Evaluation of the Mann Street Cycleway, Cairns

Prepared for Queensland Department of Transport and Main Roads

CDM RESEARCH

Contents

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Executive Summary

The Department of Transport and Main Roads (TMR) commissioned CDM Research to undertake an evaluation of the Mann Street Cycleway in Cairns. The cycleway extends from Tills Street in Westcourt to the existing Lily Creek path and the railway line near the city centre. The cycleway runs alongside Mann Street and Minnie Street and is physically protected from the roadway. The project extends over 2.6 km and includes three small bridges over drains and creeks. Priority is maintained for bicycle riders at nine minor street intersections using a raised table and coloured surface treatment accompanied by Give Way signs. The cycleway was jointly funded by the Queensland Government and Cairns Regional Council and opened in May 2017 for a total cost of $1.35 m.

The primary design intent was to provide a safe and attractive alternative route to Mulgrave Road, a major arterial road 250 m to the south that connects the western suburbs of Cairns to the CBD. It should be noted that at the time this evaluation was undertaken the project was not complete; a connection at the western end to Mulgrave Road and wayfinding signs had not been installed.

Five fieldwork activities were undertaken:

- video-based manual counts classified by mode, direction of travel and time of day over three weekdays (Monday 6 November to Wednesday 8 November 2017) and a weekend (Saturday 11 November and Sunday 12 November 2017),
- intercept surveys with cycleway users on two weekdays and a weekend day near Buchan Street (Wednesday 30 May, Saturday 2 June and Monday 4 June 2018),
- intercept surveys with bicycle riders using Mulgrave Road near Severin Street (Tuesday 29 May to Friday 1 May 2018),
- video-based observations of motorist and path user interactions at the path priority crossing at Buchan Street, and
- cyclist travel time runs along the cycleway and Mulgrave Road to estimate the variation in rider travel times between the two routes.

The evaluation was structured around six research questions:

- Has the cycleway attracted bicycle riders off Mulgrave Road?
    - The cycleway has attracted riders from the main road; around 42% of bicycle riders and 20% of pedestrians travelling for transport on the cycleway indicated they would previously have used Mulgrave Road for their trip.
    - Given the high volumes and speeds of motor vehicles along Mulgrave Road it seems highly likely this route diversion will result in safety benefits.

- Has the cycleway generated all-new cycling trips, including mode shift from car or public transport?
    - The intercept surveys find no evidence to suggest the cycleway has attracted users from car or public transport, and nor has it generated all-new recreational riding trips.
    - It is possible such behavioural responses will only appear over time, once the cycleway is complete, or possibly after connections are improved into the city and to other paths.
- Does the cycleway attract a different gender and age demographic than Mulgrave Road?
    - The cycleway may have been effective at attracting a more diverse group of bicycle riders than Mulgrave Road; 78% of riders along Mulgrave Road are adult males compared to 63% on the cycleway, 17% of bicycle riders of the cycleway are female compared to 10% on Mulgrave Road, and 21% of bicycle riders on the cycleway were children compared to 9% on Mulgrave Road.
- Does the cycleway provide a journey time equivalent to using Mulgrave Road?
    - The cycleway appears to offer marginally longer journey times than Mulgrave Road. It is estimated the additional journey time along the full route is around 30 seconds, or around 5 – 6% of the end-to-end journey time.
    - The travel time disbenefits would almost certainly be larger on the cycleway if priority was not given to cycleway users at the nine minor street crossings. In turn this would likely discourage some riders from diverting from Mulgrave Road which, given that Mulgrave Road is almost certainly higher risk, may have overall worse safety outcomes.
    - Overall, the journey time will be heavily dependent on whether the rider needs to divert from their shortest path between their origin and destination.
- Do the path priority crossings operate to an acceptable level of safety?
    - Intersection observations suggest the intersection likely operates to a level of safety similar to other intersections.
    - However, cycleway users reported near-miss events and instances where motorists failed to give way. Further, the observations did suggest an elevated risk attributable to motorists approaching from the north along Buchan Street, and crossing Mann Street heading south, failing to give way at the path – or only responding to the presence of path users during the crossing.
    - It is suggested speed cushions would be a cost-effective design response to this issue.
- Does the cycleway provide value for money?

- The cost-benefit analysis suggests a BCR of 1.1 for the central case, suggesting the project benefits marginally exceed the costs over a 30-year economic life.

Overall, we conclude that the cycleway appears to offer a substantially higher level of service to bicycle riders – and most particularly to those less confident riding in traffic. Moreover, it may attract a broader cross-section of the community to riding than does the on-road bicycle lanes on Mulgrave Road. We suggest three potential areas for improvement:

- The cycleway should be designated as a shared path rather than cyclist-only facility given that there are no footpaths along the corridor, and it is inevitable pedestrians will choose to use the cycleway.
- The cycleway could be better connected into the city centre and to other cycleways and shared paths in the city.
- Further speed control may be warranted at the path priority crossings to reduce the risk of injury.

1 Introduction

1.1 Background

CDM Research was commissioned by the Queensland Department of Transport and Main Roads (TMR) to undertake an evaluation of the Mann Street Cycleway connecting Westcourt with Cairns City. The cycleway consists of a 3.0 m wide physically separated cycleway alongside Mann Street from Tills Street in Westcourt to Minnie Street and the pre-existing Lily Creek path alongside the railway line near Water Street (Figure 1.1). The project extends over 2.6 km and includes three small bridges over drains. Priority is maintained for bicycle riders at nine minor street intersections using a raised table and coloured surface treatment. The cycleway passes alongside Parramatta State School, DFO shopping centre and Cazalys sport stadium.

1.2 Caveat

In considering the findings of this evaluation we note that the cycleway at the time of this study was not complete; the intention is for the cycleway to be extended from Tills Street one block west to Dillon Street and then to Mulgrave Road to connect to suburbs to the west. Furthermore, wayfinding signage has not yet been installed. Once complete this will presumably further improve the attractiveness of the project to bicycle riders.

1.3 Research questions

The evaluation was structured around evaluating the investment against the following research questions:

- Has the cycleway attracted bicycle riders off Mulgrave Road?
- Has the cycleway generated all-new cycling trips, including mode shift from car or public transport?
- Does the cycleway attract a different gender and age demographic than Mulgrave Road?
- Does the cycleway provide a journey time equivalent to using Mulgrave Road?
- Do the path priority crossings operate to an acceptable level of safety?
- Does the cycleway provide value for money?

1.4 Methodology

To provide insight into these questions a number of fieldwork activities were undertaken:

- video-based manual counts of bicycle riders and pedestrians using the cycleway near Buchan Street,
- intercept surveys with bicycle riders and pedestrians using the cycleway, and with bicycle riders using Mulgrave Road,
- cyclist travel time surveys along Mulgrave Road and the Mann Street Cycleway to determine typical travel times, and

- video observations of interactions at a typical path priority crossing (Buchan Street).

This evaluation used the cost-benefit analysis (CBA) methodology adopted nationally as part of the Australian Transport Assessment and Planning (ATAP) guidelines established by the state road agencies. The approach has been adapted for TMR and implemented as an online tool (CDM Research 2016).[1] The methodology requires a number of inputs, of which the most important are:

- average daily pedestrian and cyclist counts,
- average distances walked/ridden, and
- diversion rates and induced travel proportions.

The latter refer to the proportion of demand that:

- was already walking/riding before the project, and have changed their route to use the project,
- have diverted from other transport modes (e.g. private car, public transport), and
- all-new trips that would not have otherwise occurred in the absence of the project.

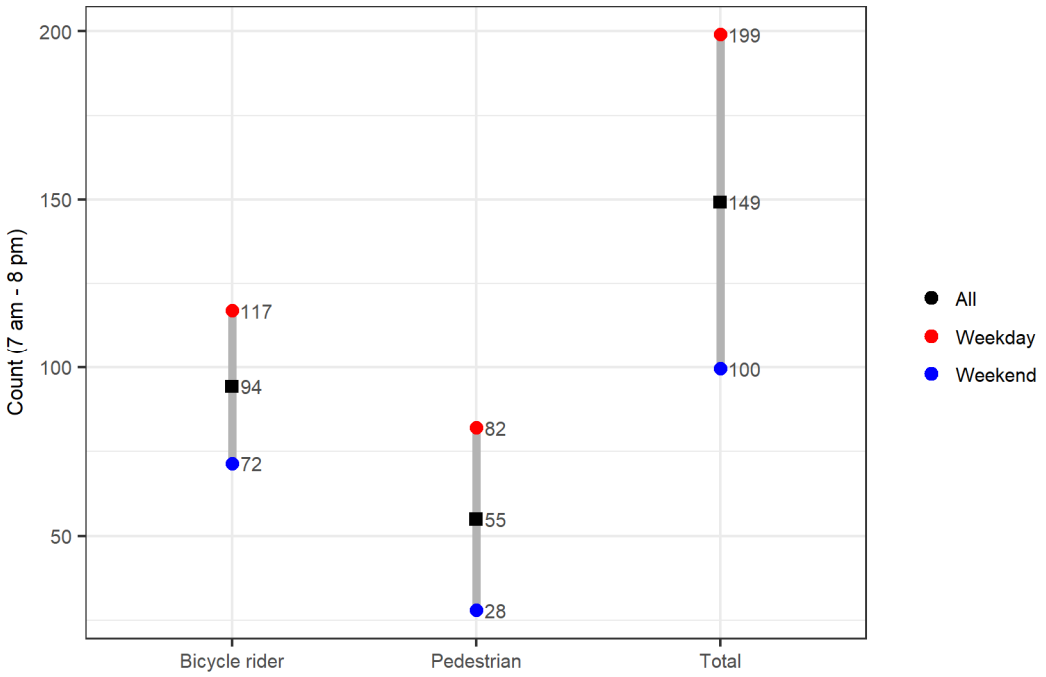
[1] https://cdmresearch.shinyapps.io/ActiveTravelBenefits/

■ **Figure 1.1: Mann Street Cycleway**

2 Demand

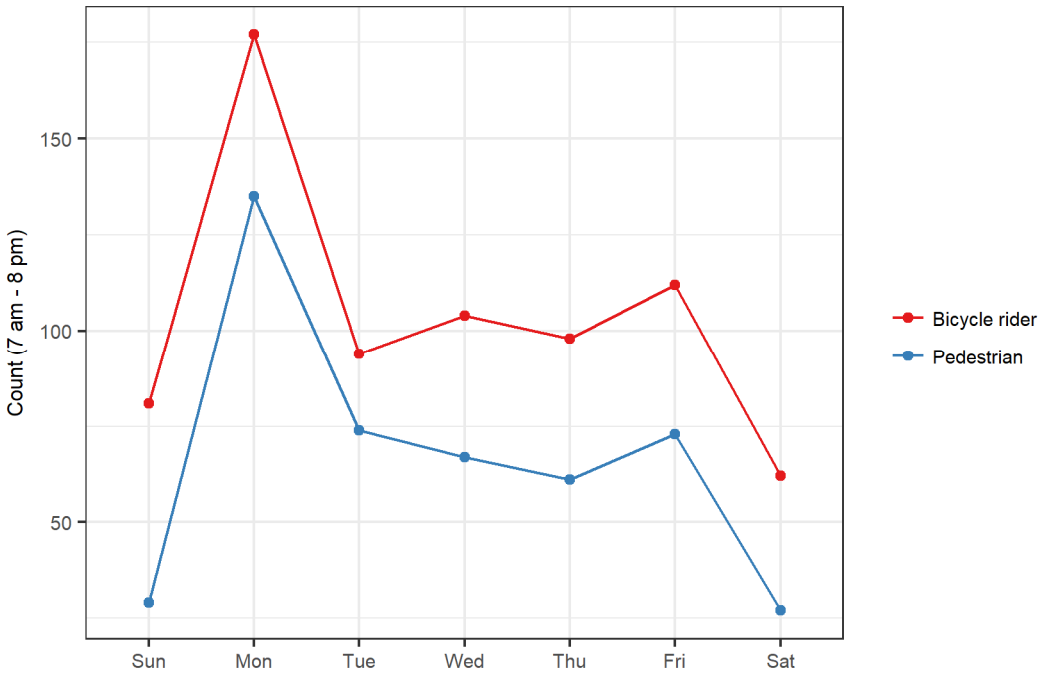
2.1 Demand

The average daily usage on the cycleway at Buchan Street over the typical week observed in November 2017 was 149 users, of which around two thirds (63%) were bicycle riders (Figure 2.1). Average usage on weekends was around double that of weekdays.

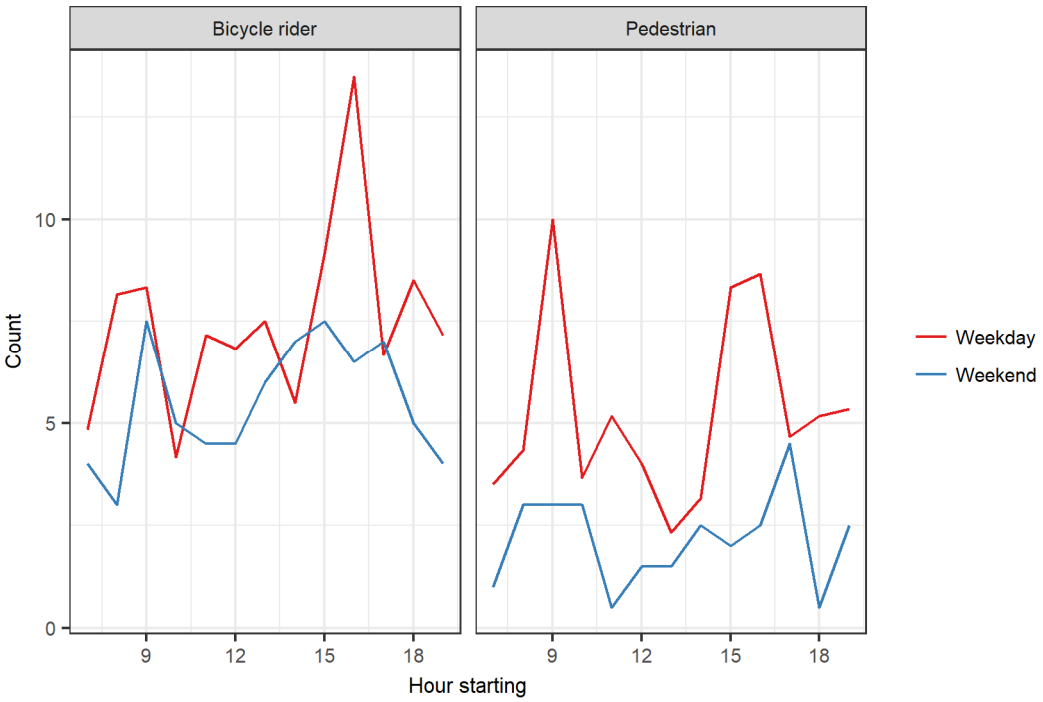


■ **Figure 2.1: Average count by mode and day of week**

The usage was highest on the Monday during the survey period and lowest on the Saturday (Figure 2.2). The time of day profile does not suggest usage is strongly influenced by the time of day (Figure 2.3).



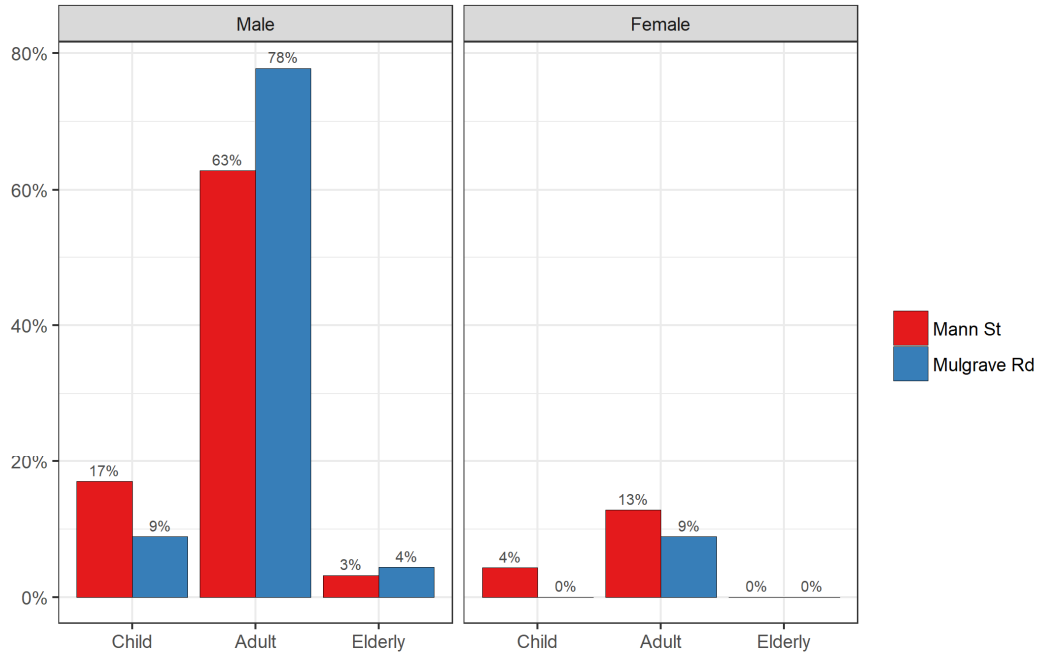
■ **Figure 2.2: Day of week by mode**



■ **Figure 2.3: Time of day by day of week (hourly bins) and mode**

2.2 Segmentation

A subset of the video from a weekday was examined and bicycle riders on both the cycleway and Mulgrave Road were segmented based on their gender and age group (child, adult, elderly). This segmentation was necessarily subjective and should only be considered as broadly indicative of the demographic characteristics of the users. However, around 17% of riders using the Mann Street Cycleway were female compared with 10% along Mulgrave Road. While adult males dominate along both corridors they make by 78% of riders along Mulgrave Road but only 63% along the cycleway (Figure 2.4). Children were more prevalent along Mann Street than Mulgrave Road.



■ **Figure 2.4: Rider demographics (note: percentages are totals by route)**

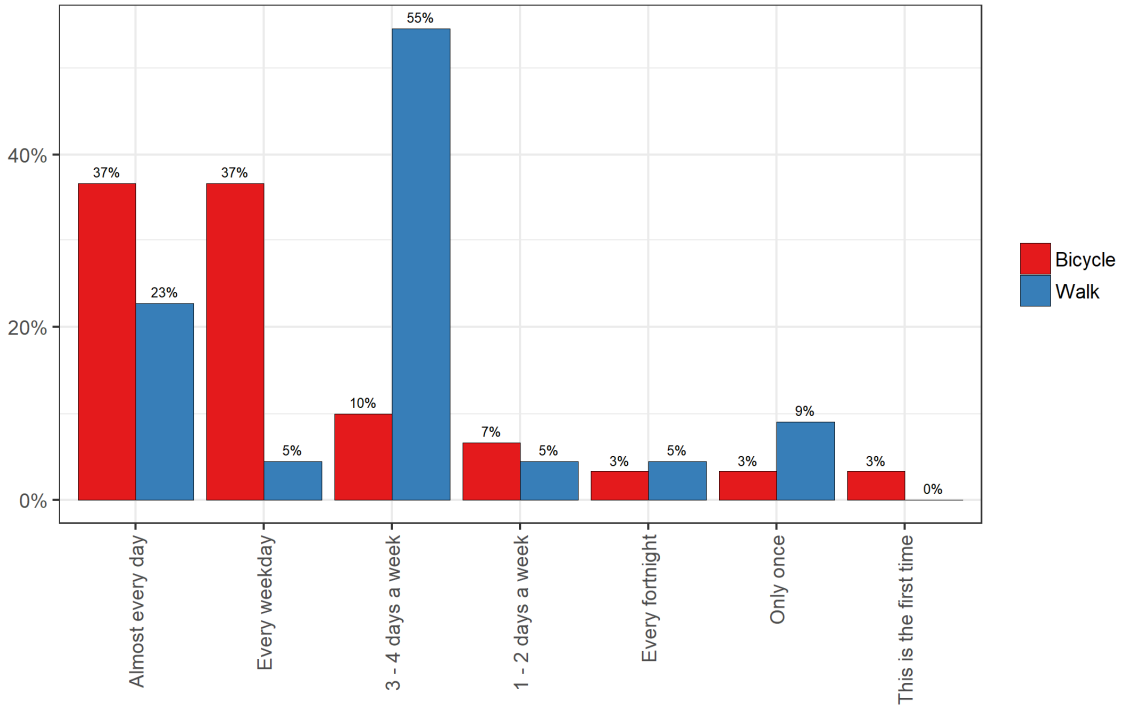
3 Mann St Cycleway user surveys

Intercept surveys were conducted with cycleway users near the intersection of Buchan Street. The interviews were conducted during daytime across several time periods (7 – 10 am, 3 – 6 pm) and days of week to capture a representative sample of users. A total of 52 complete interviews were obtained of which 30 (58%) were bicycle riders and the remainder were pedestrians (Table 3.1).

■ **Table 3.1: Completed intercept surveys by mode and day of week**

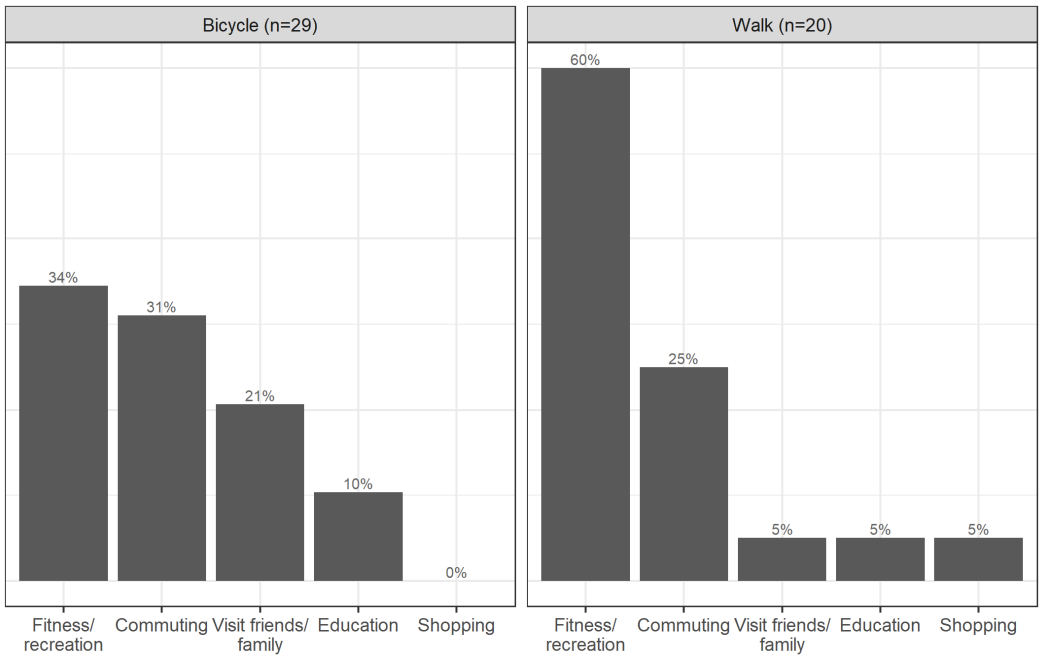
	Day of week		
Mode	**Weekday**	**Weekend**	***Total***
Bicycle	14 (44%)	16 (80%)	*30 (58%)*
Walk	18 (56%)	4 (20%)	*22 (42%)*
Total	*32 (100%)*	*20 (100%)*	*52 (100%)*

The frequency of use of the cycleway is shown in Figure 3.1. Around 74% of bicycle riders and 32% of pedestrians use the cycleway at least every weekday, although most pedestrians use the cycleway at least three times a week. This suggests a good level of familiarity with the cycleway. Around 83% of cycleway users were aware the cycleway was newly constructed, which appears reasonable given the cycleway had been completed around 12 months prior to the survey. The proportion of bicycle riders and pedestrians who were aware the cycleway were new was not significantly different from one another.



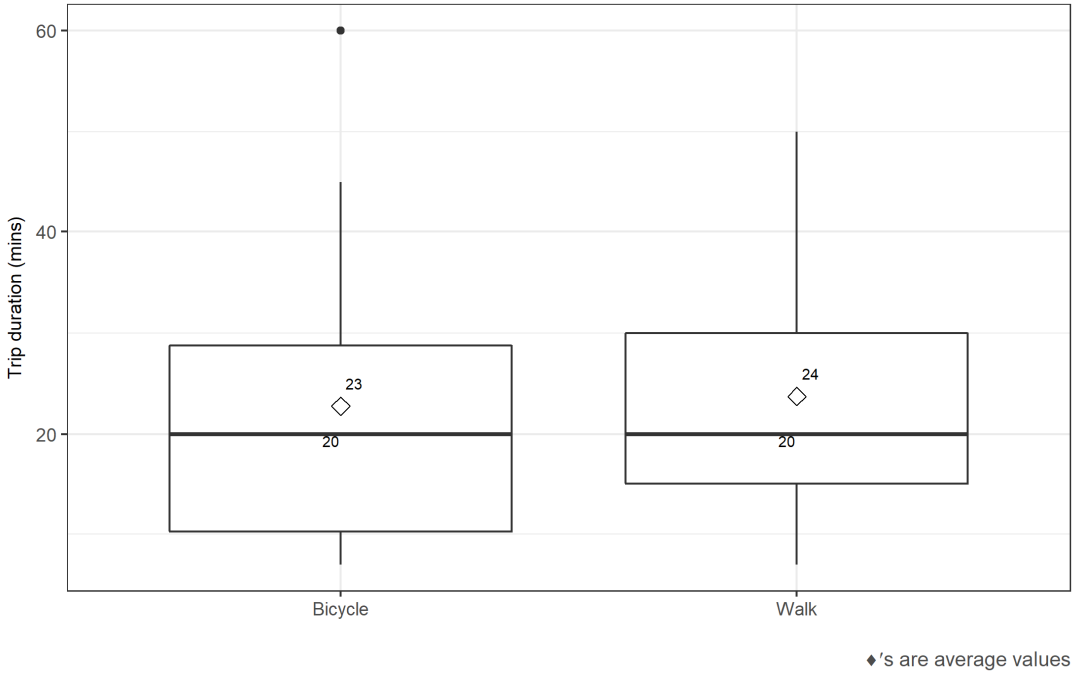
■ **Figure 3.1: Frequency of use by mode**

Around a third of bicycle riders and 60% of pedestrians were using the cycleway for fitness or recreation (Figure 3.2). The remainder of bicycle riders were travelling for transport (mainly commuting to or from work), as were around 25% of pedestrians.

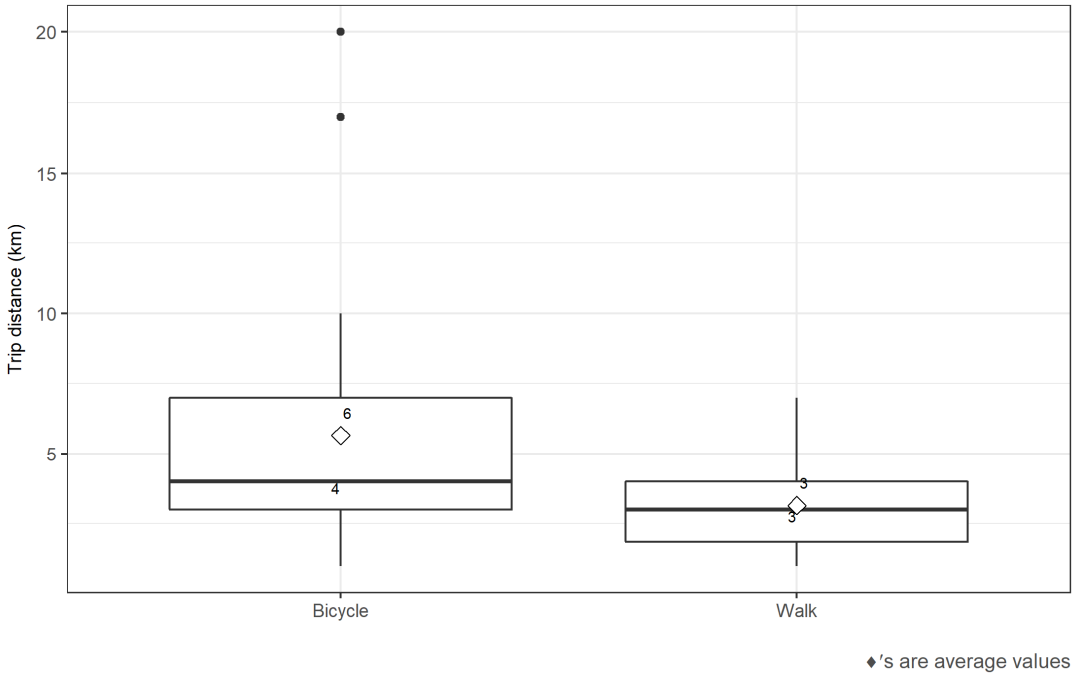


■ **Figure 3.2: Trip purpose by mode**

The median bicycle trip had a duration of 20 minutes (Figure 3.3) over a distance of 4 kilometres (Figure 3.4). Walking trips had a median duration of 20 minutes over 3 kilometres.

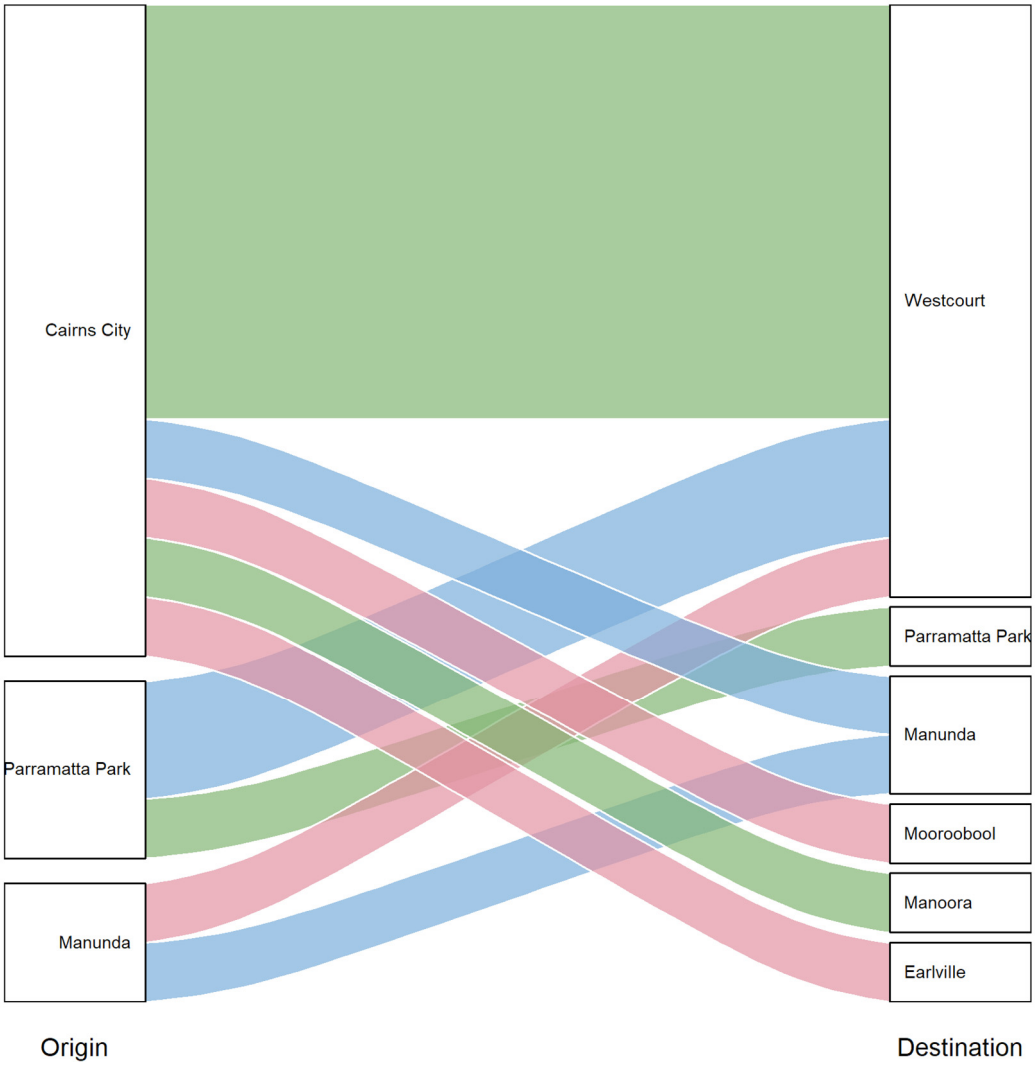


■ **Figure 3.3: Trip duration by mode**



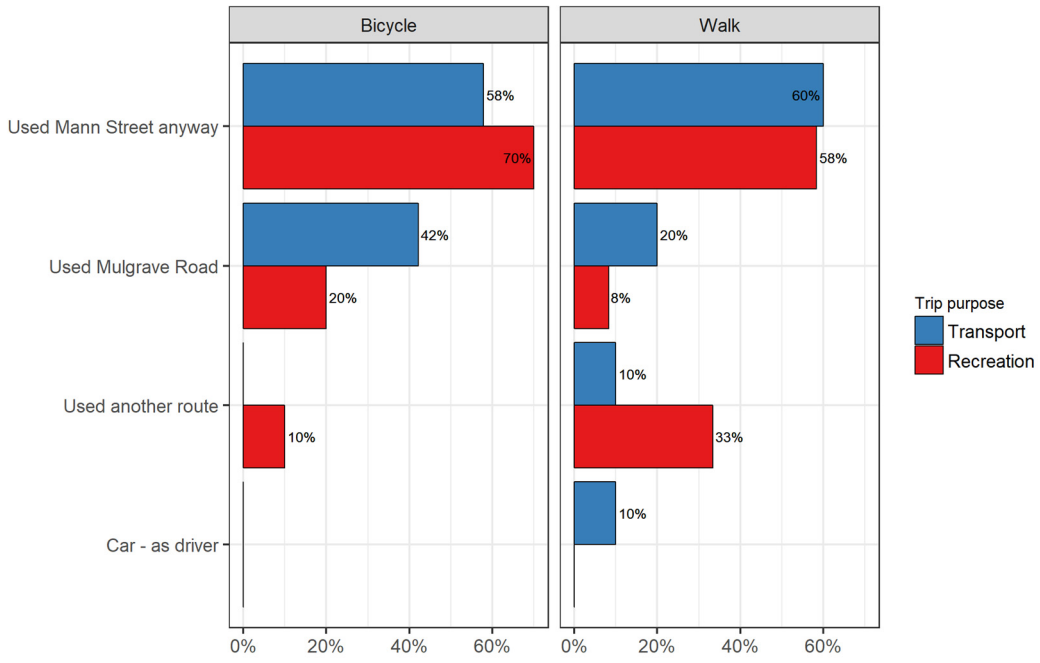
■ **Figure 3.4: Trip distance by mode**

The trip origin and destination suburbs for cycling trips for transport are illustrated in Figure 3.5. The major trip flows are between Westcourt and Cairns City (37%) and Parramatta Park and Westcourt (11%). Most recreational riding trips start and finish in Westcourt (60%). Similarly, 58% of walking trips for recreation start and finish in Westcourt, with the remainder involving adjacent suburbs such as Bungalow, Manoora, Manunda and Parramatta Park.



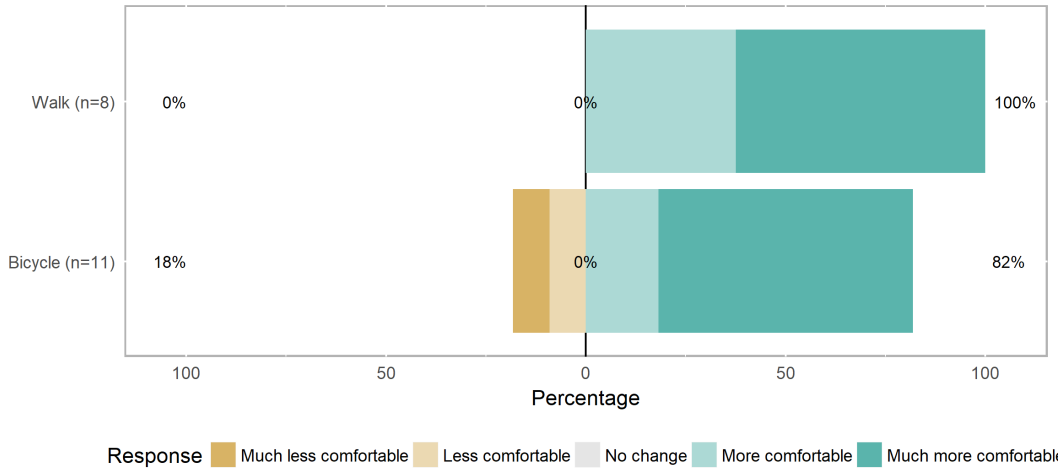
■ **Figure 3.5: Origins and destinations of cycling trips for transport (n=19)**

Respondents were asked what they would have done for their trip if the cycleway was not present. Around 62% of bicycle riders and 59% of pedestrians would have used Mann Street anyway (Figure 3.6). A fair proportion of bicycle riders (42%) and pedestrians (20%) travelling for transport would otherwise have used Mulgrave Road. There is no evidence to suggest any diversion from driving to riding, although 10% of pedestrians travelling for transport would otherwise have driven. It is noted the cycleway provides a physically separated footpath along a street where there was no footpath previously.



■ **Figure 3.6: What would you have done if the cycleway was not here?**

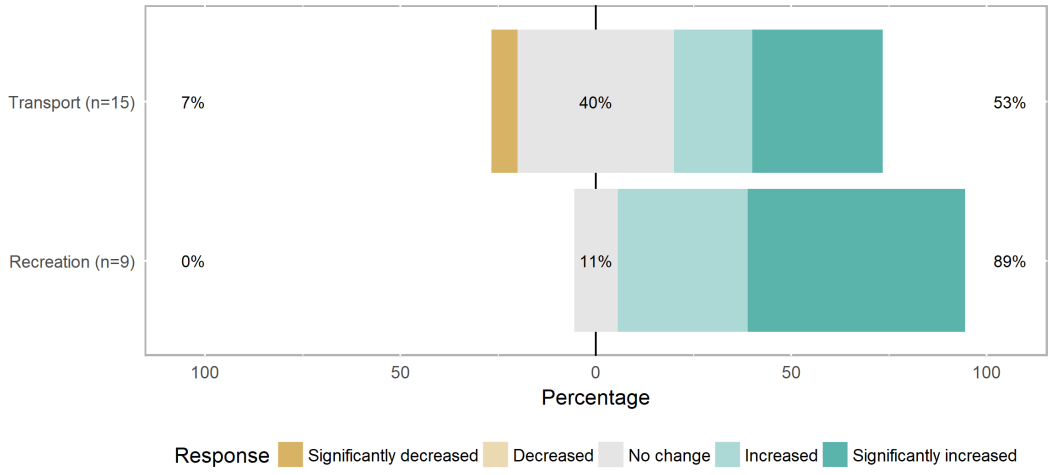
All pedestrians indicated they felt more comfortable walking along Mann Street after the cycleway was installed. This is to be expected given the absence of any off-road path prior to the cycleway. A majority of bicycle riders also felt more comfortable. The two respondents who felt less comfortable attributed this to their concerns about the crossings at minor streets.



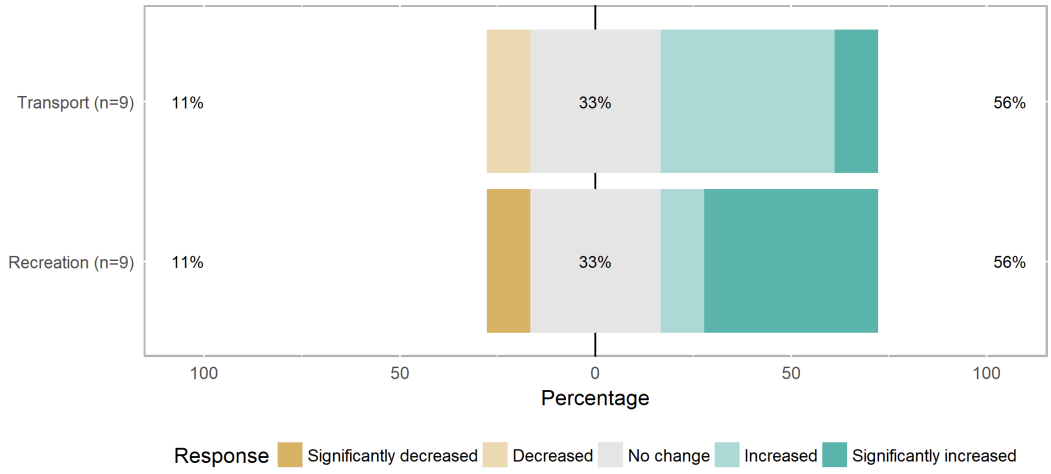
■ **Figure 3.7: Has the cycleway changed how comfortable you feel riding/walking along here?**

A significant proportion of pedestrians and bicycle riders reported that they had increased the amount of walking and riding they had been doing as a result of the construction of the cycleway. As illustrated in Figure 3.9 around 53% of bicycle riders travelling for transport indicated they had increased the amount of riding they had done over the past month, as had 89% of recreational riders[2]. Similarly, just over half of pedestrians indicated they had increased their walking activity.

[2] It should be noted however that the sample sizes are small.

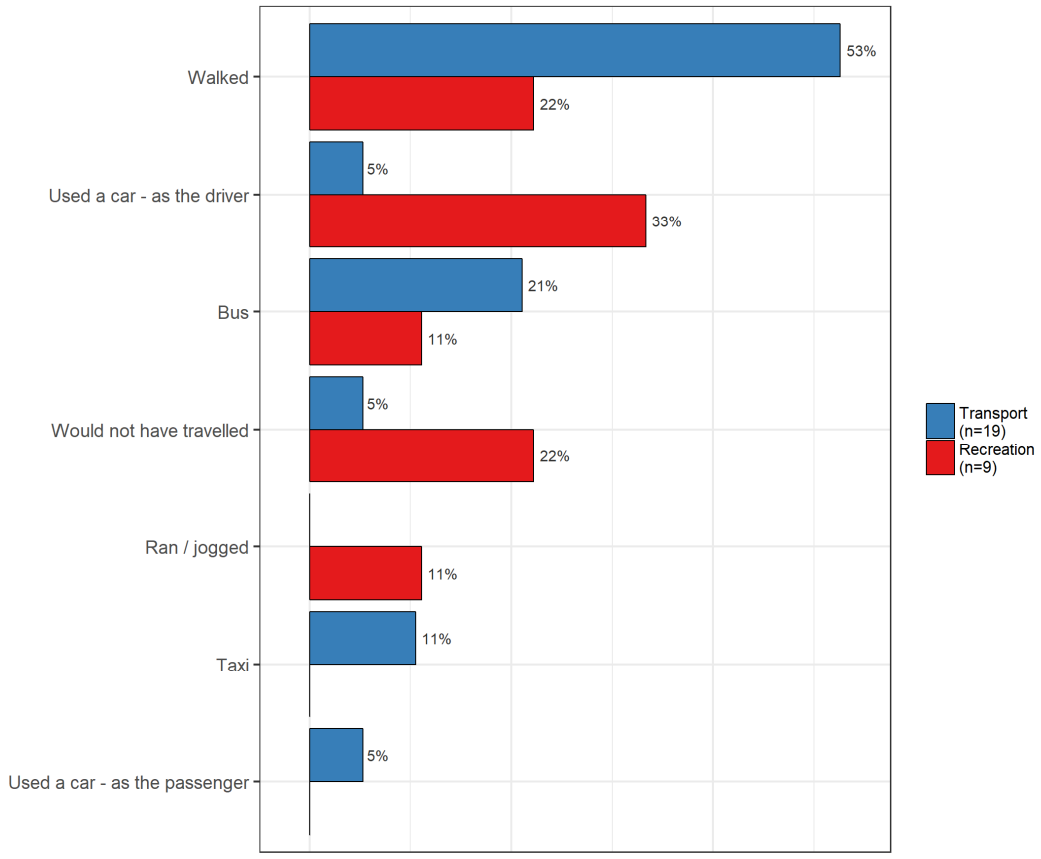


■ **Figure 3.8: Has the cycleway changed the amount of time you've spent riding over the past month?**



■ **Figure 3.9: Has the cycleway changed the amount of time you've spent walking over the past month?**

Bicycle riders were also asked what they would have done if they could not have used their bicycle for their trip. Around half of those travelling for transport would otherwise have walked, 21% would have taken a bus and 10% would have used a car (Figure 3.10). Among those travelling for recreation a third would have used a car, presumably to access another location from which they would have undertaken recreation.



■ **Figure 3.10: What would you have done if your bicycle was not available for this trip?**

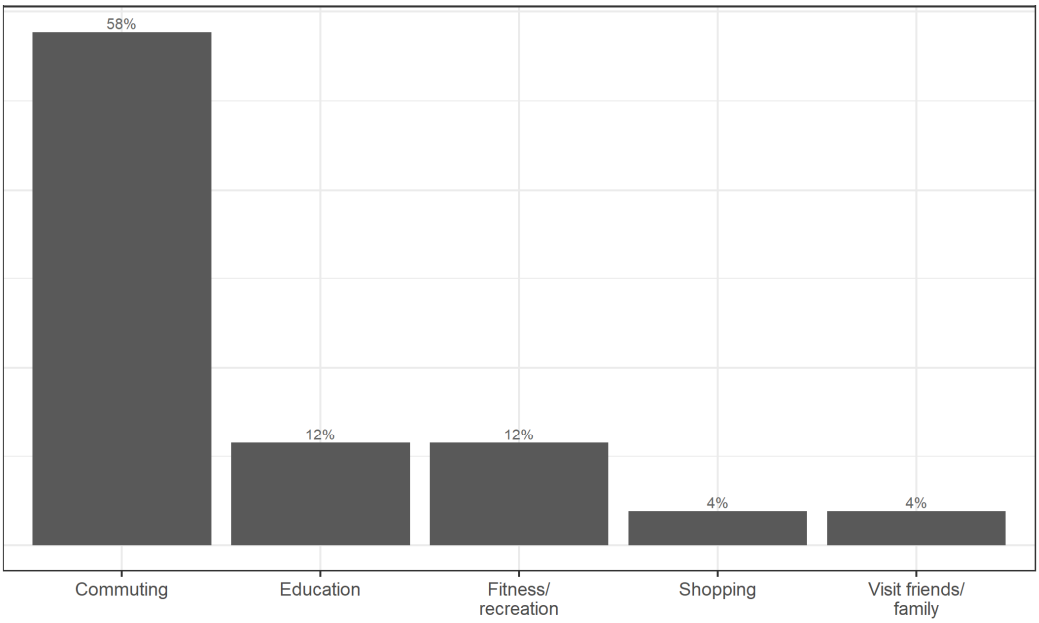
Respondents were asked after the survey if they had any other comments about the cycleway. These comments are provided verbatim in Appendix B. There was almost universal support for the cycleway, and for the development of similar projects elsewhere within Cairns. This support appeared to arise from an elevated sense of comfort that users felt in comparison to the previous situation on Mann Street, and to alternative routes such as Mulgrave Road. The most often cited areas of concern were:

- safety at path priority crossings and a perception that motorists are either unaware or do not understand the priority rules that apply (see Section 6),
- limited connectivity to other cycleways and paths and to key destinations, and
- motorists parking on the cycleway, particularly near the Cairns One apartment complex.

4 Mulgrave Road user surveys

One objective of the Mann Street Cycleway is to provide a safe and attractive alternative to Mulgrave Road for bicycle riders travelling between Cairns City and the western suburbs. Bicycle riders travelling towards the city between 7 and 10 am on four weekdays were subject to an intercept survey at the intersection of Severin Street. The purpose of this survey was to better understand whether (a) riders who are not using the cycleway are aware of its existence, and (b) if they are aware of its existence why they are not choosing to use it.

A total of 26 interviews were completed of which the majority were commuting to or from work (Figure 4.1). The median cycling trip was 20 minutes in duration over 5 kilometres which is very similar to that observed on Mann Street (Section 3).



■ **Figure 4.1: Journey purpose**

Most riders (73%) were aware of the existence of the Mann Street Cycleway. Of the 19 respondents who were aware of the cycleway 42% indicated they chose not to use the cycleway because it was faster along Mulgrave Road, and 47% indicated the cycleway was not well connected to where they started or will finish their trip.

Other comments offered by riders on Mulgrave Road are provided in Appendix C. These responses generally indicated a degree of comfort riding on busy roads and concern about glass, the intersections and connectivity of the Mann Street Cycleway. However, several riders indicated they either liked the cycleway or used it for recreation trips.

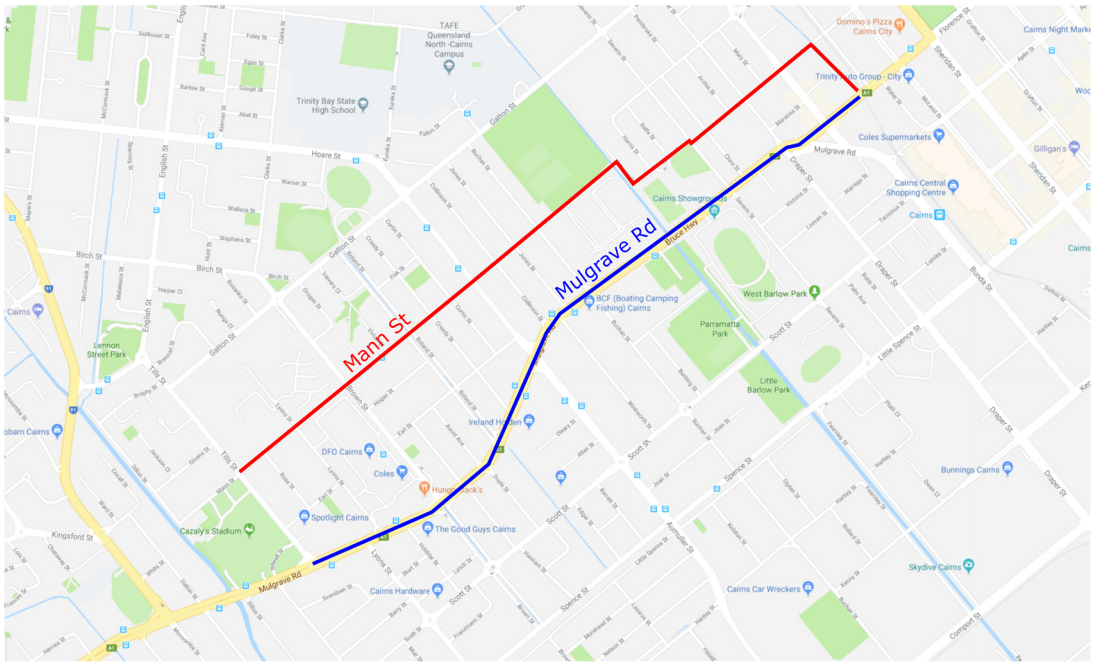
5 Travel times

Cyclist travel times were estimated by having two riders travel both routes on multiple occasions and logging their trips using a GPS logging app on their phones. Given the small sample size, both of riders and trips, this data is not intended to be definitive but rather only to provide an indication of the likely travel time differences between the routes.

The two routes were as follows:

- Mann Street from Tills Street heading east along the cycleway as far as Lily Creek Trail, then south along the trail to the intersection with Florence Street (adjacent to the railway crossing and Officeworks)
- Mulgrave Road from Tills Street east towards the city then left onto Florence Street and finishing at the railway crossing and Officeworks.

These routes are illustrated in Figure 5.1. It is noted that the routes do not start at the same location at the western end, and that the cycleway route includes an additional component at the city end to access Florence Street. This was done to fairly evaluate the routes on equivalent terms – particularly noting that many commuters using the cycleway will have destinations in Cairns City such that they are likely to need to head southeast from the cycleway to access the city. The Mann Street route is approximately 2.77 km and the Mulgrave Street route is approximately 2.54 km.



■ **Figure 5.1: Travel time routes**

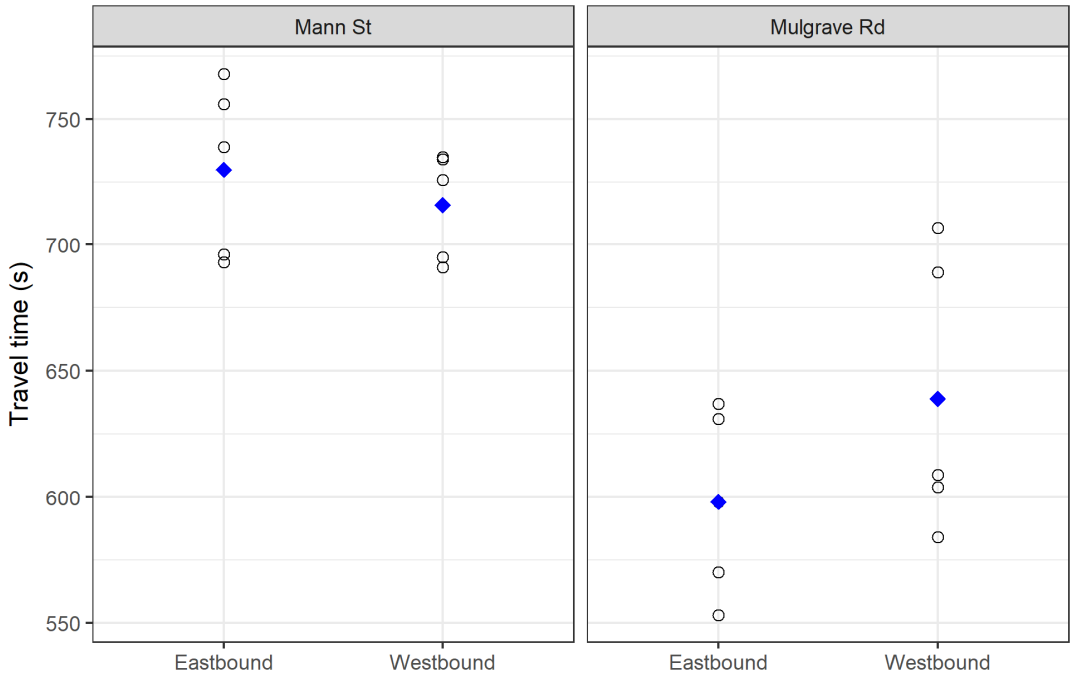
The riders travelled both routes in both directions at different times of day and days of week. This resulted in a total of 10 travel time runs on each route, of which half were westbound and half eastbound. Summary travel time statistics by route are shown in Table

5.1. The average travel time incurred along Mulgrave Road was 105 seconds shorter than along the Mann Street Cycleway, equivalent to 15% of travel time along the latter. The difference in average travel time is statistically significant at the 5% level (t=5.9, p<0.00).

■ **Table 5.1: Travel time summary statistics**

	Mann St	Mulgrave Rd	Difference
Average	723 s	618 s	-105 s (-15%)
Median	730 s	607 s	-123 s (-17%)
Minimum	691 s	553 s	-138 s
Maximum	768 s	707 s	-61 s
Std. deviation	28 s	49 s	+21 s

As shown in Figure 5.2 there is significant variation in travel times between each run, although the trend towards shorter travel times along Mulgrave Road is clear. It should be noted that the differences in average travel times by direction are not statistically significant for either route (Mann St: t=0.78, p=0.46, Mulgrave Rd: t=1.37, p=0.21).



■ **Figure 5.2: Travel time by route and direction of travel**

The differences in travel time cannot be attributed to additional time spent stationary along Mann Street. Indeed, to the contrary on average 4% of travel time along Mann Street was stationary versus 6% on Mulgrave Road. Instead, the main factors influencing travel times appear to be the increased distance along Mann Street (9%) and the design of the cycleway, which leads to marginally lower cyclist speeds than along Mulgrave Road. Given there are nine path priority crossings of minor streets it seems highly likely that if the path priority had not been installed travel times would have been significantly impacted, reducing the level of diversion onto the cycleway from Mulgrave Road. This in turn may have net safety disbenefits – as more riders would have been exposed to the risks along this road than along the cycleway.

The effective speed reduction appears to be in the order of 5-6% based on this travel time data, or account for around 30 seconds of the time difference. We suggest that it is more likely than not that the cycleway would incur a small travel time penalty for bicycle riders over using Mulgrave Road. How significant this penalty may be will be heavily dependent on the trip origin and destination.

6 Intersection performance

6.1 Background

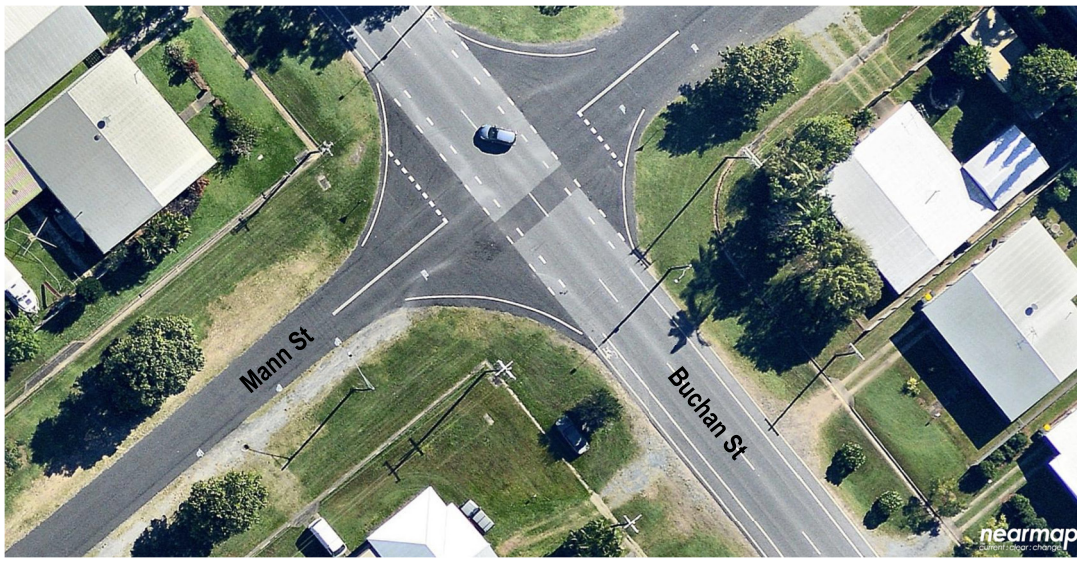
The cycleway has nine crossings of minor residential streets where the cycleway is allocated priority over the roadway. This is achieved using a raised table, green coloured surface treatment and accompanying Give Way signs (Figure 6.1 and Figure 6.2). The crossings are all setback around 6 m from the major street (Mann Street and Minnie Street) to allow a vehicle to store between the cycleway and major street, with a give way sign and line markings to indicate priority. This “bend-out” design is recommended in Austroads and TMR design guidance but is uncommon in Queensland and this is the first application of this treatment in Cairns. As such, it seems reasonable to expect a degree of user concern about the treatment – at least initially.

To evaluate the performance of the priority crossings the intersection of Mann Street and Buchan Street was observed. Events where a bicycle rider or pedestrian on the cycleway, and a motorist on the roadway, had to interact were examined. An interaction was defined as an event where either the motorist or cycleway user had to alter their speed or trajectory (even if only subtly) to avoid a collision. It should be noted that such interactions are commonplace at sign-controlled intersections and only very rarely lead to actual collisions.

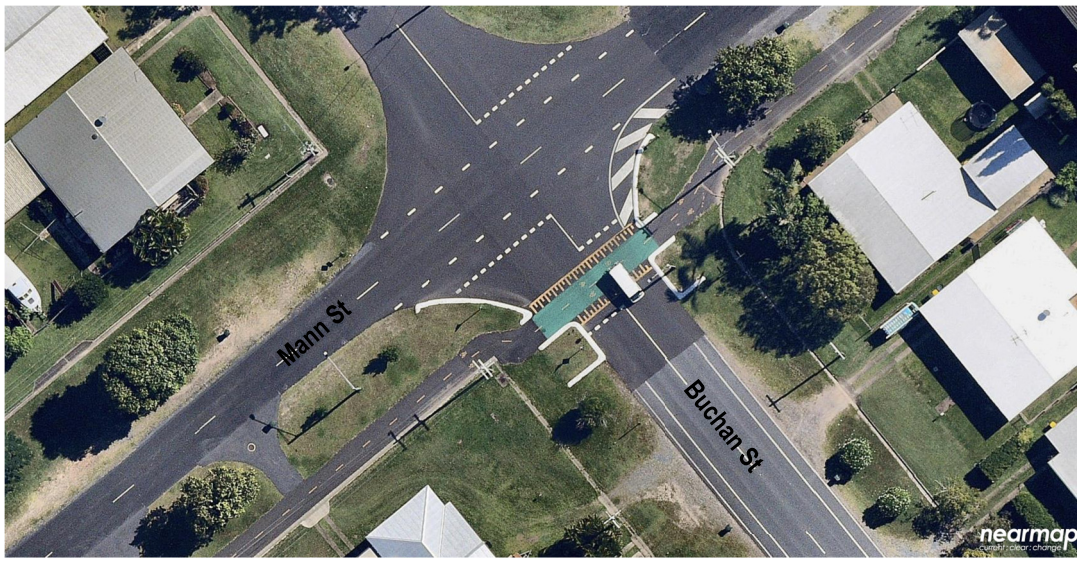
The focus was on assessing how well the crossing performs from a safety perspective. As a local street intersection, we would expect, and indeed observed in practice, negligible vehicle queuing or delays. Instead, our focus was on understanding:

a) how users interact, and to determine whether there were leading indicators of potential safety issues that warrant remediation, and
b) which physical design elements appear to be critical in contributing to safe and unsafe interactions.

The short post-construction period that has elapsed is insufficient for Police-recorded crash statistics to be used for this purpose.



- (a) Before construction of the cycleway



- (b) After construction of the cycleway
- Figure 6.1: Mann Street / Buchan Street intersection

6.2 Method

Video recordings were used of the Buchan Street intersection obtained over a 7-day period from 6 am to 8 pm in November 2017. The camera was positioned facing towards the south (Figure 6.2). Short video segments were obtained from the video record where a motorist and path user interacted with one another.

■ **Figure 6.2: Cycleway crossing view towards the south**

Each interaction was coded by:

- the direction of movement of both the path user (bicycle rider or pedestrian) and motorist,
- who appeared to give way to whom (noting that the design intent is for motorists to give way to path users),
- whether there was any physical indication of hesitation or confusion on the part of either party, and
- a subjective measure of the interaction severity.

The interaction severity was assessed using a five-point scale as shown in Table 6.1. The score was assessed primarily on the likely level or surprise or confusion experienced by one or both users. It is assumed that situations that result in high levels of confusion, and particularly surprise, are more likely to lead to collisions and potential injury.

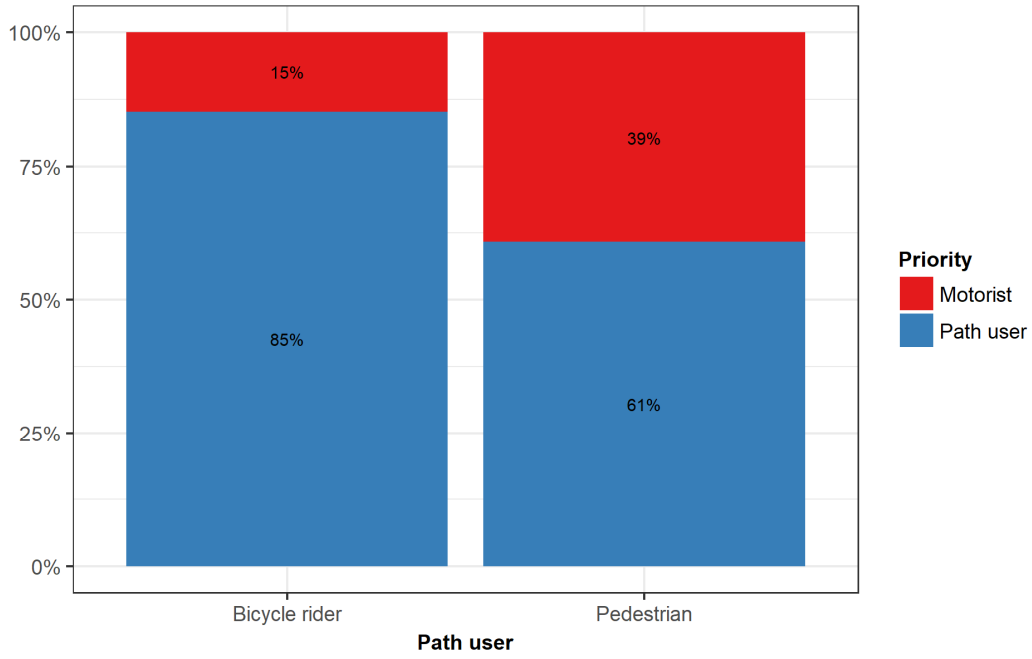
■ **Table 6.1: Interaction severity scale**

Score	Title	Description
1	No incident	Path user does not need to alter course or speed. Motorist yields and allows cyclist to pass without incident or apparent stress on behalf of either party.
2	Minor adjustment required	Path user may need to alter course slightly to allow for a comfortable passing distance, or (in the case of cyclists) gently brake or alter pedalling rhythm. The situation is unlikely to be perceived as unsafe but may be perceived as inconvenient or somewhat confusing. Similarly, a motorist may need to brake or alter course gently and be somewhat confused as to who will take priority. There is unlikely to be any sense of surprise or fright on behalf of either party, but there may be some level of confusion.
3	Major adjustment required	Path user and/or motorist may need to significantly alter course or adjust speed to avoid a collision. There is a heightened level of stress from one or both parties, and likely surprise or fright. However, this adjustment by either party readily avoids a collision.
4	Near collision	A rapid change of course or speed is required by the path user, motorist or both parties to avoid imminent collision. A significant degree of fear and fright is likely. The parties may gesture to one another.
5	Collision	There is physical contact between the parties.

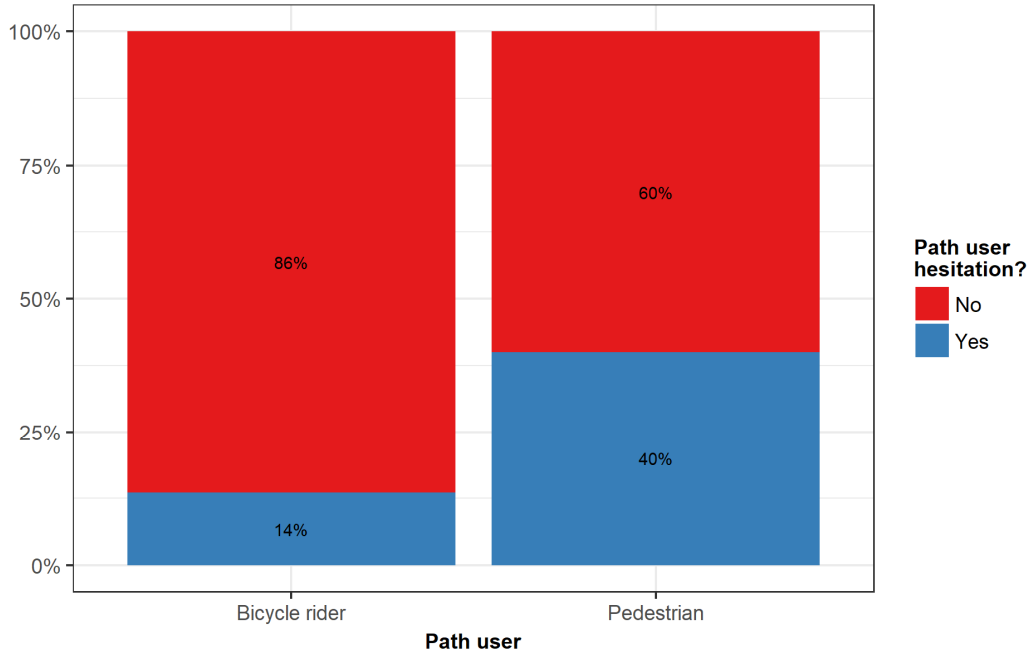
6.3 Results

Over the 7-day period a total of 169 events were observed where a cycleway user and motorist encountered one another at the intersection, and one or both had to alter their speed or trajectory to avoid a collision. Just over half (56%) of interactions involved one or more bicycle riders and a motorist, while the remainder involved pedestrians.

In most interactions involving a bicycle rider on the cycleway and a motorist the bicycle rider proceeds across the intersection ahead of the motorist (Figure 6.3). While most path users appeared to have priority in a significant minority of interactions there was evidence the path user hesitated. The typical scenario was that the path user would slow or stop and watch for clear indications the approaching motorist had seen them and was slowing to give way before proceeding. This behaviour is presumably a reasonable defensive action given that a path user is far more likely to be injured in a collision with a motorist than the motor vehicle occupant. Around 14% of interactions with bicycle riders and 40% of those involving pedestrians resulted in the path user clearly hesitating or stopping (Figure 6.4). At least some of these events suggested also a level of deference on the part of pedestrians in particular to motorists, where they would stop and signal the motorist to proceed even when the latter was clearly giving way.

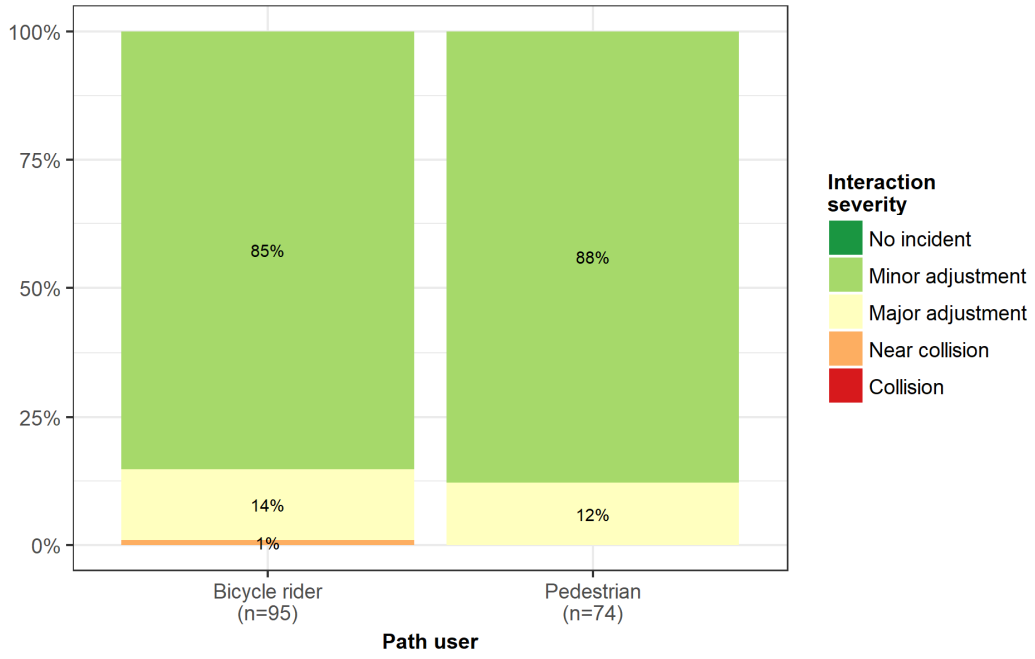


■ **Figure 6.3: User priority**



■ **Figure 6.4: Hesitation**

As expected, most interactions involved only minor adjustment by one or both parties to avoid a collision (Figure 6.5). In most instances it was the motorist who appeared to adjust their speed, or stop entirely, in accordance with the designated priority.



■ **Figure 6.5: Interaction severity**

In one incident did we judge the interaction to represent a near-collision event. In this case a motorist travelling south along Buchan Street was travelling at speed, presumably had scanned Mann Street for conflicting motor vehicles, but had not done so along the cycleway. They appeared only to observe the rider once they were on Mann Street itself (Figure 6.6). While in this instance they did stop ahead of the cycleway it seems conceivable the motorist may well have observed the cyclist too late on other occasions. Indeed, we assessed 18% of interactions where a motorist travelling south along Buchan Street straight across Mann Street as requiring major adjustment (Table 6.2). Several events were observed where motorists appeared to only observe the path user once they had entered Mann Street.

One further iteration of this scenario, as shown in Figure 6.7, is where an emerging motorist masks the presence of a bicycle rider. In this example the southbound motorist (the white vehicle) slows approaching the intersection then proceeds onto Mann Street once they establish there is no conflicting traffic. However, the grey vehicle travelling north is stopped between the cycleway and Mann Street and masks the bicycle rider travelling behind. The response is that the motorist must brake relatively hard once the rider emerges from behind the grey vehicle. As shown in this sequence of images the motorist stops well ahead of the bicycle rider, such that we classified this as a major adjustment but not near-collision event; there would likely be an element of surprise to the motorist, but speeds were sufficiently low that the motorist could respond adequately with a reasonable margin of safety. In our view

this points to the critical factor in designing these intersections safely: speeds must be low enough to enable motorists and path users to react should one user make an error.

(a) Motorist approaches and enters Mann Street at speed, bicycle rider is seemingly oblivious to approaching motorist

(b) Motorist stops for rider who does not appear to react to incident

■ **Figure 6.6: Near-collision event**

■ **Table 6.2: Interaction severity by motorist movement**

	MOTORIST MOVEMENT											
	IN (southbound)						OUT (northbound)					
SEVERITY	**Left**		**Right**		**Straight**		**Left**		**Right**		**Straight**	
Minor adjustment	11	(85%)	3	(75%)	39	(80%)	14	(78%)	23	(96%)	56	(92%)
Major adjustment	2	(15%)	1	(25%)	9	(18%)	4	(22%)	1	(4%)	5	(8%)
Near collision	0	(0%)	0	(0%)	1	(2%)	0	(0%)	0	(0%)	0	(0%)
Total	*13*	*(100%)*	*4*	*(100%)*	*49*	*(100%)*	*28*	*(100%)*	*24*	*(100%)*	*61*	*(100%)*

(a) Motorist slows before entering Mann Street

(b) Motorist accelerates, seemingly oblivious to bicycle rider behind grey vehicle

(c) Motorist initiates braking as soon as they see bicycle rider

(d) Motorist almost stationary ahead of rider

■ Figure 6.7: Bicycle rider masked by motorist emerging from Buchan Street

6.4 Commentary

Overall, we suggest the intersection performs satisfactorily. That is, in our observation the intersection performs with a level of risk similar to other sign-controlled residential street intersections in Cairns and elsewhere in Queensland. Most interactions involve little more than subtle and predictable behaviours and speeds are sufficiently low to avoid conflict and minimise the risk of injury.

We suggest the risks presented to path users are similar or better to what would be present if the crossing were not priority controlled. Our reasoning for this is as follows:

- the raised crossing reduces motorist speeds *vis a vis* a standard four-way intersection, such that motorists have more time to react and, even if they were unable to avoid a collision, would be doing so at a slower speed (hence maximising survivability),
- the priority designation puts the onus on motorists (who, by definition must be adults) rather than path users, who can be children for whom gap judgment may still be developing,
- visibility splays are very good (and certainly much better than would be present at many other urban residential intersections), and
- the crossing is clearly marked with the yellow edgelines and green pavement.

However, we do not suggest the intersection is without risks. These risks, as described in Section 6.3, appear to derive largely from straight-through motorist movements along Buchan Street. Moreover, path users indicated in the intercept surveys (Section 3) that the intersections were of concern. Most path priority crossings installed in Australia to date have involved the path crossing a minor street terminating at a major street (i.e. a T-intersection) where the path crosses the minor street. The intersection of Mann Street and Buchan Street, and indeed several of the other path crossings along the cycleway, differ insofar as the minor street continues on both sides of the major street. This appears, based on the interaction observations, to present an elevated risk of conflict from the movement directly across the minor street, and particularly *towards* the intersection arm with the path crossing (i.e. southbound along Buchan Street in this example).

In most path priority crossings at T-intersections the highest risk movement appears to be motorists turning left out of the minor street colliding with bicycle riders approaching from their left (i.e. a “contraflow” movement). We observed only three interactions of this type, of which two involved a bicycle rider and one a pedestrian. None appeared to represent near-collision events. We suggest the comparative absence of these events can be attributed to two factors:

- visibility splays from Buchan Street travelling northbound approaching Mann Street are very good, with minimal vegetation and no fences (Figure 6.8), and
- the raised table and changed priority along Buchan Street encourages motorists to slow, thereby increasing the likelihood they will look and see bicycle riders to their left.

■ **Figure 6.8: View travelling north approaching Mann Street (note: image is prior to construction of cycleway)**

Returning to the issue of straight through motorist movements we suggest the critical design parameter is motorist speed. It is well known that motorist speeds are strongly correlated with injury severity in collisions with pedestrians and bicycle riders, with speeds of around 30 km/h and below having a likelihood of leading to fatal or serious of injury of under 10%. We would argue that slow speeds at and near these intersections are appropriate given the local residential context. Moreover, we suggest that low motorist speeds facilitate greater opportunities for motorists to observe the scene, to identify and process the presence of path users and respond accordingly. The risks, as illustrated in these observations, is with the outlier motorist who approaches the intersection at excessive speed and fails to "look" and "see" a path user[3]. The issue in our view is not with the majority of motorists who traverse the intersection at reasonable speeds but with a minority who travel too fast. Buchan Street itself does little to encourage low speeds, it being straight and flat with a wide road reserve and negligible on-street parking or activation along the property boundaries to create "side friction". Furthermore, the corner radii at the intersection encourage motorists turning to do so at speed.

Our view is that vertical deflections, as exemplified by the raised table for the path crossing, are the single most effective control for this situation. We assume the ramp grade on the raised crossing is 1:12; this grade is typically recommended within the Austroads Guide to Road Design. VicRoads (2017) estimate the peak vertical acceleration experienced by a motorist crossing ramps of different grades at different speeds. Empirical testing conducted by others, much of it now more than 30 years old, suggest very few motorists are willing to

[3] We argue that "looking" and "seeing" are two distinct actions. By looking a motorist is scanning a scene, and by seeing they are processing and classifying objects within that scene – most particularly bicycle riders, whom they may not be anticipating and are likely to be more difficult to see than other motor vehicles (given their smaller size). Moreover, motorists will have a lower *expectation* of seeing a path user than a motorist.

accept vertical accelerations greater than 1g. This accords to a speed of 30 km/h for a 1:12 ramp[4]. In our view a speed of 30 km/h at around 8 – 10 m from the hold line at Mann Street would be an absolute upper bound on what is safe and reasonable. Instead, our preference would be to encourage speeds closer to 20 km/h, which would imply a ramp grade of around 1:8.

Irrespective of the ramp grade, we note that the interaction risks appear greater for those motorists travelling from the north. These motorists are not presented with a vertical deflection prior to crossing Mann Street. It is suggested a raised safety platform for the entire intersection would lead to superior safety outcomes, as this would ensure slower speeds for motorists approaching from all arms. In practice, it would be impractically expensive to install a fully raised intersection at this location except as part of a larger project. Instead, it is suggested such an approach be considered for future works at similar locations. At this intersection a cheaper retrofit option would be to install speed cushions on the Buchan Street southbound approach (Section 10). In our view this would offer two benefits:

- it would reduce the risk of right-angled crashes between motorists travelling along Mann Street and those emerging from Buchan Street that fail to give way, and
- it would ensure slower motorist speeds across Mann Street by southbound motorists along Buchan Street thereby increasing the likelihood these motorists will see and have sufficient time to react to the presence of path users.

Such an approach would, in our view, be more consistent with the Safe System philosophy of creating road environments that are tolerant of human errors and are unlikely to lead to serious or fatal injury.

[4] The VicRoads calculation is implemented here: https://cdmresearch.shinyapps.io/Ramp_Grades/ and discussed in the context of path crossings here: http://cdmresearch.com.au/post/ramp-grades/.

7 Level of service

The project had the design intent of improving the level of service (LOS) for bicycle riders, both those who previously rode on Mann Street and those who used Mulgrave Road. Level of service was assessed using the counts and a cyclist level of service model developed for TMR based on rider surveys (CDM Research 2013). This model takes into account the width of the paths, directional flows and volumes of cyclists and pedestrians as well as their speed distributions. For on-road assessment it considers the speed, composition and volume of motor vehicles, and the presence of bicycle lanes and kerbside parking.

The results from this analysis are shown in Table 7.1. Motor vehicle traffic counts are not available, but it is crudely assumed Mann Street has around 300 vph during the peak hour and Mulgrave Road has around 1,000 vph (both are one-way flows only, in the kerbside traffic lane). Mann Street prior to the construction of the cycleway is estimated to have had LOS A for confident riders and E for cautious riders. This result appears plausible; as a higher order residential street it would be unlikely to be intimidating to confident riders but may well be so for those less confident interacting with traffic. Unsurprisingly, Mulgrave Road was estimated to be marginally acceptable for confident riders (LOS C, thanks largely to the presence of the on-road bicycle lane) but completely unacceptable (LOS F) for cautious riders. The cycleway achieves a very good LOS A for both rider types. This is unsurprising given the quality of the facility and low demand which in turn leads to very infrequent interactions and delays on the path among users. It is should be noted that the model does not account for the presence of the side street crossings, nor of any additional travel time associated with this being a longer route.

■ **Table 7.1: Level of service calculation**

	Scenario		
	Mann St (pre-cycleway)	**Mann St Cycleway**	**Mulgrave Rd**
Path width	n/a	3.0 m	n/a
Motor traffic	n/a	n/a	n/a
Demand (peak hr)	300	n/a	1,000
Heavy vehicles (peak hr)	0	n/a	20
Speed	50 km/h	n/a	60 km/h
Bicycle riders			
Demand (peak hr)	200	10	204
Directional split	80/20	60/40	80/20
Average speed	20 km/h	20 km/h	25 km/h
Speed distribution (std. dev.)	5 km/h	5 km/h	3 km/h
Pedestrians			
Demand (peak hr)	n/a	10	n/a
Average speed	n/a	6 km/h	n/a
Speed distribution (std. dev.)	n/a	1 km/h	n/a
Directional split	n/a	50/50	n/a
LOS	**A (confident)** **E (cautious)**	**A**	**C (confident)** **F (cautious)**

8 Cost-benefit analysis

The cost-benefit analysis framework followed the framework recommended in ATAP Part M4[5] and described in CDM Research (2016). The key elements of this framework are:

- broad consistency with the current national guidelines (Transport and Infrastructure Council 2016),
- 30-year economic life with no residual value at the end of the appraisal period,
- estimates mortality and morbidity health benefits using a willingness to pay methodology for valuing statistical life,
- no safety in numbers effect,
- 40% of bicycle travel in the area occurs on-road without provision, 25% on-road with bicycle lanes, 30% on off-road shared paths and 5% on footpaths,
- relative risks for bicycle lanes of 0.5, off-road shared paths of 0.3 and footpaths of 1.8 (all relative to on-road with no provision),
- relative risk reduction for pedestrians of 30% (relative to the absence of any dedicated infrastructure for pedestrians along Mann Street prior to the cycleway),
- cumulative annual demand growth of 3%,
- rule-of-half applies to the willingness-to-pay component of health costs, vehicle operating and parking costs, PT fares for all users and travel time savings for new users only,
- Monte Carlo simulation to represent parameter uncertainty,
- capital and operating cost estimates to +/-10% at 95% confidence level, and
- demand estimates to +/-20% at 95% confidence level.

The input assumptions to the cost-benefit analysis are summarised in Table 4.1 and are based wherever possible on the survey data. The estimated project cost of $1.35 m was provided by TMR.

[5] https://atap.gov.au/mode-specific-guidance/active-travel/index.aspx

■ **Table 8.1: Economic assumptions**

Parameter	Assumption	Source
General assumptions		
Economic life	30 years	
Discount rate	3%, 7%, 10%	
Health benefit ramp-up period	5 years (linear)	Genter et al. (2009)
Effective average motorist speed	30 km/h	Estimate
Effective average cyclist speed	20 km/h	Estimate
Effective average walking speed	6 km/h	Estimate
Effective average PT speed	15 km/h	Estimate
Bicycle riders		
Opening year demand (AADT)	94	Video counts
Average trip distance	6 km	Intercept surveys
Diversion: car	0%	Intercept surveys
Diversion: reassign	100%	Intercept surveys
Diversion: induced	0%	Intercept surveys
Transport purpose split	66%	Intercept survey
Trip time savings	None	Assume travel time equivalent to roadway
Pedestrians		
Opening year demand (AADT)	55	Video counts
Average trip distance	3 km	Intercept surveys
Diversion: car	5%	Intercept surveys
Diversion: reassign	95%	Intercept surveys
Diversion: induced	0%	Intercept surveys
Transport purpose split	45%	Intercept survey
Trip time savings	None	Assume unchanged
Facility		
Length	2.7 km	Total length of project
Type	Off-road path	
Diverted motor vehicle travel time by period	Busy: 0% Medium: 20% Light: 80%	Guesstimate
Investment		

Parameter	Assumption	Source
Capital cost	2017: $1.35 m	TMR
Operating cost	$5,000 p.a.	Guesstimate

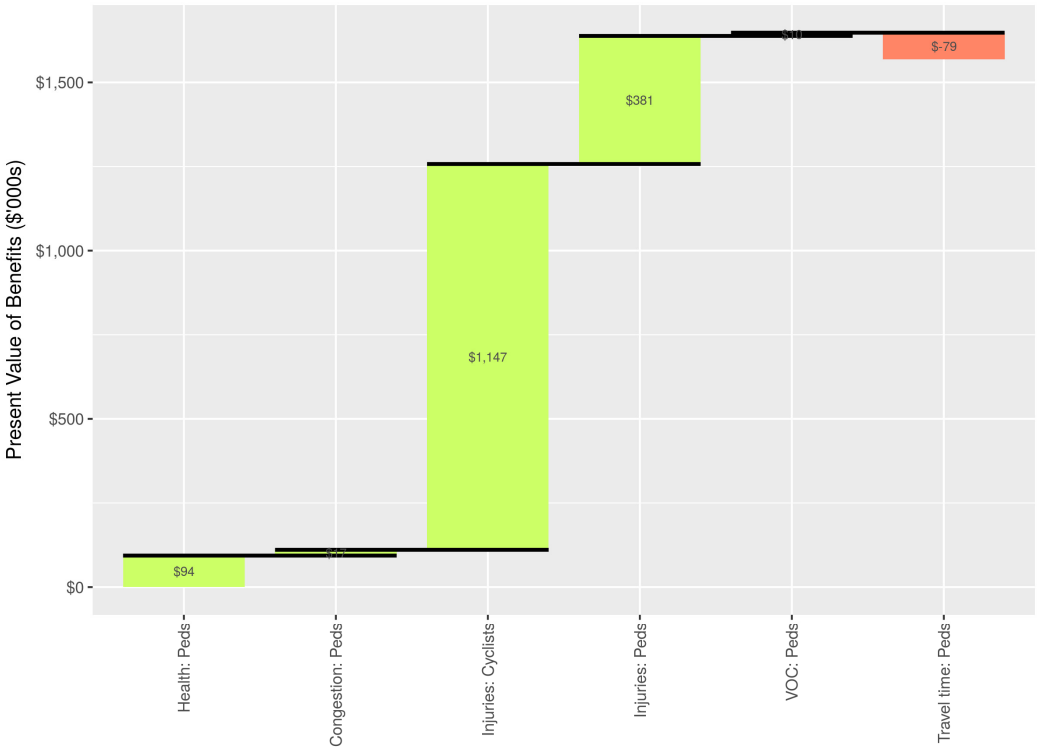
The results of the cost-benefit analysis are summarised in Table 8.2. For the central discount rate of 7% the BCR is marginally positive at 1.1, and the BCR increases to 1.6 for the lower discount rate of 4%.

■ **Table 8.2: Economic assessment**

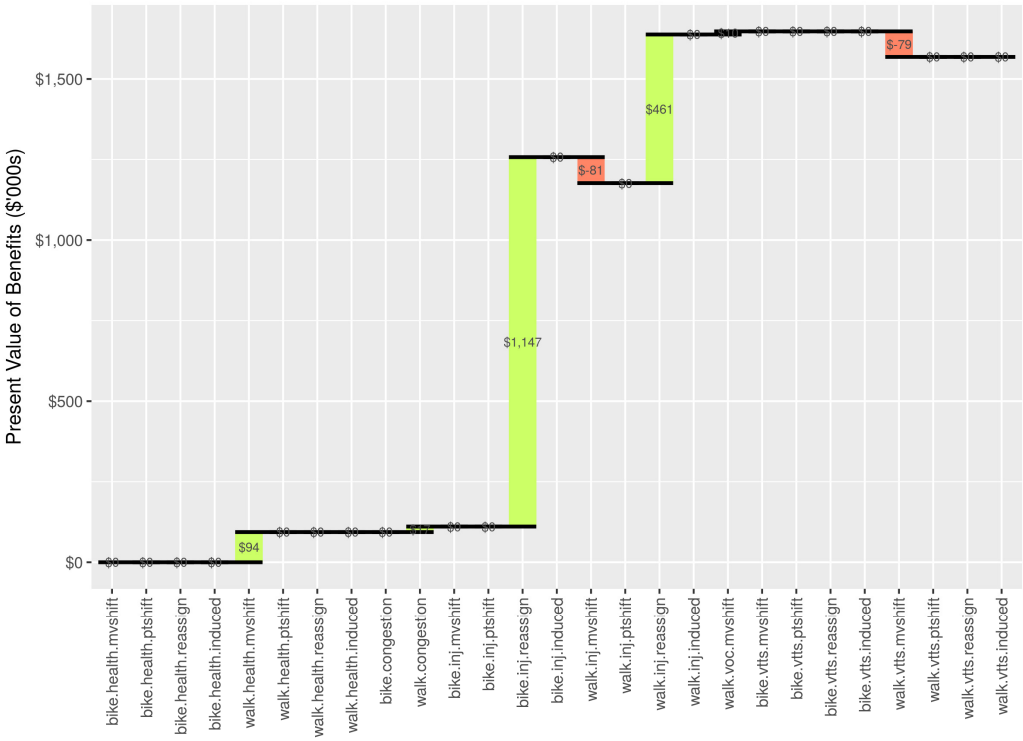
	Discount rate		
Parameter	**4%**	**7%**	**10%**
Benefit-Cost Ratio (BCR)	1.6	1.1	0.8
Likelihood BCR < 1.0	0%	18%	100%
Net Present Value (NPV)	$859,000	$77,000	-$371,000
Internal Rate of Return (IRR)	3.9%	0.5%	-3.0%
Present Value of Benefits (PVB)	$2.36 m	$1.58 m	$1.13 m
Present Value of Costs (PVC)	$1.50 m	$1.50 m	$1.50 m

All values are 2017 prices and values.

The breakdown of the NPV for the central discount rate is shown in Figure 8.1. The benefits accrue mainly from cyclist and pedestrian injury benefits. The detailed breakdown of the benefits by user class are shown in Figure 8.2. This figure suggests that most of the benefits are attributable to injury savings to existing bicycle riders and pedestrians. There are small injury and travel time disbenefits to the 5% of pedestrians who shift from driving given that it is assumed riding and walking are riskier per kilometre travelled than driving. The negligible health benefits are attributable to the absence of all-new cycling and walking travel generated by the cycleway, and very limited mode shift impacts.



■ **Figure 8.1: Summary breakdown of net present value**



■ **Figure 8.2: Detailed breakdown of net present value**

9 Discussion

The project provides a high-quality cycleway from Tills Street to the Lily Creek Trail that is clearly more attractive for a broader cross-section of bicycle riders than using the main arterial road in Mulgrave Road. Moreover, the cycleway provides an improved level of service to pedestrians as there was no footpath prior to the construction of the cycleway. This improved level of service appears to be appreciated by bicycle riders and pedestrians alike based on the overwhelmingly positive comments received from users.

Turning to the research question we provide responses to these below based on the evidence obtained in this evaluation below.

Has the cycleway attracted bicycle riders off Mulgrave Road?

The intercept surveys suggest 42% of transport riders and 20% of recreational riders have diverted from Mulgrave Road to using the cycleway. This suggests the cycleway has successfully attracted some riders from Mulgrave Road. In turn, it seems very likely this route diversion will result in safety benefits given the self-evident risks associated with mixing with high volumes and speeds of motor vehicles along Mulgrave Road.

Has the cycleway generated all-new cycling trips, including mode shift from car or public transport?

We find no evidence to suggest the cycleway has encouraged new discretionary cycling or walking trips. We hypothesise that such behavioural changes may occur over time or require improved connectivity to fully leverage the behaviour change potential.

Does the cycleway attract a different gender and age demographic than Mulgrave Road?

The observations of bicycle riders on Mulgrave Road and the Mann Street Cycleway suggests the latter attracts a much more diverse group of bicycle riders; 17% of riders on the cycleway are female compared to 10% on Mulgrave Road, and 21% of riders on the cycleway are children compared to 9% on Mulgrave Road.

Does the cycleway provide a journey time equivalent to using Mulgrave Road?

There does appear to be a travel time penalty associated with riding along the cycleway; we estimate the cycleway increases travel times in the order of 5 to 15% on account of the presence of the non-priority street crossings and the inherent nature of the cycleway. The overall journey time impacts will depend on the journey origin and destination, which is likely to be a more significant factor.

Do the path priority crossings operate to an acceptable level of safety?

In the majority of interactions at the intersection of the path at Buchan Street we find motorists give way to bicycle riders as intended. Moreover, most motorists appear to approach and cross the cycleway at a safe speed. However, as noted by respondents in the intercept survey, and observed occasionally in the video observations, on occasion motorists are failing to give way and travelling at excessive speed. This appears to occur most often, and at highest speeds, when motorists are travelling straight ahead along the minor street.

Does the cycleway provide value for money?

The cycleway, at least with current levels of demand, appears to represent fair value for money with a BCR for the central case of 1.1. The monetised benefits are almost entirely attributable to safety benefits for bicycle riders and pedestrians who no longer have to interact with motorists on Mann Street or, likely more importantly, along Mulgrave Road.

10 Recommendations

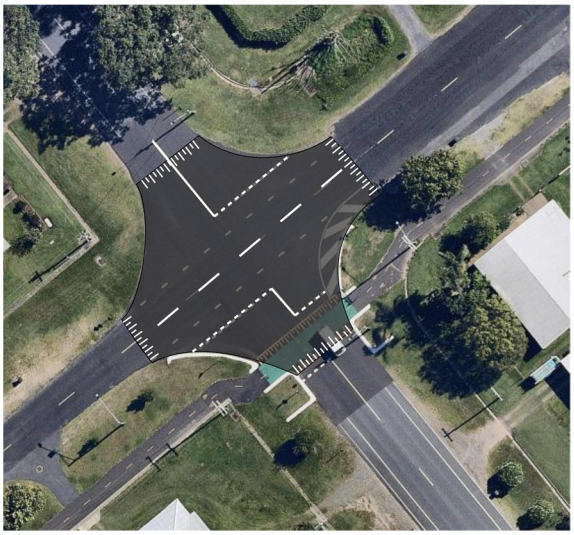
We offer three recommendations for consideration by TMR and Cairns Regional Council:

1. Redesignate the cycleway as a shared path:
    a. In areas of high cyclist and pedestrian demand in our view there ought to be a strong preference to provide physically segregated paths for bicycle riders and pedestrians. However, demand is not high at this location – and faster road riders are likely to continue to use Mulgrave Road.
    b. More importantly, the absence of footpaths along the corridor mean that it is inevitable pedestrians will use the cycleway irrespective of its cyclist-only designation. To try and discourage pedestrians from using the cycleway through pavement markings and signs in this situation is unlikely to work and probably be counterproductive; walking on the roadside is probably riskier and trying to impose implausible behaviours risks diluting the effectiveness of signs and markings in general.

2. Improve connectivity:
    a. It is understood the intention is to improve connections at the western end of the cycleway with Mulgrave Road in the vicinity of Cazalys Stadium. This may improve connectivity to the west.
    b. Connections from the cycleway at the eastern end into Cairns City are limited to the footpath or using major roadways such as Florence Street. These major roadways, and the car-dominated nature of the central city, are likely to deter bicycle riders that are not confident riding in traffic.
    c. Connections to the north alongside the railway line are incomplete. A continuous connection to the Aeroglen path near the airport would provide a high-quality connection from Westcourt to the airport precinct for workers, and to Freshwater and Redlynch for recreational riders.

3. Intersection safety:
    a. While the path priority crossings do not appear to present safety concerns higher than elsewhere on the road network these risks could be further reduced.
    b. Speed is the most critical factor in crash frequency and severity. Reducing the speed of those few motorists who travel at excessive speed is warranted. Retrofitting speed cushions on at least the opposite arm approach (Figure 10.1a) would be a low-cost way to reduce motorist speeds on the most critical approach. A more extensive alteration would involve raising the entire intersection onto a raised table (Figure 10.1b). This alternative would also slow motorists travelling along Mann Street, further enhancing safety. If the latter design were adopted it is suggested that the corner radii also be tightened.

(a) Speed cushion on opposite arm approach



(b) Raised table

■ **Figure 10.1: Possible intersection design improvements**

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Genter, J. A., S. Donovan, B. Petrenas, and H. Badland. 2009. 'Valuing the Health Benefits of Active Transport Modes'. Research Report 359. Wellington, N.Z.: NZ Transport Agency.

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Appendix A: Intercept survey script

We're completing a quick survey on the path. Could you help us?

1. INTERVIEWER enter mode of travel
    a. Bicycle rider
    b. Pedestrian
2. In what suburb did you start your trip, and where will you finish your trip?
    a. Start: _____
    b. Finish: _____
3. How long will the trip take?
    a. Hours: _____
    b. Minutes ____
4. How far is the trip?
    ____ km
5. What is the purpose of your trip?
    a. Commuting to or from work
    b. Fitness, recreation or sport
    c. Shopping
    d. School, university or other education activity
    e. Other: _____
6. How often have you walked/ridden here in the past month?
    a. Almost every day
    b. Every weekday
    c. 3 – 4 days a week
    d. 1 – 2 days a week
    e. Every fortnight
    f. Only once
    g. This is the first time
7. This cycleway was only opened a few months ago. Are you aware that it's new?
    a. Yes
    b. No
8. How would you have made this trip if this path wasn't here?
    a. Taken a different route (incl. used the road)
    b. Would not have travelled

c. Car – as driver
d. Car – as passenger
e. Motorcycle
f. Bus
g. Taxi
h. Don't know
i. Other: _____

9. What change, if any, would you say the construction of the cycleway has had on the amount of time you've spent walking/riding over the past month?
    a. Significantly decreased (by at least an hour a week)
    b. Decreased (by less than an hour a week)
    c. No change
    d. Increased (by less than an hour a week)
    e. Significantly increased (by at least an hour a week)
10. Has the cycleway changed how comfortable you feel riding/walking along here?
    a. Much less comfortable
    b. Less comfortable
    c. No change
    d. More comfortable
    e. Much more comfortable
11. IF BICYCLE RIDER: What would you have done if you couldn't ride your bike for this trip?
    a. Would not have travelled
    b. Used a car – as the driver
    c. Used a car – as the passenger
    d. Motorcycle
    e. Bus
    f. Taxi
    g. Walked
    h. Ran / jogged
    i. Don't know
    j. Other: _____
12. IF TRANSPORT PURPOSE: Which of the following best describe how easily you could have used a car for this trip?
    a. I had a car available and could easily have got access to it
    b. I could have got a car from another person where I started my trip (e.g. another household member)
    c. I did not have ready access to a car to make this trip

d. I do not have a drivers licence
e. Other: _____

13. IF COULD HAVE USED CAR: Would it have taken more or less time to reach your destination by car?
    a. More time
    b. Same time
    c. Less time
14. IF TRANSPORT PURPOSE: Which of the following best describes how easily you could have made this trip by public transport?
    a. I had a convenient public transport alternative
    b. I had a public transport alternative but it would have taken longer
    c. I did not have a viable public transport alternative
    d. Other: _____
15. IF COULD HAVE USED PUBLIC TRANSPORT: Would it have taken more or less time to reach your destination by public transport?
    a. More time
    b. Same time
    c. Less time
16. INTERVIEWER enter any other comments: _____

Appendix B: Verbatim comments (Mann Street Cycleway)

Bicycle riders:

Sometimes cars don't stop for me at the green crossings. Nice path. Very safe

Great idea having the path so don't need to worry about traffic. Give way to cyclists on the bumps is dangerous as cars don't give way.

Crossing over the streets too dangerous as cars don't give way. Almost got hit 2 times. Daughter almost got hit. Husband almost got hit also. Very dangerous

Crossovers are concerning. Cars don't stop. Dangerous for our kids. Needs more lights.

Like that the cars have to watch out for bikes. Think it's great. Build more.

It's great. Safe. Away from traffic. Speed humps good, cars mostly watch out.

I enjoy it. Thinks widening the road would have worked too and been cheaper.

Good.

Good path.

Like more please. Better connections please.

Think they should make more.

Feels safer on the paths. Enjoys cycling on them.

Thinks the cycleways are fantastic.

Loves the paths.

There used to be a bridge over the creek at the end of Mann St (western end). Can we have of back please.

Excellent. Can't wait for the connections.

Loves the paths, however at roads cars do not give way which results in accidents.

It's good but the bicycle green crossings should be zebra crossing or stop signs

Good idea more please. But the green is not clear for cars. Zebra stripe crossing would be clearer thus they have to give way

Green crossing the cars don't see the give way signs as they are so close to the crossing so makes it dangerous for pathway users.

Put in more!

Cars don't always give way to cyclists at the green crossings. Have been nearly hit a few times.

Great! Build more!

Really appreciate the cycle routes, and love using them.

Behind Cairns Central at the T intersection is dangerous if you're turning right as the continue to the right. Traffic doesn't stop for pedestrians or cyclists.

Wish there were more. Need better connections. Green crossings are really good but car drivers need more education. Give way signs are too close to the actual intersection so drivers don't see them.

Boat trailers or cars park over the pathway. Also, cars don't give way at driveways. Otherwise fantastic.

Connections aren't the best, have to be careful at crossings as cars drive through without giving way.

Love it. bring on more. Better connections please.

Cairns One tenants do not give way at the driveway even though they have give way signs.

Pedestrians:

Enjoys walking along the path. Much better than the busy road.

Residents park their cars on the pathway instead of in their driveways. Over there is a boat on a trailer with its motor hanging over the path. While the path is good drivers don't care.

Think they are great. Should build more.

Best thing since sliced bread. Great for me in my mobility scooter. The only thing is cars and trailers often park over the path at Cairns One and I can't get past.

Notice more people on it now. Feels safer. Don't trust traffic but love the separation.

Just use it for jogging. It's great.

Beautiful path.

Like it. Feel safer.

Awesome. Made it much better for joggers. Could put up more barriers to stop cars from parking over the path.

Thinks the cycleways are great. Thinks they encourage people to get on their bikes.

Fantastic!

Very safe.

Need more paths like this, and better connections.

Crossings should have stop signs as cars don't always give way.

Need more paths. Thinks they are great.

It's really good.

It's good. Not sure if it's well known yet. Cars not used to the new crossing system.

Floods a lot and council do not seem to care about it. They do not clean the path.

Its great but frustrating when I'm driving, and the cyclists are using the roads and not the dedicated paths that the council have spent our rates and taxes on building for them.

Like the path. Feels safe.

Like it. Pedestrians crossings aren't that safe because cars can't seeing the give way signs.

Think path is great. Should be more everywhere.

Appendix C: Verbatim comments (Mulgrave Road)

Cyclist didn't want to stop.

Rider loves the route. More convenient.

Would use McCoombe St to go to work but there are two bridges that are narrow plus a lot of broken glass on the paths.

Believes that drivers do not know bikers have the right of way on the new paths. They shut the showgrounds path off which is inconvenient.

Lot of broken glass and rubbish on both routes. Uses Mann St path for leisure, finds the bumps not good for faster bikes.

Uses Mulgrave Rd for work trips. Use Mann St for leisure. Mulgrave Rd more direct but scary as the buses don't give sufficient clearance. Seems like they want to knock us out.

Lots of glass on the road.

Need more lighting on cycle paths. Free cycle light program? Traffic doesn't always give way to cycles on those green crossings on the Minnie St path.

Prefer the cycle paths. Think the paths are great for Cairns.

Mann St is good to use going west, prefer to use Mulgrave Road going east simply because cycleway ends at the drain which makes it inconvenient to get to where I want to go.

Too much glass on the road. Feels dangerous with buses as they drive too close to cyclists.

Finds people are respectful of cyclists. Flat roads are perfect for bike riders.

Do use Mann St / Minnie St but it doesn't properly connect to anything. Glass on the road kills my tires. Cars don't give way at the cycle crossings on Mann St / Minnie St.

Good cycle way. Quick to town.

Likes cycling along the road. Feels pretty safe.

Dangerous with the cars and buses.

Likes cycling along the road.

Wouldn't use the cycle ways as they are inconvenient and don’t connect well. Too many walkers, dogs and glass.

Only been here one month, likes cycling on road.

Crossing the roads along the alternative cycle route is inconvenient - not straight through like on the lights here on Mulgrave Road.

Not very good connections.

Likes cycling on road feels safe.

Entry to footpaths are extremely dangerous for cyclists. Too steep and need to be updated. Loves the new cycleway on Mann Street.