One participant described their apprehension as stemming from not being able to anticipate how the scooters will be used in these kinds of spaces, due to the relative novelty of the technology:

> *my challenge with them is similar with shared spaces, where different modes of transport are generally so pedestrians, cars, cycles, etc., so I think it's - in some respects, it's just adding an extra layer to an already complicated and, at times, fractious problem of how you manage shared spaces (Interview 14).*

One observer, a focus group participant, drew comparisons between e-scooter use and cycle use in the city centre, suggesting that the success of e-scooters may depend on the amount of quality cycling infrastructure available, as well as e-scooters being accepted as a legitimate form of transport by the wider cycling community:

> *There seems to be a close relationship with cycling, as e-scooters are perceived to account for similar use cases and share the same spaces. Whilst the ways in which e-scooters play out in cities may therefore be strongly determined by the extent of cycling infrastructure and a culture of cycle use (FG Mobility Researchers).*

To some extent, a vision of a shared infrastructure for both e-scooter riding and cycling hinges on the cycling community accepting e-scooters in their domain. This may be challenging: *'The infrastructure is definitely*

not set up for scooters. If I was a cyclist, I wouldn't want to share a cycle lane with an e-scooter, seeing the recklessness that people use them adopt' (Interview 24). The introduction of new modes, such as e-scooters, may in fact requiring some rethinking of space allocation: *'It probably does require more infrastructure and bike lanes and maybe bike lanes actually need to be considered to be bigger than they are now' (Interview 27)*. This would of course pose new challenges across policy and planning, as well as the political landscape, but even just notionally, the desire for dedicated scooter infrastructure is something worth taking account of at the local level as the national trials continue to unfold around the UK.

Storage and parking are also considerations and connect with the provision of facilities and infrastructure. One participant recounted their experiences of grocery shopping, for example: *'If I've got a bike and a bike lock, I usually go to ASDA; where do you put an e-scooter? I don't know!' (Interview 24)*. This point would be easily overcome with dedicated scooter infrastructure at the store in question, but without it, would require the user to find the nearest drop-off station. On the point of locking up scooters, which is perhaps more relevant to private e-scooter use than it is to any trial scheme at the moment, one participant identified vehicle design as potentially problematic: *'With a bike it's easy because you've got a frame on a bike where you can put a chain on, but e-scooters don't appear when you look at them to have anywhere where you can fix some kind of securing item to it' (FG All Road Users)*.

Personal safety

Personal safety, in the sense of concern about harassment or attack, is an important consideration in mobility planning and our survey adds to
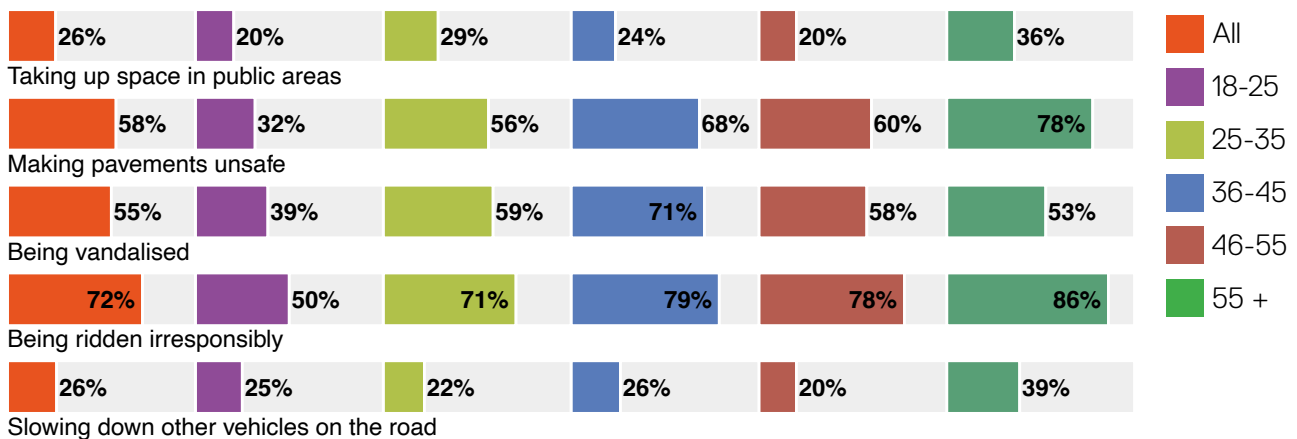
Concerns about e-scooters

Figure 11 'Concerned' or 'very concerned' about the impact of e-scooters, by age group (Survey 2: Q19 N=199)

evidence that such concerns are more likely to apply to women: *'You're always, especially as a woman, a bit of a target'* (FG Women).

The scooter's fast speed, relative to walking, was also associated with enhancing feelings of personal safety for some female participants, who felt because the scooters allowed them to get from A to B faster, they felt safer, particularly when travelling at night: *'I'm not someone who's particularly worried about walking at night, or whatever, I do it, but it does feel safer to be on a bike or a scooter because you're on the road moving faster'* (Interview 13).

Figure 12 indicates that, some people told us that they use e-scooters as a way of avoiding feeling unsafe when walking and/or waiting for public transport. There is also an indication that this concern is gendered, although it is not an issue exclusively associated with female respondents. As this female respondent illustrates, deciding on a way to get home at night can be a balance between cost, road safety, and personal safety.

> *... if I hadn't used the scooter to get home fairly quickly like at ten o'clock at night, I probably would have got a taxi rather than walk home, so that was definitely a cheaper way to get home...*

> *I mean I'm not someone who's particularly worried about walking at night, or whatever, I do it, but it does feel safer to be on a bike or a scooter because you're on the road moving faster than like if you're on the pavement walking you are probably more vulnerable to something dodgy happening. You might be more vulnerable on the roads with someone hitting you in a car, so I suppose it probably balances out, but it just feels a bit safer to be moving that bit faster and be on the road, I guess* (Interview 13).

Vulnerable road and pavement users

In our interim report we emphasised the importance of understanding the impacts of e-scooters on people with sight, hearing or mobility impairments and held a discussion with vulnerable road users. In particular, they mentioned the risk of collisions and injury given the increased probability that vulnerable people do not hear or see e-scooters in good time and find that they are unable to move out of the way rapidly enough.

During this second stage of the study, we have engaged further with people working with and representing vulnerable and disabled people. They have continued to emphasise the importance of understanding the impact, on vulnerable people, of a proliferation of e-scooters.
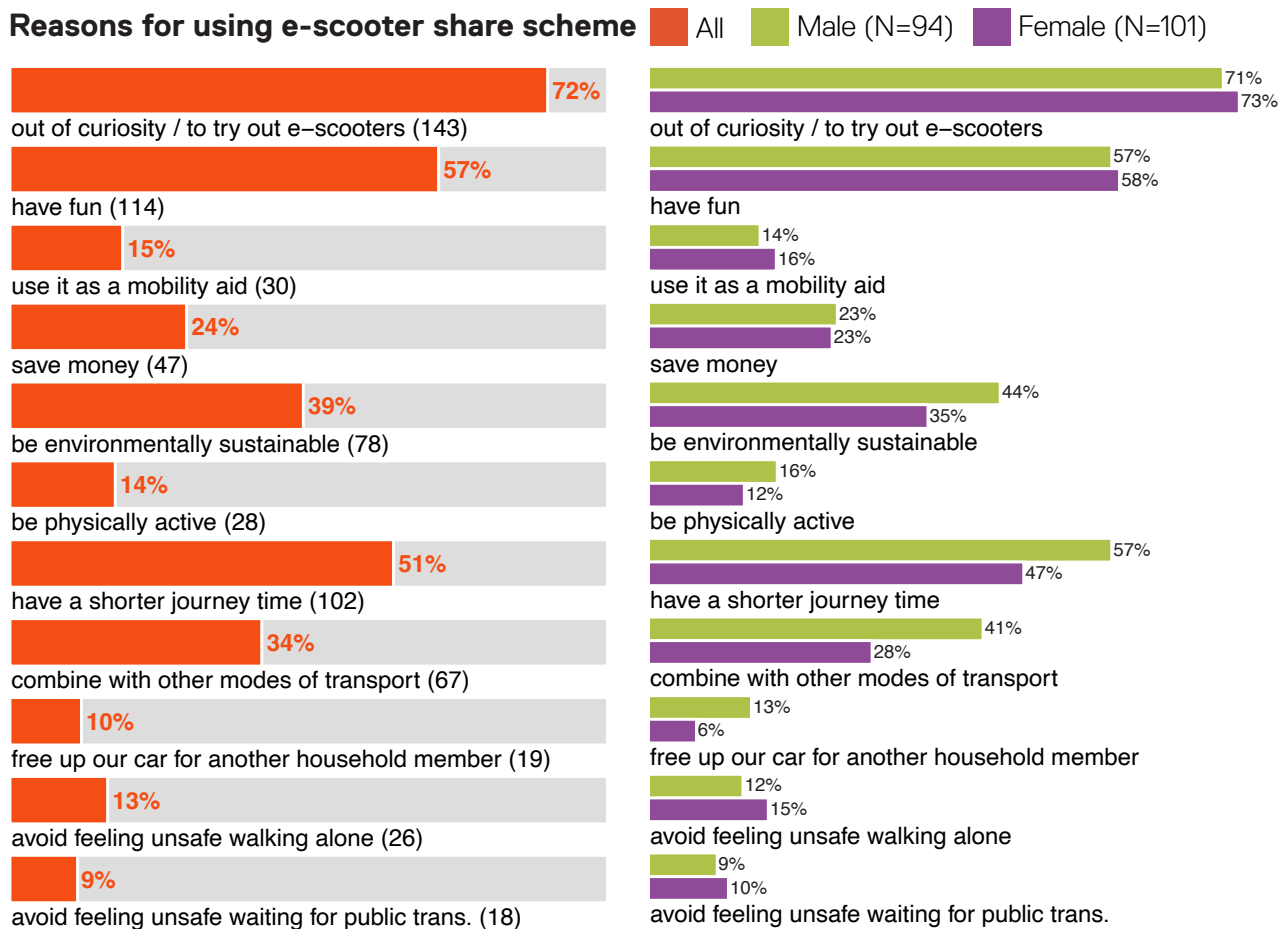
Reasons for using e-scooter share scheme

Figure 12 Stated reasons for using e-scooters in the shared scheme, by gender (Survey 2: Q12 N=199)

They expressed concerns about what they see to be a lack of enforcement in relation to private e-scooters, such that people can use these vehicles in an unregulated way, potentially at high speeds, and in areas designated for pedestrians. They noted that e-scooter riders would be unlikely to have lived experience of vulnerability and therefore less able to anticipate the needs of people with whom they share spaces. This, they argue, is likely to be exacerbated by a lack of spaces, other than pavements, where people feel they can ride e-scooters safely.

A more positive angle, however, is the potential for e-scooters to act as a mobility aid for people who might otherwise find their mobility is limited. These include people with fatigue, who may be mobile but unable to walk or cycle even short distances, and people who find walking painful. Compared with conventional mobility scooters, e-scooters are cheaper and easier to store in the home, additionally e-scooter share schemes are stored in the public realm, rather than private space. A limitation of shared schemes, however, is that the individual would need to be able to get to the place where it is parked to begin the journey. The participants emphasised that the potential for e-scooters to be used

as mobility aids by some people should not detract on the need to problematise and understand the impact of e-scooters on vulnerable people in a more general sense.

In our study we found that people who said they had a 'long-term illness, health problem or impairment that limits daily activities' were more likely, than the general sample, to say in Survey 2 that they had felt unsafe around an e-scooter or had to move out of the way of an e-scooter rider (**Figure 13**). It is worth noting however that this cohort is relatively small, in comparison with the sample as a whole. In Survey 1, with a larger sample, people in this cohort were more likely to identify factors that would deter them from using an e-scooter, concerns about road safety and helmet availability in particular. 36% of those in this category said their 'illness or mobility impairment' would be a factor that would limit their use of e-scooters.

Messaging

The messaging around the e-scooter trial scheme was found by some participants to be confusing at times, particularly in relation to separating the trial scheme from private e-scooter use: *'I think the messaging round e-scooters is confused, that at the moment people can legally use them as part of a hire scheme, but*

Factors most likely to limit use and experiences of e-scooters while walking
Do you have a long-term illness, health problem or impairment that limits daily activities?
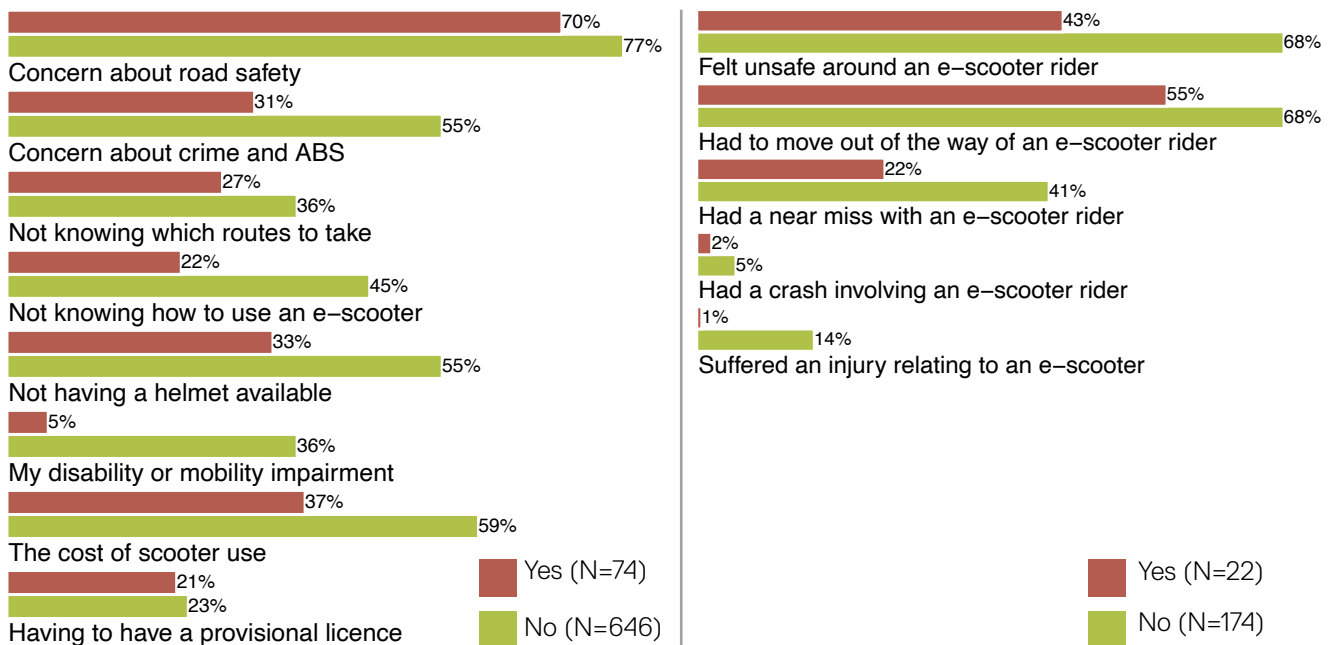

Concern about road safety — Yes: 70%, No: 77%
Concern about crime and ABS — Yes: 31%, No: 55%
Not knowing which routes to take — Yes: 27%, No: 36%
Not knowing how to use an e–scooter — Yes: 22%, No: 45%
Not having a helmet available — Yes: 33%, No: 55%
My disability or mobility impairment — Yes: 5%, No: 36%
The cost of scooter use — Yes: 37%, No: 59%
Having to have a provisional licence — Yes: 21%, No: 23%
Yes (N=74), No (N=646)

Felt unsafe around an e–scooter rider — Yes: 43%, No: 68%
Had to move out of the way of an e–scooter rider — Yes: 55%, No: 68%
Had a near miss with an e–scooter rider — Yes: 22%, No: 41%
Had a crash involving an e–scooter rider — Yes: 2%, No: 5%
Suffered an injury relating to an e–scooter — Yes: 1%, No: 14%
Yes (N=22), No (N=174)

Figure 13 – A) Factors 'somewhat likely' or 'very likely' to limit e-scooter use, B) experiences when walking – both compare those with an illness or condition that affects mobilities with those who do not. (Survey 1, Q25 N=741 and Survey 2, Q1 N=199)

there's nothing to stop them going into a shop and buying one, but then it's illegal to use it on the roads, but it's legal to use a rented one' (Interview 14).

One participant suggested this lack of awareness might be overcome by infrastructural signage, which could help guide scooter users in navigating the geofence, while educating pedestrians and other roads that scooters are being used in the area:

> *I guess a bit more signage in terms of – or awareness in general of where you can and should use the scooters. Like I say, we just went on the paths or the bikes lanes because it was quiet and we thought it's not bothering anyone. But I don't really know if we were supposed to be doing that or we were supposed to be on the road! (Interview 9)*

Some users of the scheme admitted they were not quite sure where they were supposed to use the scooter once they were scooting, as they did not know if its classification was more akin to a car or a bicycle in terms of the infrastructure it should be used on:

> *it would have been very interesting to have known exactly where I was allowed to go with it and where I couldn't. Did I have basically the same rights as a cyclist, or because it was not a Pedelec-type machine, it's actually a motorised vehicle, perhaps I should have stayed on the road. I don't know about that, and I wasn't given much guidance about that (Interview 16).*

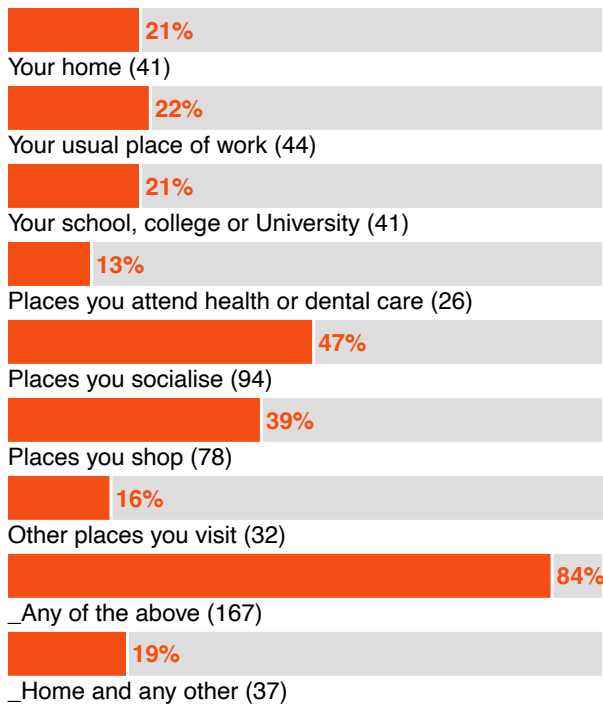### Areas within the geofence

Figure 14 **'Do the e-scooter share areas (in Salford and Rochdale) contain any of the following?' (Survey 2: Q3: N=199) Note that bottom two lines are calculated from other answers.**

It is worth noting that Lime make this information available through their App before a user's first ride.

This lack of awareness also served as a barrier to one participant and potential e-scooter user, who, while positive about the scheme overall, did not know where to start in terms of accessing it:

> *I wasn't sure how to use them, or where you left them afterwards, and also, I wasn't sure about the laws on whether you could use them on the pavement… I just didn't know the laws around using them and what I actually did with it once I got to my destination… I presume you pay for them, do you? See, I don't even know how - I'm assuming that you pay to use them. (Interview 20)*

3.4 The operational area (geofence)

The geofence affected views and experiences in multiple ways, including its impact on the potential for multi-modal transport, cost and utility, as well as its likelihood to appeal to residents who live and work within its operational area. When it comes to a share scheme with virtual docks, the geofence can play a critical role in the scheme's success, as it ultimately determines who can access the scheme, and what journey types they can make. The geofences operate within Rochdale and Salford, as the other Local Authority areas of Greater Manchester are not participating in the scheme. It is determined by the participating Councils.

The geofence played an important part in most people's use or perceived potential use of e-scooters. For many participants, living or working outside the geofence often predicated a lower level of use simply because they came into contact with the hire scooters infrequently, if at all. **Figure 14** shows that a majority respondents (84%) stated that at least one of the destinations listed was located within the geofenced area. This implies a potential for them to use the shared e-scooters as for functional journeys. Only a minority of respondents (19%) in our sample, however, said that their home and at least one other destination was within the geofence area. Whilst this group might therefore be able to use the rental scheme to get from home to, say, work, the majority of the sample might find that the geofence limits the extent to which they can make functional journeys.

Whilst this to some extent reflects the size and nature of our sample, it is self-evident that the size of the operational area will limit use, especially in an area like Greater Manchester with contiguous districts and boroughs and where people commonly live in one

borough and work in another. As shown in **Figure 5**, half of Survey 2 respondents selected the operational area as a factor that would limit their use of e-scooters.

However, if this geographical barrier was overcome, as one participant notes here, there is potential for modal shift such as, in this example, using an e-scooter instead of a taxi:

> *I definitely think I would find it useful in certain situations. The only reason really, I've not used it myself is because currently, I'm just outside the boundary of where they are located or where the pick-up points are convenient for me or pick up and drop-offs. That is the only reason I've not used it because on a lot of occasions I've wanted to go a short distance, say go to town because I'm only about a mile away from the city centre where I am now. I would have rather got a scooter, because I know how to use them. I'm familiar with them and I think that would be a better more economical way than getting a taxi which is what I do now (Interview 27).*

There is potential for the e-scooters to be used as part of a trip chain as in the case of this interviewee, who mentioned often scooting to the border between Manchester and Salford, and then walking the remainder of their journey into the city centre – a likely common use case when commuting between the two cities due to the geofence not currently crossing into Manchester city centre:

> *You can get them quite close to the city, because in Salford Central, you just walk up and you're there, so that's quite a practical reason that I have stopped before and then gone into the city, but it's been part of that leisurely activity (Interview 22).*

The provision of inclusive and equitable transport are important factors for a public trial scheme. Here, one participant involved in local transport planning recognised the scheme's ultimate ambition to provide a fair transport offer to Salford's community, which is something that can become more easily achievable as the geofence continues to grow: *'One key ambition is to use the e-scooters to enhance connectivity between areas in Salford and bridge disparities between socio-economic areas, encouraging inclusivity and equitable transport' (FG Transport Planners)*. The role of a geofence is crucial in determining the user base of a trial share scheme, and in some cases, a decision around one element of implementation can unintentionally impact the user base, and potentially lead to imbalance and inequalities when it comes to broader

access. In this example, an interviewee refers to a feeling that the operational area may have been designated in such a way as to exclude some communities:

> *I do wonder whether they've tried to [Geofence] us around some of the rougher areas to stop people taking them into the council estates, which seems a bit wrong to me because obviously there is that big council estate on Lower Broughton Road, and whether they've gone, 'Oh, we don't want them taken into there because that's where they'll get vandalised, so we won't allow that area to be in it (Interview 13).*

In **Figure 15** we provide an example of the information provided in the Lime App, including some of the park zones.
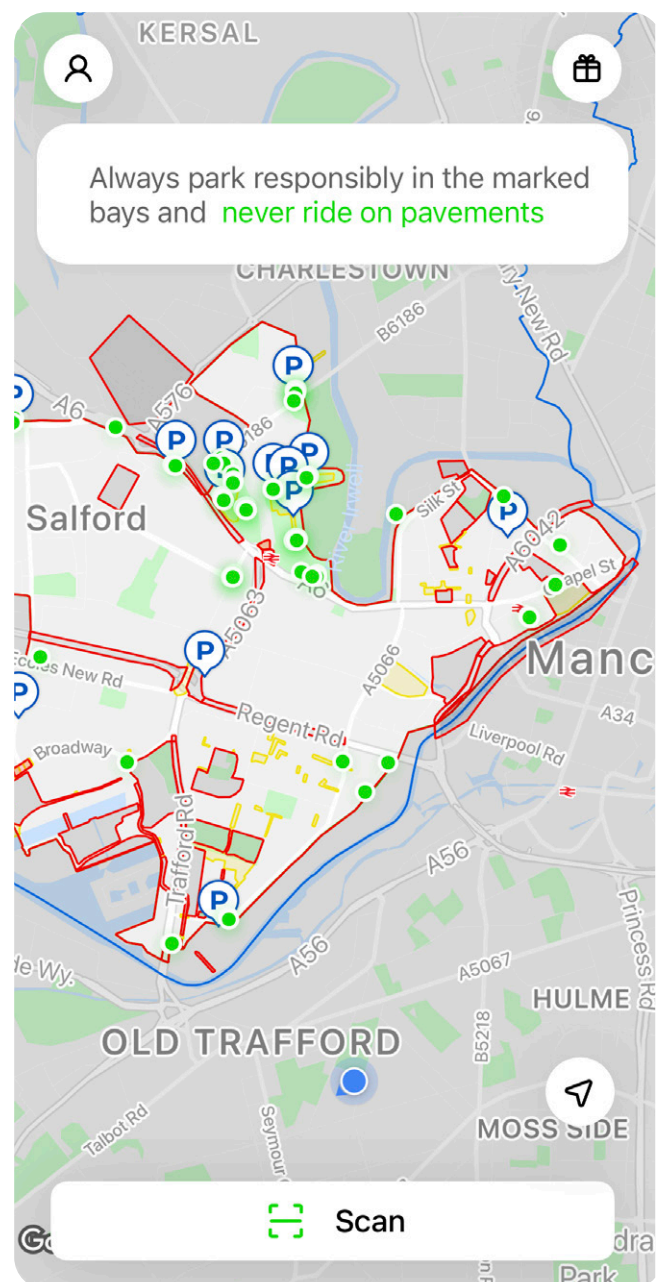

Figure 15 Examples of geofence and (some) parking zones (screenshot from Lime app, 24th January 2022)

Communication

One of the key challenges of dockless share schemes is educating the community about the current operational area, as the geofence area can be subject to change during multiple phases of a scheme. The trial scheme in Salford has had three phases so far, and each has brought a new expansion to the geofence. The scheme is currently entering Phase Four. During the summer one participant expressed the view that this could be better communicated to users, as they only discovered the scheme had moved into Phase Three when he noticed the scooters had become available in the App in a new part of Salford:

> *I found out, actually they'd extended the geofencing to the centre of Salford, all the way into Trinity. I was totally unaware of that, I discovered that by chance looking on the App and seeing scooters scattered down Chapel Street. (Interview 12)*

Locating e-scooters

One participant questioned the reliability of always being able to find a scooter when they need one, particularly when considering the trial scheme as their primary transport mode. The notion of guaranteeing long-term continuity for the user is essential here: *'what I would need to be confident is, is that I'm always going to get a scooter once I get off at Salford and that it's going to be easy in the morning to get a scooter to get to the train station' (Interview 16)*.

The challenge of ensuring continuity for the user is not a new challenge for share schemes using docks and virtual docks and is something that can become increasingly difficult to guarantee as a scheme grows in popularity and more vehicles are in use regularly.

3.5 Cost and payment

The cost of accessing the e-scooter trial scheme is a factor for people considering using an e-scooter or switching their current mode of transport to an e-scooter. Cost is a complex issue and must be understood in the context of mobility *options* more generally. Perceiving an option to be expensive does not necessarily deter use: people will continue to use a mode of transport if they feel it is the best option, even if they also perceive the cost to be high. In Rochdale and Salford, customers can choose to pay per minute (£1 unlocking fee and 15p per minute), use ride passes (for set periods of time), subscribe to Lime Prime, or take advantage of discounts through the Lime Access scheme. The pricing structure was revised in summer 2021 in order to offer a wider range of options. The pricing structure, subscription models, discounts and changes are detailed in Appendix E.

Figure 16 shows, perhaps unsurprisingly, that those in the lowest income group were more likely to say that the cost of e-scooter use would limit

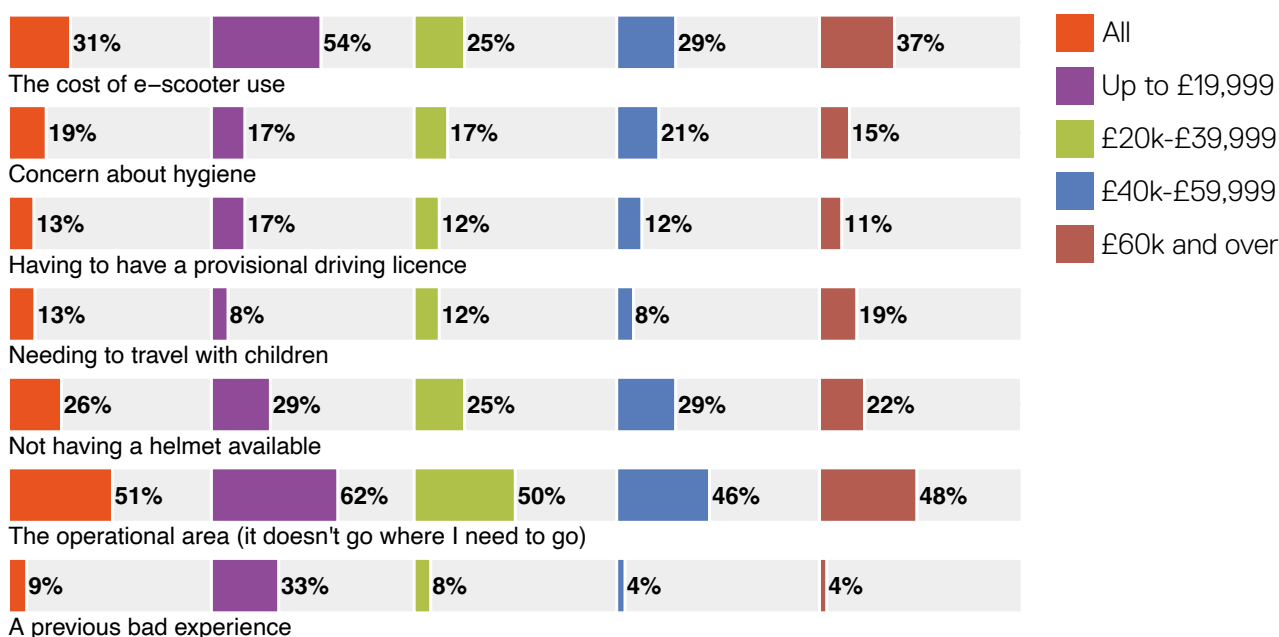## Factors likely to limit use, by household income

Figure 16 Factors 'somewhat likely' or 'very likely' to limit use of e-scooters, by household income (Survey 2: Q16 N=199)

how much they use the scheme. This implies that lower-income social groups may be less able to take advantage of the e-scooter share scheme.

Comments on cost and pricing related to the predictability of journey costs, the advantages of different pricing and billing models, costs relative to other modes of transport, and general perceptions of value for money.

To some extent perceptions of cost related to use case. Many of the participants in the study who have used the scooters were initially drawn to them out of curiosity and had only used them once or twice for recreational activities. To some degree, overall costs matter less in these circumstances as the e-scooters are providing a form of entertainment and social activity, which has been especially important against the backdrop of a national lockdown and ongoing Covid-19 pandemic. One participant, for example, recalled their thoughts after finishing their first ride:

> *I don't remember what the pricing was, if I'm honest, but I do remember being like, oh, my gosh, is it really going to cost that much? Then once I had the experience, I forgot about it. I was like, I could have just kept doing… I think in the end, I was on the scooter for about two hours plus. It was just so much fun and liberating and stuff, I didn't really care. It wasn't that bad, it was about £12.50 or It was under £15 anyway, which if I really think about it, maybe is a I don't know, if I think of just the money, it might sound like it's too much, but yes, for how I felt, and I had a really good time and stuff, I didn't mind. I didn't think about it afterwards (Interview 28).*

However, when these costs are seen in the context of daily transport, the decision-making process becomes more calculative: *'it's a bit expensive isn't it but I didn't mind just for the fun of it but again, if that was what you were relying on every day thinking around you'd probably start to tally that up against the cost of a bus ticket' (Interview 1).* Cost could therefore be considered in relation to public transport and other services such as bike share, taxis and Uber.

Predictability

Participants commented on the pricing model, describing how the nature of a pay-as-you-scoot share scheme makes it difficult to anticipate how much your journey will cost in advance, in turn making it difficult to plan your journey if you are on a budget. Comparisons were made here between the e-scooter trial scheme and London's well-established bike share scheme:

> *when you go to London the Boris Bikes I think, it's like £2 for half an hour and then you know that it's only going to be £2. I think the thing with the scooters is you don't know until you finish using it how much it's going to cost (Interview 13).*

One participant, who had not used the e-scooters, reflected on the pricing model and how this may translate to real-world use, highlighting that individuals are not necessarily able to predict their journey time: *'Cost-wise that seems quite expensive if we're trying to encourage a modal shift. I don't know, 20p a minute. You could spend minutes just at traffic lights, couldn't you?' (Interview 19).* Note that the actual cost of the Lime rental e-scooters is 15p per minute.

The shape and extent of the geofence and the distribution of parking points were also factors that affected predictability. One interviewee raised the point that you may arrive at your destination and find they cannot leave the scooter at your destination, and so you will need to locate the nearest drop-off point, which can contribute to extra time and therefore extra cost:

> *time being added on when you arrive somewhere but then the App says you can't leave it at this place so you're then looking, it's maybe another 20p, 40p or whatever clocking up while you're finding somewhere where you can leave it. (Interview 14)*

The Lime app does show drop-off points clearly on its map, but some participants noted that they struggled to look at their phone while also scooting: *'you cannot use your phone whilst riding to check you're going*

Trying out Lime e-scootesr in Rochdale

in the right direction' (Survey 1 Comments) and therefore may struggle to anticipate where the nearest drop-off zone is if you do not know the area very well.

This interviewee describes how this uncertainty and unpredictability can be problematic for people needing to budget carefully:

> *I mean I should say that it's just that I'm tight. I'm not on a really tight budget, but I guess what I'm thinking of, if I'm someone who usually would get the bus into town and it costs £1.90 or whatever to get the bus into town, I know that I'm going to get on that bus - it might not be £1.90 any more, I haven't taken a bus since forever - but I know I'm going to get on the buss and spend my £1.90 and then I'm in town whereas if I get on the scooter and I'm not sure how much it's going to cost me, that could be a limiting factor for someone on a lower income (Interview 13).*

A subscription or time-limited pass model can therefore assist journey and financial planning, as this interviewee comments:

> *if it's your main mode of commuting, it may not work out financially, if that's what you're doing, unless there was some kind of bundle system, like for five days you pay this kind of amount, that kind of thing. It might make it more worthwhile (Interview 28).*

Comparisons with other modes

Other cost comparisons were drawn between using e-scooters or using the bus service, with one participant questioning which option would be more popular if both services are of a similar cost to the user: *'if you were normally paying to get on a bus you're probably not going to pay to get the scooter instead. Like I don't think they're particularly cheap' (Interview 13).*

Additionally, students and staff from the University of Salford noted that they have access to a free bus service subsidised by the university, which travels between the main campus and MediaCityUK, which has also been a popular e-scooter route since it was introduced in Phase Two of the geofence expansion. When considering this particular journey, some staff and students referred to the free bus as a preferable option: *'I'm not going to go to the trouble of paying to hire an e-scooter when I can get on the bus for free and go down to Media City' (FG All Road Users).*

3.6 Use of private e-scooters

While our study has primarily focussed on the e-scooter trial scheme taking place in Salford, it became increasingly difficult for many participants observing e-scooter use on the streets to separate users of the trial scheme from private e-scooter users, even if the latter is currently illegal. It became clear that, to some degree, people's perceptions of e-scooters are being shaped by both types of e-scooter use, and therefore it is important to examine the impact of private e-scooter use.

Subsequently, it has not always been possible to completely separate the popularity of private e-scooters from the growing trial share scheme in Salford, when it comes to people's experiences of scooters. For example, a pedestrian who has a negative encounter with an e-scooter user on the pavement may not always know if the scooter belongs to the trial scheme, or if it is a private vehicle.

It appears that there is some confusion over the legality of e-scooters and this example suggests that retailers are not communicating clearly. This interviewee described the experience of purchasing their private e-scooter in a high street shop. She recalls that only at the point of sale was she told by the shop assistant about the limitations of where the scooter could be used legally:

> *just before point of sale in terms of putting my card into the machine to buy it, they talked me through it and said, 'Oh, you do know that legally we're obliged to tell you these should only be used on private land that's owned by you. You can't use it on roads and you should not use it on public access roads and things like that (Interview 17).*

When asked if she understood this legality: *'I said, 'Yes, of course' even though we'd had a ten-minute conversation about me commuting to work' (Interview 17).* This suggests that some retailers are not being honest about the legality around purchasing a private e-scooter, particularly when it comes to being clear about the kinds of spaces it can be used in, and ultimately, the kinds of journeys it can be used for.

Another participant observed the convenience of owning a private e-scooter while on a trip in London:

> *when I was down in London a few weeks ago, I noticed a guy who'd got an e-scooter and it had just collapsed and he'd got it on his back. Literal personal transport that you just pop out of a duffel coat or something. I thought that was in principle, in theory, that's a great thing (Interview 16).*

Conversely, the interviewee highlighted a disadvantage of (some) privately-owned e-scooters. E-scooters used in rental schemes are designed to be left outside and to function in wet conditions, but this is not always the case for other e-scooters:

> *I'm very interested to know how and why they're able to presumably be kept outside in all elements. One of the restrictions on my scooter is all over the instructions and in the shop and all over the box and just everywhere online it says you cannot get it wet even slightly. You can't go through puddles. You can't ride it when it's been raining let alone while it is raining, so obviously in Manchester that's a nightmare (Interview 17).*

Public perception

Another participant stated their concern around the public perception of e-scooters and how they felt irresponsible riders are contributing to a detrimental image of an e-scooter rider. They were concerned that this would have implications for the extent to which private e-scooters are legalised and regulated:

> *My biggest concern is the negative impact/ look that is created for other safe and sensible e-scooter users like myself. I ride as a replacement for driving my car around the city. This is greener, cheaper and more exciting, and I am now worried that there will eventually be a heavier ban on them since naive/irresponsible riders are contributing to a bad public image (Survey 2 Comments).*

This kind of concern, that the broader perception of e-scooters may overlook the behaviour of those trying to be more considerate and safe, is a key challenge for any pedestrian when attempting to identify whether the e-scooter user is a private user or a user of the trial scheme, with one participant noting the difficulty in this situation: *'I can't say with any confidence that I've noticed any difference in behaviour between the private ones and the rented ones' (Interview 14).*

3.7 Other issues

Provisional licence

The need for a provisional licence to access the trial scheme has been cited as a barrier by multiple participants. This is a condition of the national trial and is placed on the operators by the Department for Transport. One participant believed that the provisional licence served a beneficial purpose in preventing some reckless use by younger users: *'I think the fact that you need to have your provisional driving licence is genius for the fact that that stops kids going, 'Whoa! Scooter!'' (Interview 6).* However, this is coupled with the fact fewer young people are either learning to drive or purchasing cars, and subsequently not have a provisional licence, which in turn may exclude them from using the scheme: *'I'm aware that you need a provisional licence to use the e-scooters. I mean, I, for one, haven't got a provisional licence and I don't know many people at the moment who've got a provisional licence, so how do we overcome that?' (FG Community Leaders).*

A briefing on e-scooter use

4. Conclusions

4.1 Introduction

This report provides an update to the research being conducted as part of our study of the Lime e-scooter hire scheme in Salford. It explores the experiences and perceptions of those using the e-scooters as well as those of the wider public, including those who use privately-owned e-scooters.

This second stage of the study is focused on a sample of 199 respondents, a subset of the 741 people who took part in the first stage. In addition to their responses to the online questionnaire, we have conducted an additional 19 interviews (bringing the total to 31) and held a further six reference groups. The survey was conducted in July and August and the interviews in August and September. It therefore does not encompass any use within Phase 4 of the Salford trial scheme, which was launched in October 2021. A further round of online surveys, interviews and reference groups, planned for spring 2022 and with recruitment through social media, will provide a more comprehensive and robust picture of usership.

4.2 Observations

Usage

Patronage continues to be dominated by relatively infrequent e-scooter use and by journeys that people characterise as being for fun, recreation or curiosity. There are however some people who have used e-scooters for functional journeys such as those reaching work, education, shopping, healthcare and social activities. These, however, tend to be infrequent, or at least have not yet become routine. When asked how people perceive their *potential* e-scooter use, the range of use cases broadens, with stronger representation for these purposes, and travel to work in particular.

Respondents have had different reasons for choosing to use e-scooters and, after curiosity, shorter journey time and general level of convenience were the most prominent. There is evidence of a demographic gradient in access to the e-scooters, with older people much less likely to have used the hire scheme and younger people more likely to have used them and to use them more frequently. Younger people were also more likely to see themselves using them in the future.

Although people gave examples of multimodal journeys and the potential for modal shift, particularly from public transport, the most common mode of transport to be combined with or replaced by an e-scooter journey is walking. This is not necessarily problematic – since the e-scooters could be creating opportunities to make journeys that would otherwise not have been made or, as discussed below, to avoid potentially unsafe situations – but it does call into question the potential for a reduction in carbon emissions. Around half the sample, however, saw themselves unlikely to use an e-scooter as part of the hire scheme, implying a need to better understand how the e-scooters and the wider scooting environment may limit their use.

Sharing space

Female respondents were more likely to identify factors that would deter them from using e-scooters. Concerns about road safety (fear of traffic) and personal safety (fear of attack) were more pronounced amongst female respondents, although males also expressed these concerns to some extent. Females were much more likely to say that not knowing which routes to take and not having a helmet available would deter them, and these are concerns that are likely to relate to safety. The summary statistics indicate that safety concerns are prominent across the sample, but that they are more likely to be expressed by female respondents.

In our discussions, interviewees related their confidence when using an e-scooter to their sense of safety in the road environment and these concerns tend to mirror those related to cycling: perceptions of risk when riding in traffic. As with cycling, dedicated space is perceived to be important but, in the case of e-scooters respondents expressed concern about the potential for conflict when people cycling share space with those riding e-scooters. This raises questions about the sufficiency of existing cycling and shared infrastructure and its capacity to absorb growth in e-scooter ridership and, potentially, other micromobility modes. For e-scooter riders, the quality of the road surface was of particular concern, with the potential for small wheels and uneven and broken surfaces to be a dangerous combination.

Another aspect of safety concerns relates to people sharing spaces with e-scooters. Respondents told us about their experiences around e-scooters and recounted some problematic encounters and general feelings of being unsafe. Through the survey, respondents indicated that they had felt unsafe around e-scooters when walking, had to move out of the way, or had had a 'near miss'. Females were more likely to say they had felt unsafe around e-scooters when walking and men were more

likely to say they had felt unsafe whilst riding an e-scooter, an interesting finding given that men were no more likely to have used an e-scooter. Older people were more likely to report having felt unsafe around e-scooters and to have had a near-miss with an e-scooter. In relation to experiencing the public realm, and with implications for safety, respondents expressed concern about e-scooters use impinging on pavement space and making it more difficult to get around. Our fieldwork suggests that these issues will be particularly problematic for people with vulnerabilities relating to sensory or visual impairments.

Discussions on personal safety raised some important issues. Whilst respondents saw the fear of crime and antisocial behaviour as something that would deter them from using e-scooters, 'avoiding feeling unsafe (from crime and antisocial behaviour)' was also given by some as a *motivation* for e-scooter use. Whilst riding an e-scooter made some feel they were drawing attention to themselves (especially if they were wearing hi-vis clothing for road safety), for others, it was a way of avoiding attack or harassment by moving more quickly through urban areas. In this sense an e-scooter provided them with a way of moving that they perceived to be safer, allowing them to position themselves in the middle of the road, away from dark corners or unlit street pavements. There were also references to finding a balance between the risks that might be associated with being on the road and the personal safety benefits of avoiding walking.

Respondents expressed concern about a lack of clarity over where they were allowed to ride the scooters. One reflected that they had used pavements in a quiet area, making a judgement that they were not disturbing anyone but also not knowing for sure if this was allowed. Some saw this lack of clarity as a barrier to use.

Operational area (geofence)

A minority of the respondents were aware of e-scooters being available where they live, work, or attend education. To some extent, this indicates a limitation in the sample, but it is also a natural result of a geofenced scheme. Any shared mobility service has to be understood in relation to where it can and cannot be used. Half of the respondents cited the size of the operational area as a barrier to use and respondents talked about their desire to connect with places outside of the geofenced area. With the scheme expanding over time to cover more of Rochdale and Salford, there was some confusion over the current operational area, highlighting a need for clear communication on this. With participation in the trial limited to Rochdale and Salford, other areas in Greater Manchester will remain outside the scheme in the short term.

There was some confusion expressed over parking, with some respondents noting they did not know what they were supposed to do with the scooters once they

arrive at their destination. Clear communication and perhaps some public engagement to give people the opportunity to learn about the scheme could serve to overcome some of these barriers. One participant's reflection on the potential impact of having the drop off zones on the pavement is interesting, as she questions whether this placement is actively encouraging users to ride more often on the pavement, as that is where they collected (and will drop off) their scooter.

Furthermore, uncertainty around being able to find an e-scooter was given by some participants as a potential barrier to use, particularly when considering using an e-scooter to commute to work. Certainty and reliability were seen to be very important when commuting, as they will need to know their main mode of transport is functional and accessible every day.

Cost and pricing structure

The cost of e-scooter use is an important consideration, as would be the case with any share scheme, and a large minority saw this to be something that would deter or limit their use. Those in the lowest income group were more likely to say that cost would be a deterrent. This is related in part to a general sense of value for money, especially when making comparisons with public transport. It also relates to journey purpose: if use is primarily for fun or out of curiosity with a one-off or infrequent cost, then a higher cost may be less of a deterrent.

If an individual is planning to embed e-scooters into regular mobility practices, however, the approach becomes more *calculative* and the relative cost, when compared to other transport options, such as public transport, taxis and Uber, becomes important.

Unpredictability in relation to cost was an important consideration. With price being calculated per minute, it is important to take account of unfamiliarity with suitable and permitted routes, uncertainty around parking places, and 'natural' variation in journey duration stemming from factors such as traffic, junctions and traffic lights. Participants noted that not being able to know how much your trip will cost before you make it is a deterrent, to regular use in particular.

Pricing models and membership are a consideration, with some participants noting that introducing a pricing model more akin to a monthly membership, with a regular fixed payment every month for unlimited scooter use, would be more appealing than a series of per-journey payments.

Participants suggested that this would remove the uncertainty around individual journey costs, as well as help users with budgeting for transport costs each month.

Privately owned and shared e-scooters

The relationship between shared and privately-owned e-scooters is multifaceted. As with bike share, shared e-scooters provide a distinct offer in that they do not need to be stored at home or carried for the whole journey and can be picked up and dropped off as needed. On the other hand, the use of privately owned e-scooters does not require a per-use fee or a smart phone and is not restricted to a geofenced area.

Shared scheme use and private ownership each have their own advantages and disadvantages. We heard, for example, about a participant who valued being able to walk part of their journey with their friend and then pick up a shared e-scooter at the point in which they went in separate directions. We also heard from someone who had bought their own e-scooter to be able to do a 10-15 minute journey that was time-consuming by public transport and would likely have been impossible within the current geofenced area. This example indicates the increased potential of a sharing scheme if the operational area were larger. Conversely, another participant observed that Lime shared e-scooters can be ridden in the rain and through puddles, whereas some privately-owned scooters (including their vehicle) cannot operate when wet.

When asked about barriers relating specifically to share schemes, 'the operational area (does not go where I need to go)' was the most commonly selected barrier, followed by the cost of e-scooter use. Smaller numbers also selected 'concern about hygiene' and 'not having a helmet available'. The requirement to have a provisional driving licence, a feature of the current trials, was also a barrier for some.

Although privately owned e-scooters are currently illegal outside of public spaces, the reality is that many people are using their own e-scooters to get around Greater Manchester. Additionally, there are indications that Government is actively considering when and to what extent to allow private e-scooter use and therefore a need to better understand how these two modes could co-exist. There is some confusion over which e-scooters can be used and where they can be ridden and there is some evidence that retailers are not communicating clearly. We spoke to one person, for example, who had an in-depth discussion with the retailer about their plans to scoot to work only to be told at the moment of payment that they were not allowed to use their new vehicle in public spaces.

There is a methodological point to add, which is that respondents' views of e-scooters may be influenced by the current situation: seeing the potential of an e-scooter to be limited to the parameters of a sharing scheme and not wanting to consider using a private e-scooter when they are illegal. Additionally, their perceptions of e-scooters as a whole may be shaped by, on the one hand, inappropriately parked shared scooters or, on the other, the use of privately owned e-scooters at speeds above the cap placed on shared scooters.

4.3 Implications for research

As the e-scooter share scheme expands to cover more of Salford, people become used to seeing the scooters in use around their neighbourhood and places they visit, and society opens up after Covid-19 restrictions on travel, work and socialising, it is important to understand the ways in which people perceive and make use of this new form of transport. With the Greater Manchester e-scooter share trial continuing to run, and the Salford scheme having opened into Phase 4 in October 2021 (its largest geofence so far) we will continue to engage with the public, through surveys, interviews and group discussions. This will enable us to gain a robust understanding of the impact of the vehicles on mobility practices and on how people use and perceive public space. It will also aid understanding of sustainable mobility and micromobility in a broader sense. Our research to date, as documented in our Interim Reports suggests the following priorities:

- As the scheme is expanded across Salford and people become used to seeing the scooters as part of their daily routines, what does this mean for take up? A larger operational area means more potential for journeys between homes, schools, colleges, universities, workplaces, and entertainment, sport and cultural facilities. It also opens up the possibility of more multimodal travel, with e-scooters providing a way of connecting bus, tram and train journeys. It may also mean that functional journeys, as opposed to those related to fun or curiosity, will make up a greater proportion of use.

- As more Rochdale and Salford communities are included within the operational area, does this create opportunities for greater social inclusion and what are the implications for social gradients across gender, income and disability in particular? Additionally, do journey types or motivation for use begin to change across these gradients?

- Cost is evidently a factor in how people think about mobility choices and make decisions relating to trying out e-scooters and, potentially, building them into regular travel patterns. This issue is not simple and perceptions of value for money may relate to use case: what is perceived to be a high cost for every day journeys may seem more reasonable for infrequent leisure activities, especially if the 'fun' element of scooting may become part of the calculation. Different types of payment structures appeal to different audiences. It is important to form an understanding of the different pricing structures and mechanisms that may incentivise e-scooter travel and of the ways in which people make financial decisions relating to their mobility choices.

■ Interviewees have alluded to how they perceive e-scooter riders, and how they themselves have felt when riding. There is more to understand in relation to the broader image of e-scooters and other micro-mobility modes, how this differentiates from individual to individual, and how this relates to take up. To what extent do people see e-scooters and other shared modes as being 'for them', does this change over time as the scheme beds in, and does this vary across and between demographic groups?

■ We have begun to collect evidence of potential tensions between users who are sharing space. E-scooters - being quiet, potentially fast, and relatively unfamiliar are seen by some road and pavement users to be prob-lematic. There is also a question about how the cycling community will respond in the medium term to sharing segregated infrastructure with these new vehicles. There is evidence that this could be a particular issue for people with sight, hearing and mobility impairments. There is a need to better understand this situation and to explore mitigation measures.

■ Conversely, there are indications that e-scooters could provide a kind of mobility aid for people with otherwise limited mobility. Unpacking and exploring this potential will add to the evidence base on the ways in which people use micromobility.

■ Relatedly, what are the implications for infrastructure provision, including spaces for walking and cycling, of a growth in e-scooter use? What forms of infra-structure do users and potential users need and how do cities best accommodate the requirements of micromobility modes and balance them with existing transport options.

■ Privately-owned scooters continue to be used in Greater Manchester. Whilst this usage is separate from the Lime share scheme, privately-owned scooters do provide evidence that is potentially useful for this study. These two modes of operation – private ownership and share scheme – are ultimately two different choices for the consumer to make when considering embedding e-scooter use into their life, and each has their own 'offer', with advantages and disadvantages and it is useful to understand these together. Firstly, private use provides an indication of the potential for e-scooter use in general, indicating potential journey types, how usage fits within existing infrastructure, and use cases away from the constraints of the geofence. Secondly, many of the issues relating to e-scooter use – such as sharing space, feelings of safety, knowing which routes to take, weather, and carrying capacity – will apply to both shared and privately owned e-scooters. Thirdly, shared scooters have particular characteristics relating to, for example, ongoing cost, smart phone dependency, and battery charging regimes beyond the control of the user. Placing these characteristics in the context of e-scooter use as a whole can be helpful in defining and contextualising the potential future of e-scooter use moving forward.

A Method

A.1 Approach

Our study comprises a combination of qualitative and quantitative social research methods, and has so far included 2 online surveys, 12 reference groups and 31 in-depth interviews. This broad engagement approach enables us to understand the varying experiences and perceptions of the e-scooter trial. Over the last 12 months we have used this approach to identify who is using the scooters, why, how, and for what purpose, as well as asking what kind of potential people see in the scheme. Adopting this approach allows the trial to be placed within a broader context that takes account of other road users, the wider community, and vulnerable people in particular. This work builds on the Healthy Active Cities team's previous research on micromobility, including bike share (Sherriff et al., 2020), e-cargo bikes (Blazejewski et al., 2020) and low traffic neighbourhoods (Larrington-Spencer et al., 2021), and contributes to a growing field on micromobility, sustainable mobility, and active travel.

In particular, the study is creating an evidence base on:

■ who is using, or considering using, e-scooters and how these groups could be categorised;

■ reasons for using e-scooters and potential barriers to (further or more extensive) use;

■ journey purposes and other factors influencing the use of e-scooters;

■ the relationship of e-scooting with other modes of transport and how this may encourage intermodal travel and drive patronage to more sustainable modes;

■ the nature of the e-scooting experience and its relationship with the urban context, including physical infrastructure, traffic and interactions with other road users, pedestrians and cyclists;

■ perceptions of e-scooters by users and non-users in relation to convenience, impact, safety, the public realm and interactions with others;

■ the distribution of the above factors across demographic groups including gender, ethnicity, socio-economic status and levels of vulnerability and the implications of this for uptake and social inclusion;

■ the influence of the Covid-19 pandemic and associated policy responses over use of, and perceptions relating to, e-scooters.

The study runs over 2021 and 2022 and will report at the end of the e-scooter trial in the June 2022. In order to understand the evolution of e-scooter use as the trial develops and expands, it takes an iterative approach that sees the different elements repeated over the year and feeding into each other.

A.2 Reference Groups

Twelve reference groups have been carried out in this study so far. The purpose of the reference groups was to identify key themes relevant to a range of different demographic groups. These themes were used to design the survey questions and inform discussion points for the interviews. The participants were selected to provide a range across gender, ethnicity, and people who had used and not used e-scooters. Questions were posed to the group to guide conversation and open discussion was encouraged. Each reference group was designed to target different demographics, including community groups, disabled and vulnerable groups, road users, transport planners, female road and pavement users, and mobility researchers.

The 12 reference groups were conducted online, recorded, and lasted approximately one hour each. Short summaries of each reference group were created (Appendix B).

A.3 Online Survey

Two online surveys have been carried out in this study so far. The first online survey was live from 2nd until 28th March 2021 and was completed by 741 people. The second online survey was live from 19th July 2021 to 18th August 2021, and was completed by 199 people.

Both surveys were designed to provide information on the extent of the use of e-scooters, journey purposes, reasons for choosing e-scooters, and the relationship between e-scooter use and other modes of transport, particularly as the scheme moved from Phase 2 to Phase 3 in summer 2021. They were also intended as a way of selecting people to invite for interview.

The surveys started with a set of questions intended for those who had used an e-scooter as part of the Salford trial and moved on to questions that sought a more

general level of information from users and non-users. These questions, which were informed by the discussion in the reference groups, were related to factors likely to limit e-scooter use, personal priorities and factors likely to be important when deciding whether to use an e-scooter, and concerns about the potential impact of e-scooters.

We used closed lists to enable people to quickly tell us about their experiences and intentions and facilitate statistical analysis. We ensured that there were opportunities to add 'other' options and to provide free comments, something we felt to be particularly important in a newly evolving field of mobility in which we have only an initial understanding of factors such as motivations, barriers and journey purposes.

The first survey was promoted using internal news and staff and student communications in different schools at the University of Salford, TfGM's social media platforms, Lime customers registered in Greater Manchester. Twitter and Facebook were used to reach different groups including Salford communities, BBC staff at MediaCityUK, and people involved in walking, cycling and other transport campaigning and policy.

The second survey was promoted via email to a subset of people who completed the first survey. Totalling 516, this cohort had consented to being approached about further research. Participants were each sent one invitation email, with two follow up reminders.

To encourage a large and diverse sample (i.e., not limited to those particularly interested in e-scooters) we offered the opportunity to be entered into a

£100 prize draw. We wanted to recruit people who had used the e-scooters as well as those who might do in the future or who had no interest in them.

A.4 Interviews

Thirty-one interviews have been carried out so far in this study. The purpose of the interviews was to explore in more depth the themes arising from the survey, sometimes in a generic sense and in some cases in relation to specific themes that survey participants had raised in their survey responses. The interviewees were selected to provide a range across gender, age and ethnicity and to include people who had and had not used the e-scooters. A diversity of experience was sought, such as to be able to elicit views from people who indicated that they were likely to use e-scooters in the future and who highlighted particular issues or concerns. The free text comments provided in the survey responses were particularly useful for these.

The 31 interviews were conducted by video call or telephone and lasted approximately 30 minutes each. In this section, interviewees have been assigned a pseudonym to maintain their anonymity. Short summaries of each interview were created (Appendix C).

B Reference Groups

Online discussions were held with a set of reference groups formed to reflect specific expertise and experience relevant to understanding e-scooters and their use in Salford. The membership of the reference groups are drawn from Mobility Researchers, Transport Planners, Community Organisations, All Road Users, Women, and Disabled People and Vulnerable Users. These summaries should be read in conjunction with those presented in our Interim Report.

B.1 Academics

This group comprises academics working in the field of transport and active travel research. During this session three themes were identified: the legal status and regulation of e-scooters, motivations for use, and modal shift. Throughout the discussions, references were made to the differences between publicly (legal) and privately (illegally) owned e-scooters.

Legal status of e-scooters

During the time when local authorities have been running e-scooter trials, the private ownership and use of e-scooters appears to have increased significantly. It is currently illegal to ride an e-scooter in a public place in the UK, unless it is part of an official trial. However, this has not stopped many e-scooter owners from riding their scooters in public, and many businesses are selling, renting and repairing privately owned e-scooters. It was also noted that the legal status of private usage could be a barrier to conducting such research.

One participant who lived close to the border of a trial scheme noted that they would not be able to travel east from their home on a publicly owned e-scooter at all. This is in contrast to privately owned e-scooters, which are not geofenced. Even though it is currently illegal to ride a privately owned e-scooter in public, many people are doing so and due to geofencing, this may be a more attractive prospect, especially if they were ever to become fully legal.

Media headlines sometimes sensationalise stories linking crime, antisocial behaviour or accidents with e-scooters. Nevertheless, some accidents have been reported and this relatively new mode of transport, like others, will inevitably have some teething problems. For example, where is the safest place for e-scooters to be ridden? Some can reach top speeds of up to 30 miles per hour so as powered vehicles, should they be ridden on the roads rather than the pavements?

Females were also more concerned about their own personal safety when riding e-scooters: not necessarily due to the risk of falling or colliding with other vehicles or road users, but also in terms of their exposure to danger from attack or harassment. Females reportedly felt exposed while riding an e-scooter and this could explain their shorter journeys and a reluctance to ride alone for utility. Participants felt that their recreational use of scooters was more likely to be a social experience involving other people, which would have moderated the feeling of vulnerability.

Motivations for use

A key question for research is around the reasons that people use e-scooters. It seems that some users may be riding scooters primarily for enjoyment, while others are using them for some utility, perhaps to commute or as part of a longer journey. This is another area where private ownership differs from public schemes. Owners of e-scooters will be able to start their journey at home and travel wherever they like within a certain distance, depending on battery life. Users of public schemes must begin their e-scooter ride at the designated e-scooter pick-up point and end it at another one. There was sense among the participants that these kinds of limitations make private ownership more attractive than hire scheme use.

Since their small geographic range limits their use as a commuting solution, it seems that a lot of the motivation for the use of public e-scooters is around fun and enjoyment, rather than utility. It was noted by more than one participant in the group that fun is an important motivational factor, and should not be downplayed. If e-scooters are providing enjoyment to the community, then this is a positive outcome which may be contributing to general wellbeing.

Modal shift

One participant suggested that perhaps most of the journeys that had been replaced by e-scooters would have been walking journeys. For example, perhaps a journey from home to university and back again was originally accomplished by a train ride bookended by two walks, whereas now the second walk from train station to university campus and back again is replaced by the use of an e-scooter. If public e-scooter schemes are being used as replacements for walking, then there is no carbon or active travel benefit of those journeys.

Since there has been an apparent large increase in private ownership and illegal use of e-scooters on British roadways recently, this behaviour will be having some impact of the public schemes. For example, the sight of several e-scooter pick-up and drop-off points could serve as an advertisement for e-scooters generally, potentially encouraging members of the public to purchase their

own e-scooter rather than use the publicly owned ones. Research focused solely on the officially recognised e-scooter use in the hire schemes may therefore only cover part of the picture. Issues around motivations, safety and demographics are all linked to the differences between public and private use, so it is important for research to cover both types to some extent.

B.2 Transport Planners

This group comprises transport planners in the fields of active mobility based in Manchester and Salford. The purpose of this reference group is to discuss the role of e-scooters as an alternative form of sustainable transport, as well as identifying any emerging trends from the trial scheme so far. Four broad themes of discussion were identified: geofence limitations; parking; modal shift and the demographic (e.g. age and gender) differences of e-scooter users. Throughout the discussions, references were made to the differences between publicly (legal) and privately (illegally) owned e-scooters.

Geofence limitations

The trials being run by local authorities may only be conducted within the geographic area of that local authority, which means the trial e-scooters must not travel across local authority borders. They are equipped with GPS tracking and an electronic device that switches the e-scooter off if its user attempts to cross a border – this is known as 'geofencing'. This was noted as a potential limitation by participants of both groups since it constrains journeys. For example, riding a trial e-scooter from Salford to Manchester would not be possible, even if the journey were to begin close to the border.

One participant wondered if anything was known about the views of blind or vulnerable people in relation to e-scooters on pavements. One of the researchers noted that charities representing blind and partially sighted people have raised concerns that e-scooters are very quiet so their members might not be able to tell when one is approaching.

Parking

Another potential problem specific to publicly owned scooters is the system of parking. Users are told to leave their e-scooters in designated parking areas, but a participant had seen them abandoned away from parking areas. There have been concerns that the GPS system is apparently not accurate enough to distinguish the parking area from the surrounding area.

Modal shift

Another important research question is around which other modes of transport (if any) are being replaced with e-scooter rides. The public trials were introduced during the time of Covid-19 restrictions, partly as a way of reducing demand for public transport so that social distancing could be facilitated. The participants were keen to know if, for example, e-scooters were primarily being used as an alternative to bus travel, other forms of public transport, or private car use. It was noted that this would be a positive impact of the schemes, not just in terms of social distancing, but also as a means of reducing carbon emissions and fostering an increase in active travel.

Demographics

The target market for the public schemes is younger people, but this may be another area where there are differences between public and private use. The location of drop-off and pick-up points will likely have some effect. For example, where pick-up points are located on or near university campuses, they are likely to be used primarily by students. Private owners of e-scooters, on the other hand, may be using them to commute to work and this could imply that this group is older. Participants were keen to see research conducted on private use where possible.

It was noted that males and females seem to have different motivations for their use of publicly owned e-scooters. Initial data shared by the researchers showed that males were more likely to use for utility (such commuting and shopping), while females were more likely to use them for fun.

B.3 Older People

This reference group is comprised primarily of vulnerable and older residents in Salford. The purpose of the reference group is to discuss the potential impacts of e-scooters on vulnerable people, as well as the potential of the scooters for people with mobility challenges. For the second meeting, the focus continued to be on the barriers and safety concerns around the scheme, as well as how the geofence has expanded since the group last spoke, and how this has impacted people in different ways.

Awareness and understanding of scheme

Multiple members of the group noted that they had started to see e-scooters around more frequently, both in relation to the Lime trial scheme in Salford, as well as an increase in private e-scooter use. One participant expressed his support of the scheme, and an interest in trying out the scooters, but did not understand how zthe scheme was accessed, and whether it could be use without a smart phone. He felt a greater level of education and awareness was needed to teach people about the scheme. One member of the group mentioned that they used to be part of a cycling proficiency group in a local park, and that if this scheme was offered with e-scooters she would seriously consider taking part.

Safety concerns

One participant had experienced an extremely close encounter with an e-scooter user, which she described as one of the scarier moments she has had with e-scooters. The user did not stop or apologise, but continued on their way. Another participant highlighted a need for bells on the vehicles, as they are extremely quiet and fast moving, and if they are using the pavement, pedestrians will struggle to hear them coming. Appropriate infrastructure was seen by one participant to be as a necessity, if they are to become part of our blended transport system.

Potential use

Many participants recognised that it tends to be younger generations using the scooters, and this makes them feel as though they are not targeted to them, i.e. older people. The lack of insurance and the requirement for helmets also makes them feel as though the scooters are inherently associated with risk taking, which is something that does not appeal to them. The quality of Salford's footpaths and roads was also discussed as a barrier to use, citing the aforementioned risk taking in relation to potholes and uneven road surfaces. One participant expressed interest in using the scheme but felt that they would be unable to: 'I can do anything in my mind but my body won't let me'.

B.4 Older People's Day

Older People's Day is an annual event organised by local community organisations to engage with older residents in the community. During discussions with participants in the previous reference group (Older People) it was suggested by one member that the group could be invited onto the University campus to learn more about the e-scooter share scheme, as well as see the e-scooters in action.

Engagement event

On 1st October 2021 twenty-one participants came to Peel Park campus at the University of Salford and were given an introduction to the e-scooter share scheme. This included a brief introduction to what they look like, how the scooters can be operated, and how they may be used on shared spaces. Many of the comments expressed by participants during this discussion were quite critical of the share scheme, with many expressing concerns about the speed the scooters can travel at, their quietness, and the potential safety implications for older people with mobility limitations when sharing spaces with these vehicles. To a large degree these comments echoed what had already been explored in the previous reference group (Older People) that was hosted online.

Figure 17 Residents in Salford trying out the e-scooters on Older People's Day 2021

Trying out the e-scooters

However, around six participants expressed an interest in trying the scooters, and this led to some interesting observations. Access to the e-scooters was facilitated by members of staff, with free rides provided by Lime.

All participants described using the scooters as 'fun', although stated they would not want to take them on a road. They found the ergonomics around handling and balance surprisingly easy to grasp after a basic introduction. Some participants did mention they found the scooters quite unstable before they engaged the electric motor, and suggested that a three-wheel design may open up the possibility for the scooters to appeal to more people. This built on the discussions around the role of e-scooters to provide a mobility aid service to people with mobility limitations. One older male participant, drew comparisons to the feeling of riding motorbikes in his youth, and thoroughly enjoyed the experience due to these associations.

Navigating the app

One interesting observation was related to navigating the geofence on the scooter app. It was initially difficult for the participants to understand where the boundaries of the geofence were, and this was mainly down to certain roads being named on the app by their A or B classification, such as A56, rather than their common name, which is more likely to be the name that is known by local residents.

B.5 Community Leaders

This reference group is comprised of leaders of community engagement organisations dealing with older and vulnerable residents. The purpose of the reference group is to discuss the potential impact of e-scooters on the communities the organisations attending were representing.

Overcoming barriers to uptake

No one in the reference group had used an e-scooter in any capacity, and explained that this was mostly due to not seeing any potential for them in their lives. They did accept, however, that this was largely due to a broader lack of awareness and understanding around the scooters, including understanding how to access them, where they can be taken, how much they cost and where they can be used.

Developing a new offer

One member of the group reflected that the need for a provisional licence to access the trial scheme puts the e-scooters in an interesting space between, on the one hand, traditional walking and cycling options and, on the other, car ownership. This is particularly relevant for younger people, she noted, as once they get their provisional driving licence, they have the option of pursuing car ownership (or at least, car use) or making

use of these newer share schemes, which she also recognised are often tailored to younger audiences. She thinks this new kind of offer, which is moving away from personal ownership, is a good thing for younger people, but may potentially be a barrier for older people who have had their own vehicles for a long time and might be 'stuck in their ways'. It is harder for these new alternatives to change long-established behaviours, especially when they can only be accessed using modern technology, but she believes they can potentially divert the course of younger people who might otherwise just opt for car ownership.

Safety concerns

Safety concerns around older people using the e-scooters were expressed and related to the lack of helmets available as part of the trial scheme, as well as the scooters often having to be used on the road. These safety concerns were also expressed on behalf of their older residents as pedestrians, citing the speed and quietness of the scooters as a potential risk for people with mobility, visual, or hearing impairments.

B.6 Disability organisations

Two key informant discussions were held with individuals (KI1 & KI2) working within local disability organisations. The aim of these discussions was to discuss the use of e-scooters within Greater Manchester, both in terms of hire schemes as well as private use, and establish networks for further work with disability organisations and disabled people on the topic.

Current situation

Both discussions covered issues relating to the current situation, particularly in terms of private e-scooter use on the roads - for disabled people, people with limited mobility and older people. E-scooters, as they are currently being used, are resulting in harmful interactions, and creating hostile pedestrian environments. Additionally, any collision that resulted from such interactions would likely be more significant for disabled people and older people.

The current conditions were considered by KI1 as a potential outcome bias of who is currently using private e-scooters. As using private e-scooters on public roads is illegal, KI2 considered those that use them therefore have limited care for the law and, by extension, limited care for people who the law is there to protect. KI1 considered this lack of care to be reflected in the way that e-scooters are ridden by users. Furthermore, KI2 observed that despite being illegal, e-scooter use is not being enforced by the police - who say that they do not have the resources – resulting in riders being more confident in their behaviour. KI2, reflecting on their experiences of disability and the development of urban space, noted that it is important to "not only consider how they should be used, but also how they will be used". KI1, whilst recognising similar conditions, also reflected upon the role

of insufficient provision of space for e-scooter users to ride, such as in cycle lanes. This means that e-scooters users tend to use the pavement to protect themselves.

Both KI1 and KI2 also reflected that many e-scooter users may not have lived experience of disability, and this means they do not know the implications of their actions, such as close passes, on disabled people.

Mobility aids

During the discussion, KI1 noted that, to their knowledge, a rarely discussed element of e-scooter discourse has been the use of e-scooters as a form of mobility aid. Their interest in this stemmed from their disabled friend using a non-electric scooter as a mobility aid and, seeing the growth in the popularity of e-scooters, beginning to consider the potential in this. KI1 reflected that whilst e-scooters would not be suitable for all disabled people, there are opportunities for their use. KI1 discussed potential for people who experience fatigue as well as for people who have pain walking short distances and for whom e-scooters could potentially offer support. This potential, as discussed by KI1, has been noticed in online e-scooter user forums, in which the use of e-scooters as a mobility aid has been a topic of discussion.

KI1 saw additional potential in e-scooters as a form of mobility aid because of their small size and low cost in comparison to other forms of mobility aid. The small size could make storage much easier and would often enable the user to carry it inside their home for safety. The factors are important when considering disabled people, as their incomes are likely to be lower than non-disabled people.

When reflecting upon this discussion with KI2, KI2 was not enthusiastic about the potential of e-scooters in their current form as mobility aids. KI2 considered that e-scooters have not been designed with disabled people in mind and are being ridden on the roads, in a largely unregulated manner – "in spite of disabled people" – considering the previously discussed challenges.

However, KI2 did reflect that there would be greater potential of e-scooters as mobility aids if they were being designed with disabled people in mind,

particularly considering that mobility aids such as mobility scooters and wheelchairs need updating and are often expensive. This is significant, considering likely similarities in base components between electric scooters and traditional mobility aids. Similar points were made by KI1 who discussed the potential of further development of e-scooter technology. This led on to a discussion on the development of micromobility concepts developed by Lime for New York (Figure 11) and interest in similar developments for the UK context. KI2 could see the potential relevance of this development for Shopmobility in the UK, which will become more important as pedestrianisation in urban areas increases, but which needs modernisation to be more appealing to potential users.

Conflicting needs and discussion of mobility aids

A concern held by both KI1 and KI2, is that discussing the potential of e-scooters as mobility aids risks crowding out space in terms of problematising e-scooter use. There is the concern that the potential use of e-scooters as a mobility aid could be used to negate the concerns of disabled people relating to experiencing a challenging pedestrian environment as a result of their presence in shared and pedestrian spaces.

Figure 18 Accessible micromobility designs by Lime. Source: https://www.fastcompany.com/90605847/these-7-new-accessible-vehicles-let-people-with-disabilities-access-micromobility

C Interviews

One-to-one online interviews were conducted using video conferencing software. Except where indicated with quotation marks, the following are paraphrased versions of the views of the interviewees. Interviewees have been assigned a pseudonym to maintain their anonymity. This cohort of interviewees includes nineteen women and twelve men. They fall into the following age groups: 18-15 (x2), 26-35 (x7), 36-45 (x8), 46-55 (x5), 56-65 (x5), 65-74 (x2). Fourteen interviewees had experience using an e-scooter within the Salford trial and seventeen had not used an e-scooter in any setting.

1. Jessica (female, 36-45, non-user)

Jessica mainly walks, uses a push scooter or takes the bus. She thinks e-scooters could help with public transport capacity issues and social distancing during COVID-19. She has not used an e-scooter in the trial because it does not cover her area and she does not have a provisional driving licence.

2. Sophie (female, 26-35, user)

Sophie mainly used public transport and would like to use her bike more. She has used the e-scooters between Peel Park Campus and MediaCityUK and had a few technical difficulties along the way but found the route acceptable. In the future, she is more focused on using her bike than using e-scooters.

3. Alexander (male, 56-65, user)

Alexander mainly drives a car and does not use public transport. He has used an e-scooter and thinks they could be useful for traveling around the city for work meetings. Would like to see the scheme expanded and remain dockless.

4. James (male, 56-65, non-user)

James mostly uses a car to commute, although COVID-19 has changed that, and he is thinking about public transport for the future. He has not used an e-scooter but has seen them about. He would consider using one in the future if the scheme expanded.

James discussed how his view of transport has changed during lockdown. As a self-employed worker often commuting 9-10 miles to Salford, driving has often been his main mode of transport. However, with life slowing down during the first lockdown in April 2021, he noticed there is a bus service that can take him to work: 'so I can literally go door to door, and I'm thinking to myself, why am I not using public transport?'. He now thinks

there is a sufficient combination of public transport, walking and cycling to get to work without always using his car, and thinks e-scooters could be part of this.

5. Zara (female, 36-45, non-user)

Zara owns a car but has paused buying a new car because of changed mobility due to COVID-19. She sometimes cycles to work but has experienced harassment on her journey by men and this shapes her consideration of active mobility. She can imagine using a e-scooter to get around during the workday. She worries about accountability and regulation of e-scooters.

6. Louise (female, 65-74, non-user)

Louise is primarily a pedestrian. She has not used an e-scooter and does not own a car. Her main concerns relate to pedestrian safety and she feels pedestrian voices are not always heard in the debate around e-scooter use. Louise describes herself as a 'radical pedestrian' and defined her agenda as being solely concerned about the pedestrian within the context of the e-scooter scheme. She mainly wished to emphasise her concerns about safety in relation to e-scooters as well as the broader utility of e-scooters in general.

7. Chris (male, 46-55, user)

Chris is a regular user of e-scooters in the trial area. He is a regular commuter cyclist and also used to take public transport once a week for his commute. He is positive about e-scooters but has identified a number of issues (e.g. glitchy app and batteries, pavement/road/cycle infrastructure quality) that need considering. He thinks the geofenced area should be expanded, but cautiously to learn from the mistakes of Mobike.

8. Tanya (female, 36-45, non-user)

Tanya cycles with her family, commutes to work by car, finds public transport inconvenient or insufficient and would like to buy an e-bike. She has never used an e-scooter. She thinks that safety is important and

sees issues with both using e-scooters on the road and on the pavement. She thinks that e-scooters could help us to change our transport habits.

9. Phil (male, 26-35, user)

Phil lives in the city centre and walks mostly, occasionally taking public transport. He has used an e-scooter in the trial area for fun and curiosity. He thinks they could replace shorter journeys previously made by bus or walking. He thinks safety and cost could be barriers.

Phil lives and works in the city centre. He walks everywhere, including his 5-minute walk to work. He cycles for longer journeys and pre-COVID-19, would take public transport. He has borrowed a car during COVID-19, purely to get out and about, further afield from the city.

10. Sue (female, 36-45, user)

Sue lives on the border of Manchester and Salford and walks and catches the bus for transport. She has used an e-scooter in Salford and found it enjoyable. She thinks an e-scooter could really work for her commute but has concerns about using an e-scooting on the road and in cycle lanes.

11. Tom (male, 26-35, non-user)

Tom has never used e-scooters but has a strong interest in them. Cycling is his main mode of transport; he is really into cycling and is also involved with the Manchester cycling community. Tom used to use buses while he was a student, and he is hopeful that buses in Greater Manchester coming under public control might make it easier for him to use buses (e.g. on a day with bad weather) - mainly due to cost and convenience. He does not drive but is currently learning - this would be to enable longer journeys such as UK holidays without having to rely on expensive longer train journeys. He currently finds the tram the most convenient option for his commuting needs as an occasional alternative to his bike (e.g. if transporting heavy equipment).

12. Chris (male, 46-55, user, second interview)

Chris travels to work by bike almost every day, which is a 20-mile round trip. If he has to travel further he will use either public transport or his car. During the first national lockdown he used the e-scooters a lot on the university campus he works on. Rather than going for a walk, he would take an e-scooter journey due to their novelty. Once the e-scooter trial reached Phase 3 in summer 2021 and the geofence expanded, he started using them as part of his multi-modal trips, using the e-scooters to connect his journey with Manchester Victoria Train station - rather than walking from Victoria to the bus station he would walk across the bridge to Salford, pick up an e-scooter and travel up Chapel Street to the university campus. He found this route useful, and thinks additional signage could raise awareness of this

multi-modal transport option for more people. He did not find much of a cost difference between using the e-scooters and using public transport in this instance.

13. Amelia (female, 36-45, user)

Amelia lives on Chapel Street in Salford and has used the e-scooters to travel to the edge of Manchester City Centre, where she then continues her journey to work on foot. She has used the scooters around 10-15 times, but mostly cycles. These journeys have mostly replaced walking and cycling trips. She would like the geofence to extend across into Manchester so she could commute door to door on an e-scooter. She thinks they are much more ideal than Mobike and has not seen much anti-social behaviour. However, she finds commuting down the Chapel Street corridor quite stressful due to the roadworks and busy traffic. She feels safer on a scooter because she is travelling faster, but also feels the cost excludes people – especially as you do not know how much the journey will cost until you have finished. This makes it difficult to plan your finances.

14. David (male, 56-65, non-user)

David lives in the city centre and works in Salford Quays. He works ad hoc casual work at a local theatre, often in the evenings or on weekends. He mostly gets around on foot, and uses public transport for longer journeys. He also owns a car. He has not used the e-scooters yet and has no desire to, as he feels they do not offer him an option that is not more beneficial than anything else. He also does not see them as active travel as you are not exercising when you are using them. However, in principle he thinks public share schemes are a great thing as they offer a mix of multi-modal transport options. His concern is around shared spaces, as he thinks including e-scooters in these spaces is adding an extra layer to an already complicated problem. He is also concerned about the legislation of private e-scooters, as they are currently illegal but are becoming more popular, meaning there are currently no rules for people using them.

15. Rachel (female, 65-74, non-user)

Rachel mostly walks and uses public transport, often walking to her destination and getting public transport back, as her commitment to being healthy. She would love to try an e-scooter but is worried about her safety due to her older age and feeling more vulnerable than she used to. However, she would be open to trying one in a safe environment with a helmet. She has had two near misses with e-scooter users while she was walking on Chapel Street in Salford, with one instance being such a close pass she felt frightened for her safety. The e-scooter user did not stop. She is concerned about

how fast the scooters can travel and how quiet they are, and is also concerned about who is responsible when an e-scooter user collides with a pedestrian.

16. Richard (male, 56-65, user)

Richard is a musician and usually takes his car to work as he has a lot of equipment to carry around, but he also cycles a lot. He has tried the e-scooters once, out of curiosity and mostly for fun. He spent quite a bit of time finding an e-scooter that had enough charge, but once he had, he found the app easy to use. He really likes the GPS technology in the scooters but thought that while he was riding the location of the geofence was not clear. He also found the ride experience quite poor, as he did not know if he could use cycle lanes or share spaces as it was not made clear to him. He also found the road surfaces very bumpy and experienced a lot of vibration while he was riding.

17. Stephanie (female, 26-35, non-user)

Stephanie has never used the Lime trial scheme but uses her personal e-scooter on a daily basis to travel to work. She used to take two buses to work, which would take over an hour in the morning rush hour, but now her 2.5-mile journey only takes 10 minutes on her scooter. She thought about getting a bike but decided it would be too big and cumbersome, and she did not want to arrive to work sweaty or tired. She would consider using the Lime trial scheme in certain situations, such as when it is raining, as her scooter is not water resistant. One of the main reasons she has not used the trial scheme is because she lives and works outside the geofence. She could see potential in using the scooters for one-way journeys into town, or when she did not want to carry her personal scooter around in between journeys.

18. Sarah (female, non-user)

Sarah travels on foot for local journeys, but also owns a car. She used public transport much more often before Covid-19 but she has not been on public transport since the pandemic. She has not used an e-scooter but thinks they could be useful when she is travelling to a train station. She is concerned about e-scooters being used recklessly on shared space and has logged complaints to Lime about her experiences with inconsiderate users. She does not own a helmet, and thinks getting a helmet would be an investment just to try an e-scooter She is also concerned about the messaging around scooter use. She fears the way scooters are arranged to be collected or dropped off on pavements encourages people to use them on the pavement. Sarah feels like she cannot walk down certain streets, such as Chapel Street, without at least one scooter passing her at speed, and has found

Lime's customer experience to be difficult to engage with. However, she thinks the expansion to Phase 3 of the geofence is a positive thing for multi-modal transport.

19. Laura (female, 46-55, non-user)

Laura lives in Manchester but works in Salford. She has not used an e-scooter, although she did try to access one while in Cambridge visiting family. She downloaded the app and registered, but she did not have her driving licence on her person and so was unable to access a scooter. Her partner did try a scooter and found the experience quite uncomfortable due to the road surfaces, and expensive. While in Cambridge their car broke down and so he used an e-scooter to get home after dropping the car off at a garage. When he had arrived at his destination the app told him he could not leave the scooter there, and so he had to spend more time finding an appropriate drop-off site, which increased the overall cost of rental. Laura thinks there is potential for e-scooters to contribute to multi-modal transport, and if she lived and worked in the geofence she would be more open minded to using them. She works as a social worker and could see herself using an e-scooter to visit patients on her round, as those journeys are often quite short car trips, but too far to walk, so an e-scooter would be a suitable option for this.

20. Debra (female, 56-65, non-user)

Debra lives in Preston and commutes to Salford University using the train. Due to Covid-19 she now mostly works from home, but has started to drive to university to avoid the unreliable train service. However, she does prefer using the trains when she can as it allows her to extend her working day. She has not used an e-scooter, but could see an opportunity to use them when commuting to the train station in Preston, or when travelling around campus during the day. She takes medication that can sometimes affect her mobility, and she thinks an e-scooter could offer an alternative on these occasions which would allow her to keep moving. She is uncertain about where you can use e-scooters in the Salford trial scheme, or how you can access them.

21. Andrea (female, non-user)

Andrea is a student and lives near campus on Chapel Street in Salford. She mostly walks but occasionally cycles. Over the last six months she has seen e-scooters become very popular in her area, particularly in the cycle lanes and on the pavements on Chapel Street. She is a musician and often needs to travel with a lot of equipment, including her guitar, violin, synthesiser and music stands. She is able to take this equipment onto a bus, but would struggle to use an e-scooter while carrying this much equipment. She has not used an e-scooter yet, but has been interested in trying one out. The biggest barrier in the beginning was the geofence not including where she lives, but now it does and the

prospect of using one is becoming more attractive. However, she cannot see herself using one to go to MediaCity as she can take the number 50 bus for free.

22. George (male, 18-25, user)

George does not drive but he has a provisional driving licence. He has used the e-scooter trial scheme in Salford 2-3 times a month, but only for leisure purposes. He almost always uses the scheme with a friend, and thinks they are a fun way of passing the time. He sometimes uses them to go to the pub, but mostly just uses them to scoot around with no real destination in mind. He first noticed them in MediaCity and thought they were a good way to pass the time during lockdown in 2021. He thinks the price is reasonable and has not had any real issues with the app, except for a couple of occasions where the app did not recognise the scooter drop-off zone. He is open to using them to commute to work, but the pick-up point is a 7 minute walk from his house, and it only takes him 10-15 minutes to walk to work, so the journey is not practical.

23. Lucy (female, 18-25, user)

Lucy lives on campus and mostly walks or uses public transport to get around, although she sometimes cycles too. She has used an e-scooter twice, both times were for fun with her friends on campus during Phase 1 of the scheme. She was attracted to them because she was noticing how popular they were becoming and wanted to try them out. She thinks cost is a big barrier for her to use the scheme long-term, as it cannot compete with the free university bus she takes when she goes shopping or to MediaCity. Overall she feels like the e-scooters are a nuisance, not only for the university campus but for the local area. She regularly sees e-scooters left outside of designated parking areas, and scooters that have fallen over into the road.

24. Donald (male, 46-55, non-user)

Donald lives in central Manchester and has access to great public transport. He used to have a bike but it got stolen, and he has not replaced it because he fears it will just get stolen again. Storage is also an issue with bike ownership, with his daughter's bike taking up most of the spare space in the house. Donald has never used an e-scooter and does not really see their potential for him. He can walk or use public transport to get everywhere he needs to go locally, and has a car for long-distance trips. He does not see the convenience of using an e-scooter for utility trips when compared to a bicycle, as you can park your bicycle outside the supermarket, but where would you store your e-scooter? Donald has

not seen anyone over the age of 25 use an e-scooter, and finds it interesting that older people with disposable income do not seem interested in them as an option.

25. Erica (female, 36-45, non-user)

Erica lives in Bolton and has not used an e-scooter because she does not live or work in the trial area, however she is curious about them. She mostly walks and cycle, and does not own a car but she can drive. She has found herself travelling less during the pandemic and has not really needed to use public transport as much as she used to. She can see potential for using e-scooters to get from Salford Crescent train station into town or MediaCity, which was previously an awkward journey for her which could include 2-3 buses. She thinks infrastructure is key for the future of e-scooters, and thinks they should be used in the cycle lanes, and that this could contribute to a reduction in antagonism toward cyclists. She would be open to using an e-scooter trial scheme but she would be nervous about looking 'silly' on a private scooter. She would feel more comfortable using a trial scheme as other people around her would also be new to trying the scheme.

26. Erik (male, 26-35, user)

Erik lives in Rochdale and works in Salford. He almost always drives to work and it takes between 45 and 60 minutes. He sees a lot of e-scooters in Salford, but not so many in Rochdale. He has used the e-scooters in Salford 2-3 times, during Phase 1 around Salford University campus and during Phase 2 around Media City. He thinks the scooters are a good idea, and has used them often in European cities on holiday as he thinks they are easier to use than navigating public transport in a county where you do not speak the language. He found it difficult to stay in the green zones when using them in Salford, and thinks if the scooters had a phone holder this would make it a lot easier to navigate the scooter and would prevent you from entering the red zones.

27. Barry (male, 26-35, user)

Barry lives in South Manchester and since March he has been working from home. He travels a lot less than he used to before the pandemic, and since he had stopped cycling into work he finds it hard to find the time to exercise. He has used an e-scooter in Salford with a friend, mostly for leisure and to satisfy his curiosity about them. He has also used them in other UK cities, including Southampton and Bournemouth, and found the Southampton scheme particularly impressive because the geofence allowed you to go everywhere you wanted to go as a tourist. By comparison he finds the Salford scheme quite limited. He does wonder if the scooters might make you lazy over time, but overall thinks they are a good idea. In Southampton he rented a scooter and a bike from the same company using an app. He found the experience of accessing a scooter was different and

much more serious than accessing the bike, as he had to photograph both sides of his driving licence to access the scooter, whereas the bike just required his basic details.

28. Michaela (female, 26-35 user)

Michaela uses her car for all almost all her journeys. Most journeys are approximately 20 minutes, but she will use her car for shorter journeys too (such as going to the supermarket). She can no longer cycle, and sometimes struggles to walk, but she tries to be green where possible. She has recently replaced her diesel car with a petrol car as she makes multiple trips to London for work and family visits, and she wanted to avoid paying for the Ultra Low Emissions Zone. She has used e-scooters in Salford twice and thinks they are great fun, but has not had the time to use them again since. She used the e-scooters with a friend to scoot around Salford one afternoon after lockdown measures had been lifted. She found accessing the scooters quite difficult and had to ask other people for help in the beginning. The second time she used them she found it much easier because a Lime employee was on hand to help, and she thinks this would be useful for anyone thinking about using the scheme for the first time.

29. Sue (female, 36-45, user, second interview)

Sue lives in Salford but works in Manchester. She has a driving licence but she does not own a car. She lives right on the border of the city, and walks pretty much everywhere. She has used the scooters in Salford once during Phase 1 of the scheme in Peel Park for fun, but is very positive about them and would love to use them for commuting to work into Manchester. She would really like to see the geofence expanded into Manchester, and thinks this would connect with the thousands of people living on the border of the city who commute into Manchester every day. When she walks to work it takes around 50 minutes, but she

thinks with a scooter this would take 20 minutes. She would like to try this as she thinks it would free up extra time in her working day, free time she has missed since having to go back into the office for work.

30. Penelope (female, 46-55, non-user)

Penelope has not used an e-scooter, and does not use public transport because she thinks it is too expensive. She mainly drives everywhere because she is concerned about her safety, and likes to know her mode of transport is guaranteed to get her to where she needs to go. She would like to cycle and walk more, and knows the risk of being attacked is low, but does not like taking the risk. She likes the idea of e-scooters but would need more guarantees before she would consider using them as a mode of transport. For example, she would like to know that she could always access a scooter at both ends of her journey. She does not think Salford is particularly dangerous, but she would be concerned about how much attention she would gain when using an e-scooter. She thinks if she had a chance to use a scooter in a contained safe environment with an instructor, to get over that initial barrier, she would consider using them more often and potentially on a daily basis.

31. Charlotte (female, 36-45, non-user)

Charlotte walks and drives everywhere, and mostly uses her car to get to work. She lives in Bolton and works in Salford, but has not used an e-scooter. She does not see much potential to use the scooters when she is at work as she can access everywhere she needs to go on foot, and if she takes the train to work, there is a train station onsite. She thinks the e-scooters look like good fun and would consider using one, but would probably only use it for fun or recreation initially. She has noticed the e-scooters are always clean and thinks this gives them a positive image.

D Survey Questions

Q1 I understand what participation entails, how my data will be collected, stored and used, and that my identity will be anonymised in any reports and publications arising from the research. I confirm that I am at least 18 years of age and that I live, work, or study in Greater Manchester.

- ■ Yes
- ■ No

Q2 During 2021, have you used any e-scooter? (whether part of a sharing or hire scheme, or privately owned)

- ■ Yes
- ■ No

Q3 Do the e-scooter share areas (in Salford and Rochdale) contain any of the following? Select all that apply. You do not have to select any.

- ■ Your home
- ■ Your usual place of work
- ■ Your school, college or University
- ■ Places you attend health or dental care
- ■ Places you socialise
- ■ Places you shop
- ■ Other places you visit

If you selected Other, please specify:

Q4 During 2021, approximately how often have you used an e-scooter as part of the Lime share schemes in Salford and/or Rochdale? Select the option that best describes your use.

- ■ Never
- ■ Less than once a month
- ■ Once a month
- ■ Once a fortnight
- ■ Once a week
- ■ More than once a week
- ■ Daily
- ■ Don't know

Q5 In which, if any, of the following places have you used a Lime shared e-scooter? Please select all that apply. You do not have to select any.

- ■ Salford University Peel Park campus
- ■ Salford University Frederick Road campus
- ■ Media City UK
- ■ Ordsall (Salford)
- ■ Trinity and Islington (Salford)
- ■ Blackfriars (Salford)
- ■ Pendleton (Salford)
- ■ Rochdale
- ■ Other

If you selected Other, please specify:

Q6 During 2021, approximately how often have you used any other type of e-scooter? Select the answer that best describes your use.

- ■ Never
- ■ Less than once a month
- ■ Once a month
- ■ Once a fortnight
- ■ Once a week
- ■ More than once a week
- ■ Daily
- ■ Don't know

Q6_a Which of the following e-scooters have you used? Select all that apply.

- ■ another share scheme in the UK
- ■ another share scheme outside of the UK
- ■ another way of hiring (e.g. from a shop)
- ■ a privately owned e-scooter
- ■ other

If you selected Other, please specify:

Q7 Thinking about the trips you have made using an e-scooter, approximately how many would you have made, by other means, had an e-scooter not been available? Please select the answer that best describes your use.

- ■ All of them
- ■ More than half of them
- ■ Fewer than half of them
- ■ None - I would not have made any of these trips
- ■ Don't know

Q8 Thinking about the trips you have made by e-scooter, approximately how many involved another mode of transport as well? (e.g. perhaps you used an e-scooter to get to a train station or bus stop) Please select the answer that best describes your use.

- All of them
- More than half of them
- Fewer than half of them
- None of them
- Don't know

Q9 Thinking about the rest of 2021, how likely are you to use a Lime hire e-scooter in Salford or Rochdale?

- Very unlikely
- Somewhat unlikely
- Somewhat likely
- Very likely
- Undecided

Q10 Thinking about the rest of 2021, how likely are you to use any other e-scooter?

- Very unlikely
- Somewhat unlikely
- Somewhat likely
- Very likely
- Undecided

Q11 For which of the following purposes have you used, or would you be likely to use, an e-scooter? Select all that apply. You do not have to select any.

Answer options: Have used, Would use

- to get to work
- to get to education
- as part of work (for example, to meetings
- to get to healthcare (including vaccinations)
- to get to sports, cultural or entertainment events
- to get to shops
- to visit people to fulfill caring responsibilities
- to get to social occasions (e.g. friends and family)
- to ride for fun or recreation
- to try out an e-scooter

Q12 For which of the following reasons would you choose, or have you chosen, to use an e-scooter? Select all that apply. You do not have to select any.

- out of curiosity / to try out e-scooters
- to have fun
- to use it as a mobility aid
- to save money
- to be environmentally sustainable
- to be physically active
- to have a shorter journey time
- to be able to combine with other modes of transport
- to free up our car for another household member
- to avoid feeling unsafe (from crime or antisocial behaviour) when walking alone
- to avoid feeling unsafe (from crime or antisocial behaviour) when waiting for public transport

Q13 When making a journey using an e-scooter, which, if any, of the following trips have you replaced, or would you be likely to replace? (i.e. use an e-scooter instead of another option). Select all that apply. You do not have to select any.

Answer options: Have used, Would use

- Walking
- Cycling
- Public transport (bus, train or tram)
- Private car
- Taxi or Uber
- Other forms of transport

Q14 When making a journey using an e-scooter, which, if any, of the following have you combined with an e-scooter? (i.e. using an e-scooter to get to a train station, bus stop, or car club). Select all that apply. You do not have to select any.

Answer options: Have used, Would use

- Walking
- Cycling
- Public transport (bus, train or tram)
- Private car
- Taxi or Uber
- Other forms of transport

Q15 If you have used an e-scooter in the Lime hire scheme, has this had an impact on the way you get around? Select all that apply. You don't have to select any. (leave blank if you haven't used an Lime shared e-scooter)

Answer options: Much less, Slightly less, The same, Slightly more, Much more, Don't know

- I walk
- I cycle
- I drive
- I use public transport
- I ride an e-scooter

Q16 How likely are each of the following to limit how much you use an e-scooter?

Answer options: Very unlikely, Fairly unlikely, Somewhat likely, Fairly likely, Very likely, Don't know

- Concern about road safety (threat from vehicles)
- Concern about personal safety (crime and anti-social behaviour)
- Not knowing which routes to take
- Not knowing how to use an e-scooter
- A disability or mobility impairment
- Needing to carry items
- A previous bad experience

Q17 How likely are each of the following to limit how much you use an e-scooter as part of a share scheme the Lime hire scheme in Salford and Rochdale?

Answer options: Very unlikely, Fairly unlikely, Somewhat likely, Fairly likely, Very likely, Don't know

- The cost of e-scooter use
- Concern about hygiene
- Having to have a provisional driving licence
- Needing to travel with children
- Not having a helmet available
- The operational area (it doesn't go where I need to go)
- A previous bad experience

Q18 Are there any others factors that would likely limit your use of an e-scooter, whether your own or as part of a share scheme? If so, please provide brief details here.

Q19 For each of the following, how concerned are you about the potential impact of e-scooters?

Answer options: Not at all concerned, Not concerned, Neutral, Concerned, Very concerned, Don't know

- Taking up space in public areas
- Making pavements unsafe
- Being vandalised
- Being ridden irresponsibly
- Slowing down other vehicles on the road

Q20 When riding an e-scooter, have any of the following happened to you? (Select all that apply to you. You don't have to select any).

- Felt unsafe (in relation to road safety) whilst using an e-scooter
- Had a near miss with another road user or vehicle (including e-scooter riders) whilst riding
- Suffered an injury
- Felt unsafe (in relation to crime and anti-social behaviour from other people) whilst using an e-scooter
- Been subject to abuse or other anti-social behaviour

Q21 When walking, cycling or driving in Greater Manchester, have any of the following happened to you? Select all that apply. You do not have to select any.

- Felt unsafe around an e-scooter rider
- Had to move out of the way of an e-scooter rider
- Had a near miss with an e-scooter rider
- Had a crash involving an e-scooter rider
- Suffered an injury relating to an e-scooter

Q22 Do you have any additional comments about e-scooters and how you have or might make use of them or be affected by them?

Q23 Would you like to be entered into a prize draw to win £100 in shopping vouchers?

- Yes
- No

If you have answered 'Yes', please provide your email address (your email address will be stored separately from your responses).

E Lime Scheme Pricing

The following information has been supplied by Lime in order to inform our analysis, provide a record of changes in pricing over the course of the trials, and to facilitate comparisons with other services and modes of transport.

E.1 General points

■ The majority of riders use the standard Pay As You Go (PAYG) tariff of a £1 unlock fee and 15p per minute of use thereafter. This tariff has remained the same since the launch of the schemes in Salford and Rochdale in autumn 2020.

■ This is accompanied by the Lime Access scheme which offers 50% off all trips (both the unlock fee and per-minute fee) for students, jobseekers, and conces-sion pass holders. This has been available since the start of both schemes.

■ Over Summer 2021 they restructured their Ride Passes and introduced Lime Prime.

  □ Initially, they offered a Day Pass providing unlimited 30-minute rides for 24 hours at £11.99 and a Monthly Unlock Pass which waived unlock fees (per minute fees apply only) at £7.99.

  □ These have since been replaced by the 1 hour, 24 hours, and 3 day Ride Passes. This new range of passes offers better value and more flexibility to suit riders needs.

  □ Lime also introduced Lime Prime, which effectively replaced the monthly Ride Pass, at £8.99 and waives all unlock fees as well as allowing riders to reserve a vehicle for up to 30 minutes.

Ride passes
Take as many rides as you want for as long as you want*

1 hour £7.99	24 hours** £11.99	3 days** £25.99
Select	Select	Select

Enjoy £0 unlocking fees and unlimited rides

Book a vehicle in advance for up to 30 minutes at no cost

Includes rides on Lime scooters and bikes

*Ride pass is valid for chosen time period from time of purchase
**90 minutes per ride included. Standard rates apply afterwards.

Lime Prime
Unlock the best of Lime for only £8.99/month (incl. VAT)

TRY IT FREE FOR 1 MONTH

£0 unlocking fee on every ride*

Book a vehicle in advance for up to 30 minutes at no cost

Includes rides on Lime scooters and bikes

Help your city reduce pollution and traffic by going car free

Lime Prime membership applies to all rides across your country and will be automatically renewed on a monthly basis. Valid for one month (30 days) from purchase. Cancel at any time - no penalties.

*Save 25% on rides that already have a £0 unlocking fee.

E.2 More detail and example costs

Pay-as-you-go

- The most popular tariff
- £1 unlock fee, then 15p per minute of use
- Examples: 10 minute trip = £2.50, 20 minute trip = £3.50

Lime Prime

- Reserve a vehicle up to 30 minutes in advance
- No unlock fee (25% off the minutely rate is applied for any rides made with other discount codes that may already have a £0 unlock fee)
- £8.99 / month and includes a one-month free trial

1-hour Ride Pass

- Unlimited rides within a one-hour period
- Reserve a vehicle for up to 30 minutes in advance
- No unlock fee
- £7.99

24-hour Ride Pass

- Unlimited rides within a 24-hour period (maximum 90 minutes per ride, after that charged at standard rate)
- Reserve a vehicle for up to 30 minutes in advance
- No unlock fee
- £11.99

3-Day Ride Pass

- Unlimited rides within a 72-hour period (maximum 90 minutes per ride, after that charged at standard rate)
- Reserve a vehicle for up to 30 minutes in advance
- No unlock fee
- £25.99

Lime Access and Lime Aid

- In addition to the above, Lime also offer 50% discounts on all rides (including unlock fees and the minutely rate) for jobseekers, emergency workers, concession pass holders (including older people, care-leavers, and women's concessionary scheme, and disabled travel passes), and students.
- For more information and to sign up: fountain.com/limebike/apply/united-kingdom-uk-lime-access
- During the pandemic, our Lime Aid scheme offered key workers 10 free rides per month. As restrictions have been lifted, we have phased this scheme out and are encouraging users who accessed Lime Aid to instead use Lime Access which offers better value for regular users.

Lime's Previous Fare Structure

The following pricing model was superseded by the above current fare structure in Summer 2021:

- Originally, Lime offered a day pass at £11.99, which did not waive unlock fees.
- They also used to offer a Monthly Unlock Pass, which waived unlock fees. This has now been superseded by Lime Prime.

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