

Descriptive analyses of cycling data from Glasgow

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1 Introduction

The latest [Cycling Action Plan for Scotland](#) from Transport Scotland, covering 2017-2020, sets out a vision for 10% of everyday journeys to be made by bike by 2020. A series of actions are outlined in the plan to show how the Scottish Government will work with local authorities and key partners to achieve this outcome.

Glasgow City Council's [Strategic Plan for cycling 2016-2025](#) indicates how Glasgow proposes to develop cycling within the city to meet the vision of the Scottish Government, but also in terms of delivering on its own policy commitments towards regeneration, sustainability, and improving health and wellbeing. This plan builds on Glasgow's first cycling strategy which was launched in 2010.

As work begins on the actions outlined in this second plan, the Glasgow Centre for Population Health (GCPH) considered it of interest to undertake some descriptive analyses of various currently available datasets relating to cycling within Glasgow in order to help provide a picture of cycling activity within the city, and in turn, to help inform future developments.

2 Background to this paper

A brief summary of each of these analyses provided in this paper and further details of the analyses are available in the full reports^{1,2,3,4} published on the [GCPH website](#).

The first two analyses^{1,2} considered usage of two recently developed cycle routes, known as City Ways, which provide segregated access for cyclists from different parts of the city into the city centre. A series of City Ways are planned so it is of interest to examine what can be learnt from the first two examples. A third analysis³ focused on usage of Glasgow's mass bike hire scheme. The final analysis⁴ looked at travel to school in Glasgow.

3 Descriptive Analyses

3.1 Cycle journeys on the Anderston-Argyle Street Bridge

The Anderston-Argyle Street Bridge (section annotated as 2A in Figure 1 below) was completed in July 2013 and forms part of the larger Sustrans Connect2 project which was designed to provide a safe route for pedestrians and cyclists to travel from Kelvingrove Park in the west of the city into the city centre. This route is now known as the West City Way. A series of analyses was undertaken in October 2016 to investigate usage by cyclists of the route.

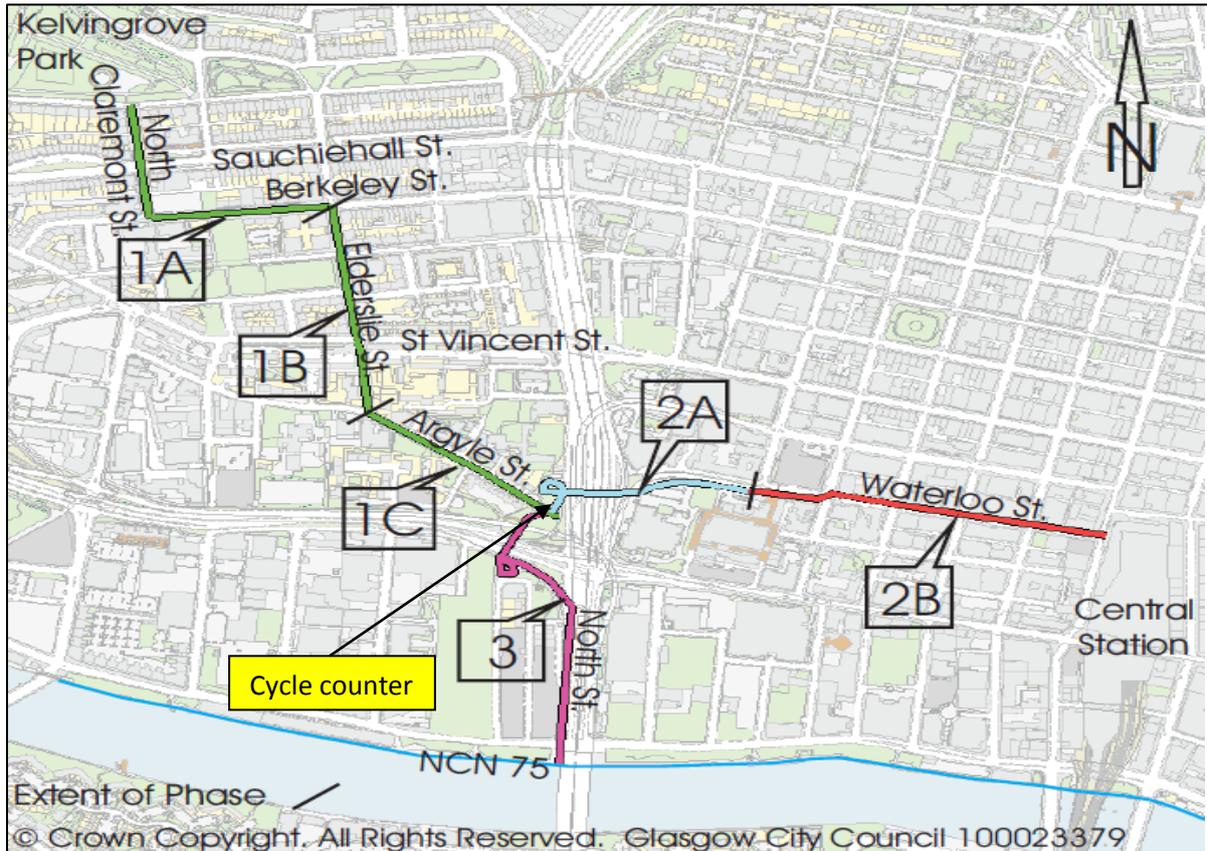


Figure 1: Glasgow city centre showing the West City Way cycle route (Glasgow City Council).

Section 2A is the Anderston-Argyle Street bridge.



Figure 2a and 2b: The Anderston-Argyle Street Bridge and the cycle counter

Analyses were based upon data gathered from a cycle counter placed at the western end of the bridge (location illustrated on Figure 1), which records numbers of cyclists passing the counter in 15 minute intervals. This data is obtained by Glasgow City Council from the suppliers of the cycle counter. The data is supplied to an interested party by Glasgow City Council, and made [publicly available online](#) by this third party. Data recording began on 28th July 2014 and data continue to be gathered on an ongoing basis.

To enable investigation of the impact of weather conditions on cycle behaviour, the data have been linked at the publicly available website with weather data obtained from the Met Office and from the University of Glasgow's weather station. A further series of analyses were undertaken to investigate the impact of weather on cycling levels on the route.

Since opening in 2013, the Anderston-Argyle Street Bridge has been providing a route into and out of the city for cyclists. Numbers of cyclists averaged 160 per day during the period July 2014 to July 2016, and overall use grew. Consideration of whether this constitutes high usage or otherwise, and how this figure corresponds to projections made for the route was beyond the scope of the current work. However, it can be seen from this study that the provision of infrastructure for cycling will attract cyclists to make use of it.

Research commissioned by GCPH in 2014⁵ examined usage of the whole of the Connect2 route (now known as West City Way), and in particular who used the route and their attitudes towards it. While not specific to the infrastructure in question in this report, the findings of this previous research indicated that the enhanced feeling of safety offered by route was encouraging people to use it.

The Glasgow City Centre Cordon count, which measures the number of cyclists at 35 entry and exit points in the city during two days in September each year, suggests more people are cycling to and from the city generally and specific cycle routes such as the Anderston-Argyle Street Bridge, the Broomielaw, and the Tradeston Bridge show large average annual percentage growths. Although the cordon data only provides a snapshot of what is occurring throughout the year, the continuing growth in cycling numbers at city entry and exit points close to the Anderston-Argyle Street Bridge suggests that the bridge may be attracting new users rather than simply diverting cycling traffic from elsewhere. It would be interesting to examine cycle accident statistics for the area to determine whether the perceived safety advantage of the new route has translated into reductions in incidents. The bridge also provides a new route for pedestrians to and from the city centre, and in assessing the overall contribution of the infrastructure to active travel within Glasgow, increases in pedestrian usage would also be of interest.

There are clear seasonal effects apparent, with two to three times more cyclists using the bridge in the summer months compared with in the winter. Patterns of usage suggest that commuting is a major reason for cycle journeys on the route, with the main direction of travel being into the city from the west in the morning and in the opposite direction the evening. Findings of the previously mentioned GCPH study⁵ appear to confirm this, with 43% of those interviewed stating that they were commuting. The numbers of eastbound and westbound journeys made using the bridge do not correspond and suggest that perhaps an alternative route is being used for some eastbound journeys. Further investigation would be required to understand this. The GCPH usage research consulted only with users of the route. It would also be of interest in future to speak to cyclists commuting into and out of the town from the west but who do not use the route, and ask about the reasons for their route choice. The cordon count data shows a similar pattern of higher westbound than eastbound travel on the bridge and suggests that usage of St Vincent Street, or other nearby unsegregated routes by cyclists travelling east, may account for some of the difference. Weather conditions do impact on the number of journeys made with increasing temperatures associated with higher numbers of cycle journeys and higher wind speeds with reduced numbers of cycle journeys. Public holidays impact on

number of journeys made but not in a predictable way; school holidays appear to have limited impact on usage.

3.2 Cycle journeys on the South West City Way

The South-West City Way, launched in October 2015, provides 2km of segregated cycleway linking Pollokshields on the southside of Glasgow to the Tradeston Bridge over the river Clyde. The Tradeston Bridge (or “Squiggly Bridge”) provides access to the city centre and other cycle routes. The South-West City Way is shown in dark green in Figure 3 below. The route comprises a number of innovative cycle design features such as a cycle only diagonal crossing with its own traffic light phases separate from the traffic, bus stop bypasses and footrests and handrests at junctions.



Figure 3: Location of South-West City Way.

A cycle counter incorporated into the route near the junction of Shields Road and Scotland Street (location shown in Figure 3) went live on 5th March 2016. Data from this counter for the period from Saturday 5th March 2016 to Monday 26th September (205 days) were made available to the GCPH by Glasgow City Council. The data relates to journeys made in either direction on the route as it was not possible to disaggregate them at the time. These issues have now been resolved.

The route attracted on average more than 500 cyclists a day between March and September 2016, with a steady increase in cyclist numbers during this period. The impact of seasonal effects on this trend is of interest and further research should be undertaken to analyse the data gathered for the period from October 2016 to March 2017 to study this. The data could also be linked to weather data for the area to assess the impact of weather conditions on cycling levels. Data from the Glasgow Cordon Count shows a large increase in numbers of cyclists using the Tradeston Bridge from 2015 to 2016. Given that the South-West City Way route leads to the Tradeston Bridge and that it was introduced in the month following the 2015 survey, it would seem that the route is attracting cyclists. The data from the two days studied in the cordon count suggests that at least some of this growth is

coming from additional cycle journeys rather than diversion of cyclists from existing routes. However further research with users would be required to confirm that this is the case. Compared with the Argyle Street-Anderston Bridge, which forms part of the West City Way, the route, although newer, already appears to be attracting a larger number of users. This may be for a number of factors including perceptions of quality of the routes, the availability of alternative routes, extent of changes required from the existing routes of cyclists and the adjacent cycle infrastructure. Also, it may be that cyclists are more likely to use only part of the West City Way route for a journey). Qualitative research with users of the South-West City Way and comparison of this with research previously commissioned by the GCPH looking at users' attitudes towards the West City Way⁵ would help to elucidate this. Like the Argyle Street-Anderston Bridge, a major use of the South West City Way appears to be commuting. The route has a number of features which are designed to improve safety for cyclists. It would be interesting now to compare accident statistics for the years immediately preceding the introduction of the route, with those following its introduction in October 2015.

2.3 Glasgow's public cycle hire scheme: analysis of usage between July 2014 and June 2016

Mass automated cycle hire schemes originated in the 1960s. They have evolved and spread since then, with schemes now available in over 1,000 locations worldwide. The largest schemes can be found in China⁶. The Chinese city of Hangzhou has over 66,000 bikes available for rent. In Europe, one of the largest schemes is in Paris which has around 20,000 bikes.

A public cycle hire scheme was introduced in Glasgow on June 24th 2014. The contract for provision of the scheme for three years was awarded to NextBike (<http://www.nextbike.co.uk/>), which runs similar schemes in cities across the world.



Figure 4: Glasgow public bike hire scheme rental location, George Square.

Individuals wishing to hire a bike must register with Nextbike either online, via an app, or by phone. They can then hire a bike from any of the Glasgow rental locations (Table 1) using the app, by phone, or using a rental card obtainable from the company. Bikes can be returned to any rental location. An annual subscription of £60 can be paid by those likely to make regular use of the scheme. For subscribers, the first 30 minutes of any ride is then free, with a fee of £0.50 for each additional 30 minute period. The maximum charge per 24 hours is £5. Less frequent users can choose to pay a £10 starting credit amount and then each rental costs £1 per 30 minutes up to a maximum of £10 in any 24 hour period. Special deals are available to staff and students of the University of Glasgow, the University of Strathclyde and Glasgow Caledonian University, and corporate membership packages are also available.

Data on bike hires was made available to the Glasgow Centre for Population Health (GCPH) by Glasgow City Council for the period from 23rd June 2014 to 30th June 2016. This comprised 204,133 records. After removing incomplete records, records relating to temporary locations used only during the Commonwealth Games held in Glasgow in July/August 2014, and restricting data to the period 1st July 2014 to 30th June 2016 to allow an exact two-year time period of study, there were 191,874 records available for analysis. There were approximately 16,000 people registered to use the scheme during this time. Nextbike were not able to release full demographic information for these people due to data confidentiality requirements, but were able to make available their first name and part of their postcode of residence.

Initially, 400 bikes were introduced to 31 locations (Phase 1, 24th June 2014) with a small number of extra bikes available in reserve for replacing missing bikes or those temporarily unavailable as requiring repair. A further ten locations were added subsequently (Phase 2, 4th May 2015), although the number of available bikes was kept similar. Locations are listed in Table 1 and mapped in Figure 5. On 14th March 2016, the Queen Street station location (city centre) was transferred to Shields Road North (in the south of the city) as a result of the improvement works taking place at the station. A further two rental locations were added on 18th April 2016, at Gartnavel General Hospital (in the west of the city) and the Queen Elizabeth University Hospital (in the south of the city). In February 2017, an expansion to the scheme was agreed by Glasgow City Council⁷, with the contract for the provision over the next seven years awarded to Nextbike. During this time, the number of hire stations will increase to 100, and the number of bikes within the scheme will be more than doubled to 900

Table 1. Glasgow's public cycle hire scheme locations.

Location	Phase	Postcode district
Argyle Street Railway Station	1	G2
Botanic Gardens	1	G12
Bridge Street Subway	1	G5
Broomielaw	1	G2
Buchanan Street Bus Station	1	G2
Charing Cross Railway Station	1	G2
Emirates Arena	1	G40
Finnieston Street	1	G3
Gallery of Modern Art	1	G1
George Square	1	G2
Glasgow Caledonian University	1	G4
Glasgow Cathedral	1	G4
Glasgow Central Station	1	G1
Glasgow Green	1	G1
Glasgow Science Centre	1	G51
Kelvinbridge Subway	1	G4

Kelvingrove Art Gallery	1	G3
Merchant Square	1	G1
Mitchell Library	1	G3
Partick Interchange	1	G11
Queen Street Railway Station	1	G1
Riverside Museum	1	G3
Scottish Exhibition and Conference Centre (SECC)	1	G3
St Enoch Square	1	G1
St George's Cross	1	G4
Trongate	1	G1
University of Glasgow (East)	1	G3
University of Glasgow (West)	1	G12
University of Strathclyde (North)	1	G4
University of Strathclyde (South)	1	G1
Waterloo Street	1	G2
Barrowlands	2	G4
Bellgrove Railway Station (North)	2	G31
Bridgeton Cross	2	G40
Cessnock Subway Station	2	G51
City of Glasgow College (Riverside Campus)	2	G5
Eglinton Toll	2	G41
Govan Cross	2	G51
Paisley Road Toll	2	G51
Queens Park North	2	G42
Queens Park West	2	G42
Gartnavel General Hospital	3	G12
University Hospital	3	G51
Shields Road (North)	14/3/2016	G41

Phase 1: 24th June 2014; Phase 2: 4th May 2016; Phase 3: 18th April 2016.

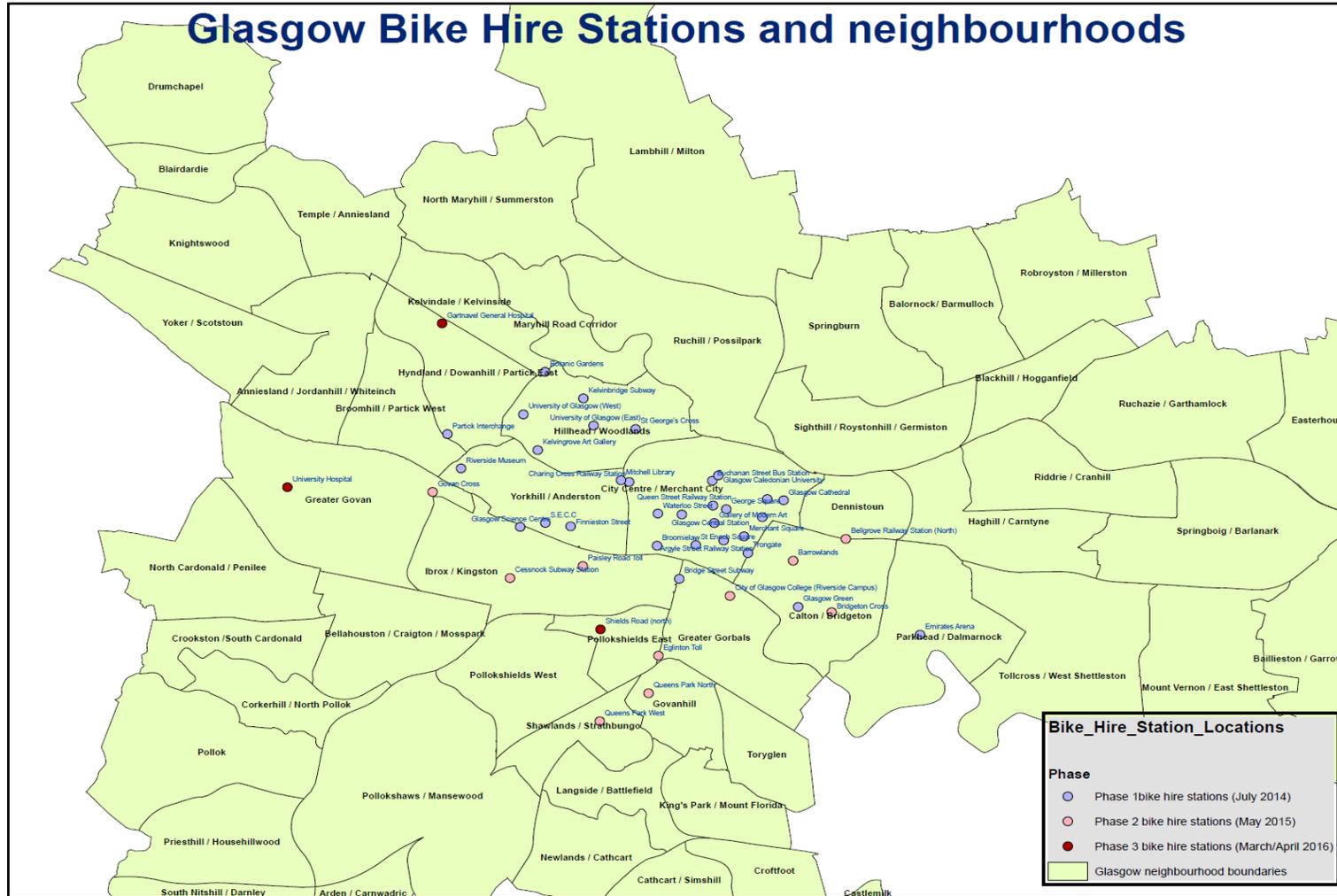


Figure 5: Glasgow’s public cycle hire scheme locations.

During the first two years of operation of the Glasgow public bike hire scheme, there were around 200,000 bike hires made and 16,000 people registered to use the scheme. The number of hires varied seasonally, and according to the day of the week. The number of hires in the summer were three to five times higher than those in the winter. Most hires took place on weekdays and during the periods 7.30am to 9.30am and 4.30pm to 6.30pm, suggesting the scheme is being used for commuting. There was a steady growth in usage during the two-year period, which may partly be associated with the increase in the number of hire locations. Most hires were for less than 30 minutes and the most popular rental location was Glasgow Green. Sunshine and higher temperatures were associated with a greater number of hires, whereas increasing wind speeds and rain were associated with fewer hires. Most people registered to use the scheme live within Glasgow or the surrounding area, and a higher proportion of women than seen in other cycling activities have registered⁸. Qualitative research is now required to understand users' and non-users' views and perspectives of the schemes and to find out more about the reasons for journeys being made, and the actual routes taken.

2.4 Travel to school in Glasgow: a descriptive analysis of results from the Hands Up Survey

The Hands Up Scotland Survey is an annual survey based on a large sample of pupils enrolled at schools in Scotland. The survey, first conducted in 2008, is funded by Transport Scotland and is a joint project between Sustrans and Scottish local authorities. The survey asks, 'How do you normally travel to school?', with the following response options: walk, cycle, scooter/skate (includes skateboarding), park and stride (driven part of the way by car and walk the rest), driven, bus, taxi and other. The survey is carried out during the second week of September each year.

The data collected are reported at a national and a local authority level on the [Sustrans website](#), where a [national results summary](#)⁹ is also available. Data at an individual school level in each local authority are supplied to the relevant local authority. Where a percentage represents a value of between one and four pupils, the data is suppressed to maintain anonymity of respondents.

This analysis focused upon the data gathered for state schools in Glasgow City in 2015, which were made available to the Glasgow Centre for Population Health (GCPH) by Glasgow City Council. The findings gathered, particularly related to cycling, are described here and compared with the national data.

Around half of Glasgow primary school pupils and one third of secondary school pupils took part in the Hands Up Survey in 2015. The survey shows that Glasgow has a greater percentage of pupils walking to school than the overall figure for Scotland, but also a higher percentage of pupils being driven and a smaller percentage travelling by bus than Scotland as a whole. Levels of walking are similar in primary and secondary schools, but other forms of active travel (cycling and use of scooters/skating) decline between primary and secondary school. Since 2008, there has been little change in the percentage of active versus motorised travel to school in Glasgow overall. However there are large differences in levels of active travel among schools, with some primary schools reporting more than 80% of pupils using active travel and others with less than 40%. There are likely to be a multitude of issues influencing these differences such as geographical spread of the school catchment area, transport and road infrastructure in the area and availability of supporting measures such as installation of bike shelters and bikeability training. Further investigation would be needed to tease out the features which are affecting travel modes in local situations. Numbers of pupils cycling are very small but there does appear to be an increasing number of primary pupils cycling and also using skates/skateboards/scooters. This increase appears to have resulted in a redistribution of numbers among active travel modes however, as growth has come from a reduced number of walkers, rather than from reduced numbers of children using motorised transport. A multi-agency project, Play on Pedals¹⁰, designed to give every preschool child in Glasgow the opportunity to learn to ride a bike before starting school, was introduced in Glasgow in early 2014 and may be contributing

to the growth in numbers of primary school pupils cycling to school. It would be interesting to work with schools with high levels of active travel, to understand what has contributed to their success. Some factors of success may be specific to a particular school, but there are likely to be other aspects which could be transferrable to other schools.

Research indicates that action is needed on a number of fronts simultaneously to promote increased levels of cycling¹¹. For schools, this may take the form of the provision of cycle training such as the Bikeability scheme, secure cycling parking, creation and awareness raising of safe routes of travel, promotion of active travel in the school curriculum, and ensuring access to bikes. A report¹² produced in 2016 for the Scottish Government provides evidence on school transport choices and which approaches have been effective in influencing these, in order to inform the development of workable and deliverable policies that minimise the proportion of journeys to school made by car while increasing the proportion choosing active travel. This work comprised a literature review, secondary data analysis, qualitative studies with staff, pupils, and parents, and discussions with local stakeholders. This work again highlights that a suite of interventions is needed to effect change.

Glasgow's Strategic Plan for cycling 2016-2025¹³ makes a number of commitments to encouraging cycling among schoolchildren with a view to increasing levels of children cycling to 7% by 2025. These include increasing Bikeability Level 2 participation to 100% of primary schools by 2025, 100% of city schools to have cycle parking by 2025, and support for schools to train ride leaders/coaches working within the school.

The Scottish Government's Cycling Action Plan for Scotland¹⁴ also contains a number of measures designed to promote cycling to school, including support to install improved cycle facilities within schools, opportunities for secondary school pupils to train to become 'cycle champions' within their school and development of schemes to provide access to bikes in areas of low cycle use or deprivation. The plan also promotes projects to encourage primary school pupils to continue cycling when transferring to secondary education, a time when as seen with the Glasgow data, the proportions of pupils cycling falls.

Given that increases in cycling may be coming from children changing from walking to school rather than from those being driven, particular efforts in future could target those parents of children who currently drive their child to school but who live within cycling or walking distance of the school.

4 Conclusions

- The Cycleways and the bike hire scheme are being used for commuting, and use appears to be steadily increasing
- It is likely that interactions between these initiatives are impacting on usage, with each one driving use of the other
- Glasgow cordon count shows increases in number of journeys into the city centre overall, suggesting that the new infrastructure is attracting new users.
- There has been some growth in cycling among primary children, which may be associated with recent interventions to support cycling among this age group, but further work is required in relation to secondary school pupils. This is addressed in Glasgow's strategic plan for cycling.
- Further work is needed to monitor cycleway usage over a longer period of time.

- Qualitative research is required to understand who are the users and non users of the bike hire scheme, what are their views and perspectives of the scheme, and to find out more about the reasons for journeys being made and the routes taken.
- Work with individual schools to better understand their HandsUp results is required. In particular, it would be of interest to look at what is influencing higher levels of cycling in some schools compared with others and consider feasibility for spread to other schools.

5 References

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