

Governing Urban Transformation

Understanding what works: evaluating cycling infrastructure.

A report for Manchester City
Council.

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Author declaration:

I, **9335916**, confirm that this report is based on my own work and that I am happy with both my own and my partner's **9447184** contribution to the final submitted version.

Abstract

This report has been commissioned by Manchester City Council (MCC) with the purpose of evaluating Manchester's cycling infrastructure and noting what has been a success, and what aspects of it can be improved, so as to produce recommendations for MCC. The focus of this report is on the safety of the new cycle lanes that have been, and continue to be, implemented along Wilmslow Road/Oxford Road in Manchester, particularly the Rusholme/"Curry Mile" section of cycle way. This section of cycle way was chosen due to the area being a traffic hotspot, therefore it is a crucial space to ensure the safety of cyclists, pedestrians and motorists alike. Guided by both primary and secondary data collection, this report establishes which infrastructural elements have been successful thus far and which have been less so. Primary data comprises observation of the study site, which was undertaken in order to allow reflection upon the interactions between cyclists, pedestrians, motorists with the infrastructure. This was supplemented by secondary data provided from by Transport for Greater Manchester (TfGM); comparisons were also made to the Netherlands due to their cycling success and the marketing of the Wilmslow Road cycle way as 'Go Dutch'. From this research, potential solutions were identified as increased safety education, the use of bollards over armadillos, and improving the safety of cyclists at side roads and junctions. Such recommendations for MCC are useful, however, it is important to note the time constraints of this research. Therefore, further research could be conducted when the cycle way has been fully constructed and users have had time to adapt.

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Table of Abbreviations

MCC: Manchester City Council

TfGM: Transport for Greater Manchester

UoM: University of Manchester

1. An introduction to the features of the Wilmslow Road cycleway

Wilmslow Road in Manchester is considered as the busiest bus corridor in Europe; this poses a significant challenge to the City Council in meeting the needs of not only buses but other motorists, pedestrians and cyclists. New segregated cycle lanes have recently been implemented stretching from Didsbury to The University of Manchester campus; the cycle lanes from Manchester Metropolitan University campus to St. Peter's Square are still under construction. Key features of the new cycle way along Rusholme/"Curry Mile" include green surfacing on the lanes, segregation kerbs to separate cyclists from motorists, and traffic lights for cyclists. A comparison will exist throughout between the current infrastructure on the Rusholme cycle way and the cycling infrastructure adopted in the Netherlands. The Netherlands has significantly higher cycling levels than Manchester, and is a useful comparison due to its similar weather and flat landscape (Wardlaw, 2014). From this, the report will fulfil its purpose in providing potential infrastructural improvements which MCC could make to improve the Rusholme cycle way.

2. Context; Manchester vs. Netherlands

MCC works closely with 'Corridor Manchester' (corridormanchester.com) and its stakeholders to make Manchester a cleaner, smarter city. Corridor Manchester is a partnership between several world class institutions along the Wilmslow Road corridor. In order to collaboratively achieve their sustainability goal, ensuring maximum safety through the infrastructure on the Wilmslow Road/Oxford Road corridor is of utmost importance. Since the installation of the new cycle way, cyclist numbers have doubled and the longevity of the infrastructure needs to be ensured so cycling numbers can be maintained and continue to increase.

The Netherlands is a useful basis for future improvements, with a use of both segregated cycle lanes and cycling amongst public areas. A key similarity between the Netherlands and Rusholme is the coloured surfacing of the cycle lanes, although the Netherlands adopt bollards rather than armadillos as a form of segregation (Laker, 2015). Cycling amongst public areas, however, is not recommended to be replicated in Manchester; this is because the UK has a path dependency and lock-in towards private car use (Upham *et al.*, 2013).

Cycling levels in the Netherlands are 10x higher than in the UK (Pucher and Buehler, 2008), and in particular, a 'cycling culture' is prevalent. Such a culture results in cycling appealing to all members of the public, with equal levels amongst males, females, and children, and little tension existing between cyclists and other transport modes (Pucher and Dijkstra, 2003). At present, the Wilmslow Road/Oxford Road cycle corridor is unlikely to meet Dutch cycling levels which can be attributed to the safety concerns of both existing and potential cyclists. However, urban development is a significantly influential factor since cycle lanes in the Netherlands have existed for decades, unlike the UK (Upham *et al.*, 2013). This therefore poses a problem in altering the urban environment on a scale much greater than simply the integration of cycle lanes.

Cycling fatalities in the Netherlands are 3x lower than in the UK despite a considerably higher number of cyclists, and less than 1% of Dutch cyclists choose to wear helmets (Pucher and Buehler, 2008). Levels of females and children cycling along the Rusholme corridor are low

(Zahabi *et al.*, 2016), particularly in areas which are not segregated (TfGM report, 2016). This could be a reflection of safety concerns, and therefore a potential area for infrastructural improvements. Since cycling in the Netherlands is a standard mode of transport it is highly convenient with storage facilities on bikes (Aldred and Dales, 2016) and does not require any specialist cycling or safety equipment (Jacobsen, 2003). In contrast, the general UK perception towards cycling is that it is less convenient due to the requirement of specialist equipment (Noland, 1994).

Another marked difference is that Dutch transport legislation favours cyclists over motorists (Hallal *et al.*, 2012); this is not the case in the UK (Simpson, 2017). Legislation against motorists has greater enforcement levels in the Netherlands and motorists are legally responsible for collisions with cyclists, regardless of the cyclist's actions, which forces motorists to drive with special attention (Rietveld and Daniel, 2004). This reduces the number of fatalities and therefore makes cycling more appealing. Such legislation is not present in the UK and therefore contributes to the higher number of fatalities. However, greater awareness in the UK is beginning to develop, with campaigners calling for the Highway Code to be revised to give greater protection to cyclists, specifically with regard to cyclist priority at side roads and junctions (Maidment, 2017).

3. Data collection process

From our research, infrastructural improvements along the Rusholme section of the corridor will be suggested. Our research questions are:

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| <p>1. <i>From observations, how do users interact with the new cycling infrastructure? Is it safe and easy to use?</i></p> |
| <p>2. <i>From TfGM's report, how aware are planners towards safety issues on the Rusholme cycle way?</i></p> |
| <p>3. <i>To what extent does the Wilmslow Road cycleway compare to other well-established cycle ways, such as the Netherlands?</i></p> |

Table 1: Research Questions

3.1. Primary data

In order to answer the above research questions, it was necessary to collect primary data; this included observations of the Rusholme section of cycle way. The data collection was conducted over a two day period and at different times of the day – 09:00-09:30, 17:00-17:30 and 20:00-20:30; this allowed for comparisons to be made between rush hour and the evening. Ellis and Bocher (2006) emphasise that observations allow researchers to 'experience an experience' through thoughts, emotions and actions. The main purpose of the observations was therefore to reflect upon the interactions between cyclists, people, vehicles and the infrastructure and record any successes and failures relating to safety.

3.2. Secondary data

Secondary data is already existing and publicly available information; this makes it reliable and of proven quality (Clark, 2006). It provides a contextual background and was used in relation to the primary data so as to provide validation to the experiences that arose (Corbin and Strauss, 2008). Secondary data in the form of a report was obtained from a representative

from TfGM who gave permission for the data to be used as an aid to the research. The report provided a 6-monthly review of the Wilmslow Road/Oxford Road cycleway, and included in-depth statistics on usage levels, design review, and areas for further improvements. The data in TfGM's report was collected on a greater scale than was possible within the timeframe allocated to this research; our observation did, however, supplement the secondary data. The quantitative data from the report can be compared to cycling success in the Netherlands, and comparisons between the infrastructures at the two different locations provided suggestions of how infrastructure in the Netherlands can/cannot be adopted into a Manchester context.

Finally, the opportunity arose to attend an Environmental Sustainability seminar at the University of Manchester (UoM). It focused upon the Oxford Road corridor, with information provided from a TfGM representative and the UoM sustainability team. This increased the level of policy understanding with regards to future areas of improvement which they had identified. It also increased the awareness of future plans along the corridor, which enhanced the research.

4. Recommendations for MCC

4.1. Key findings shown through observations

| Time of data collection | Number of cyclists travelling in <u>both</u> directions | Number of cyclists wearing cycling safety equipment (helmet, reflective clothing) | Number of cyclists not using the cycle lane |
|-------------------------|---|---|---|
| 09:00-09:30 | 201 | 188 | 27 |
| 17:00-17:30 | 163 | 140 | 39 |
| 20:00-20:30 | 108 | 89 | 52 |

Table 2: Observation data collection results

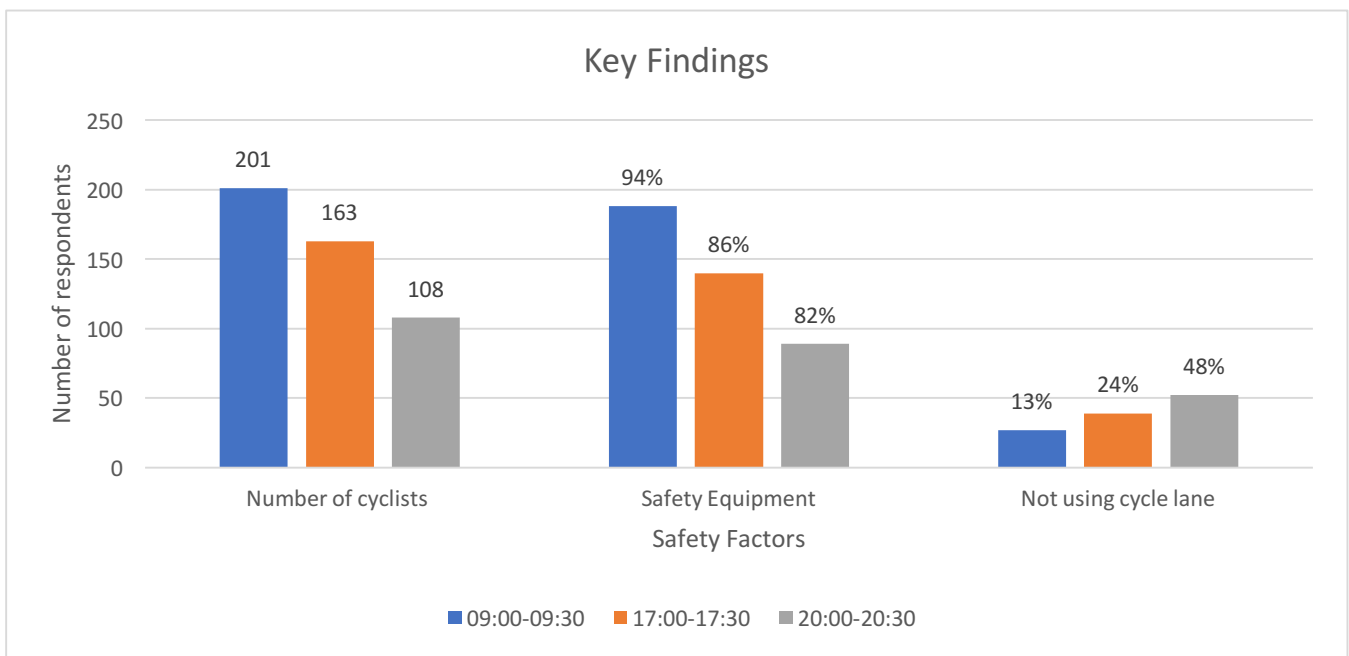


Figure 1: Key findings in graph format

The key findings from table 2 and figure 1 are:

- The highest number of cyclist travel in the morning closely followed by the evening 'rush hour'.
- Cyclists in the evening have the lowest safety equipment usage (82%) and the lowest cycle lane usage (48%) which provides reasoning for the greater number of collisions observed in the evening.

- The number of cyclists wearing safety equipment at all times of day is higher than Amsterdam levels (Wardlaw, 2014).
- Cyclists in the morning adopt the most safety equipment (94%) and used the cycle lanes the most (87%). This is likely to be due to the higher density of road users within this time period.
- A similar reason can be attached to the high safety equipment usage at 17:00 hours (86%).
- A much higher number of cyclists at 20:00 were observed than would be expected, however, large groups of cyclists were witnessed and this is a contributing factor.

4.2. Effective measures

Before identifying future improvements, it is useful to identify the successful components of the cycle way. The cycleway has been effective in increasing the number of cyclists travelling along the corridor, with cycling numbers doubling and 75% of respondents stating they use the new cycle way (TfGM report, 2016). Cyclists appear to be satisfied with the new forms of infrastructure, with 85% of cyclists rating the early green light as excellent or good and 82% of cyclists rating the kerb segregation as excellent or good. TfGM successfully engaged with a broad range of stakeholders, which was successful in meeting the requirements of a variety of users.

However, in answer to the first research question, 41% of respondents stated safety as a reason for not adopting cycling, and therefore to increase the sustainability of Greater Manchester, awareness needs to be increased for people to effectively use the infrastructure to improve safety levels.

4.3. Areas of potential improvement

4.3.1. Maintenance

Our observations, alongside the TfGM report, identified that some infrastructural elements are unsuitable for the high volume of traffic along the corridor. For example, the armadillos were installed in some areas as a cheaper alternative to kerb segregation. However, they have already suffered visible damage and therefore may not be suitable for the Rusholme cycle

way due to high traffic flows. In the Netherlands, cycle lanes are segregated from motor traffic by solid barriers such as bollards or trees (Laker, 2015) which could be an alternative option for MCC to adopt. However, there are existing pressures on revenue budgets, meaning that it is unlikely that the armadillos will be replaced if they are to remain in place in the long-term; this can be said to devalue the scheme by removing the safety benefits to users.

To ensure consistency, pale green surfacing has been implemented to the cycle lane, however, from our observations it is evident that it has already started to be worn down. This poses a safety problem at junctions as it is not really clear to motorists that they are crossing a cycle lane. This could be dangerous and during the observations we witnessed a motorist parked for several minutes across a cycle path; this is shown in figure 2.



Figure 2: A motorist obstructing the cycleway
(authors own image)

We propose that a brighter colour surfacing is used so that cyclists can be clearly differentiated from other road users, and not as much maintenance is needed of this simple feature (Pucher and Buehler, 2016).

It was also evident that a potential maintenance problem could be litter in the cycle lanes, shown in figures 3 and 4. The amount of litter increased over the course of the day.



Figures 3 and 4: Litter in the cycle way on the Rusholme section of the cycle way

The litter poses a safety issue because we observed cyclists having to swerve out of the way to avoid it. This suggests that greater daily maintenance may be required.

4.3.2. Attitudes

It was found that issues of conflict exist between road users, and levels of this have increased since the implementation of the new cycle lanes. The main issues include pedestrians walking in the cycle lane, shown in figure 5, and a lack of awareness by cyclists for pedestrians and vice versa.



Figure 5: Pedestrian walking in the cycle way and cyclist not using cycle lane

The TfGM report supports these findings as it stated only 10% of cyclists strongly agreed the cycle way has improved pedestrian experience, and 69% of pedestrians disagreed that the segregated cycle way is an improvement. Despite this, TfGM have reported that since the number of cyclists has doubled and the number of collisions has remained static, collision numbers have theoretically halved. However, during the observations, multiple collisions were observed between cyclists and pedestrians which makes the tension between these users understandable. Bus stops with cycle by-passes are essentially traffic islands between two flows of traffic. It was also observed that very few collisions are officially reported and therefore collision statistics can be unrepresentative. However, a low number of reporting is likely to have existed prior to the new cycleway also. Therefore, the cycle lanes may not be as safe as they initially appear.

However, MCC have the potential to diminish conflict on the Rusholme cycle way through replicating the positive attitudes associated with the Dutch cycling culture. This could be achieved through deterring motorised travel, for example bollards to reduce direct use of

private cars to increase the appeal of cycling, as is the case in Amsterdam (Bratzel, 1999). By reducing the incentives of car use through bollards, car density alongside cycle routes would decrease thereby reducing potential collisions.

A replication of Dutch attitudes could reduce the limited understanding between road users and particularly towards cyclists in the UK. In Amsterdam, motorists are held legally responsible for collisions with children and elderly cyclists, even if they are cycling in the wrong direction or ignoring traffic signals (Pucher and Buehler, 2008). This forces motorists to drive with special attention, since traffic laws are strictly enforced by police and courts. Such an issue in the UK is becoming increasingly recognised, however, with MPs proposing for a similar law to be implemented (Maidment, 2017). It is therefore suggested that MCC aim to improve user attitudes around the cycle way rather than make any particular infrastructural amendments. This could be aided through compulsory 'share with care' signs and other legislative improvements to pedestrian-cyclist awareness. This seems to be recognised from a top-down perspective with plans already existing for this signage to be implemented (TfGM report, 2016).

To further increase safety, extensive education on road safety with a particular focus on cyclists is likely to be effective if implemented by MCC. Such education already exists within the Dutch education system from an early age; this is not the case in UK legislation and motorists therefore have a lower awareness of cyclists. However, from attending the Environmental Sustainability Seminar, it became apparent that TfGM are initiating safety campaigns to increase awareness between road users, and if these are unsuccessful, there are plans to enforce sanctions against motorists, pedestrians and cyclists. From the research conducted, such plans would be an effective intervention by MCC.

5. Concluding remarks

Table 3 is a summary of the finalised recommendations which we propose MCC should adopt.

| Solutions |
|---|
| <p>Increase awareness of other users of the cycle lane via:</p> <ul style="list-style-type: none"> • Share with care signs • Increased education and safety campaigns <p>Failing such solutions, financial sanctions against inappropriate use</p> |
| <p>Make the cycle lanes more prominent via:</p> <ul style="list-style-type: none"> • Brightly coloured surfacing of the cycle lane throughout, particularly at side roads and junctions • Bollards rather than armadillos to segregate the cycle lane |
| <p>Increase disincentives of car use via:</p> <ul style="list-style-type: none"> • Bollards on direct routes to appeal to cyclists but not motorists • Favour cyclists over motorists in transport legislation |

Table 3: Proposed solutions for MCC

In response to the first research question, our observations reveal that at our study site, users seem to have limited awareness of the correct manner in which to use the new infrastructure. Whilst the infrastructure is theoretically safe and easy to use, the study site is a traffic hotspot and so safety issues arise where different transport modes interact. The key issues are: pedestrians obstructing the cycle lane, and motorists' lack of awareness at junctions.

In answer to the second research question, from a top down perspective as evidenced in TfGM's report, planners have identified the successful aspects of the cycle way and aim to improve this further. From our attendance at the Environmental Sustainability Seminar, it is

clear that planners are working towards initiating safety campaigns through more prominent signage such as the 'share with care' signs.

For the third research question, the comparison of Manchester to the Netherlands shows that MCC have successfully adapted some 'Go Dutch' elements to their cycle lanes, however, safety issues in Manchester are much greater. This cannot be purely attributed to infrastructural issues as public attitudes are a significant barrier in achieving the same Dutch cycling success in Manchester and recommendations have been made on this basis.

Finally, it needs to be recognised that installing segregated cycle lanes in Rusholme's existing, busy and ageing infrastructure is unlikely to ever satisfy all road user requirements. Alongside underinvestment in highways over previous years, some safety and satisfaction issues are likely to always exist towards the cycle lane. Whilst it is understandable that new infrastructure may have teething problems, some of the safety issues outlined in this report have the potential to remain if no action is taken. Therefore, we hope that from this report, the suggested safety improvements are viable for MCC to adopt.

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