PAVING THE ROAD TO ACCESSIBILITY:

THE NEED FOR INCLUSIVE TRANSPORT POLICY TO ENABLE CYCLING ACCESSIBILITY FOR ALL, NO MATTER OF ABILITY, OR DISABILITY.

A CASE STUDY OF LONDON.

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FIGURE 1 LED RIDE WITH ALL ABILITY BIKEWORKS, STRATFORD TO ILFORD

TRANSPORT PLANNING SOCIETY BURSARY 2020

A TRANSPORT SYSTEM THAT IS ACCESSIBLE FOR EVERYONE – HOW DO WE MAKE THIS HAPPEN?

18TH DECEMBER, 2020

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INTRODUCTION

Clayton et al (2017) suggest that there is a knowledge gap regarding the barriers to cycling for Disabled individuals. This paper will use the current health pandemic as a catalyst to review accessibility to cycling within London's transport network for Disabled individuals.

In response to the Covid-19 pandemic, the Department for Transport (DfT) released 'Gear Change', in July 2020 (The Department for Transport, 2020), a document with a 'vision' to harness increases in cycle uptake and ensure that cycling plays a larger role in the UK's transport system going forward. In May 2020, £2 billion was released by the DfT's Emergency Active Travel Fund for emergency infrastructure implementation to protect the population from the risk of COVID-19 by creating social distancing and alternatives to public transport (Department for Transport, 2020). In London, the Streetspace project erected 80km of protected cycle lanes (O'Connor, 2020) and introduced over seventy Low Traffic Neighbourhoods (LTNs) throughout London (Aldred and Verlinghier, 2020).

There has been an unprecedented transformation in the way that people travel and use the transport system, with passenger transport usage reducing by 93% and journeys travelled via cycling increasing by 295% in London (The Department for Transport, 2020). But has the uptake in cycle levels been inclusive for all members of the population, specifically those in Disabled groups? And how successful will the infrastructure led approach highlighted in the Gear Change vision be in increasing this inclusivity for Disabled groups within cycling going forward?

The Equalities Act 2010 defines a disability to be a physical or mental impairment that has a substantial and long term negative effect on the individual's ability to do every day activities. In 2018, 28% of the UK population identified as Disabled (Burns et al., 2020).

Firstly, a review of the DfT's Gear Change vision, and supporting Infrastructure Design Guidance (LTN 1/20) will determine to what extent there has been an increased focus on improving the inclusivity of cycle uptake for Disabled individuals in light of Covid-19.

Secondly, Equality Impact Assessments (EQIAs) conducted on emergency Streetspace infrastructure in Newham, Hackney, Tower Hamlets and City of London, will be used to evaluate their inclusivity for Disabled cyclists. Findings from interviews and surveys conducted with Disabled cyclists from across London will determine the inclusivity of cycling during the Covid-19 health pandemic and highlight the level of importance of infrastructure and behavioural barriers in enabling this. An evaluation of the extent that Gear Change meets these requirements will be determined.

It is pertinent that we use Covid-19 as an opportunity to recognise holes in cycling policy, create lessons learnt and harness the popularity of cycling as a transport mode, making it more accessible for Disabled individuals to ensure that all members of the population can stay safe and active. By creating inclusive cycle infrastructure for Disabled cyclists you are creating infrastructure that is more inclusive for all.

A timely call to action for Transport Planners will be made using recommendations based on the findings of this research.

LITERATURE REVIEW

The social model of disability suggests that society creates social and cultural barriers which make an individual Disabled (Wheels for Wellbeing, 2018), with transport being the largest concern for disabled people in their local area (Clayton et al., 2017).

Not all communities and groups take up, and receive equal benefit from, cycling, with policy igniting this problem by failing to discuss Disabled groups as cyclists (Aldred, Clements and Andrews, 2018)

Released in July 2020, the DfT's Gear Change vision, along with LTN 1/20, released updated guidance to respond to Covid-19 changes in usage of the UK's transport system and harness, and sustain, the cycle uptake witnessed. This section will evaluate to what extent this guidance has focused on the inclusivity of cycling for Disabled individuals.

DEPARTMENT FOR TRANSPORT'S GEAR CHANGE VISION, AND LTN 1/20 CYCLE INFRASTRUCTURE DESIGN, JULY 2020

FIGURE 3 DEPARTMENT FOR TRANSPORT'S GEAR CHANGE 'VISION' DOCUMENT

FIGURE 2 DEAPRTMENT FOR TRANSPORTS CYCLE INFRASTRUCTURE DESIGN GUIDANCE DOCUMENT, LTN 1/20

In 2017, it remained unusual for Disabled cyclists to be considered within broader transport strategy documents (Aldred, Clements and Andrews, 2018). Gear Change (The Department for Transport, 2020) recognises inclusive cycling as an 'underlying theme'. Recommending infrastructure changes to enable everyone from 8-80, regardless of disability, to have access to cycling, this indicates growth in the representation of Disabled cyclists in UK policy.

The guidance documents have a strong infrastructure focus, highlighting a need to 'sharply improve…the quality of cycle infrastructure'. Despite recognition of this in 2014 in the London Design Standards, dimensions advised for wider cycles were suggested as provisional, with more research required in the area (Transport for London, 2014).

LTN 1/20 identifies a need for specific infrastructure changes, such as wider cycle lanes, to accommodate wider adapted cycles (1.2m average). A desirable cycle lane width of 2.0m, with 3-4m widths dependant on exceptions, is advised. This highlights a progression in UK cycle infrastructure design policy. However, LTN 1/20 is a guidance document, rather than a national standard. Without minimum infrastructure standards adequate for wider cycles, the level to which these 'exceptions' will be implemented is questioned. Despite suggesting that only good quality infrastructure schemes reaching the Cycling Level of Service (CLoS) standard of 70% will be funded, this evaluation refers to a minimum width pass level of 1.5m, rather than the desirable width for adapted cycles.

LTN 1/20 replaces LTN 1/12 promotion of shared use routes for pedestrians and cyclists, suggesting that 'cycles must be treated as vehicles and not as pedestrians'. Wheels for Wellbeing (2018) found that 75% of respondents used their cycle as a mobility aid and 45% have been asked to dismount from their cycle on shared use paths, indicating inclusivity could be reduced for these individuals. The Leicester Street Design Guide (Leicester City Council, 2020) suggests that the joint space of cyclists and pedestrians can provide inclusivity through creating more opportunities for continuous and direct routes.

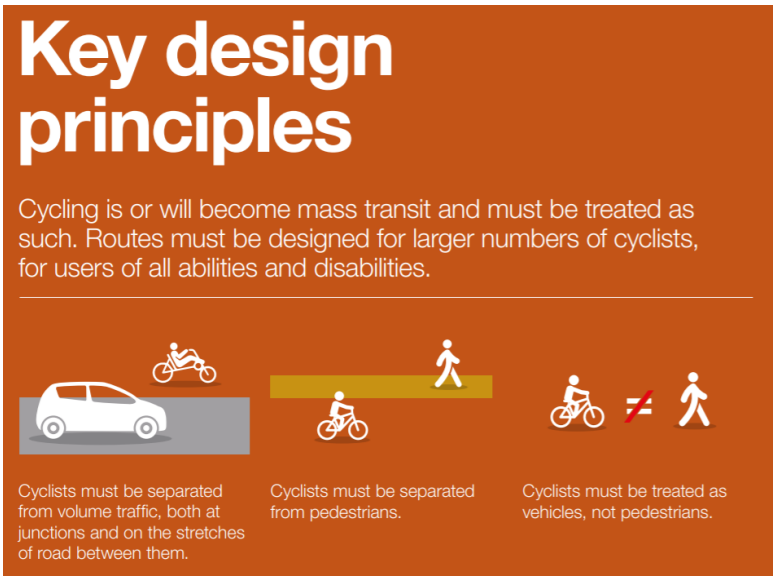

FIGURE 4 'CYCLIST MUST BE TREATED AS A VEHICLE', KEY DESIGN PRINCIPLES MENTIONED IN GEAR CHANGE AND LTN 1/20

The creation of cycle infrastructure can increase levels of cycling, however, it is suggested that infrastructure alone is not always effective (Panter et al. 2016). Gear Change has some recognition of behavioural challenges to cycling, however, it does not go far enough. Comparatively to infrastructure, there is no allocated money specifically to behaviour change within cycling.

Gear Change encourages 'every adult and child' to take up cycle training. Cycling training has reported substantial increases in cycle uptake (Fell and Kivinen, 2016) with Clayton et al. (2017) highlighting a number of specific benefits of cycle training for Disabled groups. Despite suggesting that cycle training will be open to all, there is currently no accredited on-road cycle training for adapted cycle users. Klein et al. (2005) suggest a need for innovative teaching techniques and specialised equipment to enable effective cycle training for those with certain disabilities.

Wheels for Wellbeing (2018) have recognised other social barriers to cycling for Disabled cyclists which are not included in Gear Change. Highlighting the high expense of adapted cycles in comparison to standard cycles, adapted cycle loan schemes are suggested to enable inclusive cycle uptake. The local provision of inclusive cycle hubs is also valued.

METHODOLOGY

Primary research with individuals that identify as Disabled was conducted through an online survey encompassing a variety of open and closed questions.

The aim of the survey (appendix 8) was to identify potential barriers, or indicators to encourage, cycling, and assess how these have altered in the context of Covid-19. To establish a broad representation from individuals at different confidence stages within cycling, this survey was posted through Wheels for Wellbeing's social media platform as well as to new participants at the Hounslow inclusive cycle hub.

In total, there were 30 responses collected in November 2020. Due to the nature of conducting research during Covd-19, and the shielding of individuals during this time, online surveys were valuable. Despite response rates being lower than desired, it is important to note that a sole reliance on online surveys can be problematic; Jonhansson et al. (2020) suggest a varied digital inclusion dependant of type of Disability.

These surveys were paired with range of 5 structured, semi structured and open interviews. Type of disability varies considerably in the UK, and presents different barriers (Department for Work and Pensions, 2020). Conducted with Disabled cyclists with different disabilities (mobility impairments and visual impairments) that used different cycles (tricycles, handcycles, tandem), the interviews sought to build on the information collected in the surveys and gain insight of the varying levels of cycle inclusivity for different disabilities.

EQIA 4 (appendix 7) was conducted on an all ability ride with Bikeworks, from Stratford to Ilford, to gain an understanding of the inclusivity of cycle infrastructure for tricycles. EQIA components were based on infrastructure categories identified as barriers by Wheels for Wellbeing (2020). It was important to liaise with the tricycle cyclists to gain an understanding of any infrastructure barriers specific to tricycles and use this to increase the accuracy of completion for subsequent EQIAs. Two structured interviews were conducted after the led ride to complement findings from EQIA 4. Further EQIAs were conducted on three emergency cycle lanes: Queensbridge Road, Hackney (appendix 4), Burdett Road, Tower Hamlets (appendix 5), and Threadneedle Street, City of London (appendix 6). This helped to gain an understanding of the inclusivity of emergency infrastructure.

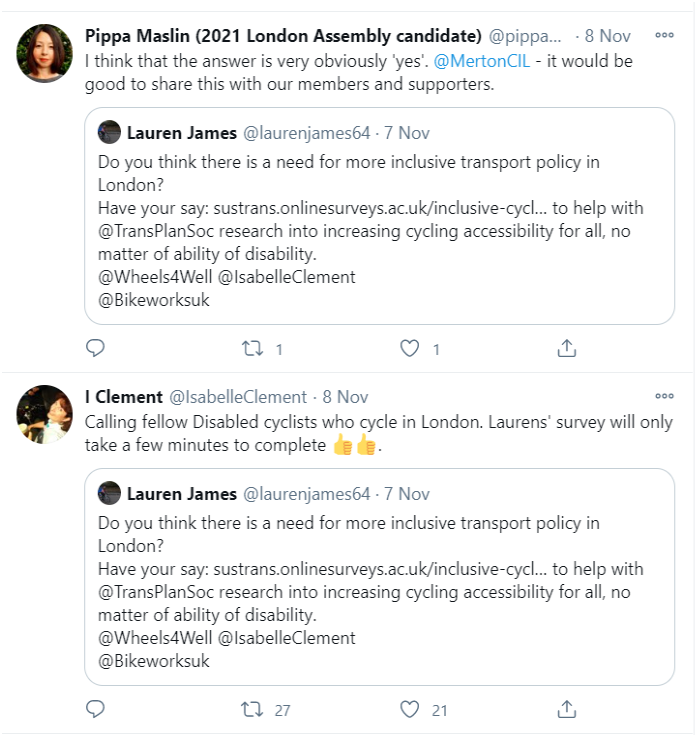

FIGURE 5 SHARING OF THE SURVEY ON SOCIAL MEDIA PLATFORMS

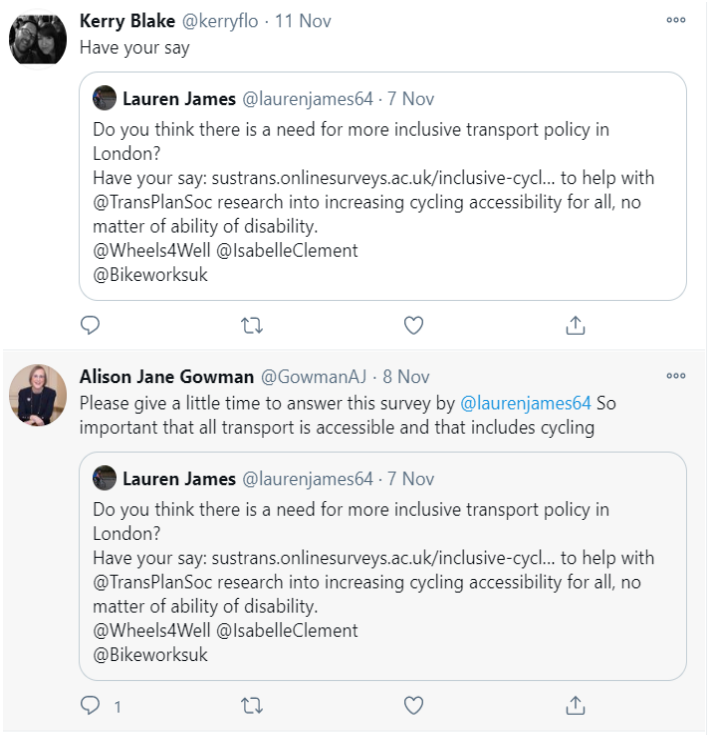

FIGURE 6 SHARING OF THE SURVEY ON SOCIAL MEDIA PLATFORMS

Discussion

Infrastructure and inclusivity

Gear Change, and LTN 1/20, have a strong infrastructure focus, with active travel funding being allocated to good quality infrastructure. Research highlighted Low Traffic Neighbourhoods and the implementation of emergency cycle lanes as key areas to increase cycle uptake for all.

Public sector equality duty (PSED) states cycle infrastructure should be designed to accommodate the needs of Disabled cyclists and the dimensions of non-standard cycles. To date, no in depth equalities monitoring of emergency infrastructure has been conducted. This section will evaluate the inclusivity of the emergency implementation of these infrastructure changes and the extent to which they are inclusive for Disabled cyclists.

Inclusivity of Low Traffic Neighbourhoods (LTNs):

An Low Traffic Neighbourhood is a group of residential streets which have restrictions to the passage of through motor traffic. Over 70 new LTNs have been implemented in boroughs across London between March and September 2020 in order to enable social distancing and increase walking and cycling levels (Aldred and Verlinghier, 2020).

LTN 1/20 recommends the increased implementation of LTN's, however no minimum standards are set to encourage London boroughs to implement LTNs. This has resulted in a lack of implementation by some boroughs, or the removal of LTNs once implemented due to opposition in other boroughs.

FIGURE 5 CYCLISTS ENTERING AN LTN ON LED RIDE WITH BIKEWORKS, FROM STRATFORD TO ILFORD

BENEFITS:

Aldred and Verlinghier (2020) suggest that LTN implementation addresses the different needs and social barriers experienced by Disabled individuals. 63% of participants suggested that they have cycled more since lockdown. This data suggests the emergency implementation of LTNs to have contributed to increases in cycling for 29% of respondents since March 2020.

Shared use on the carriageway was highlighted as a deterrent to cycling for respondents; "CARS MAKE ME NERVOUS", "CARS AND BUSES ARE VERY SCARY AND HAVE NO CONSIDERATION FOR REGULAR CYCLISTS", with 74% of online survey respondents strongly agreeing that cycling in their local area would be made easier if cars on the roads were reduced. Through reallocating space away from cars and towards people, LTNs can alter perception of safety and increase confidence to cycle on roads.

Safer positioning on the road for certain adapted cycles has been made possible by LTNs since March 2020. Camber refers to the angled gradient where the middle of the road is higher than that by the kerb. Interviewee 2 suggested that positioning a hand cycle in the middle of a low traffic road within an LTN is "SAFER AND FLATTER" for the cyclist. Similar positioning enables safer turning at junctions due to the lower level of the cycle. Ultimately, "THE CAR NEEDS TO BE THE GUEST".

EQIA 4 highlighted this point. Travelling through the Idmiston Road, Newham, access to the LTN, tricycle cyclists were able to cycle comfortably and safely in the middle of the road, experiencing no difficulties with balance, and enabling safe turning at junctions. Interviewee 4 recommending THE EASE OF ACCESS TO QUIET ROADS THAT LTNS PROVIDE.

FIGURE 6 CYCLIST POSITIONING ON LED RIDE WITH BIKEWORKS, FROM STRATFORD TO ILLFORD

POTENTIAL BARRIERS:

Despite strong support for the inclusivity of LTNs, the research draws attention to the placement of LTN barriers. Wheels for Wellbeing (2020) state the minimum width for bollards to be no less than 1.5m apart. Despite this being highlighted in LTN 1/20, EQIA 4 identified that this is not always translated on the ground. The narrow width of the planters on the Ash Road entry to the LTN, Newham, would have provided access problems for the tricycles (figure 7); "WITH ADAPTED BIKES IT CAN BE TRICKY TO GET THROUGH BOLLARDS AND GATES ESPECIALLY IF THE BIKE IS TOO WIDE" (appendix 12). Although access to Idmiston Road was not a problem for the tricycles (figure 5), problems could have occurred for wider cycles. Advice from Disable individuals should be taken to design inclusive LTNs (Aldred & Verlinghieri, 2020).

FIGURE 7 ASH LANE ACCESS TO LTN, NEWHAM, PART OF LED RIDE WITH BIKEWORKS, STRATFORD TO ILFORD

EMERGENCY CYCLE LANES:

80 km of emergency cycle lanes have been implemented across London since March 2020. This data suggests that emergency cycle lanes have created access for 63% of adapted cyclists. However, the speed of implementation of the emergency infrastructure meant that EQIAs were not completed on all emergency measures. The benefit of conducting EQIAs was highlighted by Interviewee 3 using experience identifying barriers to inclusivity on the Ripple Greenway, Barking and Dagenham, led by Sustrans. The use of EQIA analysis across three emergency cycle lanes implemented since March 2020 found that the level of inclusivity for wider cycles varied.

Width and segregation

41% of respondents that believed their cycling had increased since lockdown suggested that this was enabled by segregated cycle lanes; THE MAIN FEATURE NEEDED FOR INCLUSIVE CYCLING IS SEGREGATED INFRASTRUCTURE…THE FACT THAT EMERGENCY MEASURES ARE SEGREGATED IS GOOD" , with perceptions of safety being identified as a consistent deterrent to cycling. However, 64% strongly agreed that current cycle infrastructure was not adequate for adapted cycles.

LTN 1/20 suggests the minimum width of a cycle lane to be 1.5m, with 2m being desirable. Research found that the translation of this on the ground varied on the three emergency cycle lanes analysed. EQIA research identified Threadneedle Street (EQIA 3) to be the only emergency cycle lane that had implemented the desirable width, reallocating road space to create separate 2m lanes for walking and cycling. Burdett Road emergency cycle lane had a consistent 1.5m width (EQIA 2), with Queensbridge Road emergency cycle lane width varying between 1.5m to 1m (EQIA 3). These two cycle lanes, particularly Queen Road, could restrict physical access for some wider cycles.

EQIA analysis found that all three emergency cycle lanes had been segregated, mostly by chicane poles. Despite increasing perceptions of safety, the addition of barriers could act as a physical deterrent for wider cycles if the width was not adequate originally. This was not identified as a problem on the Threadneedle Street emergency cycle lane (see figure 12), but access would have been restricted for wider cycles on the Queensbridge Road emergency cycle lane. These findings are inconsistent with LTN 1/20 recommendations which suggest against the use of barriers on cycle infrastructure.

Research stated visibility issues for lower level cycles (interviewee 2). EQIA analysis identified that the use of road blocks, rather than intermittent chicane could reduce the visibility of adapted cycles to road users (see figure 13).

FIGURE 9 EMERGENCY CYCLE LANE, QUEENSBRIDGE ROAD, HACKNEY.

FIGURE 8 EMERGENCY CYCLE LANE, QUEENSBRIDGE ROAD, HACKNEY. GRADIENT ON CYCLE LANE HIGHLIGHTED.

CONTINUOUS ROUTES AND WAY FINDING

Continuous, and joined up, routes was highlighted as the second most common catalyst for cycle uptake since March 2020. Interviewee 2 suggests that all types of inclusive infrastructure should be looked at as a whole network in order to make them accessible by all. Research found the level of continued access to other cycle routes from the emergency routes to be varied.

EQIA 2 indicated the successful joining of the Burdett Road emergency cycle lane to cycle superhighway 2, suggesting increased access. However, Queensbridge Road emergency cycle lane had areas of discontinuity, with Threadneedle Street cycle lane identifying an isolated emergency cycle lane which did not join up to others despite having emergency cycle lanes located nearby. With

research indicating perception of safety and shared use routes to be deterrents to cycling, the discontinuous nature of these two cycle lanes requiring individuals to re-join carriageway traffic could reduce their inclusivity.

Without the joining up of routes, it is hard to locate infrastructure. Despite signage being identified for the joining of Burdett Road emergency cycle lane to cycle superhighway 2 in EQIA 2, all EQIAs suggested a lack of signage to promote emergency cycle routes. Wheels for Wellbeing (2020) recognise inclusive signage to create inclusive cycle uptake. However, this has not been recognised in LTN 1/20. 44% strongly agree and, 19% agree that they had never seen emergency Streetspace cycle lanes in their area; "I HAVE SEEN PHOTOGRAPHS OF EMERGENCY CYCLE LANES, BUT NOT SEEN ANY IN THEIR LOCAL AREA". Interviewee 2 suggests the positioning of emergency cycle lanes for radial journeys into central London could be the reason for this, and instead need to be positioned to aid short, local and aerial journeys. No emergency cycle lane infrastructure was available to be incorporated in the outer borough led ride from Stratford to Ilford.

FIGURE 10 EMERGENCY CYCLE LANE, THREADNEEDLE STREET, CITY OF LONDON. SPACE ALLOCATED TO CYCLES AND AWAY FROM CARS

FIGURE 11 EMERGENCY CYCLE LANE, CANNON STREET, CITY OF LONDON. IDENTIFYING ROAD BLOCKS USED FOR SEGREGATION

INCLUSIVITY AND BEHAVIOUR CHANGE

Effective design of cycle infrastructure cannot be achieved without behavioural interventions (Hull and O'Holleran, 2014).

64% of suggestions to encourage inclusive cycle increases for Disabled individuals going forward were categorised as behavioural, compared to infrastructure focused. Interviewee 2 highlighted how THE NATURE OF VARIOUS TYPES OF DISABILITY, AND SOCIAL BARRIERS FACING DISABLED INDIVIDUALS, OFTEN MEANS THAT IT IS A HARDER, AND LONGER, PROCESS FOR A DISABLED PERSON TO 'REIMAGINE' THEIR JOURNEY AND

CHANGE THEIR TRANSPORT MODE. The interviewee suggests that implementation of EMERGENCY INFRASTRUCTURE MAY HAVE IGNITED A TRANSITION BACK TO CYCLING FOR MANY, BUT NOT FOR ALL, WITH FURTHER INTERVENTIONS NEEDED FOR THESE INDIVIDUALS.

Infrastructure-based cycle interventions should go hand in hand with behaviour change interventions to ensure inclusivity within cycling (interviewee 2). The research identified specific behaviour change interventions which could have contributed towards inclusive cycle uptake during the Covid-19 health pandemic. Gear Change did not mention these interventions, and no active travel funding was allocated for these.

FIGURE 12 LED RIDE WITH BIKEWORKS FROM THE ALL ABILITY HUB IN STRATFORD

INCLUSIVE CYCLE HUBS

The increased provision of inclusive cycle hubs was the most common suggestion to increase the inclusivity of cycling for Disabled individuals going forward. This research highlighted a number of behavioural interventions as suggestions for inclusive cycle uptake, each of which have been successfully offered at inclusive hubs. Of respondents that had attended sessions at inclusive cycle hubs, over 50% highlighted the range of benefits that inclusive hubs can provide: access to adapted cycles, learning a new or building on an existing cycle skill, gaining confidence cycling outside sessions and socialising (see appendix 9). This was consistent with findings from the Inclusive Cycle Hub, Hounslow, by Sustrans and Hounslow Council in September 2020 (appendix 10). The ability of hubs to encourage new individuals to cycle, as well as aiding an increase in cycling for current Disabled cyclists was highlighted by interviewee 2.

However, the provision of Inclusive cycle hubs is limited across London, as suggested by Interviewee's 2 and 3. 50% of online survey respondents had never attended a session, with 28% suggesting that they did not have one located locally to them, and 28% suggesting that they did not know that they

exists and. Interviewee 4 emphasised "I DIDN'T KNOW ALL ABILITY CYCLING EXISTED, AND THAT IT WAS LOCAL TO ME".

The benefits provided by Inclusive cycle hubs demonstrates a need for "MORE FUNDING SO THAT THESE GROUPS CAN PROVIDE MORE ADAPTED BIKES, EQUIPMENT AND STAFF TO RUN THESE SESSION. DISABLED PEOPLE CAN BE FORGOTTEN ABOUT. WE NEED TO KEEP GROUPS LIKE THIS GOING AS IT MAKES A DIFFERENCE TO DISABLED PEOPLE'S LIVES".

FIGURE 13 ALL ABILITY CYCLE HUB SET UP AT INWOOD PARK, HOUNSLOW

BARRIERS WITHIN COVID-19

The data showed that access to green spaces in local areas would encourage an increase in their level of cycling, 74% of respondents strongly agreeing; PARKS AND CYCLE HUBS ARE AN IMPORTANT PLACE FOR NEW DISABLED CYCLISTS TO GAIN CONFIDENCE IF NOT CONFIDENT ENOUGH TO CYCLE ON THE ROAD.

Victoria Park, East London, and Richmond Park, West London, are two examples of parks that implemented temporary restrictions to cycling during the summer, 2020. Many disabled people rely on All Ability Cycling and parks as the only means of exercise they can do outdoors; "IF I DIDN'T HAVE ACCESS TO THE SESSIONS DURING THIS PANDEMIC, I DON'T KNOW WHAT I WOULD HAVE DONE" (appendix 12). During the covid-19 pandemic, whereas infrastructure may have increased cycling for confident cyclists, the closure of parks and reduced access to inclusive cycle hubs could have reduced cycle uptake for new Disabled cyclists; "IT WAS UNFORTUNATE THAT AT THE SAME TIME THAT ON-ROAD FACILITIES WERE BEING IMPROVED, OFF-ROAD OPPORTUNITIES WERE BEING REDUCED".

ADAPTED CYCLE LOAN SCHEMES

Despite not being referenced in Gear Change, the provision of cycle loan schemes was the most common suggestion to enable inclusive cycling going forward. Lack of ownership is a barrier to cycling, with 57% of survey respondents not owning an adapted cycle. In the context of Covid-19, 25% of online survey respondents strongly agreed that they could have cycled more during lockdown if they had access to adapted cycles during lockdown.

Current cycle rental schemes in London, such as the docked Santander cycles, are not inclusive of adapted cycles (interviewee 5). Similarly, despite many London Boroughs purchasing the Pedal my Wheels loan scheme, many have not funded the inclusion of adapted cycles. Inclusive cycle hubs are an ideal location to provide these schemes as the facilities give cyclists the opportunity to gain knowledge about cycles available and try out different types of cycles before purchasing (interviewee 2).

Attaining the first tandem provided by loan from Pedal My Wheels, interviewee 1 highlights the benefit of cycle loan schemes, "IF I HADN'T BEEN ABLE TO RENT IT OUT, I WOULDN'T HAVE BEEN ABLE TO CYCLE" (appendix 11). The high cost associated with adapted cycles was identified as a key catalyst for cycle loan schemes; "I WOULD LIKE MY OWN BIKE BUT THEY ARE SO DEAR. I CAN ONLY USE THE BIKE AT THE [INCLUSIVE] SESSIONS". As well as high cost, difficulties in obtaining a tandem were associated with a lack of access to information about different types of tandems, and places to access them.

FIGURE 14 VISUALLY IMPAIRED CYCLIST AT THE PREDENTIAL RIDE, 2019

CYCLE TRAINING

Cycle training was the second most common suggestion to increase cycle inclusivity going forward, with 30% of online survey respondents strongly agreeing that the lack of confidence cycling on road had deterred them from cycling more since March 2020. Gear change recommends cycle training to be available 'for all'. However, the research suggests that Bikeability training available may not be relevant for individuals that use specific adapted cycles. There is a need for specific cycle training for

individuals using adapted cycles. In the context of Covid-19 in London, funding for cycle training was paused for London Boroughs for a prolonged period during the Covid-19 pandemic, with no specific budget allocated to adapted cycle training to date.

Interviewee 2 suggested that the lower level of certain adapted cycles, and consequent changes in road positioning, emphasised a need for specific adapted cycle training to ensure safe cycling on roads. This was also identified on the led ride with Bikeworks (EQIA 4).

The importance of specific tandem cycle training attained at Merton Sports and Social Club for the Blind was highlighted as 'crucial' by interviewee 1; TRAINING IN COMMUNICATION, TRUST AND MANAGING WEIGHT DISTRIBUTION IS CRUCIAL IN ENABLING SAFE, COMFORTABLE AND ENJOYABLE CYCLING- "AT FIRST WE BOTH PUT OUR RIGHT FOOT OUT TO STOP AND THIS WASN'T SAFE, WE DIDN'T REALISE… I WOULDN'T JUST CYCLE WITH ANYBODY, I NEED TO PRACTICE AND GAIN TRUST FOR COMFORT AND TO ENJOY" (appendix 11).

FIGURE 15 VISUALLY IMPAIRED INDIVIDUAL TRAINING TO RIDE A TANDEM AT MERTON SPORTS AND SOCIAL CLUB FOR THE BLIND

KNOWLEDGE SHARING

The lack of Disabled imagery in policy is highlighted as a barrier to cycling for Wheels for Wellbeing (2020). The value of inclusive cycle hubs in creating knowledge sharing has been highlighted in this research. Despite Disabled cyclist's imagery featuring in Gear Change, Interviewee 2 suggests that inclusive hubs are vital in creating Disabled cyclist role models which will promote the use of cycling not only for Disabled individuals, but for all.

Inclusive hubs have the ability to create a knowledge network for all within cycling, not just Disabled cyclists. Interviewee 5 suggests that the existence of quiet routes for those that are not as confident should be publicised. Specifically for the visually impaired, Interviewee 1 suggests that it is difficult to find an appropriate front rider due to differences in weight, and suggests a lack of knowledge in where

to look for a rider. "A CLUB WOULD BE REALLY NICE" and could offer and promote a database to find appropriate and trusted front riders, and appropriate safe routes for tandem cycles.

RECOMMENDATIONS:

1. ### RECOGNITION OF BEHAVIOUR CHANGE INTERVENTIONS TO CREATE INCLUSIVE CYCLE UPTAKE
   Allocated emergency active travel funding specifically for behaviour change interventions to create inclusive cycle uptake as a Covid-19 response. Amendment to cycle guidance documents, such as Gear Change, to include inclusive behaviour change interventions.

2. ### REQUIREMENT OF EQIAS ON ALL INFRASTRUCTURE IMPLEMENTED:
   From November 2020, as part of the second round Active Travel funding, EQIAs to be conducted on every piece of emergency infrastructure before implementation, and the inclusivity of infrastructure evaluated before agreement to fund.

3. ### CHANGE IN GOVERNANCE STRUCTURE FROM NATIONAL TO LOCAL LEVEL:
   Local level policy in order to create a grass roots approach to evaluating the inclusivity of emergency infrastructure, recognising, and rectifying, barriers to implemented infrastructure. Liaising between boroughs to guarantee effective infrastructure implementation.

4. ### LOCAL AUTHORITIES FUNDING ALLOCATION TO ENABLE INCLUSIVE CYCLE UPTAKE FOR DISABLED GROUPS:
   Going forward from Covid-19 response, funding specifically for behaviour change schemes aimed at Disabled cyclists within Local Implementation Plans.

5. ### INCLUSIVE CYCLE HUBS IN EVERY BOROUGH IN LONDON:
   Including the promotion of these in order to increase knowledge of how to access.

CONCLUSION:

While the research suggests cycle uptake has increased for slightly over half of Disabled cyclist in this research since March 2020, the start of the Covid-19 pandemic, there is still a large percentage that have not been included in the unprecedented increases in cycling witnessed in London.

This research suggests that not all the emergency infrastructure implemented has translated the recommended standards noted in Gear Change and LTN 1/20, and therefore not all has been inclusive for Disabled cyclists. Behavioural change interventions are referenced but largely left out of Covid-19 response strategy, with no allocated emergency response funding for this area. This research highlights the benefit of behavioural change interventions, such as the provision of inclusive cycle hubs, in order to create inclusive cycle uptake. In order to enable an inclusive increase in cycling for all, there is a need for a combined, multilateral approach to cycling interventions within policy which references infrastructure changes to be paired with behavioural change techniques.

Now is the time to act, use Covid-19 as an opportunity to listen to feedback from Disabled cyclists in a grass root approach, and make sure that current increases in cycling are inclusive for all so that they can be sustained.

To evaluate the success of transport planners in achieving inclusive cycle uptake from subsequent rounds of active travel funding, it would be important to repeat this research again in autumn 2021.

Disability is a complex issue, with a wide range of disabilities being prominent in the UK. With a focus on mobility impairments and visual impairments, type of disability has highlighted different ways that cycle infrastructure can offer barriers in this research. It would be beneficial to do this research again for different types of disabilities in order to understand how barriers to cycling are experienced differently. This would highlight recommendations specific to disability and enable the creation of truly inclusive policy.

Designs that satisfy the requirements of Disabled cyclists, also meet the needs of many other people. Through providing inclusive cycle infrastructure design, social inclusion can be met (Clayton et al. 2017). By creating a cycle framework that is inclusive for Disabled cyclist, you are creating a cycle network that is inclusive for all.

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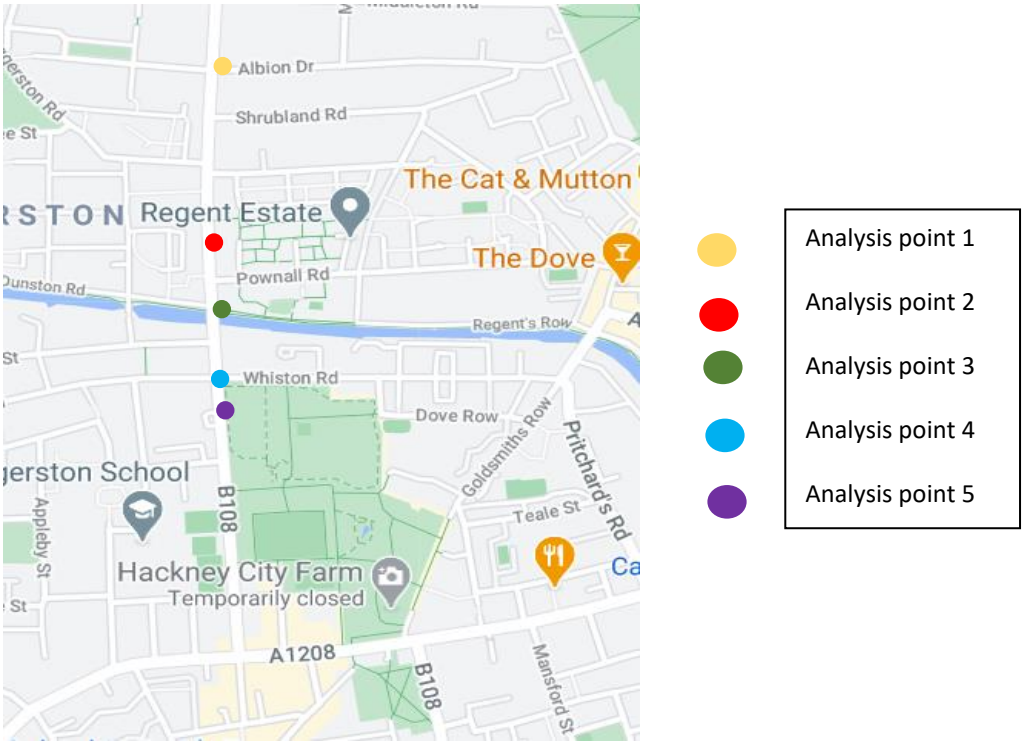
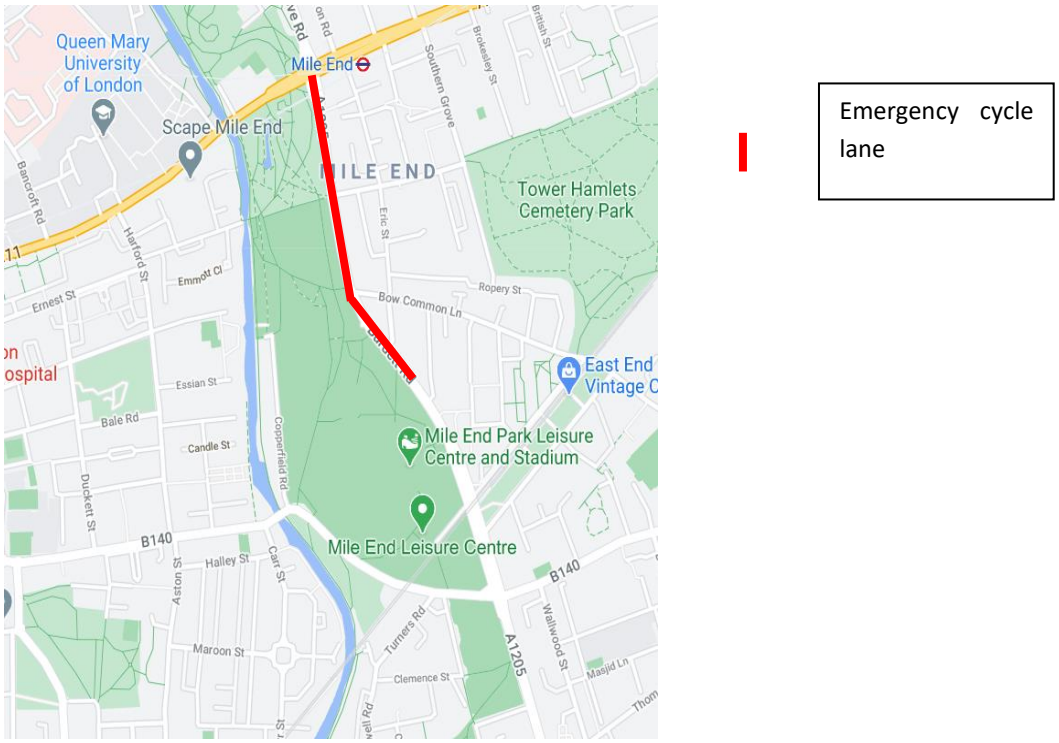
APPENDIX:

Appendix 1: Queensbridge Road, Hackney, emergency cycle lane location map [EQIA 1]



Appendix 2: Burdett Road, Tower Hamlets, emergency cycle lane location map [EQIA 2]



Appendix 3: Threadneed Street, City of London, emergency cycle lane location map [EQIA 3]

Emergency cycle lane

Appendix 4: EQIA 1- Queensbirdge Road, Hackney

Queensbridge Road, Hackney – *emergency infrastructure, partial segregation added to cycle lane.*					
Type of problem identified (e.g. surface, path, width, amenities, junction, wayfinding, level of segregation, access points)	**Explanation of problem identified**	**Infrastructure type**	**Nature/ volume of traffic using it**	**'Adapted cycle friendliness' rating**	**Which groups/ types of cycles could be affected**
Width	Orange dot (see map): the width of the cycle lane is around 1.5m. Approx. adapted cycle width is 1.2m- would allow for adapted cycle but would make overtaking difficult. Red dot: the width of the cycle lane narrows to below 1.5m on the approach to the bridge. This would be very tight for a wide cycle. The implementation of chicane poles to segregate the cycle path from the carriageway causes a physical barrier to access for wider cycles. Purple dot: the start of the permanent, emergency segregated cycle lane- the width to access this is 1.5m and marked by chicane barriers.	Temporary, partially segregated cycle lane. Emergency, permanent segregated cycle lane.	Large amount of car traffic	6- cycling possible, but could be limiting for certain adapted cycles. Overtaking not possible.	Wider cycles
Access e.g. kerbs	Red dot: at the start of the temporary cycle lane, high and angled kerbs which could cause manoeuvring issues for wide cycle. Dropped kerbs at the start and end of the cycle ways so ease in accessing. However, gradient is quite steep.	Temporary cycle lane	Large amount of car traffic	6- cycling still possible, dependant on width of cycle.	Dropped kerb can affect any cycle

Surface of path	New tarmac road surface most of the way. Red dot: A few pot holes in the road at places where there are drains which could make the cycle unbalanced.	Temporary, partially segregated cycle path	Large amount of car traffic	7 – mostly smooth surface.	Any cycle, particularly wider cycles with 4 wheels as these holes might be harder to avoid
Continuous route	Green dot, point 3: partial segregation from the carriageway finishes and the cycle lane terminates. Cycles re-join shared use of the carriageway.	Temp cycle lane to carriageway, to segregated cycle	Large amount of car traffic	7- cycling possible but dependant on the confidence and skill of cyclist to cycle of road to link between cycle routes. Access to permanent cycle route difficult.	Any cycle- dependant on perception of safety and cycle skills of rider.
Gradient	Between red and green dots: steep incline for 50m. Steep camber gradient for most of the temporary route which could leave certain adapted cycles unbalanced, cycling still possible. Steep gradient to get onto the permanent segregated cycle lane.		Large amount of car traffic	6- cycling possible, but cycle could be left unbalanced.	Wider, 4 wheeled cycles.
Wayfinding	No wayfinding for the emergency infrastructure, or to connect the emergency infrastructure to the permanent infrastructure. This is included on the Sustrans space to move tool with the length of road that it is in place. However, the gap in continuation of route is not highlighted.	Cycle lane	Large amount of car traffic	5- can be used but hard to plan route if not knowledgeable of area.	
Junction	Spacing of chicane barriers to segregate route (2.5m) could make turning right onto side roads difficult for certain cycles, due to larger turning circle for wider cycles.	Emergency partially segregated cycle lane Shared use carriageway cycling	Large amount of car traffic	7- cycling possible but access could be limited for wider cycles.	Wider cycles

	Blue dot: discontinued cycle route, re-joining the carriageway at points. Could prove visibility issues for lower level cycles, especially turning at junction.		Large amount of car traffic	7- cycling possible but access could be limited for lower level cycles.	Recumbent cycles

Appendix 5: EQIA 2- Burdett Road, Tower Hamlets

Burdett Road – *emergency infrastructure, new cycle lane created with partial segregation.*					
Type of problem identified (e.g. surface, path, width, amenities, junction, wayfinding, level of segregation, access points)	**Explanation of problem identified**	**Infrastructure type**	**Nature/ volume of traffic using it**	**'Adapted cycle friendliness' at this part of the route**	**Which groups of people/disability this would affect**
Width	The width of the cycle lane is around 1.5m. Approx. adapted cycle width is 1.2m- allow for adapted cycle but would make overtaking difficult. Partial segregation from the carriageway created using chicanes poles, causing a physical barrier to access for wider cycles.	Emergency cycle lane, partial segregation	Large amount of car traffic	6- cycling possible, but could be limiting for certain adapted cycles. Overtaking not possible.	Wider cycles
Access e.g. kerb	No access via kerb at the start or end of the cycle ways so ease in accessing. Not many dropped kerb along the cycle lane if the cyclist wanted to pull over.	Emergency cycle lane, partial segregation	Large amount of car traffic	7- Healthy Streets indicator suggest infrastructure should include areas to stop and rest.	All cycles

Surface of path	Smooth tarmac surface and mostly flat surface.	Emergency cycle lane, partial segregation	Large amount of car traffic	8- provide a more comfortable ride	All cycles
Continuous route	At the north end, the emergency cycle lane links to cycle superhighway 2 at the junction with A11. The cycle lane does not run the full length of the road. At the South end, the cycleway terminates, without joining to another cycle lane and cycles must have shared use with carriageway.	Emergency cycle lane, partial segregation joining to Cycle Superhighway	Large amount of car traffic, joins to cycle super highway which has large cycle flow.	8- safer turning at junction. 5- cycling possible, potentially dependant on the confidence of the cycling	All cycles
Gradient	Mostly flat gradient for the extent of the route.	Emergency cycle lane, partial segregation	Large amount of car traffic	8- less likely to disrupt of some types of cycles.	Wider, four wheeled cycles
Wayfinding	No signage for the emergency cycle lane from either end. However, at the North end of the temporary cycle lane there is signage to indicate the start of the Cycle Super Highway at the A11. Signage is not at varying levels, and adapted cycling imagery is not used. This route is shown on the Sustrans Space to Move website.	Emergency cycle lane, partial segregation	Large amount of car traffic	6- can be used but hard to plan route if not knowledgeable of area. 7- not all individuals have access to internet or have knowledge of where to look for routes.	All cycles
Junction	Spacing of chicane barriers to segregate route (2.5m) could make turning right onto side roads difficult for certain cycles, due to larger turning circle for wider cycles.	Emergency cycle lane, partial segregation	Large amount of car traffic	6- cycling possible but access could be limited for wider cycles.	Wider cycle

	Continuous route at the junction with A11 to turn onto Cycle Superhighway 2.			8- could influence those that are not as confident cycling on roads.	All cycles

Appendix 6: EQIA 3- Threadneedle Road, Tower Hamlets

Threadneedle road– *emergency infrastructure, new cycle lane created with partial segregation to reallocate space away from cars to cycling*					
Type of problem identified (e.g. surface, path, width, amenities, junction, wayfinding, level of segregation, access points)	**Explanation of problem identified**	**Infrastructure type**	**Nature/ volume of traffic using it**	**'Adapted cycle friendliness' at this part of the route**	**Which groups of people/disability this would affect**
Width	Width at least 2.5m for one way cycle lane. Easier access for wider cycles, possible overtaking. Reallocation of carriageway lane away from cars and towards cycles.	Emergency cycle lane, partial segregation	Low level of car traffic	8- greater access for wider cycles	Wider cycles
Access e.g. kerb	No access via kerbs at the start or end of the cycle ways so ease in accessing. Not many dropped kerbs along the cycle lane if the cyclist wanted to pull over.	Emergency cycle lane, partial segregation	Low level of car traffic	7- Healthy Streets indicator suggest infrastructure should include areas to stop and rest.	All cycles
Surface of path	Smooth tarmac surface and mostly flat surface.	Emergency cycle lane, partial segregation	Low level of car traffic	8-provide a more comfortable ride	All cycles

Continuous route	Static cycle lane, temporary segregated cycle lanes nearby but not joined up, must cycle on the carriageway to access them.	Emergency cycle lane, partial segregation	Low level of car traffic	7- cycling possible but dependant on the confidence, skill and area knowledge of cyclist to cycle of road to link between cycle routes.	All cycles
Gradient	Mostly flat gradient for the extent of the route.	Emergency cycle lane, partial segregation	Low level of car traffic	8- less likely to disrupt of some types of cycles.	Wider, four wheeled cycles
Wayfinding	Signage on a side road stating change in layout due to new cycle lane. No other signage to explain the new one way route, or indicate joining with nearby cycle lane. Lots more emergency, segregated cycle lanes nearby but no signage to these- Queen Street, Bartholomew Lane added chicanes to Quietway 2 etc. Threadneedle Road temporary infrastructure is on the Sustrans Space to Move tool, but surrounding emergency lanes are not.	Emergency cycle lane, partial segregation	Low level of car traffic	6- can be used but hard to plan route if not knowledgeable of area. Not all individuals have access to internet or have knowledge of where to look for routes.	All cycles
Junction	Spacing of chicane barriers to segregate route (2.5m) could make turning right onto side roads difficult for certain cycles, due to larger turning circle for wider cycles.	Emergency cycle lane, partial segregation	Low level of car traffic	6- cycling possible but access could be limited for wider cycles.	Wider cycle
Barriers	The segregation of some part of the route have been done by road blocks, rather than chicanes. This could cause visibility issues for lower level cycles. Speed limit of cars reduced to 15mph- infrastructure, car reduction and reduced speed showing more than one method being used.	Emergency cycle lane, partial segregation	Low level of car traffic	6- cycling possible but safety and visibility could be reduced for some cycles. 8- could increase perceptions of safety	All cycles

Appendix 7: EQIA 4- All Ability Bikeworks led ride, Stratford to Ilford

Led Ride with Bikeworks, Stratford to Illford					
Type of problem identified (e.g. surface, path, width, amenities, junction, wayfinding, level of segregation, access points)	**Explanation of problem identified**	**Infrastructure type**	**Nature/ volume of traffic using it**	**'Adapted cycle friendliness' rating**	**Which groups/ types of cycles could be affected**
Width	Segregated cycle lane as a whole was around 2.5m wide at most points- dual directional nature meant that the width of each one way cycle lane was 1.5m (see figure 1). Not far from the velodrome, the width of this was not wide enough for the tricycle, the raised material segregating the cycle lanes made the tricycles unbalanced. There would have been no room to overtake. Once reaching quietway 6, the width had improved for access by the tricycles.	Segregated cycle lane Quietway 6	No traffic- segregated. Not a busy cycle route at this time of day so no problems with overtaking from other cyclist. Low amount of cyclists on route.	6- Segregated from the road. Width leaving the tricycles slightly unbalanced. 8- segregated route.	All in a wide cycles .e.g. trike, side by side
Access e.g. kerbs	At one point along the path the cycle track finished and resumed again a metre further down. This meant that the cycles moved onto the road to enable this transition. The turning circle for a tricycle is larger than that of a standard cycle meaning that the area needed to aid this turn was increased- the tricycles had to position further into the middle of the road. Due to the lower level of the tricycle/ recumbent cycles, a cycle instructor was needed to help out with this and ensure safety and visibility to cars.	Cycle lane/ road	Quiet, not many cars on the road.	5 – Possible but cyclists needed a cycle instructor for aid and visibility.	

	When turning around, the nature of the larger turning circle for the tricycle resulted in the wheel of the tricycle got caught on the kerb and the aid of the cycle instructor was needed.	LTN	Quiet	3- aid of cycle trainer needed.	
Surface of path	Segregated cycle path this was mostly flat and smooth. The raised material used to segregate this, left the tricycles unbalanced.	Segregated cycle path	Some road traffic, not a lot of cycle traffic	6- cycling still possible	
Gradient of route	Speed bumps, particularly those before junctions- physically harder to cycle (see fig 14), when at a junction the speed of the cycle is slowed down and a longer gap in traffic is needed to turn. Hard for the trikes to get over a steep lengthy climb at point in the route, cycle trainer needed to help aid this. Areas of quietway 6 had a gradient which left the tricycles unbalanced (see fig 8)	Cycle path Cycle path	Some road traffic, not a lot of cycle traffic Some road traffic, not a lot of cycle traffic	7- cycling still possible 4 – very difficult without aid 6- cycling possible but cycles left unbalanced.	
Wayfinding	Signposting lacking to find quietway 6. Once on quietway 6 signposting improved, however this was not of varying levels and including imagery of inclusive cycles.	Quietway 6	Low amounts of cycle traffic	8- cycling possible with a lead rider but may have proved a problem for cyclists that do not know the routes as well.	

Other	Idmiston Road LTN: The reduction in road traffic meant that the tricycles were able to travel in the middle of the road and not left unbalanced. Access to Idmiston Road LTN was tight but possible for the tricycles. Entry to the LTN via Ash Road would not have been possible (see fig x). No emergency cycle lanes available for led ride.	LTN LTN Emergency cycle lane	No road traffic No road traffic -	9 4 -	-

Appendix 8: Online Survey example

Are your day-to-day activities limited because of a health issue, disability or learning difficulty that has lasted or is expected to last at least 12 months?

Yes, limited a little

Yes, limited a lot

No

Prefer not to say

If yes, please use this space to provide more information on which health issue/ disability is limiting your day-to-day activities:

Asthma

Hearing

Mental Health

Mobility

Learning difficulties

Not applicable

Prefer not to say

Age:

14 and under

15-24

25-34

35-44

45-54

55-64

65+

Have you ever attended an inclusive cycle session using adapted cycles (such as tricyles, handcycles, side-by-side cycles, tandem cycles etc.)?

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Access to adapted cycles	☐	☐	☐	☐	☐
Enable me to learn a new cycle skill	☐	☐	☐	☐	☐
Enable me to build on existing cycle skills	☐	☐	☐	☐	☐
Enable me to gain confidence to cycle outside of group sessions	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐

If you have not attended an inclusive session, why not?

Didn't know they exist

Do not have an inclusive group session nearby

I do not like cycling

I do not need an adapted cycle

Other

Do you cycle in London?

Yes

No

If yes, have you cycled more since March 2020, since coronavirus lockdown measures were first implemented?

Yes

No

How far you do you agree that the below would make cycling easier for you in your area?

Please don't select more than 1 answer(s) per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Adequate cycling infrastructure for adapted cycles	☐	☐	☐	☐	☐
Quiet roads	☐	☐	☐	☐	☐
Segregated cycle lanes	☐	☐	☐	☐	☐
Dropped kerbs	☐	☐	☐	☐	☐
Surrounding green spaces	☐	☐	☐	☐	☐

Have any of the above suggestions mentioned in question 10 made cycling easier for you in your area? Please specify which suggestion you are referring to:

If you do not feel like your level of cycling has increased since March 2020, why do you think this is? Please state how far you agree that the below statements are the reason for this:

Please don't select more than 1 answer(s) per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I do not have access to an adapted cycle outside of the Inclusive Cycling sessions	☐	☐	☐	☐	☐
I do not have access to a standard two wheeled cycle outside of the Inclusive Cycling sessions	☐	☐	☐	☐	☐
I do not feel confident to cycle on the road	☐	☐	☐	☐	☐
I do not feel like the roads are equipped for adapted cycles e.g. not wide enough	☐	☐	☐	☐	☐
I do not like cycling	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	

Do you own an adapted cycle? If yes, please specify the type of cycle e.g. tricycle

f you do not own an adapted cycle, how far do you agree that the below options are barriers to buying an adapted cycle:

Please don't select more than 1 answer(s) per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
High cost	☐	☐	☐	☐	☐
Storage problems due to the large size of adapted cycles	☐	☐	☐	☐	☐
Lack of cycle skills to cycle outside of groups sessions on roads/ cycle paths	☐	☐	☐	☐	☐

Lack of confidence skills to cycle outside of groups sessions on roads/ cycle paths	☐	☐	☐	☐	☐
I can cycle using a standard two wheeled cycle and do not need an adapted cycle	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐

Streetscape cycle lanes are temporary cycle lanes that were put in place in May 2020 as a coronavirus response to encourage an increase in cycling. Have you ever used an adapted cycle or standard two wheeled cycle on these cycle paths? If yes, please specify which type of cycle was used and the location of the temporary cycle lane if you know this.

If you have not used the Streetspace temporary cycle lanes, how far do you agree that the below are reasons for this:

Please don't select more than 1 answer(s) per row.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I have never seen Streetspace temporary cycle in the area that I live in	☐	☐	☐	☐	☐
I do not feel confident enough to use Streetspace temporary cycle lanes	☐	☐	☐	☐	☐
I do not own an adapted cycle	☐	☐	☐	☐	☐
The cycle lanes are not wide enough for an adapted cycle	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	

What do you believe could be done to improve the uptake of cycling for disabled groups where you live? Please specific the borough that you live in.

Appendix 9: Online Survey results

Participant information

Age	% selected
14 and under	8
15-24	4
25-35	12
35-44	19
45-54	30
55-64	27
65+	4

Health condition

Health condition	% selected
Asthma	8
Hearing	8
mental health	17
mobility	33
learning difficulties	17
visual impairment	14
Other	2

Inclusive cycle hubs

Benefits of inclusive cycling sessions	% strongly disagree	% disagree	% neutral	% agree	% strongly agree
Access to adapted cycles	0	0	0	14	86
Learn a new cycle skill	0	15	36	7	43
Build on existing skills	0	7	21	36	36
Confidence outside of the sessions	0	14	29	21	35
Other			45	10	45

COVID-19 Context

Cycled more since March 2020	% agree
yes	63
no	37

Use of adapted cycle on Streetspace emergency infrastructure	% agree
yes	63
no	38

Specific suggestion of what has encouraged increased cycle uptake in your area since March?
Quiet roads/ltns
Segregated cycle lanes
Green space
Mini Holland- Waltham forest
Dropped kerb
Continuous, direct routes
Mentioned places- CS7, C5, Lambeth LTN, Waltham forest mini Holland, East Dulwich LTN

Reasons for lack of increase in cycling since March 2020	% strongly disagree	% disagree	% neutral	% agree	% strongly agree
No access to adapted cycle	24	1	25	25	25
lack of confidence on roads	20	30	20		30
infrastructure not adequate for adapted cycles	9	9	9	9	64
I do not like cycling	80	10	10		

Suggestions to make cycling easier for participants in their local area:	% strongly disagree	% disagree	% neutral	% agree	% strongly agree
Cycle infrastructure changes	0	0	5	19	76
Less cars on the roads		5	21		75
street/ infrastructure changes	4	4	8	12	72
Access to green areas	0	9	0	16	74

Further suggestions for increasing cycle for Disabled individuals going forward	% suggested	Type of intervention
Dedicated segregated cycle lanes improved quality	17	Infrastructure
LTNs	14	Infrastructure
More inclusive cycle hubs	9	Behaviour Change
Cycle storage	9	Infrastructure
adapted cycle hire	9	Behaviour Change
Cycle training	7	Behaviour Change
Driver/ non adapted cyclist awareness for adapted cycles	7	Behaviour Change
Join up temporary cycle paths	3	Infrastructure
Finding a front rider- registered catalogue	9	Behaviour Change
repairs for adapted cycle repairs - cost/ repairs	9	Behaviour Change
Finding appropriate routes	1	Behaviour Change
Knowing where inclusive hubs are	1	Behaviour Change
Step free access for cycling between cycle routes	1	Behaviour Change
Parks closed to traffic	1	Behaviour Change
Insurance for tandem riders	1	Behaviour Change
Kerbs	1	Infrastructure

Category of suggestions for inclusive cycle uptake going forward:	% agree
Infrastructure	36
Behaviour Change	64

Appendix 10: Hounslow Inclusive hub feedback- participant surveys over 5 inclusive sessions

Feedback from sessions:	% that chose disagree	% that chose neutral	% that chose agree	% that chose strongly agree
Today's session enabled the participant to learn a new cycling skill		9%	22%	68%
Today's session enabled the participant to build on existing cycling skills	5%	5%	15%	75%
the participants learnt how to cycle more safely today		15%	25%	60%

First time trying an adapted cycle- 82% yes

Interested in attending another session- 96% yes

What did participants enjoy about today's sessions? – socialising, trying an adapted cycle for the first time, ability to cycle as a wheelchair user, learning new cycle skills and confidence.

Appendix 11: Interview 1- visually impaired cyclist

Recorded via audio, an open story of the journey of cycling for her, and the experience of a visually impaired individuals cycling in London, Croydon. Example of open interview. Main take always below:

Experience cycling in London:

Always enjoyed cycling in the countryside. Became severely visually impaired later on in life and couldn't ride a standard cycle anymore.

Learnt to ride a tandem at an inclusive hub in at the Sports and Social club for the Blind, Merton. I had missed was the feeling of speed, wind on your skin. Later joined the Wheels for Wellbeing club in Lambeth. From here I trained for the prudential ride with a front rider- cycling around London was fantastic experience, with 10 other tandems taking part. Cycling in London was scary at first- it was busy, lots of cyclists, lots of buses.

After the prudential ride, I wanted to cycle with my husband. We didn't have a tandem and needed to purchase one. Before purchasing one, we returned to the Sports and Social club for the Blind, Merton, to try out the tandems and see if they could cycle together. Specific training for them both separately and together was required; they both put right foot down which wasn't safe to do and we didn't know before. There is skill and communication and trust to it as you give control to the front rider, I wouldn't just want anybody to be the front rider unless they knew my preferred speed and distance for comfort and to enjoy myself- training was vital and fun. There was also someone there that knew about, and could help with altering the seats. It was hard to find a tandem that fit as husband is taller than her.

You are not allowed a tandem on the train in Croydon. There is no way to get to countryside without cycling a long time on busy motorway type roads. We are fit, but not sporty, we just do it as we enjoy it. London Sport event to increase cycling for disabled directed me to Pedal My Wheels where they found us a folding tandem, and we paid a £2000 payment plan. If I hadn't been able to rent it out, I wouldn't have been able to cycle. Folded tandem has enabled us to go on train and go to places outside of London, Bedington Park to play tennis, and go shopping to the supermarket during lockdown.

Hopes for the future:

There are many barriers to finding a front rider. You need communication, trust, and weight needs to match each other. If I didn't have my husband, I wouldn't know where to look for front rider. Sport England have got a page for trained guide runners for Park Runs, and Jog in the Park, but it is more difficult to find a front rider for a tandem. It would be fantastic if we could have a database for front runners, or a club where there is a number of trusted people that you can call on. When my husband is ill and not available, I could use pool of front riders.

A club would be really nice. A club would be good for finding trails. Routes have been hard to find, and we haven't found a good map of cycle routes appropriate for tandem cycling- a club could help this. Maintenance of the cycle is also expensive. The club could help provide this. With a club, you group people and pool information and support. Tandem cycling is a fantastic activity for couples, to have fun, to stay fit, to go out of London, to explore. It is really good fun.

Appendix 12: Interview 4, tricycle cyclist

Example of structured interview

1. *Outside of infrastructure, how far do you agree that the closure of parks to cycles have contributed to reducing cycle uptake for Disabled groups during the Covid-19 health pandemic. How far do you agree?*

Strongly agree. With the pandemic I feel the government didn't consider disabled people when it came to allowing the public to do one hour of exercise outdoors when lockdown first started in March. Many disabled people rely on All Ability Cycling as the only means of exercise they can do outdoors. If I didn't have access to the sessions during this pandemic, I don't know what I would have done as exercise and keeping active is beneficial for me as a disabled person.

2. *What do you believe could be done to improve the uptake of cycling for disabled groups where you live? Please specific the borough that you live in.*

I live in Hammersmith and Fulham borough and having lived in the borough growing up I didn't know All Ability Cycling existed, and that it was local to me. I feel more needs to be done to raise awareness of groups like Bikeworks. Also, more funding needs to be given so that these groups can provide more adapted bikes, equipment and staff to run these sessions. More needs to be done to have facilities and venues available to run these groups indoors as well as outdoors. In winter riding around in a park when the weather is not good, doesn't help. It will be good to offer indoor and outdoor cycling.

3. *How has the reduced use of public transport affected you during coronavirus? Have you had to use a different mode of transport as an alternative?*

I rely on family members and use Dial a Ride. I can't rely on a service like Dial a Ride as there have been occasions where I would be waiting around for a long time for the driver to turn up. Bikeworks have started a pilot scheme called Ride Side by Side, which is like a taxi service on a bike to take disabled and elderly people to local places that they wish to go. I recently booked it to attend my All Ability cycling session, that really helped for my own independence.

4. *Have you got any low traffic neighbourhoods in your area? If yes to the above, have you used them? Please specify where*

There must be, but I haven't used it.

5. *If yes, what do you believe the benefits of a low traffic neighbourhood is?*

It's good for cycling and gives ease of access to quiet roads. If children are playing it's safer having less cars.

6. *If anything, are there any barriers to low traffic neighbourhood?*

With adapted bikes it can be tricky to get through bollards and gates especially if the bike is too wide.

7. *Thinking back to the led ride in Illford last week, are there any bits of infrastructure on the route that you consider good or potentially restrictive for adapted cycling?*

The quiet routes were great that we went along on route.

8. Do you think infrastructure changes, such as LTN's, or more behavioural intervention, such as cycle training, are more important in make cycling for inclusive for Disabled groups? Please explain you're your answer below:

I think that anything that can benefit the disabled community is very much needed and is important. Disabled people can be forgotten about. We need to keep groups like the all ability hub (Stratford) going as it makes a difference to disabled people's lives. I have always found that any disability equipment can be unaffordable for many disabled people as the prices for adapted equipment such as bikes are very expensive. Even a payment plan would still be difficult to pay for.