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Let's GET Wellington MOVING

Appendix C Golden Mile Multi Criteria Analysis (MCA) Report

October 2021

Golden Mile Single Stage Business Case | Contract No. 1851

Futuregroup

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Executive Summary

The Golden Mile Project is part of the Let's Get Wellington Moving (LGWM) programme. The first phase of this project comprises delivery of a single stage business case by late-2021.

This report sets out the alternatives and options processes undertaken to identify technical option preferences for each section of the Golden Mile for LGWM to consider for advancement to the second stage of the SSBC. Its predominant focus is on the multi criteria analysis (MCA) processes undertaken to evaluate the short-listed options identified in the Golden Mile Short List Report (May 2020).

Golden Mile is the heart of our City

The Golden Mile plays a vital role in the success of Wellington's transport system, regional economy and sense of place. Transecting central Wellington, it provides the core spine to the city's bus network and enables thousands of people to access employment, do business, shop, dine and to access other central city destinations each day. It has the highest pedestrian volumes in New Zealand. Due to its critical functions, the Golden Mile must perform at a high level, both as a transport asset that safely and efficiently moves people and goods, and as an important place for people that is pleasant, safe and attractive.

Around 70,000 people travel on Lambton Quay and Willis Street each day. On each street up to 50 per cent of people are moving on foot and a similar amount are travelling on buses. Fewer than 10 per cent of the people move through Lambton Quay in cars. While fewer people move through Manners Street and Courtenay Place each day (about 40,000), these roads are also heavily used by people on buses (about 50 to 70 per cent) and people walking (about 30 per cent). People in cars represent around 20 per cent of people using Courtenay Place.

The relative volume of cyclists is comparatively low, with cyclists accounting for just over 1 per cent or 500 people per weekday. This number is reflective of the mix of uses, with cyclists sharing road space with large numbers of buses and private vehicles, as well as sections of the Golden Mile which are restricted to Bus Only.

Given the high number of people travelling on buses and walking along the Golden Mile, any changes made to its transport network will affect the daily movement of many people.

The journey from long to a short list of options

The alternatives and options development process commenced with the development of an "interventions toolbox" and a suite of contrasting "mitigation / intervention" scenarios for each section of the Golden Mile that would help respond to the key public transport, pedestrian and public realm problems identified in the Golden Mile Strategic Case. All up, over 250 mitigation / intervention scenarios were initially identified.

Following a viability and feasibility screening process the number of potential mitigation / intervention scenarios was reduced to 21. These scenarios were then assessed against the investment objectives and 'key success factors' identified in the Strategic Case. Through this high-level MCA evaluation process, nine scenarios were removed due to their low scores. This left a short list of 12 scenarios needing further consideration in the short list assessment process.

The first step in the short list assessment process was to complete the technical work identified for assessing the 12 short listed scenarios. This work involved responding to three fundamental questions regarding bus stop spacing / location, private motor vehicle (PMV) restrictions and corridor space allocation. The outcomes of this work enabled the Golden Mile Project Team to reach several conclusions regarding optimal bus stop configuration options, key pinch points for bus journey times, the likely strategic benefits of removing PMVs and corridor space allocation options for each scenario. Based on the conclusions from this work, and in order to further differentiate between the 12 scenarios, the Golden Mile Project Team developed a "decision-making tree" to help package the scenarios into short-listed options. This decision-making tree comprised of the following two strategic questions:

1. Retain or remove PMV access from the Golden Mile? and
2. If removing PMVs, should the existing cross sections at Lambton Quay and Courtenay Place be retained, or should the “extra” space be converted into additional pedestrian and / or urban realm amenity?

In accordance with the Golden Mile Project Team’s responses to the above questions, three short listed scenarios were identified in the Golden Mile Short List Assessment Report for further consideration as follows: Scenario 1CW7 (which was renamed Option 1); Scenario 2BX8 (which was renamed Option 2), and Scenario 3BX9 (which was renamed Option 3).

The short-listed options were then renamed Concept One (“Streamline”), Concept Two (“Prioritise”) and Concept Three (“Transform”) for the purposes of the 2020 Golden Mile Public Engagement Programme. Each concept was summarised in the public engagement material as follows:

Concept One: “Streamline” (i.e. Short Listed Option 1)	Concept Two: “Prioritise” (i.e. Short Listed Option 2)	Concept Three: “Transform” (i.e. Short Listed Option 3)
		

Each of the above concepts shared the following common design features:

- Changes to PMV access to the Golden Mile to improve bus reliability and travel times
- Closure of “side road ends”, removal of on-street car parking (on the Golden Mile), consolidation of bus stops and re-location of loading bays / taxi stands to improve bus reliability and travel times and to convert the “left over” road / on-street parking space to increase pedestrian / public realm areas, and
- Emergency vehicle access would always be maintained.

The key design differences between the concepts included:

- Concept One would retain PMV access but there would be turning restrictions at key intersections on Lambton Quay and closure of four side road ends. Such interventions would enable existing road space to be converted into new pedestrian / public realm areas (there would be an overall increase of this type of space by about 30%). This option’s focus would be on improving bus reliability and travel times by reducing vehicle conflicts and optimisation of use of space
- Concept Two would remove PMV access and introduce 10 side road end closures (i.e. the same side road end closures as proposed in Concept One, plus an additional six end

closures[1]). Such interventions would enable the remaining road space to be converted into new pedestrian / public realm areas (there would be an overall increase of this type of space by about 30%). A key distinctive feature of this concept was the creation of additional bus capacity through provision of two bus lanes in each direction on Lambton Quay and Courtenay Place. This additional capacity would be for improving bus reliability and travel times, and

- Concept Three would also remove PMV access and introduce 11 side road closure ends (i.e. the same side road end closures identified in Concepts One and Two plus the additional closure of the Tory Street / Courtenay Place intersection for north / south through movement). A key distinctive feature of this concept was the provision of one lane for buses in each direction along the entire Golden Mile (plus use of in-line bus stops). This intervention would enable the conversion of existing carriageway, particularly on Lambton Quay and Courtenay Place, to new pedestrian / public space areas. As a consequence, there would be an overall increase of pedestrian / public space by about 75%. The key outcome of this concept would be to improve bus reliability and travel times and to significantly increase pedestrian / public realm space in the Golden Mile. Concept Three would also provide opportunities for dedicated cycling facilities to be located on Courtenay Place and / or Lambton Quay if required.

Another key point of difference between the concepts were their construction cost estimates. That is, Concept Three was likely to cost significantly more than either Concept One or Two.

Feedback from the community

Engagement on the concepts proposed for the Golden Mile Project ran from June to August 2020. Overall, about 2000 people and organisations commented on the proposed concepts. Most of the comments received expressed a preference for Concept Three for Lambton Quay, Willis Street and Courtenay Place (there was also support for the minor changes proposed for Manners Street). The majority also supported providing cycling facilities and retaining loading bays or taxis stands on the Golden Mile (or were supportive of allowing service vehicles to use the Golden Mile at certain times of the day). However, the retail and hospitality business sectors were concerned that the concepts, or certain aspects of the concepts (e.g. reducing on-street parking, removing PMV access and service vehicle access), would impact negatively on retail / business activity.

Additional engagement with some of the submitters occurred during November 2020 to help further improve the Golden Mile Project Team's understanding of their submissions. Overall, this engagement reinforced the key themes identified during the main engagement programme, including the need to carefully consider how to best implement any public realm improvements, the processes for removing on-street parking, and how to best provide for vehicles needing to service businesses located on the Golden Mile.

Final MCA processes and identification of recommended option preferences

The final MCA processes for the short-listed options commenced following completion of the Golden Mile Public Engagement Programme. It included confirming the assessment criteria to be used to evaluate each of the options[2] and the experts (i.e. MCA assessors) who would undertake each assessment.

An MCA Workshop was held on 30 November 2020. At this workshop, the MCA assessors presented their evaluations for each option's relevant section of the Golden Mile to the other MCA assessors, key members of the Golden Mile Project Team, key members of LGWM (including its subject matter experts) as well as representatives of Taranaki Whānui and Ngāti Toa.

[1] It is noted that the Tory Street / Courtenay Place intersection would remain open for north / south through movement under Concept Two

[2] It is noted that the concepts were renamed options for the purposes of the MCA process following completion of the Public Engagement Programme

Using a 7-point scoring system (and noting that the cost, benefits / disbenefits and value for money assessment criterion were not assigned specific scores) the MCA assessors unweighted (i.e. raw) evaluation scores and final rankings are set out below:

Assessment area	Lambton Quay				Willis Street				Manners Street		Courtenay Place			
	Do-Minimum	Option 1	Option 2	Option 3	Do-Minimum	Option 1	Option 2	Option 3	Do-Minimum	All Options	Do-Minimum	Option 1	Option 2	Option 3
Delivery of Objectives														
Bus Travel Time and Reliability	0	1	2	1	0	1	2	2	0	1	0	1	2	2
Bus Passenger Boarding and Alighting Comfort and Convenience	0	1	3	2	0	1	1	2	0	1	0	2	3	2
Pedestrian Safety	0	1	0	2	0	1	1	1	0	1	0	1	0	2
Pedestrian Capacity	0	1	2	2	0	1	1	2	0	1	0	1	2	2
Improve Place quality	0	0	1	3	0	1	1	1	0	0	0	0	1	3
Effects														
Social	0	0	1	3	0	1	2	3	0	0	0	1	2	3
Retail Impacts	0	1	1	2	0	1	1	2	0	0	0	1	1	1
Cycling Level of Service	0	1	1	3	0	0	0	-1	0	-1	0	1	1	3
General (Road) Safety	0	1	1	2	0	1	1	1	0	1	0	1	1	2
Sustainability	0	1	1	3	0	1	1	3	0	0	0	1	1	3
Fit with LGWM Programme	0	0	3	3	0	-1	-1	-1	0	0	0	2	3	2
Delivery, maintenance, and operations														
Delivery	0	-1	-1	-2	0	-1	-1	-2	0	-1	0	-1	-1	-2
Operations and Maintenance	0	-1	-2	-3	0	-1	-2	-3	0	-1	0	-1	-2	-3
Timeframe for Delivery	0	2	2	2	0	2	2	2	0	2	0	2	2	2
Final scores and rankings														
Total scores	0	8	15	23	0	8	9	12	0	4	0	12	16	22
Final rankings		3rd	2nd	1st		3rd	2nd	1st		All Options		3rd	2nd	1st

Cost, benefit, and value for money ranges			
Assessment criteria	**Option 1**	**Option 2**	**Option 3**
Cost estimates range (real)	**$15M - $23M**	**$21M - $32M**	**$52M - $79M**
Discounted Costs (present value)	*$14M - $20M*	*$19M - $29M*	*$47M - $72M*
Benefit ranges (present value)	**$31M– $57M**	**$42M - $219M**	**$87M - $505M**
Indicative BCR ranges (i.e. value for money)	**1.6 – 4.2**	**1.5 – 12**	**1.2 - 11**

Individual benefit components	Option 1 ($M)	Option 2 ($M)	Option 3 ($M)
Car travel time impact	-$6.2 - $4.8	-$79 - $37	-$79 - $37
Public transport travel time benefit	$18 - $24	$26 - $34	$23 - $30
Public transport reliability benefit	$4.7 - $6.1	$9.1 - $12	$9.1 - $12
Pedestrian realm benefits	$11 - $17	$81 - $128	$122 - $407
Pedestrian travel time benefits	$3.1 - $4.9	$5.8 - $9.4	$13 - $20

All MCA evaluations were undertaken relative to a “Do-Minimum scenario” with each option scored objectively (positively or negatively) against this reference position. A critical feature of the Do-Minimum scenario was the assumption that a second north-south bus corridor would operate within the Wellington CBD, and would enable the maximum number of buses on the Golden Mile to be “capped” at 100 vehicles per hour per direction (i.e. any additional buses over this cap would be accommodated on an alternative corridor).

As set out in the table above, Option 3 was ultimately identified as the best performing option for Lambton Quay, Willis Street and Courtenay Place under the unweighted scoring process. The “All options” option was considered the best performing option for Manners Street.

In addition to identifying the unweighted scores (i.e. raw scores), a weighting scenario exercise was undertaken to test various sensitivities of the unweighted scores to matters considered under various weighting themes, to be possibly more important. The outcomes of the weighting scenarios (and the unweighted evaluations) are set out below:

Golden Mile Section	Option	Unweighted Score	Investment Objective Weightings	Focus on improving the public realm	Focus on people movement	Focus on Safety	Program fit and delivery focus	Economic Focus	Social Focus	Workshop Weighting
Lambton Quay	Do-Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Option 1	1.47	0.13	0.11	0.13	0.13	0.09	0.12	0.09	0.11
	Option 2	2.43	0.23	0.19	0.23	0.12	0.19	0.21	0.13	0.23
	Option 3	3.67	0.24	0.28	0.23	0.25	0.19	0.26	0.25	0.28
Lambton Quay Option Preference		Option 3	Option 3	Option 3	Option 3	Option 3	Option 3	Option 3	Option 3	Option 3
Willis Street	Do-Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Option 2	1.50	0.14	0.14	0.14	0.13	0.06	0.14	0.10	0.14
	Option 1	1.37	0.14	0.13	0.16	0.11	0.04	0.14	0.09	0.16
	Option 3	1.77	0.18	0.15	0.19	0.13	0.16	0.16	0.17	0.08
Willis Street Option Preference		Option 3	Option 3	Option 3	Option 3	Option 2	Option 3	Option 3	Option 3	Option 1
Manners Street	Do-Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	All Options	0.80	0.11	0.08	0.11	0.10	0.06	0.10	0.03	0.10
Manners Street Option Preference		All options	All options	All options	All options	All options	All options	All options	All options	All options
Courtenay Place	Do-Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Option 1	2.17	0.18	0.14	0.16	0.15	0.17	0.16	0.14	0.15
	Option 2	2.23	0.20	0.17	0.22	0.04	0.18	0.18	0.13	0.19
	Option 3	3.53	0.26	0.29	0.26	0.25	0.15	0.28	0.22	0.31
Willis Street Option Preference		Option 3	Option 3	Option 3	Option 3	Option 3	Option 3	Option 3	Option 3	Option 3

As set out above, under the weighting scenarios, Option 3 was also generally preferred.

Overall, Option 3 was ultimately identified through the MCA process as the best performing option for Lambton Quay, Willis Street and Courtenay Place (and the “All options” option was considered the best performing option for Manners Street).

Recommendations and next steps

The next step is for LGWM to consider the option preferences identified for each section of the Golden Mile that have been recommended to be advanced to the second stage of the business case. That is, the preference to advance Option 3 for Lambton Quay, Willis Street and Courtenay Place and the “All options” option for Manners Street to the second stage of the business case.

It is noted however that affordability and / or funding availability may be key matters needing further consideration by LGWM when considering this report’s recommended option preference(s). If these matters are ultimately identified to be key determinants in the final decision-making processes for the preferred option, one alternative pathway for delivering the option might be for LGWM to consider how it might be phased in overtime. In addition, elements of the preferred option may be trialled or refined during the detailed design and implementation phases of the project.

As a consequence of the MCA process the following key considerations were identified:

- There were distinct trade-off decisions needing to be made between PMV restrictions / removal, on-street parking removal and side road end closures and the desired to improve public transport and pedestrian / public realm space. The significance of the trade-off decisions varied between the options

- The removal of on-street car parking, side road end closures and removal of PMVs, as proposed under Options 2 and 3, would deliver significant bus travel time and reliability benefits and would provide extra pedestrian and public realm space. However, realising these outcomes would result in existing traffic (i.e. PMVs) movement patterns changing within the CBD and a reduction in on-street parking availability on the Golden Mile (particularly on Lambton Quay and Courtenay Place). In addition, there would be disruption for the CBD community during construction of either Option 2 or 3. In comparison, Option 1 would deliver fewer bus benefits, but would result in less traffic re-distribution and construction disruption effects
- The conversion of road carriageway to pedestrian / public realm on Lambton Quay and Courtenay Place under Option 3 would improve pedestrian movement and create new public realm space as well as dedicated new spaces for cycling. Such outcomes would change the character of the Golden Mile, moving it from a vehicle focused environment to one that is focused on public transport, pedestrian movement / dwelling and active mode movement, and
- All options would have differing degrees of costs, with the indicative cost estimates for both Options 1 and 2 being significantly less than the estimate for Option 3. The key cost difference between Option 2 (and 1) and Option 3 is the extra costs associated with converting road carriageway to pedestrian / public realm space.

A key discussion at the MCA Workshop was the findings of the retail impact assessment, including its key finding that Option 3 would generate net benefits in the form of increased footfall leading to increased sales and revenue (in particular it was expected that widened footpaths, together with dedicated space for bikes and scooters, would increase customer access to the Golden Mile with almost immediate effect). It was also noted that in contrast, both Options 1 and / or 2 would generate less benefits for businesses / retailers on the Golden Mile.

Opportunities to improve on the technically best performing option(s) were also discussed / identified through the MCA process, including:

- Considering indented bus stops instead of in-line bus stops
- Retaining north / south through traffic at the Tory Street / Courtenay Place intersection (rather than full closure)
- Considering how cycling provisions on Courtenay Place and / or Lambton Quay would integrate with Wellington City Council's strategic cycling network plans
- The retention of loading bays and / or taxis stands on the Golden Mile outside of peak hours (and improving existing loading bay / taxi enforcement), and considering further as to how these facilities could be transitioned overtime to the Golden Mile's side roads, and
- Investigating further the material costs for new pedestrian / public realm spaces, including considering implementing different treatments along the Golden Mile.

With regard to the higher cost estimates for Option 3, MCA Workshop participants noted that this was a matter needing further specific consideration by LGWM, however, the participants did note that Option 3 (as well as the other options) could be phased in overtime if funding was to be a decision-making factor. Workshop participants considered that phasing (with some referring to phasing as "mixing and matching") could be further explored in detail in the second stage of the business case, but did request that a possible example of phasing over the short and long term be referenced in this report. This example is as follows:

- Removal of on-street car parks from the Golden Mile (but retaining loading bays and / or taxis stands on the Golden Mile)
- Phasing in closure of side road ends, including using tactical urbanism to help develop proof of concepts

- Phasing in bus stop consolidation and traffic signal phasing changes
- Phasing in build out of pedestrian pavements (or treatments) at key locations, and
- Removing PMVs from parts or all of the Golden Mile.

In the longer term, completing Option 3 could comprise of closure of all side road ends, full removal of PMVs, completing all pavement kerb build outs (including the kerb build outs needed to complete Option 3's bus lane configurations for Courtenay Place and Lambton Quay) and full relocation of loading bays / taxis to side roads.

Recommendations and next steps

The next step is for LGWM to consider the option preferences identified for each section of the Golden Mile that have been recommended to be advanced to the second stage of the business case. That is, the technical preference to advance Option 3 for Lambton Quay, Willis Street and Courtenay Place and the "All options" option for Manners Street to the second stage of the business case (noting that there are opportunities to further refine the design and optimise the phasing of Option 3 during this stage).

1. Introduction

The Golden Mile Project is part of the Let's Get Wellington Moving (LGWM) programme. The first phase of this project comprises delivery of a Single Stage Business Case (SSBC) by late-2021.

The key purpose of this report is to describe the alternatives and options assessment processes undertaken to identify option preferences for each section of the Golden Mile for LGWM to consider for advancement to the second stage of the SSBC. Its predominant focus is on the multi criteria analysis (MCA) processes undertaken to evaluate the short-listed options that were identified in the *Golden Mile Short List Assessment Report* (Short List Report).

2. Golden Mile Context

The Golden Mile plays a vital role in the success of Wellington's transport system, regional economy and sense of place. It is the busiest pedestrian area in the city and a key shopping and entertainment destination. It's also the main route for buses, bringing about 37,000 people into the central city on a typical day.

The Golden Mile is made up of a series of streets (see Figure 1) that have distinct characteristics and different functions as set out as follows:

- **Lambton Quay** is the centre of employment and retail activity in Wellington City. It is surrounded by high rise office buildings with the highest employment concentration in New Zealand, as well as a large number of retail shopfronts and eateries. The street space along Lambton Quay is heavily used, with over 63,000 people using each block every day. Of these people, about 46 per cent are pedestrians (or about 29,000 people per day), 44 per cent move by bus (or about 28,000 people per day) and 9 per cent are in private motor vehicles (PMV) or about 6,100 people per day (the remaining people are using other modes, such as bikes)[3]

Figure 1: Golden Mile Sections

- **Willis Street** is a busy hub of employment and retail activity. It is also surrounded by high rise office buildings, as well as retail shopfronts and eateries. The street space along Willis Street is the busiest section of the Golden Mile, with just under 70,000 people in each block every day. Of these people, about 45 per cent are pedestrians (or about 31,500 people per day), 44 per cent move by bus (or about 30,200 people per day), and 10 per cent are in PMVs or about 6600 people per day (the remaining people are using other modes, such as bikes)[4]
- **Manners Street** represents a transition point between Wellington Central, which is dominated by high density, high rise office buildings and supporting activities, and Te Aro, which is characterised by a mix of residential, entertainment and office activities, mostly accommodated in low to medium rise buildings. Manners Street is used by around 40,000 people every day and has the highest volumes of pedestrians and bus passengers of any part of the Golden Mile. Of these people, about 66 per cent move by bus (or about 26,000

[3] Golden Mile Improvements, Problem Definition and Case for Change (June 2019), page 9
[4] Ibid, page 10

people per day), 32 per cent are pedestrians (or about 13,000 people per day), and 2 per cent are in PMVs (or about 1000 people per day)[5], and

- **Courtenay Place** is Wellington's centre of entertainment activity, and has a variety of restaurants, bars, cinemas, and theatres. It is also surrounded by offices and apartments. The street space along Courtenay Place is used by over 40,000 people every day. Of these people, 48 per cent move by bus (or about 20,400 people per day), 31 per cent are pedestrians (or about 13,000 people per day), and 20 per cent are in cars or about 8,600 people per day (the remaining people are using other modes, such as bikes)[6].

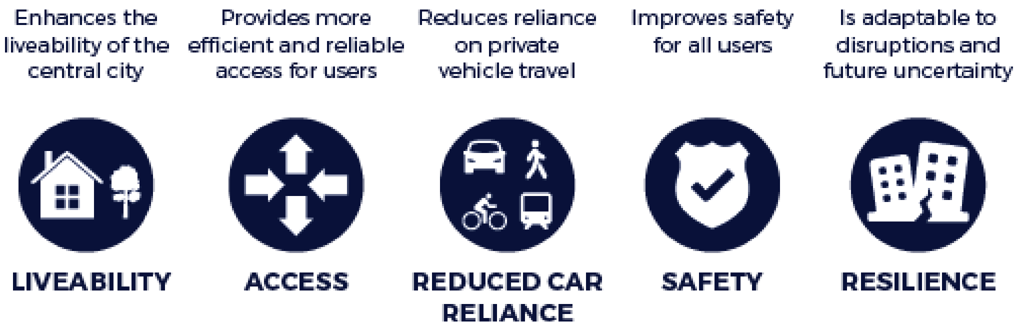
3. Let's Get Wellington Moving - Overview

The LGWM programme is a joint initiative between Wellington City Council (WCC), Greater Wellington Regional Council (GWRC) and Waka Kotahi NZ Transport Agency (Waka Kotahi). The programme area incorporates the area from Ngauranga Gorge to Wellington International Airport, encompassing the Wellington Urban Motorway and connections to the central city, Wellington Hospital and the eastern and southern suburbs.

The LGWM programme is seeking to deliver an integrated transport system that supports the community's aspirations for how Wellington City will look, feel and function in the future. Its Short Term Programme, of which the Golden Mile is one of its 'packages', is tasked with developing and implementing transport improvements that are capable of being progressed within the next 5 years, ahead of the more complex components of the wider programme of investment [e.g. Mass Rapid Transit (MRT)].

3.1 LGWM Programme Objectives

The LGWM programme is seeking to achieve five objectives for a transport system that:



3.2 Golden Mile Objectives

The LGWM programme has developed specific objectives for the Golden Mile Project to ensure that the transport and public realm outcomes to be pursued for the Golden Mile are aligned with the overall direction of the LGWM programme.

Figure 2 sets out the respective objectives for the LGWM programme and the corresponding objectives for the Golden Mile project.

[5] Ibid, page 13
[6] Ibid, page 15

Figure 2: LGWM programme and Golden Mile objectives

LGWM Objectives	Golden Mile Objectives
Enhanced liveability of the central city	• Character & place value enhanced through good urban design • Improved amenity for people inhabiting the corridor (i.e. facilities to prevent overcrowding, seats, wind breaks, shelters)
More efficient and reliable access to support growth	• Increased people carrying capacity of the corridor for buses • Improved pedestrian levels of service • Enhanced economic productivity through an accessible city
Reduced reliance on private vehicle travel	• Improved bus travel reliability and travel times • Improved levels of service for cycling
Improved safety for all users	• Conflicts between people and vehicles reduced • Reduction in deaths and serious injuries
Adaptable to disruption and future uncertainty	• Constraints on long-term corridor re-configuration minimised • Route resilience for re-routing options due to major planned and unplanned events

4. Golden Mile Vision 2036 Statement

The *Golden Mile Vision 2036 Statement*[7] was established to help guide development of the SSBC. Development of the vision was informed by the five goals identified in WCC's Long Term Plan (*Our City Tomorrow)* 2018-2028[8], the LGWM Vision Statement as well as the objectives identified in Figure 2 above.

The Golden Mile Vision 2036 Statement is summarised below in Figure 3.

[7] See: Vision-2036-April-2020.pdf (lgwm.nz)
[8] The five goals identified in *Our City Tomorrow* are as follows: resilient, greener, compact, inclusive and connected, vibrant and prosperous. For further information on *Our City Tomorrow* see: http://ltp2018.publications.wellington.govt.nz/Part+B+Summary+of+Our+10-Year+Plan/Our+long-term+city+outcomes

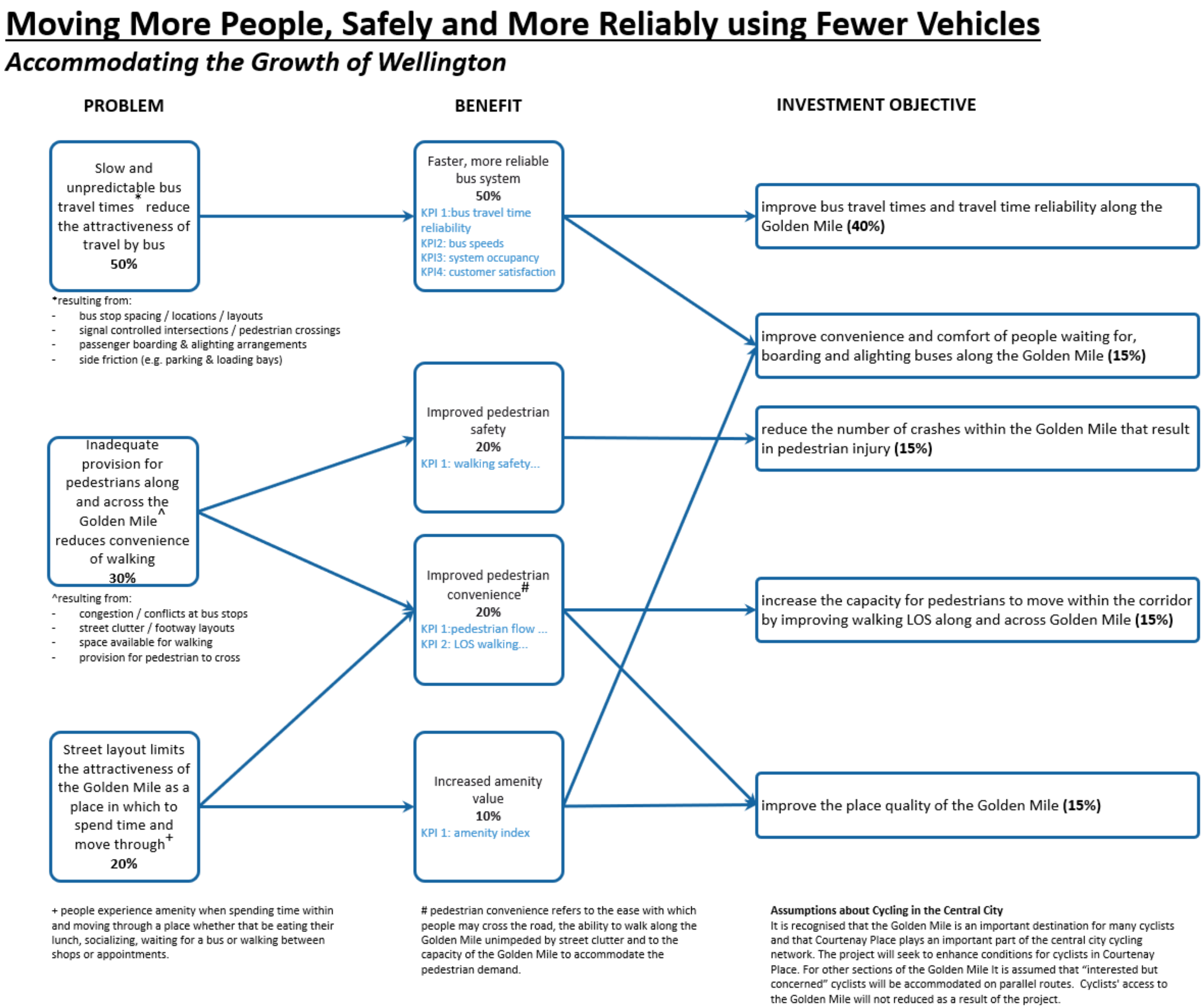
Figure 3: Golden Mile Vision 2036 Statement

5. Golden Mile Strategic Case

The *Golden Mile Strategic Case*[9] (Strategic Case) was developed to support the delivery of the SSBC in early 2020. One of its key purposes was to identify the investment objectives (as well as the problem and benefit statements) to be considered during the alternatives and options development and assessment processes. The problem / benefit statements and investment objectives identified in the Strategic Case are set out below in Figure 4.

[9] See: Microsoft Word - Golden Mile Strategic Case Refresh - FINAL June 2020.docx (amazonaws.com)

Figure 4: Problem / benefit statements and investment objectives

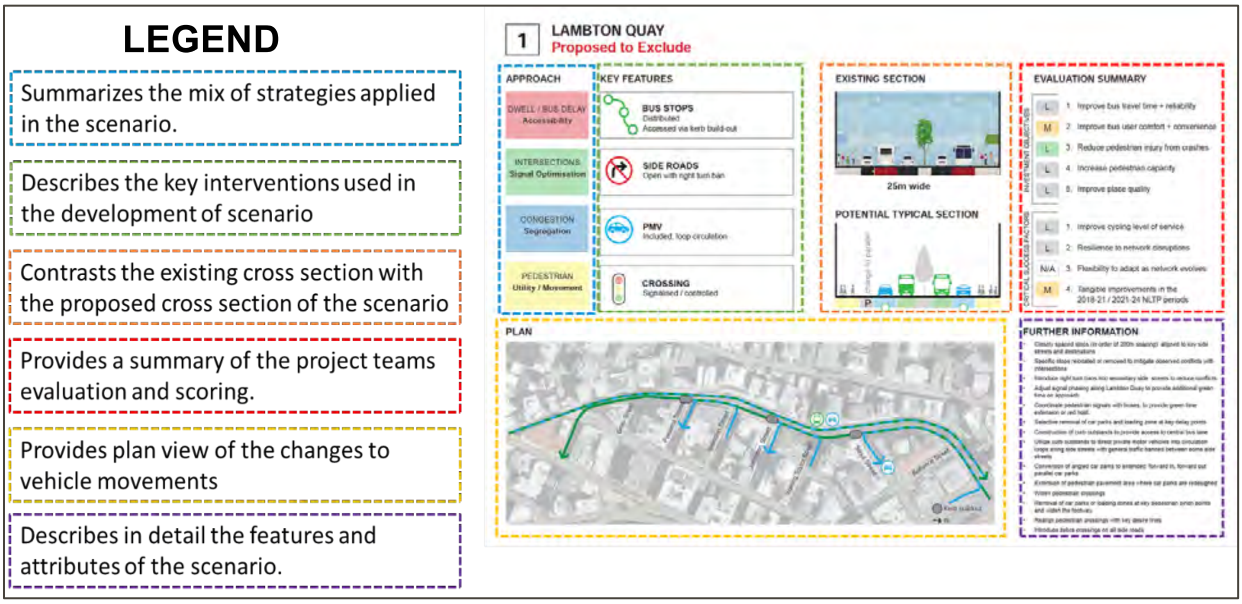


6. Golden Mile Long List Assessment Report

The *Golden Mile Long List Report*[10] (Long List Report) sets out the processes undertaken to identify a long list of intervention options and "mitigation / intervention strategies" that could help to address the problem statements and achieve the investment objectives identified in the Strategic Case. The key steps undertaken in the long list process included:

- Step 1: Development of an intervention "toolbox". This toolbox ultimately identified over 150 different types of interventions that could address the problems and help to achieve the investment objectives
- Step 2: Additional "root cause" problem analysis. This process resulted in identification of the following four key strategic issues: dwell times; congestion; intersection delay / variability; and, pedestrian / urban amenity
- Step 3: Development of "mitigation / intervention strategies" to address the key strategic issues for each section of the Golden Mile
- Step 4: Identification of over 250 "sub-section" mitigation / intervention scenarios for the Golden Mile. The scenarios not considered to be feasible or effective by the Golden Mile Project Team were removed from further consideration. This process eventually left 21 scenarios needing further assessment
- Step 6: Application of the mitigation / intervention strategies to each of the 21 scenarios in order to identify each scenario's key features / attributes. This enabled before and after cross sections to be developed, as set out in Figure 5 below:

Figure 5: Example of sub-section scenario assessment (Lambton Quay Scenario 1)



- Step 7: Evaluation of the 21 scenarios through a high-level MCA process. This process involved evaluating each scenario against the investment objectives and 'key success factors'[11] that had been identified in the Strategic Case. Through this

[10] See: https://lgwm.nz/assets/Documents/Technical-Documents/Golden-Mile/Golden-Mile-Long-List-Report-June-2020.pdf

[11] Golden Mile Strategic Case (2020), page 45

evaluation process a further nine scenarios were eliminated, which left 12 scenarios needing further assessment.

The Long List Report concluded that further technical assessments were needed before any short listing of the remaining 12 scenarios could occur. The report identified that this additional work was required to further understand the corridor wide implications of each scenario and to determine whether any of them could be combined. It recommended that this additional investigation work be informed by responding to the following three questions:

- **What is the optimum bus stop spacing / locations for the corridor?** (i.e. to help inform both the potential to use high capacity stops at Lambton Quay and / or Courtenay Place and retain or simplify bus stops on Willis and Manners Streets)
- **Whether to restrict traffic access from the Golden Mile and, if so, to what extent?** (i.e. to help inform the key decision to remove PMV access from key segments of the Golden Mile and in particular, Willis Street), and
- **How to allocate road space for buses, pedestrians and faster active modes?** (i.e. to help inform the extent to which active carriageway may be repurposed at Lambton Quay and / or Courtenay Place).

7. Golden Mile Short List Assessment Report

The Short List Report[12] sets out the key development and assessment processes undertaken to evaluate the 12 remaining scenarios identified in the Long List Report. It also sets out how the scenarios were eventually "packaged" into the short-listed options.

To respond to the Long List Report's questions, the Golden Mile Project Team undertook bus stop catchment and capacity modelling, "space allocation / cross section" evaluations as well as general transport modelling. Ultimately, this technical work enabled the project team to reach the following key conclusions:

- To achieve the greatest benefits for bus users and pedestrians (and cyclists / fast mobility devices), PMVs would need to be removed from the Golden Mile
- PMVs are currently a significant impediment to the capacity of the northbound bus stop on Willis Street, and therefore their removal would significantly improve the operation of buses on Willis Street
- The removal of PMVs from Lambton Quay without removing traffic from Willis Street would negatively impact bus operations at the Willis / Hunter Street intersection. It is therefore preferable that PMVs be removed from both Willis Street and Lambton Quay
- Transport modelling indicated that removing PMVs from Willis Street would have minimal impacts on wider CBD traffic movements
- The optimal bus stop configuration for the Golden Mile was likely to be a five paired bus stop arrangement, with Willis Street forming a key point of access for maintaining bus catchments on the Golden Mile
- The Manners Street / Cuba Street stop pair was viewed as being a critical boarding and alighting location for passengers accessing the Cuba Street Mall
- Overall bus capacity on the Golden Mile is limited by the size of bus stops, which in turn is limited by the available cross section. No one mix of improvements is likely

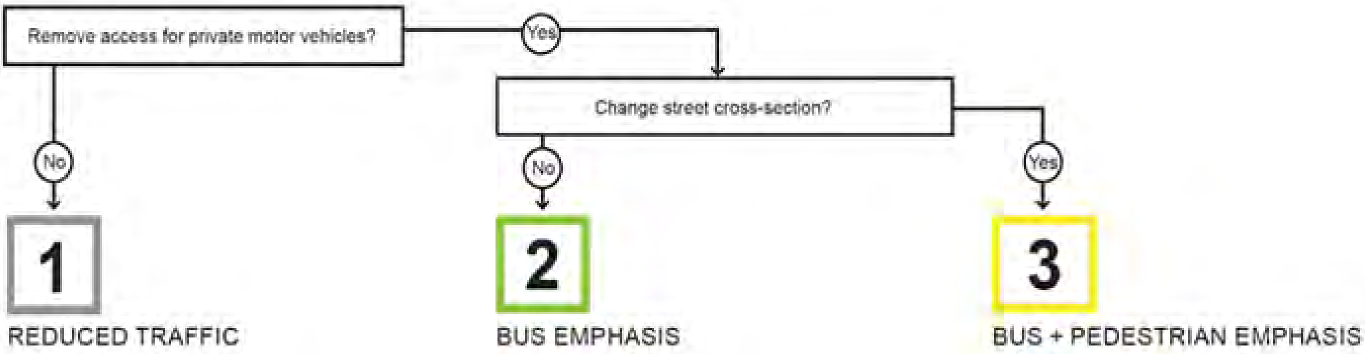
[12] See: https://lgwm.nz/assets/Documents/Technical-Documents/Golden-Mile/Golden-Mile-Short-List-Report-June-2020.pdf

to provide unlimited capacity for increased bus volumes along the Golden Mile as long as bus stops are retained, particularly at the key pinch points of Willis Street and Manners Street

- A reduction in carriageway from four lanes to two lanes on Lambton Quay and Courtenay Place would provide the greatest opportunity for improvements for pedestrians, cyclists and public realm. However, there would need to be a trade-off between providing for these activities and improving bus efficiency, which may involve the use of indented or off-line bus stops while maintaining a two lane bus carriageway elsewhere, and
- The restriction of PMVs on Courtenay Place and Willis Street (south of Mercer Street) would provide opportunities for implementation of WCC's Strategic Cycle Network Plan.

Based on the above conclusions, and in order to further differentiate between the 12 scenarios, the Golden Mile Project Team developed a "decision-making tree" to help package the scenarios into short-listed options. This decision-making tree comprised of the two strategic questions as set out in Figure 6 below:

Figure 6: Decision-making tree



If the response to Question One (i.e. whether to retain or remove PMVs from the Golden Mile) was "no", then long list scenario combination of 1CW7 was identified to be pursued (referred to as the Reduced Traffic Option).

If, however the answer was "yes" to removing PMVs, then the next question related to whether the existing cross sections (i.e. on Lambton Quay and / or Courtenay Place) should be retained or the extra space (e.g. from the removal of indented bus stops) be converted to additional pedestrian and / or public realm space. If the response was to retain the existing cross sections, then long list scenario combination 2BX8 was identified to be pursued (referred to as the Bus Emphasis Option). If, however the response was to convert the extra space to additional pedestrian pavement / public realm, then long list scenario combination 3BX9 was identified to be pursued (referred to as the Bus + Pedestrian Emphasis Option).

In summary, the Golden Mile Project Team's responses to the decision-making tree process enabled the following three scenarios to be identified (which were renamed as options in the Short List Report):

- Scenario 1CW7 (which was renamed Option 1)

  Key features of this option included: restricting PMV movements; consolidation of bus stops; removal of on-street car parks; relocation of loading bays / taxi stands to side roads; closure of side road ends; and, creation of new spaces for pedestrians / public realm.

- Scenario 2BX8 (which was renamed Option 2)

  Key features of this option included: removal of PMV access; provision of two bus lanes in each direction on Courtenay Place and Lambton Quay; consolidation of bus stops; removal of on-street car parks; relocation of loading bays / taxi stands to side roads; closure of side road ends; and, creation of new spaces for pedestrians / public realm.

- Scenario 3BX9 (which was renamed Option 3)

  Key features of this option included: removal of PMV access; provision of two dedicated bus lanes along the entire Golden Mile; consolidation of bus stops; removal of on-street car parking; relocation of loading / taxi bays to side roads; closure of side road ends; creation of significant new spaces for pedestrians / public realm; and, dedicated cycling opportunities (e.g. Courtenay Place).

Prior to undertaking final MCA processes for the above short-listed options, LGWM identified that community feedback on the options was needed before decisions on option preferences could be identified. To help inform community engagement, the Golden Mile Project Team also developed high level implementation costs and economic benefits / disbenefits information.

In terms of the high-level implementation costs (real)[13] for each option: Option 1 was identified as expecting to cost between $15M and $23M; Option 2 was expected to cost between $21M and $32M; and Option 3 was expected to cost between $52M and $79M.

Table 1 summarises the high level indicative economic benefits / disbenefits[14] that were identified in the Short List Report for each of the options.

Table 1: Short List Report's indicative benefits / disbenefits for the short-listed options (over a 40-year evaluation period)

Benefits / disbenefits	Option 1	Option 2	Option 3
Bus travel time and reliability benefits[15]	$15M to $22M	$50M to $75M	$40M to $65M
Pedestrian travel time benefits	$4M to $7M	$9M to $14M	$15M to $21M
Public realm benefits	$4M to $6M	$4M to $6M	$55M to $85M
General traffic (dis)benefits[16]	-$3M to -$4M	-$6M to -$9M	-$6M to -$9M
Benefit Cost Ratio Range	1.2 – 3.0	1.5 – 6.0	1.2 – 8.5

[13] It is noted that the cost estimates identified in the Short List Report were not based on design drawings and excluded operational and maintenance costs and the costs associated with any wider network improvements to address traffic redistribution. However, high level footpath / streetscaping costs were included in the cost estimates

[14] General traffic disbenefits do not assume any mode shift away from general traffic to more favourable modes. As such this estimation of disbenefits should be considered conservative

[15] It is noted that the bus travel time / reliability benefits identified are indicative only and are expected to change as the SSBC is further developed. Future refinements include accounting for bus-on-bus delay / variability changes, improving traffic on bus delay / variability, refining bus travel time reliability benefit forecasting and modelling changes in bus stop boarding and alighting patterns

[16] Only the disbenefits for Willis Street were calculated for the Short List Report

8. Community Engagement

Community engagement on the short-listed options was undertaken from June to August 2020. As noted in Section 7, one of the key purposes of the community engagement programme was to provide the community with an opportunity to comment on each of the options before undertaking final MCA and LGWM decision making processes.

This section of the report provides a brief overview of the engagement feedback received on the short-listed options. Further information on the findings of the engagement programme can be found in the *Golden Mile Engagement Summary Report*[17].

It is noted that for the purposes of the community engagement programme, the short-listed options were referred to as concepts (rather than options). A summary of the concept descriptions for the engagement programme are provided in Table 2 below. In addition, each concept's indicative cross section for Lambton Quay and Courtenay Place are provided in Table 3 below.

[17] See: https://lgwm.nz/assets/Documents/Technical-Documents/Early-Interventions/Golden-Mile-engagement-report-June-August-2020.pdf

Table 2: Summary descriptions for each of the concepts identified for the Golden Mile Community Programme

<table>
<tr><th>Concept One: “Streamline” (i.e. Short Listed Option 1)</th><th>Concept Two: “Prioritise” (i.e. Short Listed Option 2)</th><th>Concept Three: “Transform” (i.e. Short Listed Option 3)</th></tr>
<tr>
<td>

Key features:

- PMV access retained (except for Manners Street, east of Cuba Street), some turning restrictions would apply on Lambton Quay
- Ends of Blair, Allen, Cuba and Mercer Streets closed
- Loading zones and taxi stands relocated to side streets
- On-street car parking removed

  (removal of on-street car parks and relocation of loading bays / taxi stands would provide a combined 30% more footpath space)
- Bus stops consolidated to improve bus reliability [a maximum five-minute walk to a bus stop (for someone walking at an average speed)], and
- Emergency vehicle access would be allowed 24 / 7

</td>
<td>

Key features:

- PMV access removed
- Two bus lanes in each direction on Courtenay Place and Lambton Quay
- Ends of Blair, Allen, Cuba and Mercer Streets closed
- Ends of Ballance, Stout, Waring Taylor, Johnson, Brandon and Panama Streets closed
- Loading zones and taxi stands relocated to side streets
- On-street car parking removed

  (removal of on-street car parks and relocation of loading bays / taxi stands would provide a combined 30% more footpath space)
- Bus stops consolidated to improve bus reliability [a maximum five-minute walk to a bus stop (for someone walking at an average speed)], and
- Emergency vehicle access would be allowed 24 / 7.

</td>
<td>

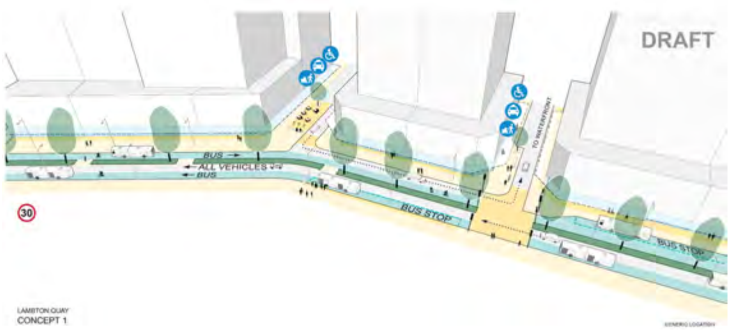
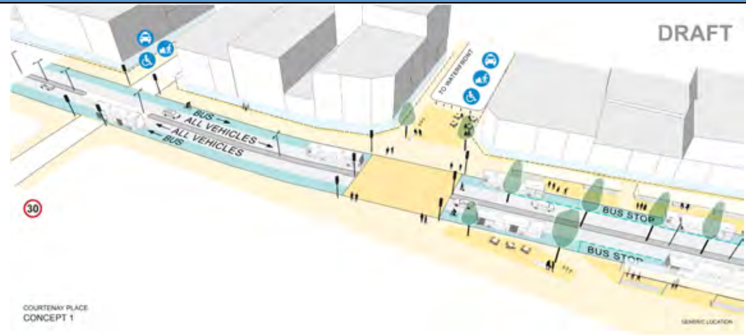
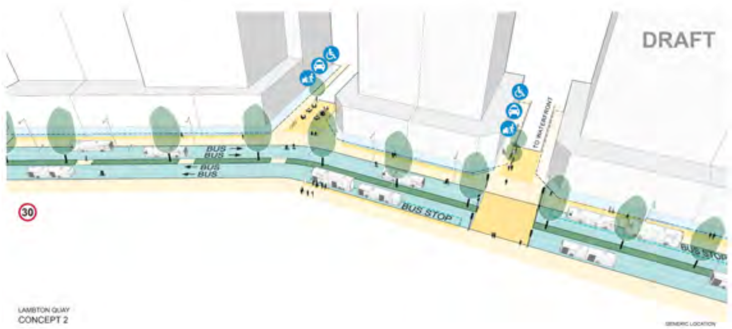
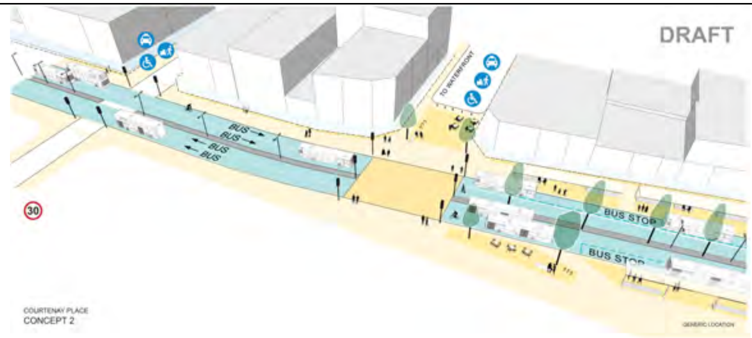
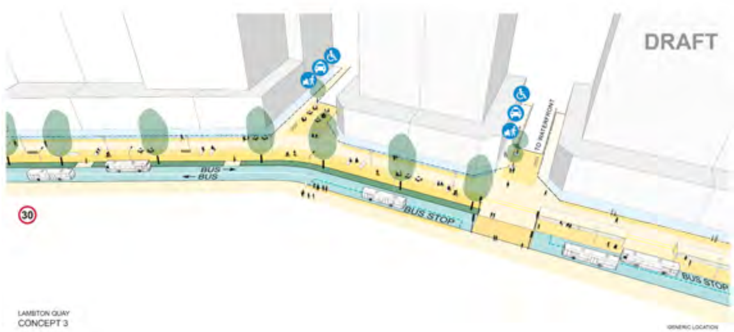
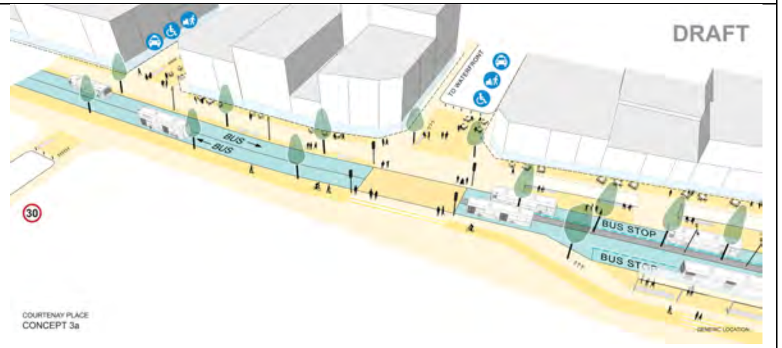
Key features:

- PMV access removed
- One bus lane in each direction along the entire Golden Mile (bus stops would be located “in-line”)
- Ends of Blair, Allen, Cuba and Mercer Streets closed
- Ends of Ballance, Stout, Waring Taylor, Johnson, Brandon and Panama Streets closed
- Ends of Tory Street closed
- Option to provide a dedicated or shared space for cyclists and fast active modes (e.g. e-scooters) on Courtenay Place and Lambton Quay (north of Panama Street)
- Loading zones and taxi stands relocated to side streets
- On-street car parking removed

  (removal of on-street car parks and relocation of loading bays / taxi stands would provide a combined 75% more footpath space)
- Bus stops consolidated to improve bus reliability [a maximum five-minute walk to a bus stop (for someone walking at an average speed)], and
- Emergency vehicle access would be allowed 24 / 7.

</td>
</tr>
</table>

Table 3: Indicative cross sections for Lambton Quay and Courtenay Place identified in the Golden Mile Community Programme

	Lambton Quay Indicative Cross Section Layout	Courtenay Place Indicative Cross Section Layout
Concept One: “Streamline” (i.e. Short Listed Option 1)		
Concept Two: “Prioritise” (i.e. Short Listed Option 2)		
Concept Three: “Transform” (i.e. Short Listed Option 3)		

The key engagement questions asked by the community engagement programme included:

- What do you like about each concept and why?, and
- What don't you like about this concept and why?

Feedback was also sought on what people thought about providing extra space for cyclists and fast active modes, allowing certain vehicles (such as taxis, delivery and maintenance vehicles) to access the Golden Mile and how they would like to see the extra space at the end of closed side roads used.

8.1 Summary of Community Feedback

The key comments received for each concept (and the other questions asked) are summarised below:

8.1.1 Concept One

The key comments received on Concept One are summarised as follows:

- Some liked its balance, that it retains some general traffic while providing some improvements at a reasonable cost and would have least impact on retail / business activity, and
- Some didn't like that it wouldn't lead to significant change.

8.1.2 Concept Two

The key comments received on Concept Two are summarised as follows:

- Some liked the removal of PMVs, and it was a good step-up from Concept One
- Whilst some liked the proposal of giving public transport priority, some questioned whether two bus lanes in each direction on Lambton Quay and Courtenay Place was the best way to achieve this outcome. Key concerns included safety for people crossing the road and whether it was the best allocation of corridor space, and
- Others didn't like the removal of PMVs, on-street car parks and loading zones as they felt that these measures would have negative impacts on retail / business activity and personal security.

8.1.3 Concept Three

The key comments received on Concept Three are summarised as follows:

- Some liked the significant increase in pedestrian space, along with the provision of space for cycling and fast active modes
- Some were concern that removal of PMVs, on-street parking and loading zones would have negative impacts on local businesses and personal security
- Some felt that the design, particularly closing ends of side roads, would attract more people and result in additional economic benefits
- Some raised concerns that having only one bus lane in each direction would mean buses may not be able to overtake each other, particularly at the in-line bus stops, which would slow bus journeys down, and
- Some noted that this concept had the highest costs and that moving to this concept could be undertaken over time to help manage costs and impacts.

8.1.4 Other Comments

Other key comments received that did not specifically relate to a concept included:

- Some were supportive of consolidating the number of bus stops (noting that the current bus stop configuration was impacting on bus travel times / reliability). Others were less supportive of consolidating bus stops, expressing concern that people with limited mobility would be negatively impacted
- Some were supportive of having new space made available for cycling and other fast active modes along both Lambton Quay and Courtenay Place. However, most felt it was important that such facilities were physically separated from other modes, as it would be safer and would attract more users, and
- Some were supportive of retaining service vehicles at certain times of the day / night on the Golden Mile.

Overall, nearly 2000 people commented on the short-listed options, with the majority expressing a preference for Concept Three for Lambton Quay, Willis Street and Courtenay Place (people weren't asked to specifically comment on Manners Street). The majority also supported providing cycling facilities and retaining loading bays / taxis stands on the Golden Mile (or were supportive of allowing taxis to use the Golden Mile at certain times of the day / night).

However, the retail and hospitality business sectors did express concern that the concepts or certain aspects of the concepts (e.g. reducing on-street parking, PMV access and or service vehicle access), would impact negatively on retail / business activity. The impacts and future uncertainties of Covid-19 heightened these concerns.

8.1.5 Post Community Engagement Programme Discussions

During November 2020, LGWM undertook further engagement with some submitters to improve its understanding of their submissions. The key themes to emerge from this additional engagement included:

- The ability for businesses, particularly hospitality and retail, to be serviced via loading zones and / or "drop off" zones was important
- The ability of some large commercial vehicles currently servicing the Golden Mile to turn around if restricted to side road access
- Time of day service vehicle restrictions could be supported if the hours worked for the retailers / businesses and service delivery companies
- Support for alternative parking arrangement options. Some noted that easy and accessible car parking is required to encourage patrons to the city and to support retail and hospitality industries (e.g. replace the Golden Mile on-street car parks with new and affordable car parks that are located near the Golden Mile)
- There are a high number of "CBD workers" working from home following Covid-19, and there is uncertainty as to how many of them will eventually return, and what reduced worker numbers "might look like" for the future of the Golden Mile
- Designs for the pedestrian space and new urban amenity areas needed to encourage / enhance foot traffic and to provide for green infrastructure. Some believed that good urban design improvements would in turn support the retail and hospitality sectors, and
- Disability parks should be kept as close as possible to the Golden Mile (e.g. on either side streets or provide "drop off" zones on the Golden Mile).

9. MCA Methodology for Assessing the Short-Listed Options

This section of the report summarises the MCA processes and outcomes of the final MCA process for the short-listed options for the Golden Mile Project. The key purpose of undertaking this MCA was to help identify option preferences for each section of the Golden Mile to be advanced to the second stage of the SSBC.

It is important to note that an MCA is just a tool to help probe the dimensions of a problem and inform decision-making. It is not the “decisionmaker” itself. For example, affordability and funding availability may well be key determinants for LGWM when making final option selections.

9.1 MCA Assessment Criteria and MCA Assessors

The first key step in the MCA process was to select the relevant MCA assessment areas for evaluating the short-listed options, and then, to select the expert MCA assessors who would undertake each assessment. It is noted that the assessment criteria and selection of the MCA assessors was undertaken in accordance with the LGWM’s MCA guidelines framework.

The assessment criteria and MCA assessor’s organisations are set out in Table 4 below.

Table 4: Assessment areas and summary descriptions

Assessment criteria	Assessment description summary	FutureGroup assessor's organisation
Delivery on investment objectives		
Bus Travel Time and Reliability (i.e. Investment Objective 1)	This assessment criteria evaluated: • Bus travel times – by corridor or link, and • Bus reliability – by corridor or link.	Stantec
Bus Passenger Boarding and Alighting Comfort and Convenience (i.e. Investment Objective 2)	This assessment criteria evaluated: • Walking distances to stops • Bus service rates • Customer wait times, and • Bus stop crowding.	Stantec
Pedestrian Safety (i.e. Investment Objective 3)	This assessment criteria evaluated the effect on: • Pedestrian safety, and • Pedestrian safety on adjacent streets where traffic is expected to be re-routed.	Stantec
Pedestrian Capacity (i.e. Investment Objective 4)	This assessment criteria evaluated the effect on: • Pedestrian level of comfort • Pedestrian delay, and • Bus stop occupancy.	Stantec
Improve Place Quality (i.e. Investment Objective 5)	This assessment criteria evaluated the following four attributes of urban amenity: • Composition • Comfort • Connectedness, and • Activity.	Boffa Miskell

Assessment criteria	Assessment description summary	FutureGroup assessor's organisation
Effects		
Social	This assessment criteria evaluated the effect on • Equitable access to social and economic opportunities (e.g. employment, health and cultural opportunities), and • Social connectedness.	WSP
Retail Impacts	• This assessment evaluated the current state and future expected impacts of the short-listed options on Golden Mile retail activity.	Ernst Young (EY)
Cycling Level of Service	This assessment criteria evaluated the effect on: • Cycling level of service, and • Perceived safety and comfort of cycling on the Golden Mile.	WSP
General (Road) Safety	• This assessment criteria evaluated the likely effects on road safety, and on those adjacent streets to where traffic is expected to be re-routed.	Stantec
Sustainability	This assessment criteria evaluated the short-listed options as follows: • Alignment with sustainability policy, strategy and guidance • Lower vehicle kilometres travel (VKT) in transport system • Extent and appeal of cycling • Large scale physical works • Opportunity for green infrastructure and vegetated street • Sufficient area for pedestrian and active modes priority, and • Opportunity for tactical urbanism.	WSP
Fit with LGWM Programme	This assessment criteria evaluated: • Project Interface: alignment or conflict with the other LGWM packages (e.g. MRT alignment, MRT interchange, City Streets), and • Flexibility / ability to integrate / potential scale of rework.	WSP

Assessment criteria	Assessment description summary	FutureGroup assessor's organisation
Delivery, Operations and Maintenance		
Delivery	This assessment criteria evaluated potential construction impacts on: • Duration of delivery • Pedestrians during delivery • Bus operations during delivery • Retail (during construction), and • Access to and servicing of private buildings (i.e. deliveries, removals and building maintenance).	WSP
Operations and Maintenance	This assessment criteria evaluated the effect on: • Public operational costs (e.g. maintenance, refuse collection, street cleaning and landscape maintenance) • Ability to accommodate utilities and services repairs and renewals • Ability to re-route bus services due to major planned and unplanned events • Ability for buses to pass a broken-down vehicle • Ability to accommodate marches and events • The flexibility of future corridor use (movement and place) • Emergency services response times / effectiveness, and • Operational cost.	WSP
Timeframe for Delivery	This assessment criteria evaluated: • Ability to demonstrate tangible improvements (outputs) within the 2018-21 / 2021-24 period, and • Ability to demonstrate tangible improvements (benefits) within the 2018-21 / 2021-24 period.	WSP

Assessment criteria	Assessment description summary	FutureGroup assessor's organisation
Cost, benefits, and value for money		
Cost Estimate Ranges	This assessment criteria evaluated the cost (real) range estimates for the short-listed options.	WSP
Benefit / Disbenefit Range	This assessment criteria evaluated the net benefit ranges for the short-listed options, taking into account: • Car travel time (dis)benefits • Public transport travel time benefits (excluding congestion impacts from vehicles and other buses) • Public transport reliability benefits (limited to signal timing variations) • Pedestrian realm benefits, and • Pedestrian travel time benefits (from reduced delays at removed side street signalised crossings).	MRCagney
Value for Money	This assessment criteria evaluated the Benefit Cost Ratio (BCR) ranges for the short-listed options.	MRCagney

9.2 Preparing for the MCA Assessments

In order to prepare for the MCA Workshop, two pre-workshop briefings were held with the MCA assessors to outline the "MCA instructions".[18] In summary, these instructions included the following:

- An MCA workshop would be held on Monday 30 November 2020 [which would adopt the *Decision Conferencing* approach (i.e. where scoring and weightings are identified through discussion and consensus, but informed by expert views)]
- The option drawings to be evaluated were the corridor diagrams identified in the Golden Mile Short List Report[19]. These drawings are replicated in **Appendix A** of this report
- Where possible, the assessments should be evidence based (e.g. using quantitative information) to inform the MCA assessor's overall assessment
- The rationale or logic (e.g. methodology) underpinning each assessment needs to be transparent, simple and easily understandable
- The assessment is to primarily focus on the performance of each option within the next ten years (i.e. prior to the MRT package coming online)
- The short-listed options were to be compared against the do-minimum scenario (it is noted that each MCA assessor were also asked to be familiar with the Golden Mile's key project assumptions)
- The short-listed options were to be evaluated on a section-by-section basis (e.g. Lambton Quay, Willis Street, Manners Street and Courtenay Place)
- To provide comment on the impacts of the short-listed options: if loading bays on the Golden Mile were to be retained: if a combination of loading bays / taxi stands were to be retained on the Golden Mile; if north / south through traffic at the Tory Street / Courtenay Place intersection was to be retained for Option 3; and the impacts on faster active modes (e.g. cyclists and e-scooters)
- A 7-point scoring system was to be used to score each option as set out in Table 5 below:

Table 5: 7-point scoring system

Score	Scoring Description	Definition
3	Large Positive	Major positive impacts resulting in substantial and long-term improvements or enhancements of the existing environment.
2	Medium Positive	Moderate positive impact, possibly of short-, medium- or long-term duration. Positive outcome may be in terms of new opportunities and outcomes of enhancement or improvement.
1	Slight Positive	Minimal positive impact, possibly only lasting over the short term. May be confined to a limited area.
0	Neutral	Neutral - no discernible or predicted positive or negative impact.
-1	Slight Negative	Minimal negative impact, possibly only lasting over the short term, and definitely able to be managed or mitigated. May be confined to a small area.

[18] It is noted that key members of LGWM and its subject matter experts attended the second specialist briefing No. 2 held on 1 November 2020
[19] Golden Mile Short List Assessment Report (2020), Appendix E

Score	Scoring Description	Definition
-2	Medium Negative	Moderate negative impact. Impacts may be short, medium or long term and are highly likely to respond to management actions.
-3	Large Negative	Impacts with serious, long-term and possibly irreversible effect leading to serious damage, degradation or deterioration of the physical, economic, cultural or social environment. Required major rescope of concept, design, location and justification or requires major commitment to extensive management strategies to mitigate the effect.

- All scoring was to be absolute (that is, no artificial distinctions were to be made between the options)
- The do-minimum scenario would automatically receive a score of zero (0)
- The costs, benefits and value for money criteria would be considered in the MCA spreadsheet (and evaluation outcomes presented), but would not be assigned specific scores, and
- Weightings would be applied to the unweighted (i.e. raw) scores for sensitivity testing purposes (e.g. workshop weightings).

At both pre-workshop briefings, a summary of the outcomes of the Golden Mile Community Engagement Report was provided (as summarised above in Section 8), as well as a copy of the full report.

9.2.1 Key Project Assumptions and the Do-Minimum

A project assumption and do-minimum briefing note was prepared to inform the MCA assessment process. The purpose of this note was to firstly identify the Golden Mile Project's key assumptions (relevant to the MCA), so they could be understood prior to each MCA assessor undertaking their option assessments. Secondly, and as noted above, the purpose of developing the do-minimum scenario was to enable the MCA assessors to compare the short-listed options against a "base case" option.

The *Golden Mile Project assumption and Do-minimum* Briefing Note is attached as **Appendix B** and summarised below.

9.2.1.1 Key Project Assumptions

The key project assumptions are summarised as follows:

- Bus vehicle capacity on the Golden Mile is finite and the total number of buses served by the Golden Mile will be constrained. As such, it is assumed that bus volumes on the Golden Mile are capped at 100 buses per hour per direction, and any additional bus services over this cap will be accommodated on a second north-south bus corridor
- Option development was to be undertaken in accordance with the Golden Mile Vision 2036 Statement, and there is a general acceptance of lower / less PMV access and a reduction / removal of on-street parking
- MRT would not be on the Golden Mile (although it is expected that there would be an "integration point" at the Courtenay Place / Taranaki Street intersection)
- Despite MRT's future capacity potential, the Golden Mile bus route will still provide significant carrying capacity and would continue to be a high-quality public transport spine in the future

- Property acquisition was not anticipated, and options were to be developed to sit within the existing road corridor
- The assumed design year for travel demand and public transport patronage is 2036
- Public transport patronage and growth would return to pre-Covid growth projections by 2036
- Patterns of employment and employment distribution would return to pre-Covid levels by 2036
- Rates of car ownership and vehicle operating costs would remain consistent with existing forecasts, and
- There would be no change in temporal demands, with AM and PM peak demand periods continuing into 2036.

The following measures were specifically excluded from the Golden Mile Project:

- Changes to fares and pricing structures of bus and / or taxi services
- Changes to bus fleet (including use of high-capacity buses beyond those already in use)
- Changes to bus routes, services and timetables
- The addition of new car parks, changes to car park pricing or parking strategies beyond the extent of the Golden Mile, and
- Major grade separation works (e.g. elevated structures) and / or changes to roads or intersections beyond the extent of the Golden Mile.

9.2.1.2 Do-minimum Scenario

The key aspects of the do-minimum scenario are summarised as follows:

- Design year is 2036
- Population for Wellington City to increase from 211,000 (2018) to 240,000 by 2036 (refer to Appendix B for additional population forecasts)
- Employment in the CBD to grow from 96,000 (2018) to 112,000 by 2036 but the additional trip demand is expected to be accommodated by non-PMV modes
- Public transport patronage in the CBD to increase from 28,000 (2016) to 37,000 by 2036
- Pedestrian growth in the CBD to grow from 11,000 (2019) to 13,500 by 2036
- Cyclist volumes in the CBD are expected to grow from 1000 to 2000 per day by 2036
- There will be little change in PMV volumes by 2036
- Total trip volumes to the CBD are expected to increase from 82,000 to 96,000 with the additional trip demand expected to be accommodated by non-PMV modes (PMV mode share is to reduce from 50 to 44 per cent, public mode share to increase from 35 to 39 per cent, and active mode share to increase from 15 to 18 per cent)
- Bus flows in the AM peak (October 2020) includes 88 buses per hour northbound and 81 buses per hour southbound. GWRC has brought 25 additional buses that will be fully operational by 2022. This will result in 101 buses per hour northbound and 93 buses per hour southbound by 2022
- The bus volume capacity of the Golden Mile is “capped” at 100 vehicles per hour per direction (any additional buses over this cap will be accommodated on alternative routes / corridors), and

- The following features of the Golden Mile will remain unchanged:
  - land use mixes
  - road cross sections, lane configurations and use of space
  - loading, parking, taxi stands and disability parking bays
  - location and extent of pedestrian crossings, and
  - configuration of traffic movements and controls / intersections.

10. Evaluating the Short-Listed Options

This section of the report sets out the outcomes of each MCA assessor's evaluation of the short-listed options (that were undertaken in accordance with the process steps outlined in Section 9.2 above).

The MCA Workshop for the Golden Mile was held on Monday 30 November 2020. It was attended by the MCA assessors, key members of the Golden Mile Project Team, observers from LGWM as well as representatives from Taranaki Whānui and Ngāti Toa. The names of those who took part in the MCA Workshop are provided in **Appendix C**.

The outcomes of the MCA assessors unweighted (i.e. raw) scores for each short-listed option are set out in Table 6 below. Each MCA assessor's individual unweighted scores are then summarised in the commentary that follows this table (the assessors detailed reports can be found in the relevant appendices).

The cost estimate ranges, net benefit and value for money criteria (i.e. BCR ranges) assessments are presented in Table 6 below, however as noted above, these were not assigned specific scores.

For the purposes of the MCA, as there were no differentiators between the short-listed options for Manners Street (e.g. PMVs removed, end of Lower Cuba Street closed, loading bays relocated), just one score was provided for a Manners Street "All Options" option.

Table 6: MCA assessor unweighted (i.e. raw) option scores

Assessment area	Lambton Quay				Willis Street				Manners Street		Courtenay Place			
	Do-Minimum	Option 1	Option 2	Option 3	Do-Minimum	Option 1	Option 2	Option 3	Do-Minimum	All Options	Do-Minimum	Option 1	Option 2	Option 3
Delivery of Objectives														
Bus Travel Time and Reliability	0	1	2	1	0	1	2	2	0	1	0	1	2	2
Bus Passenger Boarding and Alighting Comfort and Convenience	0	1	3	2	0	1	1	2	0	1	0	2	3	2
Pedestrian Safety	0	1	0	2	0	1	1	1	0	1	0	1	0	2
Pedestrian Capacity	0	1	2	2	0	1	1	2	0	1	0	1	2	2
Improve Place quality	0	0	1	3	0	1	1	1	0	0	0	0	1	3
Effects														
Social	0	0	1	3	0	1	2	3	0	0	0	1	2	3
Retail Impacts	0	1	1	2	0	1	1	2	0	0	0	1	1	1
Cycling Level of Service	0	1	1	3	0	0	0	-1	0	-1	0	1	1	3
General (Road) Safety	0	1	1	2	0	1	1	1	0	1	0	1	1	2
Sustainability	0	1	1	3	0	1	1	3	0	0	0	1	1	3
Fit with LGWM Programme	0	0	3	3	0	-1	-1	-1	0	0	0	2	3	2
Delivery, maintenance, and operations														
Delivery	0	-1	-1	-2	0	-1	-1	-2	0	-1	0	-1	-1	-2
Operations and Maintenance	0	-1	-2	-3	0	-1	-2	-3	0	-1	0	-1	-2	-3
Timeframe for Delivery	0	2	2	2	0	2	2	2	0	2	0	2	2	2
Final scores and rankings														
Total scores	0	8	15	23	0	8	9	12	0	4	0	12	16	22
Final rankings		3rd	2nd	1st		3rd	2nd	1st		All Options		3rd	2nd	1st

Cost, benefit, and value for money ranges			
Assessment criteria	**Option 1**	**Option 2**	**Option 3**
Cost estimates range (real)	**\$15M - \$23M**	**\$21M - \$32M**	**\$52M - \$79M**
Discounted Costs (present value)	*\$14M - \$20M*	*\$19M - \$29M*	*\$47M - \$72M*
Benefit ranges (present value)	**\$31M– \$57M**	**\$42M - \$219M**	**\$87M - \$505M**
Indicative BCR ranges (i.e. value for money)	**1.6 – 4.2**	**1.5 – 12**	**1.2 - 11**

Individual benefit components	Option 1 (\$M)	Option 2 (\$M)	Option 3 (\$M)
Car travel time impact	-\$6.2 - \$4.8	-\$79 - \$37	-\$79 - \$37
Public transport travel time benefit	\$18 - \$24	\$26 - \$34	\$23 - \$30
Public transport reliability benefit	\$4.7 - \$6.1	\$9.1 - \$12	\$9.1 - \$12
Pedestrian realm benefits	\$11 - \$17	\$81 - \$128	\$122 - \$407
Pedestrian travel time benefits	\$3.1 - \$4.9	\$5.8 - \$9.4	\$13 - \$20

10.1 MCA Assessor Evaluation Summaries

This section of the report summarises each MCA assessor's evaluation and scores for their respective assessment criteria (further information on each assessment can be found in the relevant appendices).

10.1.1 Bus Travel Time and Reliability

The *bus travel time and reliability* assessment involved evaluating the short-listed options using the following key metrics:

- Travel times to assess bus journey times, and
- Standard deviation of travel time to evaluate travel time reliability.

To assess the above metrics, a journey-time model was developed to evaluate bus journeys along the corridor. This model is a physics-based monte-carlo model that modelled bus movements along the corridor under sub-optimal and optimal conditions. The journey-time model mathematically emulated the typical travel time of a bus through the corridor, incorporating delay points (such as intersections) and applied a probability of occurrence to each delay point where applicable (which was representative of the variability of signals etc). Delay was calculated assuming the deceleration, dwell and acceleration of a bus as it applied to each delay point.

The journey-time model took into account intersection and signal delay points (e.g. pedestrian signals) and assessed the AM and PM peaks for both the north and south movements (it excluded however congestion delay from mixed traffic operations and bus-on-bus delays).

The short-listed option scores for the *bus travel time and reliability* MCA assessment criteria are set out below in Table 7.

Table 7: Bus travel time and reliability option scores

Lambton Quay			Willis Street			Manners Street	Courtenay Place		
Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	All Options	Option 1	Option 2	Option 3
1	2	1	1	2	2	1	1	2	2

In addition to the above evaluation scores, the MCA assessment made the following observations for the short-listed options:

- The utilisation of a second bus spine and capping total bus numbers on the Golden Mile to 100 (as identified in the Do-Minimum scenario) is crucial for all options and in particular Option 3 where carriageway capacity is reduced
- All (options) would improve travel times when compared to the do-minimum scenario
- Generally, Options 2 and 3 have faster journey times across all time periods and directions of travel
- Reliability improves under all options, with Options 2 and 3 typically providing less variability in travel time
- There are marginal differences in journey times between Options 2 and 3
- The option of indenting bus stops might mitigate some of the negative features evident in Option 3 (e.g. buses stopping in-line), however additional space for longer bus bays is still required at the northern and southern ends of the Golden Mile
- Retaining loading bays could have minor impacts on bus journey times / efficiency (the impact would however depend upon final loading bay configurations and their associated restrictions)

- Taxis are generally considered a bigger impediment to bus operations than service vehicles, due to their poor conformity with regulations and a tendency to stop anywhere (taxi access is likely to be non-viable under Option 3 or restricted to access out of hours only), and
- There would be marginal impacts on bus travel times and operations if the Tory Street / Courtenay Place intersection was to remain open for north / south through movements in Option 3.

See **Appendix D** (Bus Travel Time, Reliability, Comfort and Convenience Report) for the relevant evaluation report.

10.1.2 Bus Passenger Boarding and Alighting, Comfort and Convenience

The *bus passenger boarding / alighting, comfort and convenience* assessment involved evaluating the short-listed options using the following key metrics:

- Catchment areas to assess walking distances to bus stops
- Buses per hour per stop to assess bus service rates
- Passenger wait time for assessing customer waiting times, and
- Number of waiting passengers and area occupied to assess bus stop crowding.

To assess the above, a bus stop model was developed to evaluate arrival and departure rates of buses at each stop, passenger wait times and passenger volumes. The model considered traffic congestion, the bus fleet mix and variable dwell times of buses as a result of passenger boarding and alighting.[20] The model also applied distribution of probabilities to reflect the variability of operations and to emulate:

- Intersection and signal delays
- Bus fleet composition
- Traffic congestion, and
- Variable passenger / bus dwell time.

In addition, a qualitative review of the option diagrams was undertaken to identify and score some of the unquantifiable aspects of the options such as bus stop amenity.

The short-listed option scores for the *bus passenger boarding / alighting, comfort and convenience* MCA assessment criteria are set out in Table 8 below.

Table 8: Bus passenger boarding / alighting, comfort and convenience option scores

Lambton Quay			Willis Street			Manners Street	Courtenay Place		
Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	All Options	Option 1	Option 2	Option 3
1	3	2	1	1	2	1	2	3	2

In addition to the above evaluation scores, the MCA assessment made the following observations for the short-listed options:

- Option 2 was likely to provide the least delay and highest throughput of buses on Lambton Quay and Courtenay Place
- Option 3 performs worse on Lambton Quay and Courtenay Place
- The configuration and location of bus stops on Willis Street under Option 3 provides increased customer amenity and accessibility when compared to Options 1 and 2

[20] It is noted that the bus stops were assessed in isolation and passenger route choice or arrival rates were not factored into the model

- Retention of general traffic northbound on Willis Street reduces the performance of bus stops under Option 1
- Courtenay Place West (Option 1 only) performs comparatively poorly
- The bus stop on Manners Street (at Cuba Street) is a key constraint for all options due to the limited cross section of Manners Street, which prevents buses from overtaking and limits space for waiting passengers and pedestrians. In addition, the proximity of the pedestrian crossing at the Manners / Lower Cuba Street intersection limits bus throughput at this location which exacerbates bus congestion, and
- Bus arrival and departure rates were sufficient to clear all forecast passenger volumes (i.e. there is no evidence of overcrowding).

The MCA assessment also made the following general observations applicable to all the short-listed options:

- Intersection and / or pedestrian crossing signal controls are the key controlling mechanisms for bus stops
- Accommodating PMVs in signal phasing significantly reduces bus throughput along the Golden Mile, particularly at the key entry and exit points at Bowen / Whitmore / Lambton and Cambridge Terrace / Courtenay Place
- Bus operation and service rates at bus stops could be moderated through the tactical use of signal controls and phasing
- Double decker buses are a key determinate of bus stop operation (e.g. increasing the number of double deckers is likely to degrade the operational profile), and
- Retaining loading bays or loading bays / taxis stands are likely to impede bus stop operations, and especially the Willis Street bus stops.

See Appendix D (Bus Travel Time, Reliability, Comfort and Convenience Report) for the relevant evaluation report.

10.1.3 Pedestrian and General (Road) Safety

Both the *pedestrian safety* and *general (road) safety* assessment criteria were examined using the following information:

- Historic crash data along the Golden Mile for a 5- and 10-year period to identify changing trends, if any (e.g. crash type, crash cause, user and vehicle types), and
- MCA assessor's route knowledge (including providing specific consideration to the WCC safety focus programmes for Manners and Willis Streets).

A key assumption for both safety MCA assessments was that future crashes would follow the same pattern as historic crashes (e.g. people would continue to "jaywalk").

See **Appendix E** (Pedestrian and General (Road) Safety Report) for the relevant evaluation report.

10.1.3.1 Pedestrian Safety

The MCA assessment identified pedestrian safety benefits and disbenefits. Disbenefits have been separated into two categories, Category 1: disbenefits are those that can be eliminated or minimised through good design and are shown in blue italic text, and Category 2: disbenefits that cannot be minimised through design and will remain. The benefits and disbenefits are summarised in the tables below.

Table 9: Pedestrian safety comments for Option 1

Golden Mile Section	Benefits	Disbenefits
Lambton Quay	Removal of some PMVs in southbound direction Removal of parking / loading	Northbound PMVs remain One-way traffic between Grey and Ballance Streets will increase risk to crossing pedestrians Service access provided in pedestrianised areas Side roads closed to vehicles, causing vehicles to reroute to uncontrolled roads
Willis Street	Right turn conflicts removed (i.e. Mercer Street)	No PMV reduction Most frontages will still be accessible to PMVs, increasing side friction risks for pedestrians
Manners Street	Manners / Cuba Street intersection closed to vehicles Closed to PMVs	Vehicles reroute to other uncontrolled roads Service access provided in pedestrianised areas
Courtenay Place	Some right turn conflicts removed (e.g. Allen Street) Removal of parking / loading	No PMV reduction Multiple lanes of traffic vs impaired pedestrians Side roads closed to vehicles, causing vehicles to reroute to uncontrolled roads Most frontages will still be accessible to PMVs, increasing side friction risks for pedestrians Service access provided in pedestrianised areas

Table 10: Pedestrian safety comments for Option 2

Golden Mile Section	Benefits	Disbenefits
Lambton Quay	PMVs removed Removal of parking / loading Side roads closed	Multiple bus lanes vs pedestrian crossings, other road users will also use the bus stop lane when unoccupied by buses (e.g. cyclists), this will require a higher alert levels from pedestrians Side roads closed to vehicles, causing vehicles to reroute to uncontrolled roads
Willis Street	PMVs removed Right turn conflicts removed (i.e. Mercer Street)	Vehicles reroute to uncontrolled roads

Golden Mile Section	Benefits	Disbenefits
Manners Street	Manners / Cuba Street intersection closed to vehicles	Service access provided in pedestrianised areas
Courtenay Place	PMVs removed Some right turn conflicts removed (e.g. Allen Street) Removal of parking / loading	Multiple bus lanes vs impaired pedestrians, other road users will also use the bus stop lane when unoccupied by buses (e.g. cyclists), this will require a higher alert level from pedestrians Side roads closed to vehicles, causing vehicles to reroute to uncontrolled roads Service access provided in pedestrianised areas

Table 11: Pedestrian safety comments for Option 3

Golden Mile Section	Benefits	Disbenefits
Lambton Quay	PMVs removed Removal of parking / loading Wider footpaths	Side roads closed to vehicles, causing vehicles to reroute to uncontrolled roads
Willis Street	PMVs removed Right turn conflicts removed (i.e. Mercer Street)	Vehicles reroute to uncontrolled roads Service access provided in pedestrianised areas
Manners Street	Manners / Cuba Street intersection closed to vehicles Closed to PMVs	Vehicles reroute to other roads Service access provided in pedestrianised areas
Courtenay Place	PMVs removed Right turn conflicts removed (e.g. Allen and Tory Streets) Removal of parking / loading Wider footpaths Dedicated median separated cycleway	Side roads closed to vehicles, causing vehicles to reroute to uncontrolled roads Service access provided in pedestrianised areas

The short-listed option scores for the *pedestrian safety* MCA assessment criteria are set out in Table 12.

Table 12: Pedestrian safety option scores

Lambton Quay			**Willis Street**			**Manners Street**	**Courtenay Place**		
Option 1	**Option 2**	**Option 3**	**Option 1**	**Option 2**	**Option 3**	**All Options**	**Option 1**	**Option 2**	**Option 3**
1	**1**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**2**

10.1.3.2 General (Road) Safety

The MCA assessment for general (road) safety also identified the benefits and disbenefits using the same categorisation method as used above for the pedestrian safety assessment. The benefits and disbenefits are summarised in the tables below.

Table 13: General (road) safety comments for Option 1

Golden Mile Section	Benefits	Disbenefits
Lambton Quay	Removal of some PMVs in southbound direction Removal of parking / loading	Northbound PMVs remain One-way traffic between Grey and Ballance Streets will increase risk to road users Increased bus stop lengths Increased side friction for cyclists Side roads closed to vehicles, causing vehicles to reroute to uncontrolled roads
Willis Street	Right turn conflicts removed (i.e. Mercer Street) Strategic cycleway along Dixon Street	No PMV reduction Increased bus stop lengths Increased side friction for cyclists Vehicles reroute to uncontrolled roads
Manners Street	Manners / Cuba Street intersection closed to vehicles Closed to PMVs Removes LMV vs bus crashes	Increased bus stop lengths Increased side friction for cyclists Vehicles reroute to other uncontrolled roads
Courtenay Place	Some right turn conflicts removed (e.g. Allen Street) Removal of parking / loading	No PMV reduction High bus vs PMV crash rate unchanged Increased bus stop lengths Increased side friction for cyclists Side roads closed to vehicles, causing vehicles to reroute to uncontrolled roads Most frontages will still be accessible to PMVs, increasing side friction risks for road users

Table 14: General (road) safety comments for Option 2

Golden Mile Section	Benefits	Disbenefits
Lambton Quay	PMVs removed Removal of parking / loading	Cyclists mixing with two lanes of buses Increased bus stop lengths

Golden Mile Section	Benefits	Disbenefits
		Increased side friction for cyclists Side road closed to vehicles, causing vehicles to reroute to uncontrolled roads
Willis Street	PMVs removed Right turn conflicts removed (i.e. Mercer Street) Strategic cycleway along Dixon Street	Increased bus stop lengths Increased side friction for cyclists Vehicles reroute to uncontrolled roads
Manners Street	Manners / Cuba Street intersection closed to vehicles Closed to PMVs Removes PMV vs bus crashes	Merge conflicts - Courtenay into Manners (two lanes into one) Increased bus stop lengths Increased side friction for cyclists Vehicles reroute to other uncontrolled roads
Courtenay Place	High bus vs PMV crashes removed Some right turn conflicts removed (e.g. Allen Street) Removal of parking / loading	Multiple bus lanes vs other road users Cyclists mixing with two lanes of buses Increased bus stop lengths Increased side friction for cyclists Side road closed to vehicles, causing vehicles to reroute to uncontrolled roads

Table 15: General (road) safety comments for Option 3

Golden Mile Section	Benefits	Disbenefits
Lambton Quay	PMVs removed Removal of parking / loading	Increased bus stop lengths Increased side friction for cyclists Side roads closed to vehicles, causing vehicles to reroute to uncontrolled roads
Willis Street	PMVs removed Right turn conflicts removed (Mercer Street) Strategic cycleway along Dixon Street	Increased bus stop lengths Increased side friction for cyclists Vehicles reroute to uncontrolled roads
Manners Street	Manners / Cuba Street intersection closed to vehicles Closed to PMVs Removes PMV vs bus crashes	Merge conflicts - Courtenay into Manners (two lanes into one) Increased bus stop lengths Increased side friction for cyclists

		Vehicles reroute to other uncontrolled roads
Courtenay Place	High bus vs PMV crashes removed Right turn conflicts removed (e.g. Allen and Tory Streets) Removal of parking / loading	Removal of central median, increasing risk of head on collisions Increased bus stop lengths Increased side friction for cyclists Side roads closed to vehicles, causing vehicles to reroute to uncontrolled roads

The short-listed option scores for the *general (road) safety* MCA assessment criteria are set out in Table 16.

Table 16: General (road) safety option scores

Lambton Quay			**Willis Street**			**Manners Street**	**Courtenay Place**		
Option 1	**Option 2**	**Option 3**	**Option 1**	**Option 2**	**Option 3**	**All Options**	**Option 1**	**Option 2**	**Option 3**
1	**1**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**2**

10.1.4 Pedestrian Capacity

The *pedestrian capacity* assessment involved individually assessing / scoring the following criteria in order to ascertain overall option scores for the pedestrian capacity assessment criterion:

- Pedestrian level of comfort
- Pedestrian delay, and
- Bus stop occupancy.

10.1.4.1 Pedestrian Level of Comfort

Pedestrian level of comfort was assessed using the Transport of London (TfL) Pedestrian Comfort Guidance, and was undertaken via the following key steps:

- Step 1: The Golden Mile was divided into sections based on footpath width changes (using the Golden Mile Topographical Survey data as the base case)
- Step 2: Each section was categorised using the TfL's "High Street" category process (e.g. areas dominated by retail, food and drink)
- Step 3: Street furniture that would reduce level of comfort was identified, and
- Step 4: Pedestrian counts for the peak and average hour by section were identified (i.e. the 2016 Active Mode Visualisation counts scaled up using March Monitoring data).

Using the 7-point scoring system, the outcomes of the pedestrian level of comfort assessment are set out below in Table 17.

Table 17: Pedestrian level of comfort scores

Golden Mile Section	Option 1	Option 2	Option 3
Lambton Quay	**2**	**2**	**2**
Willis Street	**0**	**0**	**2**
Manners Street	**0**	**0**	**0**
Courtenay Place	**1**	**1**	**1**

The scores set out in the above table were based on the percentage improvements and compared to the existing situation. The assessment noted that whilst the increase in footpath widths (proposed for all options) provides improvements, the existing situation does already provide a good overall level of comfort. Despite this finding, the assessment did identify that extra footpath space on Lambton Quay would result in the greatest levels of service improvements. Option 3 on Willis Street would also result in a step change in level of service, reflecting the width improvements proposed.

10.1.4.2 Pedestrian Delay

This assessment criteria comprised quantifying pedestrian delay along and across the Golden Mile using the "Pretty's Method" (as per the Highways Control Manual[21]). The assessment was undertaken via the following key steps:

- Step 1: All legal crossing opportunities for pedestrians were identified
- Step 2: Each crossing location was categorised as either signalised, unsignalised or zebra
- Step 3: Residual available walking space calculated (once bus stop queuing space was subtracted)
- Step 4: Delay at unsignalised / zebra crossings were estimated (across was 20 seconds and along was 10 seconds), and
- Step 5: Identification of the number of pedestrians crossing at each location.

Using the 7-point scoring system, the pedestrian delay evaluation assessment is set out below in Table 18.

Table 18: Pedestrian delay option scores

Golden Mile Section	Option 1	Option 2	Option 3
Lambton Quay	**1**	**3**	**3**
Willis Street	**2**	**2**	**2**
Manners Street	**2**	**2**	**2**
Courtenay Place	**1**	**2**	**2**

The scores set out in the above table were based on the percentage improvements and compared to the existing situation. For Lambton Quay, Options 2 and 3 scored 3s as they would both have more side road areas converted to pedestrian space and reduced delays. For Willis and Manners Streets, side road closures and signal time reductions would result in pedestrian delay reductions (so all received scores of 2). For Courtenay Place, Option 3 was considered slightly better than Option 2 due to the ends of Tory

[21] See: http://www.trb.org/Main/Blurbs/175169.aspx

Street becoming pedestrian areas (however such an improvement did not warrant an improved score).

10.1.4.3 Bus Stop Occupancy

This assessment criteria involved quantifying the impacts of bus stop occupancy on pedestrians via the following steps:

- Step 1: Determine arrival rate of patrons (which was based on an arrival rate survey at two stops on Lambton Quay and Courtenay Place, one on each side of the road)
- Step 2: Determine boarding rates per stop using snapper data with boarding rates adjusted to account for the proportion of passengers who do not use Snapper[22], and
- Step 3: Calculate available walking space per option [assuming a maximum queue length of 10m to determine width of queuing patrons (personal area assumed at $1m^2$ per person)].

Using the 7-point scoring system, the bus stop capacity evaluation outcomes are set out below in Table 19.

Table 19: Bus stop capacity evaluation scores

Golden Mile Section	Option 1	Option 2	Option 3
Lambton Quay	**1**	**1**	**1**
Willis Street	**0**	**0**	**2**
Manners Street	**0**	**0**	**0**
Courtenay Place	**2**	**2**	**2**

The scores set out in the above table were based on the percentage improvements and compared to the existing situation. As a general comment, the assessment noted that the increase in footpath width under Options 2 and 3 for Lambton Quay and Courtenay Place would result in an increase of available area for pedestrians to pass (and scored 1s and 2s respectively). For Willis Street, Option 3 would provide increased footpath width and improved bus stop locations, which would in turn increase the available waiting space at bus stops.

10.1.4.4 Overall Scores

The overall short-listed option scores for the *pedestrian capacity* MCA assessment criteria are set out in Table 20.

Table 20: Overall pedestrian capacity option scores

Lambton Quay			Willis Street			Manners Street	Courtenay Place		
Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	All Options	Option 1	Option 2	Option 3
1	2	2	1	1	2	1	1	2	2

In addition to the above evaluation scores, the MCA assessment made the following observations for the short-listed options:

- All (options) would improve pedestrian conditions, however Options 2 and 3 perform better than Option 1. On average Option 3 performs marginally better than Option 2

[22] This assumes that cash payments will continue to be accepted in 2036

- Retaining loading bays or loading bays / taxis stands was likely to result in the following:
    - a slight decrease in the level of comfort scores for Lambton Quay for all options, and for Option 3 on Willis Street
    - no impacts on pedestrian delays, and
    - a decrease in bus stop occupancy scores for Willis Street (for Option 3) and Courtenay Place (for all options)

There would be no pedestrian capacity impacts if north / south through traffic remained on Tory Street.

See **Appendix F** (Pedestrian Capacity Report) for the relevant evaluation report.

10.1.5 Improve Place Quality

The *improve place quality* assessment involved firstly individually assessing / scoring the following key attributes of urban amenity, prior to ascertaining overall scores for the improve place quality assessment:

- Composition
- Comfort
- Connectedness, and
- Activity.

A description of each attribute, and their associated evaluations, are as follows:

10.1.5.1 Composition

Composition comprises character distinctiveness (e.g. ability to appreciate heritage features and to express local identity) and legibility and wayfinding (e.g. how easy it is to read space and know where you are in the city). Composition is measured by the relative increase / decrease in the number of side streets closed and potential to simplify space and elements within space that is available for green infrastructure.

Using the 7-point scoring system, the outcomes of the composition evaluation assessment are set out below in Table 21.

Table 21: Composition option scores

Option 1		Option 2		Option 3	
0	Minimal change	**2**	Side street closures and traffic removal simplifies space, particularly service lane at south	3	Most significant simplification of space – clarity of purpose. Space away from awnings enables views to heritage buildings + opportunities to dwell. Space for green infrastructure

10.1.5.2 Comfort

Comfort includes the ability to enjoy the space (e.g. the area is 'habitable' as public realm or there is a separation of distance from buses / traffic). It is noted that in terms of comfort the urban amenity score is focussed on the conditions that enhance the quality of the space for use by people spending time there – noise, support infrastructure / furniture, shelter, simplicity of space rather than confusion from multiple direction vehicle movements (the definition is different for pedestrian comfort which is focussed on the ease of use for 'destinational pedestrian trips').

Using the 7-point scoring system, the outcomes of the comfort evaluation assessment are set out below in Table 22.

Table 22: Comfort option scores

Option 1		Option 2		Option 3	
0	Minimal change	**1**	Traffic removal increases comfort, although 4 lanes of buses still has a strong influence on space / human scale	3	Most space possible reallocated to people. Good opportunity to improve CPTED issues (congestion / quality / character)

10.1.5.3 Connectedness

Connectedness comprises how easy it is to cross the street (e.g. ability to cross informally, opportunities to cross at signals and number of lanes to cross) and how easy it is to move along the street (e.g. continuous footpaths at side streets). Comfort is measured by the relative increase / decrease in the number of side streets closed, the number of lanes to cross and traffic volume.

Using the 7-point scoring system, the outcomes of the connectedness evaluation assessment are set out below in Table 23.

Table 23: Connectedness option scores

Option 1		Option 2		Option 3	
0	Minimal change	**1**	Less signalised crossings reduce accessibility. Easier to informally cross due to less traffic	3	Less signalised crossings reduce accessibility, however much easier to informally cross – only two lanes of buses

10.1.5.4 Activity

Activity includes the opportunity for activity (e.g. extension of trading area and public dwelling space) to be undertaken. Activity is measured by the relative increase / decrease in the area provided for dwelling / activity (rather than movement) and flexibility and capacity for a space to hold events.

Using the 7-point scoring system, the outcomes of the activity evaluation assessment are set out below in Table 24.

Table 24: Activity option scores

Option 1		Option 2		Option 3	
0	Although Cuba Street / Manner Street vehicle connection is stopped, there is little other activation space generated	**1**	Footpath infill for movement rather than dwelling. Some benefit from end of street closures	3	Most space possible reallocated to business trading and public space. Supports gatherings / events

10.1.5.5 Overall Scores

The overall short-listed option scores for the *improve place quality* MCA assessment criteria are set out in Table 25.

Table 25: Improve place quality option scores

Lambton Quay			Willis Street			Manners Street	Courtenay Place		
Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	All Options	Option 1	Option 2	Option 3
0	2	3	1	1	1	0	0	1	3

In addition to the above evaluation scores, the MCA assessment made the following observations for the short-listed options:

- Service access to the Golden Mile at night and early morning is recommended for retaining "eyes on the street". However, rather than having dedicated loading bays as indented road space, could this space be used at all times (i.e. shared with pedestrians / micro-mobility users in the off-peak)?
- Taxis are a positive as they support accessibility, reduce car dependency and provide eyes on the street at night. There is potential for off-peak access to Golden Mile without compromising bus efficiency
- For both taxis and loading bays, the bigger issue is the extent to which access is enabled by the side streets (however if these remained open to through traffic the scores would be less positive), and
- It is important that adequate pick-up / drop-off space is provided in the side streets to encourage taxi use, and that taxi stands are distributed.

See **Appendix G** (Place Quality Report) for the relevant evaluation report.

10.1.6 Social

The social MCA assessment evaluated the effects of the short-listed options on:

- Equitable access to social and economic opportunities such as employment, retail, health and cultural opportunities. For the purposes of the assessment, 'equitable access' considered different sectors of society including mobility impaired, income groups and age groups. 'Access' considered changes in the number and location of mobility parks, bicycle parks, motorcycle parks, on-street public car parks, off-street public car parks and bus stop locations, and
- The effect on social connectedness.

The assessment was undertaken by a multidisciplinary expert team,[23] who evaluated the short-listed options against "social effects mechanisms" for key target groups most likely to be impacted by each option. The following social mechanism factors included providing / enabling:

- A variety of public spaces that meet the diverse needs for people to gather (e.g. that meet the needs of youth)
- More space so that appropriate amenities can be provided, and people have the ability to move freely and safely
- Reliable travel times for through travellers
- Active mode users to move safely, have connection to networks, and to have access to active transport facilities such as bike parks in the right places, and
- Bus users with reliability and access to bus stops.

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[23] This panel comprised of public health, safety and parking, behavioural science and mobility and latent demand and mobility experts

Based on the above mechanisms, the equity implications for the following target groups were considered:

- Youth
- Family groups (applying the "8 to 80 year" principle)
- Mobility impaired (e.g. disabled, impaired, challenged)
- Affordable housing inner city residents
- Non-PMV users, and
- Hospital, university, airport destinations beyond the CBD.

The common needs for the above groups included: the need for increased bus travel time reliability; more space for public realm; improved pedestrian level of service; and, separation between modes and speeds. The evaluation also noted that for the mobility impaired and families, the location of bus stops, access to parking and drop-offs / pick up on side streets were of greater significance for these particular groups.

The short-listed option scores for the *social* MCA assessment criteria are set out in Table 26.

Table 26: Social option scores

Lambton Quay			Willis Street			Manners Street	Courtenay Place		
Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	All Options	Option 1	Option 2	Option 3
0	1	3	1	2	3	0	1	2	3

In addition to the above evaluation scores, the MCA assessment made the following observations for the short-listed options:

- For Courtenay Place, Options 1 and 2 will make bus travel more viable for youth and non-PMV users. However, Option 3 would result in:
  - increased walkability (giving effect to WCC's walkability aspirations)
  - increased space for walking and public realm amenities, which would promote a sense of belonging and the liveability and increase the accessibility for the mobility impaired and families
  - increased space, which would separate walkers of different speeds and abilities from faster active modes
  - improved capacity would provide opportunities to integrate history and water sensitive design features in (new) places to reflect sustainability values
  - extra space for micro mobility facilities to improve mode choice
  - safer places at night with lighting and security and reducing crowding
  - providing dedicated drop-off / pickup zones in side streets to:
    - meet the needs of the more vulnerable / less confident people to participate in the night-time economy and events
    - allow for access to health and other services located in the CBD
    - allow for the provision of key services to residents, and
    - ensure access to pickups to get to hospital.
  - increased bus reliability for mobility impaired, through travellers, and students, and

- improved connectivity to cycle networks would improve the viability of active modes for non-PMV users.

- For Willis Street, and for Options 1 and 2, there would be some benefit from increased space at Mercer Street and improving connections to the Civic Square would provide new shelter, sunny spaces for events and public realm improvements. However, under Option 3 there would be greater opportunity to use Mercer Street as a significant place for events, to provide amenity for children and youth, to provide a relatively sheltered and sunny public realm space for informal activities
- For Lambton Quay, Options 1 and 2 would both result in improved bus services and some increase in space. However, for Option 2 more bus movements would make for a less sociable pedestrian environment and reduced formal crossings may reduce accessibility and safety for the mobility impaired and for families. For Option 3 the benefits outlined above for Courtenay Place would apply equally to Lambton Quay as well
- For Manners Street, there would be minimal social impacts
- Retention of taxi stands would result in minimal change to the option scores. The assessment noted however that redesigned taxi stands on Courtenay Place could improve access for mobility impaired people to entertainment opportunities. Furthermore, provision of taxi bays and accessible / priority parking on side streets rather than directly on Lambton Quay would help to ensure participation and provision of essential services
- There is a preference for separation of walking and all other modes for greater safety and comfort for mobility impaired people and families, and
- There is a preference that distances to bus stops not be based on 'average' walking speed if buses are to be a viable option for mobility impaired people and families. Reduced formal crossing opportunities and bus stops could reduce accessibility and viability of public transport for mobility impaired people and family groups. This could be significant enough to reduce the score from 3 to 2 for Lambton Quay in particular.

See **Appendix H** (Social Report) for the relevant evaluation report.

10.1.7 Retail Impacts

The *retail impacts* assessment assessed both the current state and future expected impacts of the short-listed options on Golden Mile retail activity. In order to assess the impacts, the following two workstreams were undertaken:

- Workstream 1: Market assessment, which included:
    - evaluating current market rents, lease demand, growth rates, vacancy rates and tenancy trends
    - benchmarking of income / return metrics against other comparable NZ retail precincts
    - analysis of historical retail transaction data to understand current trends and to predict future trends including sales volumes, pedestrian traffic and turnover rent, and
    - discussions with leasing agents in the Wellington City market to understand critical retail market.

- Workstream 2 comprised of case study research and an assessment of local and international best practice to identify benefits, risks, and impacts to retailers.[24]

The two workstreams enabled a retail impact assessment to be undertaken to identify both the likely positive and negative impacts of each short-listed option on Golden Mile retailers (and businesses) and on landlords and tenants (e.g. rent trends and lease demands). See **Appendix I** (Retail Impacts Report) for further information on the two workstreams.

A key input into the retail impact assessment was a quantitative modelling assessment undertaken by MRCagney, which evaluated the impacts of removal of on-street parking on retail activity. Among other matters, the assessment included a 'net impact evaluation', which assessed the possible impacts of each option's proposed on-street car park removal on the net (annual) revenue collected by Golden Mile retailers. It also identified the impacts of the options on spend by mode of arrival, likelihood to spend money and changes by arrival to the Golden Mile by mode. A key input into MRCagney's assessment was the *Golden Mile Retail Intercept Survey* that was undertaken by WSP Research in late November 2020. Both the MRCagney and WSP Research reports are attached in full in **Appendix J** (Impacts on Parking on Retail Activity).

A summary of the MCA evaluations for Lambton Quay, Willis Street, Manners Street and Courtenay Place are provided in the tables below. It is noted that the key question that underpinned each option evaluation was *"What is the likely impact / opportunity to retailers and businesses?"*.

Table 27: Lambton Quay

Option	Score	Justification
Status Quo (Do-minimum)	*0*	• *High street retail with established brands* • *28 parking spaces* • *High pedestrian flow* • *Low street front vacancy*
Option 1	**1**	• Increased foot traffic and pedestrian activity • Better public transit
Option 2	**1**	• Improved transport networks from two bus lanes • No general traffic may limit access
Option 3	**2**	• 75% more footpath space • No general traffic may limit access • Bike and scooter allowances create long term benefits

Table 28: Willis Street

Option	Score	Justification
Status Quo (Do-minimum)	*0*	• *High street retail with established brands* • *No parking spaces or taxi stands* • *High pedestrian flow* • *Low street front vacancy*
Option 1	**1**	• Increased foot traffic and pedestrian activity • Better public transit

[24] It is noted that no case study is completely comparable due to unique demographics and attributes of Wellington's Golden Mile

Option 2	**1**	• Improved transport networks from two bus lanes • No general traffic may limit access
Option 3	**2**	• 75% more footpath space • No general traffic may limit access • Bike and scooter allowances create long term benefits

Table 29: Manners Street

Option	Score	Justification
Status Quo (Do-minimum)	*0*	• *Mainly secondary retail* • *No parking spaces or taxi stands* • *Medium / low pedestrian flow* • *High street front vacancy* • *Lower area character*
All Options	0	• Increased footpath space • Close to Lower Cuba Street • No general traffic • One bus lane and one bus stop in each direction

Table 30: Courtenay Place

Option	Score	Justification
Status Quo (Do-minimum)	*0*	• *Mainly hospitality & entertainment* • *Prominent night life* • *52 parking spaces*
Option 1	**1**	• Minimal increase in pedestrian activity
Option 2	**1**	• Better public transit • No general traffic may limit access • Minimal impact from limiting general access, low private vehicle usage
Option 3	**2**	• Increased footpath space and modal allowances create long term benefits • No general traffic may limit access • Subdued impact due to atmosphere

The overall short-listed option scores for the *retail impacts* MCA assessment criteria are set out in Table 31.

Table 31: Retail impact option scores

Lambton Quay			Willis Street			Manners Street	Courtenay Place		
Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	All Options	Option 1	Option 2	Option 3
1	1	2	1	1	2	0	1	1	2

In addition to the above evaluation scores, the MCA assessment made the following comments on loading bays / taxis stands for the short-listed options:

- For Lambton Quay, retaining loading bays would be a positive (e.g. less risk and greater convenience for retailers). It is noted that there are several loading bays for large retailers already located on The Terrace and Featherston Street. In terms of retention of taxis on Lambton Quay, they would provide greater convenience for customers, but would be of marginal benefit to retailers. It is unlikely to be a deterrent to accessing retailers if taxi stands were to be relocated

- For Willis Street, retaining loading bays would be a positive (e.g. less risk and greater convenience for retailers). It is noted that there are several loading bays for large retailers already located on Boulcott Street
- For Manners Street, retaining loading bays would provide little benefit for retailers, and
- For Courtenay Place, retaining loading bays would be a positive (e.g. less risk and greater convenience for retailers). In terms of retention of taxis, the need for these is greater at night than during the day, and if relocated to side roads is likely to provide increased convenience for customers.

There were several other key observations made by the retail impact assessment, including:

- **Covid-19 has impacted the retail market** - retailers currently face a difficult operating environment that may compound the positive or negative impacts. Vacancy rates are expected to increase from fewer tenants in the market and increased business failure
- **Option 3 is expected to deliver the best net benefit** - this option would generate net benefits in the form of increased footfall leading to increased sales and revenue (in particular it was expected that widened footpaths, together with dedicated space for bikes and scooters, would increase customer access to the Golden Mile with almost immediate effect). In contrast, it was noted that both Options 1 and 2 would generate less benefits for businesses / retailers on the Golden Mile[25]
- **Landlords and tenants are both expected to benefit** - landlords can expect greater lease demand, favourable lease terms, lower vacancy rates increased rental appreciation and property values. Tenants can expect increased competition for retail spaces and higher rents, and higher sales volumes and retail exposure from increased pedestrian footfall and modal share, and
- **Likely that the positives will outweigh the negatives** - perceived negatives (particularly from on-street carpark removal) have been raised by some. While these might materialise, they are relatively small compared to the overall positive benefits expected from the options.

See Appendix I (Retail Impacts Report) for the relevant evaluation report.

10.1.8 Cycling Level of Service

The *cycling level of service* assessment involved using the Trafitec Danish Roadway Segment Cycling Level of Service 2007 (i.e. the Danish Method) framework to evaluate the short-listed options.

Based on the Danish Method the MCA assessment noted that the most important predictors of cyclist satisfaction is the type and width of a facility, the size of the buffer from the facility to traffic in the nearest lane and the distance from pedestrians. It was also noted that traffic volumes, pedestrians in the space, parked vehicles, bus stops interrupting the route and greater vehicle speeds were also important level of service factors.

The following key assumptions underpinned the cycling level of service assessment:

[25] Golden Mile Retail Impact Assessment (December 2020), page 37

- For Option 1, some side streets are closed, which helps to reduce the general traffic volume along the Golden Mile and reduced turning movement conflicts at some intersections. The ability for cyclists to filter through would ensure cycle connectivity
- For Option 2, cyclists would be able to continue to ride on parts of Lambton Quay and Courtenay Place, side street closures would help to reduce the general traffic volume along the Golden Mile and reduced turning movement conflicts at some intersections. Cyclists would be able to filter through side streets. Removal of general traffic would be of benefit to cyclists, and
- For Option 3, there would be an opportunity to provide a protected cycle facility, ends of side road closures would improve the ability for cyclists to filter through, and the removal of general traffic would be of benefit to cyclists.

Other factors considered in the assessment included:

- Position of bus stops (i.e. in-lane or indented bus bays)
- Cycle access (i.e. if cycle access is not allowed on Manners Street between Taranaki Street and Lower Cuba Street)
- Loading bays and taxi stands, and
- Intersection treatments (including closing side streets).

The short-listed option scores for the *cycling level of service* MCA assessment criteria are set out in Table 32.

Table 32: Cycling level of service option scores

Lambton Quay			Willis Street			Manners Street	Courtenay Place		
Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	All Options	Option 1	Option 2	Option 3
1	1	3	0	0	-1	-1	1	1	3

In addition to the above evaluation scores, the MCA assessment made the following observations for the short-listed options:

- For most of the sections of the Golden Mile, the retention of loading bays and taxi stands are likely to have a negative impact on cycling, however this effect would not be significant enough to change the option scores. As there is an opportunity to provide a protected cycle facility as part of Option 3, the level of service for cyclists is likely to be compromised if service vehicles are allowed, or allowed to manoeuvre, on the cycleway on Courtenay Place and / or Lambton Quay, and
- Allowing north / south through movements at the Tory Street / Courtenay Place intersection is likely to have minimal impacts on cycling level of service. Intersection treatments may be required but the improved cycling level of service along Courtenay Place would be maintained.

See **Appendix K** (Cycling Level of Service Report) for the relevant evaluation report.

10.1.9 Sustainability

The *sustainability* assessment involved firstly reviewing WCC's sustainability policy, strategy and guidance material, prior to assessing / scoring the following criteria in order to ascertain overall sustainability scores:

- Lower vehicle kilometres travelled (VKT) in the transport system (i.e. indicates reduced use of PMVs and internal combustion engines and reduced emissions, pollution and resource use)

- Extent and appeal of cycling (i.e. indicates increased probability of mode shift away from vehicle use and reduced emissions, pollution and resource use)
- Large scale physical works (i.e. from a construction phase perspective, it indicates reduced emissions, pollution, energy, waste generation and resource use)
- High opportunity for green infrastructure and vegetated street (i.e. indicates increased probability of vegetated street scape, biodiversity improvements, improved water quality outcomes, and shaded cool places to retreat to on hot days)
- Sufficient area for pedestrian and active modes priority (i.e. indicates increased probability of mode shift away from vehicle use and reduced emissions, pollution and resource use and potential increased greenspace and its benefits), and
- High opportunity for Tactical Urbanism (i.e. indicates increased probability and multiplying factor for increased mode shift away from vehicle use and reduced emissions, pollution and resource use and increased greenspace and its benefits).

Using the 7-point scoring scale, the outcomes of the MCA evaluation for each of the above criteria are summarised in Table 33 below. For avoidance of doubt, the MCA assessment advises that mode shift and low bus travel times are also important determinants of sustainability but were not assessed in order to avoid double counting of impacts considered by other assessment criterion.

Table 33: Sustainability assessment

	Lambton Quay			Willis St			Manners Street	Courtenay Place		
Options	**1**	**2**	**3**	**1**	**2**	**3**	**All Options**	1	2	3
Lower VKT in transport system	2	2	2	2	2	2	0	2	2	2
Extent and appeal of cycling	1	1	3	1	1	3	0	1	1	3
Large scale physical works	-1	-1	-1	-1	-1	-1	0	-1	-1	-1
High opportunity for green infrastructure and vegetated street	1	1	3	1	1	3	0	1	1	3
Sufficient area for pedestrian and active modes priority	1	1	3	1	1	3	0	1	1	3
High opportunity for Tactical Urbanism	1	2	3	1	2	3	0	1	2	3

More information on the above evaluation scores can be found in the MCA assessor's evaluation report in **Appendix L** (Sustainability Report).

The overall short-listed option scores for the *sustainability* MCA assessment criteria are set out in Table 34.

Table 34: Sustainability option scores

Lambton Quay			Willis Street			Manners Street	Courtenay Place		
Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	All Options	Option 1	Option 2	Option 3
1	1	3	1	1	3	1	1	1	3

10.1.10 Fit with LGWM Programme

The *fit with LGWM programme* assessment firstly involved reviewing the outcomes and outputs identified in the LGWM PBC for the Golden Mile Project. This included considering whether the PBC's need for early benefits would be realised and the "interface impacts" with the MRT (e.g. alignment and interchanges) and the City Streets packages (as well as the WCC Strategic Cycle Network Plan). Secondly, the assessment involved evaluating / scoring the following criteria (prior to ascertaining an overall score for the fit with LGWM Programme assessment):

- Alignment / integration [i.e. with the other LGWM packages (e.g. MRT alignment, MRT interchange, City Streets)], and
- Flexibility / ability to accommodate change (and / or to integrate / potential scale of rework).

The MCA assessment noted that in order to avoid duplication with the project investment objectives assessments, the outcomes (e.g. bus service reliability) and outputs (e.g. improve bus stop layouts) sought by the LGWM PBC were not evaluated (i.e. to avoid double counting of impacts).

A summary of the MCA assessment's evaluations for Lambton Quay, Willis Street, Manners Street and Courtenay Place are set out in the tables below.

Table 35: Lambton Quay

	Option 1	Option 2	Option 3
Alignment / Integration	Includes changes aligned to project objectives No conflict with other LGWM packages	Closing side road connections to Lambton Quay creates more opportunity to locate bus stops closer to the Waterfront for pedestrians and MRT connections (e.g. Post Office Square)	Advantages of Option 2 Ability to accommodate separated cycling facilities if these are not able to be delivered on Featherston Street or the Quays
Flexibility to accommodate change	Some physical works to create the left turn traffic circulation loops (To retain flexibility / avoid rework consider ways to deliver these temporarily in the short term)	Limited physical work means minimal re-work if change is needed to integrate with other LGWM packages	Option 3 would involve more physical work than Options 1 or 2 and is likely to be more expensive to rework (To retain flexibility / avoid rework consider ways to deliver these temporarily in the short term)
Rating	***Neutral***	***High***	***High***

Table 36: Willis Street

	Option 1	Option 2	Option 3
Alignment / Integration	Minimal change from current situation Small changes are aligned with the project objectives Would not create the opportunity to provide a safe and convenient cycling movement between Willis Street northbound and Mercer Street	Removing traffic from Willis Street puts traffic pressure on the Willis and Victoria Street intersections with Ghuznee Street – this could make it more challenging to accommodate improvements for people on bikes or buses on these north-south corridors Preventing traffic from driving northbound ahead across the Boulcott Street intersection will make it difficult to provide a safe cycle movement for people riding to the north	Removing traffic from Willis Street puts traffic pressure on the Willis and Victoria Street intersections with Ghuznee Street – this could make it more challenging to accommodate improvements for people on bikes or buses on these north-south corridors Preventing traffic from driving northbound ahead across the Boulcott Street intersection will make it difficult to provide a safe cycle movement for people riding to the north
Flexibility to accommodate change	Corridor width limits opportunities Minimal flexibility: the ongoing need to accommodate traffic within the corridor prevents road space reallocation without disadvantaging people traveling on foot or by bus	Corridor width limits opportunities	Corridor width limits opportunities
Rating	***Low Negative**** *(but minor positive if cyclist routed via Victoria)*	***Low Negative*** *(but minor positive if cyclist routed via Victoria)*	***Low Negative*** *(but minor positive if cyclist routed via Victoria)*

Table 37: Manners Street

	Option 1	Option 2	Option 3
Alignment / Integration	Minimal change in any of the options All options include changes that are aligned with the project objectives No conflict with other LGWM packages	Minimal change in any of the options All options include changes that are aligned with the project objectives No conflict with other LGWM packages	Minimal change in any of the options All options include changes that are aligned with the project objectives No conflict with other LGWM packages

Flexibility to accommodate change	Minimal opportunity to incorporate more ambitious change within Manners Street without disadvantaging people traveling on foot or by bike	Minimal opportunity to incorporate more ambitious change within Manners Street without disadvantaging people traveling on foot or by bike	Minimal opportunity to incorporate more ambitious change within Manners Street without disadvantaging people traveling on foot or by bike
Rating	***Neutral***	***Neutral***	***Neutral***

Table 38: Courtenay Place

	Option 1	Option 2	Option 3
Alignment / Integration	Some bus stops closer to intersections and intersecting public transport routes	Removal of traffic Releases more green time to be allocated to north south public transport and non-motorised traffic Creates more opportunity to relocate bus stops closer to intersections and intersecting public transport routes	Advantages of Option 2 Enables provision of a separated cycling facility [redacted]
Flexibility to accommodate change	Limited physical work means minimal re-work if change is needed to integrate with other LGWM packages Ongoing need to accommodate traffic within the corridor prevents roadspace reallocation without disadvantaging people traveling on foot or by bus	Limited physical work means minimal re-work if change is needed to integrate with other LGWM packages	Option 3 would involve more physical work than Options 1 or 2 and is likely to be more expensive to rework. (As a mitigation consider ways to deliver Option 3 temporarily in the short term that retains more flexibility)
Rating	***Medium Positive***	***High Positive***	***Medium Positive***

The overall short-listed option scores for the *fit with LGWM programme* MCA assessment criteria are set out in Table 39.

Table 39: Fit with LGWM programme scores

Lambton Quay			Willis Street			Manners Street	Courtenay Place		
Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	All Options	Option 1	Option 2	Option 3
0	3	3	-1	-1	-1	0	2	3	2

In addition to the above evaluation scores, the MCA assessment made the following observations for the short-listed options:

- If it is assumed that retaining either loading bays or taxi stands on the Golden Mile means that vehicle types would be permitted to enter or exit the Golden Mile at

Taranaki Street, Boulcott / Willis Street or Williston Street intersections, then this would influence the design of these intersections changing the extent to which:

- o bus stops can be safely located close to intersections (enabling interchange with MRT)
- o additional green time can be allocated to north / south public transport and non-motorised movements, and
- o movements for people on bikes can be safely accommodated through some intersections in the corridor (e.g. Boulcott / Willis, Mercer and Willis Streets).

The assessment noted that these changes would not alter any of the short-listed option ratings / scores.

See **Appendix M** (Fit with LGWM Programme Report) for the relevant evaluation report.

10.1.11 Delivery

The *delivery* assessment involved considering the construction impacts of each short-listed option on pedestrians, buses, retailers, building servicing and traffic. It also considered construction impacts on retailers.

As set out in Table 40, indicative construction timeframes were developed specifically for this MCA evaluation. They are based on an assessment of available resources (e.g. contractors), available working hours, wider network / programme implications, project staging and desire for proof of concept (impacts on utilities were not considered).

Table 40: Assessed construction timeframes

Golden Mile Section	Option 1	Option 2	Option 3
Lambton Quay	6-9 months	9-15 months	12-18 months
Willis Street	< 3 months	< 3 months	3-6 months
Manners Street	< 3 months	< 3 months	3-6 months
Courtenay Place	3-6 months	3-6 months	6-12 months

The short-listed option scores for the *delivery* MCA assessment criteria are set out in Table 41.

Table 41: Delivery option scores

Lambton Quay			Willis Street			Manners Street	Courtenay Place		
Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	All Options	Option 1	Option 2	Option 3
-1	-1	-2	-1	-1	-2	-1	-1	-1	-2

More information on the reasons for the above option scores can be found in the relevant MCA assessment report in **Appendix N** (Delivery, Operations and Maintenance Report).

In addition to the above evaluation scores, the MCA assessment made the following observations for the short-listed options:

- Retaining loading bays and / or a combination of loading bays / taxi stands would reduce the construction impacts of Options 1 and 2 if they remain in the same location. However, there is likely to be more construction effort required for Option 3, and

- There is the potential for minor reductions in construction impacts if cul-de-sac treatments are not required if north / south through movement at the Tory Street / Courtenay Place intersection is allowed.

10.1.12 Operations and Maintenance

The *maintenance and operations* assessment involved considering the costs of maintenance, access for maintenance / utilities, ability for buses to pass broken down vehicles, public events and traffic.

Key assumptions used in the assessment included: no impacts on current bus diversion routes (e.g. Taranaki to / from Whitmore via Quays); bus services would not operate during public events (e.g. the Very Welly Christmas); and, footpaths would be more costly to maintain than road and paved footpaths.

The short-listed option scores for the *operations and maintenance* MCA assessment criteria are set out in Table 42.

Table 42: Operations and maintenance option scores

Lambton Quay			Willis Street			Manners Street	Courtenay Place		
Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	All Options	Option 1	Option 2	Option 3
-1	-2	-3	-1	-1	-2	-1	-1	-2	-3

More information on the reasons for the above option scores can be found in the relevant MCA assessment report in Appendix N (Delivery, Operations and Maintenance Report).

In addition to the above evaluation scores, the MCA assessment made the following observations regarding the short-listed options:

- There would be a step change in the impact on utilities access, buses ability to pass and emergency services for Option 3 (but these impacts would be negligible under Options 1 and 2)
- Retaining loading bays and /or a combination of loading bays / taxi stands would result in minor operational and maintenance access improvements, and
- There is the potential for minor operational and maintenance improvements if north / south through movement at the Tory Street / Courtenay Place intersection is allowed.

10.1.13 Timeframe for Delivery

The *timeframe for delivery* assessment criteria involved assessing the following:

- Ability to demonstrate tangible improvements (<u>outputs</u>) within the 2018-21 / 2021-24 period, and
- Ability to demonstrate tangible improvements (<u>benefits</u>) within the 2018-21 / 2021-24 period.

The key assumptions underpinning the assessment included:

- SSBC to be complete by July 2021
- Detailed design to be complete by July 2022
- Construction to commence in mid to late 2022, and
- Construction completed by July 2024.

The short-listed option scores for the *timeframe for delivery* MCA assessment criteria are set out in Table 43.

Table 43: Timeframe for delivery scores

Lambton Quay			Willis Street			Manners Street	Courtenay Place		
Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	All Options	Option 1	Option 2	Option 3
2	2	2	2	2	2	2	2	2	2

At the MCA Workshop, the MCA assessor noted that all of the short-listed options could be completed within the next five years. It was also noted the retention of loading bays and / taxis (or both) and north / south through movement at the Tory Street / Courtenay Place intersection would have no impact on the above scores.

See Appendix N (Delivery, Operations and Maintenance Report) for the relevant assessment report.

10.1.14 Costs

The *cost* assessment is based on the cost estimate ranges for each short-listed option that were identified in the Short List Report (i.e. the cost estimates have not been updated).[26] As noted above, this assessment criterion was not assigned a specific score.

To recap, the cost estimates for each short-listed option had been built up from the following:

- Linear items
- Area items
- Intermittent items
- Proportion for services relocation
- Proportion for temporary traffic management
- Proportion for preliminary and general
- Proportion for other costs (e.g. professional services and client costs), and
- Proportions for risk and contingency.

It is noted that the cost estimate ranges exclude operational and maintenance costs, and the costs associated with wider network improvements to address traffic redistribution.

The *cost* estimate ranges for each of the short-listed options is provided in Table 44 below.

Table 44: Cost estimate ranges

	Option 1 ($M)	**Option 2** ($M)	**Option 3** ($M)
Cost estimate ranges[27]	**$15 to $23**	**$21 to $32**	**$52 to $79**

In addition to the above evaluation scores, the MCA assessment made the following observations for the short-listed options:

- Retaining loading bays and / or a combination of loading bays / taxi stands might result in minor cost savings for Options 1 or 2 if they were to remain in the same location, and
- There might be potential cost savings if cul-de-sac treatments on Tory Street are not required.

[26] Golden Mile Short List Assessment Report (2020), Appendix F
[27] These are real costs (i.e. they are not the discounted costs)

It is noted that the key cost differences between the options can be generally attributed to:

- Creation of additional pedestrian pavement / public realm from the closure of side road ends for Options 2 and 3 (i.e. there are more side road end closures for these options when compared to Option 1)
- Creation of additional pedestrian pavement / public realm for Option 3 because of the extra kerb build outs required on Lambton Quay and Courtenay Place for the traffic lane reductions, and
- Higher traffic management, service relocation and preliminary and general costs for Options 2 and 3 (i.e. due to their larger construction footprints when compared to Option 1).

See the Short List Report for further information on the construction cost estimates for each short-listed option.

10.1.15 Benefits and Disbenefits

The *benefits* and *disbenefits* assessment involved updating the economic benefits and disbenefits ranges for each short-listed option as provided in the Short List Report, and presenting them as net benefit ranges. It is also noted that this assessment criterion was not assigned a specific score.

The process for updating the benefits / disbenefits involved considering the following impacts:[28][29]

- Car travel times
- Public transport travel times
- Public transport reliability
- Pedestrian realm benefits, and
- Pedestrian travel time benefits.

Road user impacts were assessed using AIMSUN model extracts.[30] Public transport benefits were assessed using MRCagney's runtime model[31] and pedestrian benefits were assessed using the interim guidance on Urban Amenity in Pedestrian Environments.[32]

The updated net present values for each of the short-listed options are set out in Table 45.

Table 45: Updated net present value of the short-listed options

Benefits and costs	Option 1 ($M)	Option 2 ($M)	Option 3 ($M)
Car travel time impact	-$6.2 - $4.8	-$79 - $37	-$79 - $37
Public transport travel time benefit	$18 - $24	$26 - $34	$23 - $30

[28] The benefits have been estimated using the Monetised Benefits and Costs Manual; 2019 values of time; and a 4% discount rate over a 40-year evaluation period. Costs were based on the cost ranges identified in the Golden Mile Short List Report

[29] Benefits attributed to cycling have yet to be calculated as the design maturity with respect to cycling is only at a high level. The final SSBC is expected to capture the benefits attributed to cycling

[30] Key modelling assumptions for road users was based on the whole city centre, private vehicles and only weekdays were modelled. No HCV impacts were measured, no growth in vehicle demand was assumed over time, and importantly no mode shift was assumed

[31] This model is a physics-based, Monte Carlo Model (it only considers variability from signalised intersections). It models weekdays, but not evening or weekends, and assumes public transport growth is 1.6% per year

[32] Pedestrian demands were taken from the LGWM Active Mode Model. It models weekdays, but not evening or weekends, and assumes pedestrian growth is 1.6% per year

Public transport reliability benefit	$4.7 - $6.1	$9.1 - $12	$9.1 - $12
Pedestrian realm benefits[33]	$11 - $17	$81 - $128	$122 - $407
Pedestrian travel time benefits	$3.1 - $4.9	$5.8 - $9.4	$13 - $20
Construction costs (present value)	***$14 - $20***	***$19 - $29***	***$47 - $72***
Total benefits	**$31 – $57**	**$42 - $219**	**$87 - $505**

See **Appendix O** (Economics Report) for the relevant evaluation report.

10.1.16 Value for Money

The *value for money* assessment involved identifying each of the short-listed option's indicative BCR ranges. The BCR ranges have been derived from the net present benefits (as identified in Table 45) and the net present costs of the short-listed options (i.e. the discounted costs identified in Table 45).

The indicative *BCR* ranges for each of the short-listed options are set out in Table 46.

Table 46: Indicative BCR ranges

	Option 1	**Option 2**	**Option 3**
BCR ranges	**1.6 – 4.2**	**1.5 – 12**	**1.2 - 11**

See Appendix O (Economics Report) for the relevant evaluation report.

10.2 MCA Weighting Scenarios

Table 6 above sets out the MCA assessors unweighted (or raw scores) for each of the short-listed options. In addition, to identifying these scores, a weighting scenario exercise was undertaken by the Golden Mile Project Team to test the various sensitivities of the unweighted scores to matters considered under various weighting themes. Accordingly, a range of weighting systems were developed, and then applied to the unweighted scores. These weighting scenarios are described below, and their numerical percentages are set out in **Appendix P**.

10.2.1 Workshop Weighting

A "workshop weighting" scenario reflects the importance that the MCA assessors placed on each individual assessment criterion at the MCA Workshop.

The workshop weighting discussion was undertaken at the end of the scoring component of the MCA Workshop. To facilitate the discussion the assessors were asked to identify how important they considered the different assessment criteria to be by assigning low medium and high rankings to each assessment criterion. The Golden Mile Project Team subsequently then applied numerical percentages to the rankings following completion of the workshop. At the workshop, the MCA assessors identified the following assessment areas to be either of high, medium or low-ranking importance:

- **High**
    - investment objectives
    - retail impacts, and
    - operations and maintenance.

[33] Refer to Section 4.3.3 (page 21) of Appendix M for more information. In summary, it covers benefits to be generated by providing improved seating, increasing the number of trees / plantings, reduction in adjacent traffic volumes and widen footpaths in crowded conditions

- **Medium**
  - Social
  - Cycling level of service
  - General (road) safety, and
  - Sustainability.
- **Low**
  - Fit with LGWM programme
  - Delivery, and
  - Timeframe for delivery.

Although not included directly in the weightings (as they were not assigned a specific score), the MCA assessors advised that the cost estimates, benefits / disbenefits and value for money criteria would 'normally' receive High rankings as well.

10.2.2 Investment Objectives Weighting

This weighting was based on LGWM's priorities and investment objectives and assigned a higher weighting to all MCA scores that related to the achievement of investment objectives according to the relative emphasis placed on each investment objective (see Figure 4).

10.2.3 Focus on Improving the Public Realm Weighting

This weighting placed increased emphasis on improving public realm, by increasing the weighting applied to place and pedestrians.

10.2.4 Focus on People Movement

The weighting scenario placed emphasis on interventions that move people through the corridor, with increased weighting applied to bus travel time and pedestrian capacity.

10.2.5 Focus on Safety Weighting

This weighting scenario placed increased importance on safety outcomes and reduces the overall weighting applied to investment objectives, while increasing the weighting applied to pedestrian and general safety.

10.2.6 Programme Fit and Delivery Focus Weighting

This weighting scenario placed increased emphasis on broader programme fit and the ability to quickly deliver outcomes. It reduces the overall weightings for investment objectives and applies increased weighing to program fit and delivery aspects.

10.2.7 Economic Focus Weighting

This weighting scenario assumes priority is placed on achieving maximum economic return.

10.2.8 Social Focus Weighting

This weighting scenario placed increased emphasis on relative social support and business impacts. It reduces the overall weightings for investment objectives and applies increased weighting to social and business impacts.

10.2.9 Weightings Evaluation Summary

Table 47 compares the unweighted (i.e. raw) scores with the weighting scenarios set out above.

Table 47: Evaluation of the weighted scenarios and unweighted (i.e. raw) rankings

Golden Mile Section	Option	Unweighted Score	Investment Objective Weightings	Focus on improving the public realm	Focus on people movement	Focus on Safety	Program fit and delivery focus	Economic Focus	Social Focus	Workshop Weighting
Lambton Quay	**Do-Minimum**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Option 1	1.47	0.13	0.11	0.13	0.13	0.09	0.12	0.09	0.11
	Option 2	2.43	0.23	0.19	0.23	0.12	0.19	0.21	0.13	0.23
	Option 3	3.67	0.24	0.28	0.23	0.25	0.19	0.26	0.25	0.28
Lambton Quay Option Preference		**Option 3**	**Option 3**	**Option 3**	**Option 3**	**Option 3**	**Option 3**	**Option 3**	**Option 3**	**Option 3**
Willis Street	**Do-Minimum**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Option 2	1.50	0.14	0.14	0.14	0.13	0.06	0.14	0.10	0.14
	Option 1	1.37	0.14	0.13	0.16	0.11	0.04	0.14	0.09	0.16
	Option 3	1.77	0.18	0.15	0.19	0.13	0.16	0.16	0.17	0.08
Willis Street Option Preference		**Option 3**	**Option 3**	**Option 3**	**Option 3**	**Option 2**	**Option 3**	**Option 3**	**Option 3**	**Option 1**
Manners Street	**Do-Minimum**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	All Options	0.80	0.11	0.08	0.11	0.10	0.06	0.10	0.03	0.10
Manners Street Option Preference		**All options**	**All options**	**All options**	**All options**	**All options**	**All options**	**All options**	**All options**	**All options**
Courtenay Place	**Do-Minimum**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Option 1	2.17	0.18	0.14	0.16	0.15	0.17	0.16	0.14	0.15
	Option 2	2.23	0.20	0.17	0.22	0.04	0.18	0.18	0.13	0.19
	Option 3	3.53	0.26	0.29	0.26	0.25	0.15	0.28	0.22	0.31
Willis Street Option Preference		**Option 3**	**Option 3**	**Option 3**	**Option 3**	**Option 3**	**Option 3**	**Option 3**	**Option 3**	**Option 3**

11. Key Considerations and Recommendations

This section of the report summarises the key considerations identified during the MCA process. It also sets out the recommended technical option preferences for each section of the Golden Mile as a consequence of the MCA process.

11.1 Key Considerations

Because of the MCA process the following key considerations were identified:

- There were distinct trade-off decisions needing to be made between PMV restrictions / removal, on-street parking removal and side road end closures and the desired to improve public transport and pedestrian / public realm space. The significance of the trade-off decisions varied between the options
- The removal of on-street car parking, side road end closures and removal of PMVs, as proposed under Options 2 and 3, would deliver significant bus travel time and reliability benefits and would provide extra pedestrian and public realm space. However, realising these outcomes would result in existing traffic (i.e. PMVs) movement patterns changing within the CBD and a reduction in on-street parking availability on the Golden Mile (particularly on Lambton Quay and Courtenay Place). In addition, there would be disruption for the CBD community during construction of either Option 2 or 3. In comparison, Option 1 would deliver fewer bus benefits, but would result in less traffic re-distribution and construction disruption effects
- The conversion of road carriageway to pedestrian / public realm on Lambton Quay and Courtenay Place under Option 3 would improve pedestrian movement and create new public realm space as well as dedicated new spaces for cycling. Such outcomes would change the character of the Golden Mile, moving it from a vehicle focused environment to one that is focused on public transport, pedestrian movement / dwelling and active mode movement, and
- All options would have differing degrees of costs, with the indicative cost estimates for both Options 1 and 2 being significantly less than the estimate for Option 3. The key cost difference between Option 2 (and 1) and Option 3 is the extra costs associated with converting road carriageway to pedestrian / public realm space.

11.2 Recommended Option for each Golden Mile Section

The following commentary discusses the unweighted scores and weighing scenario assessments for each option for each section of the Golden Mile. This section also identifies the technically preferred option preference for each section of the Golden Mile (as identified through the MCA process) for further consideration by LGWM.

11.2.1 Lambton Quay

Option 3 for Lambton Quay was ranked first under both the unweighted and weighted scenario assessments. In summary, it was ranked first due to its higher scores (i.e. +3s) for the improved place quality, social, cycling, sustainability and fit with LGWM programme assessment criterion. It also scored well (i.e. +2s) for bus boarding / alighting, comfort and convenience, pedestrian / general (road) safety, pedestrian capacity, retail impacts and timeframe for delivery assessment criterion. Through the MCA Workshop process, a number of the MCA assessors identified design opportunities to further refine Option 3's design for Lambton Quay (e.g. providing indented bus stops rather than in-line bus stops), as discussed further below.

Option 3 did score negatively for the delivery and operations / maintenance criterion (scoring a -2 and -3 respectively), and the challenges identified in the respective MCA assessments for both criteria (e.g. narrow lanes and footpaths during construction) will need to be further examined in the second stage of the SSBC.

For completeness, it is noted that most of the community feedback received through the Golden Mile Engagement Programme expressed a preference for Option 3 for Lambton Quay.

11.2.1.1 Recommendation for Lambton Quay

It is recommended that Option 3 for Lambton Quay be progressed to the second stage of the SSBC.

11.2.2 Willis Street

Option 3 for Willis Street was ranked first under both the unweighted and weighted scenario assessments. In summary, it was ranked first due to its higher scores (i.e. +2s) for the bus travel time / reliability, for bus boarding / alighting, comfort and convenience, pedestrian capacity, retail impacts, and timeframe for delivery assessment criterion. The social assessment criteria scored the highest for Option 3 (i.e. +3).

Option 3 does appear to be more challenging from a cycling level of service perspective (e.g. northbound cyclists), which recorded a -1 score. It also appears to be more complex from a delivery and operations / maintenance perspective (scoring a -2 and -3 respectively). The challenges identified for both of these criteria in their respective MCA assessments (e.g. limited space for bikes to pass stationary buses, and construction disruption) will need to be further examined in the second stage of the SSBC.

For completeness, it is noted that most of the community feedback received through the Golden Mile Engagement Programme expressed a preference for Option 3 for Willis Street.

11.2.2.1 Recommendation for Willis Street

It is recommended that Option 3 for Willis Street be progressed to the second stage of the SSBC.

11.2.3 Manners Street

The “All Options” option for Manners Street scored a range of 0s and +1s. Scores of +1 were recorded for the bus travel time / reliability, for bus boarding / alighting, comfort and convenience, pedestrian safety / general (road) safety and pedestrian capacity assessment criterion. It is noted that the highest scoring assessment criteria was the timeframe for delivery criteria (i.e. +2). These scores reflect that this option will have positive impacts.

Concerns were however noted for cycling on Manners Street (which scored a -1). It also appears that there might be some challenges from a delivery and operations / maintenance perspective (scores of -1 were recorded for both assessment criteria). The challenges identified for both of these criteria in their respective MCA assessments (e.g. no dedicated cycling provision, and construction disruption) will need to be further examined in the second stage of the SSBC.

As effectively only one option was proposed for Manners Street, and the MCA scoring demonstrates positive impacts, it is therefore recommended that the All options option be advanced to the second stage of the SSBC.

11.2.3.1 Recommendation for Manners Street

It is recommended that the Manners Street “All Options” option be progressed to the second stage of the SSBC.

11.2.4 Courtenay Place

Option 3 was ranked first under both the unweighted and weighted scenario assessments. In summary, it was ranked first due to its higher scores (i.e. +3s) for the improved place quality, social, cycling and sustainability assessment criterion. It also scored well (i.e. +2s) for the bus travel time / reliability, bus boarding / alighting, comfort and convenience, pedestrian / general (road) safety, pedestrian capacity, fit with LGWM programme and the timeframe for delivery assessment criterion. It however scored lower (when compared to the other options) for retail impacts (with a score of +1). Through the MCA Workshop process, a number of the MCA assessors identified design opportunities to further refine Option 3's design for Lambton Quay (e.g. providing indented bus stops rather than in-line bus stops), as discussed further below.

Option 3 did score negatively for the delivery and operations / maintenance criterion (scoring a -2 and -3 respectively), and the challenges identified in the respective MCA assessments for both criteria (e.g. narrow lanes and footpaths during construction) will need to be further examined in the second stage of the SSBC.

For completeness, it is noted that most of the community feedback received through the Golden Mile Engagement Programme expressed a preference for Option 3 for Courtenay Place,

11.2.4.1 Recommendation for Courtenay Place

It is recommended that Option 3 for Courtenay Place be progressed to the second stage of the SSBC.

11.3 Summary of Recommended Technical Option Preferences

Table 48 summarises the technical option preferences identified through the MCA process for each section of the Golden Mile. These preferences are recommended to be advanced to the second stage of the SSBC.

Table 48: Summary of recommended option preferences

Golden Mile Section	Recommended technical option preference
Lambton Quay	3
Willis Street	3
Manners Street	All Options
Courtenay Place	3

11.4 Opportunities for further Design Refinement

Through the MCA process, the MCA assessors identified opportunities to further refine Option 3's design in the second stage of the business case and the detailed design phase, including:

- Considering indented bus stops instead of in-line bus stops
- Retaining north / south through traffic at the Tory Street / Courtenay Place intersection (rather than full closure)
- Considering how cycling provisions on Courtenay Place and / or Lambton Quay would integrate with WCC's strategic cycling network plans
- The retention of loading bays and / or taxis stands on the Golden Mile outside of peak hours (and improving existing loading bay / taxi enforcement), and considering further as to how these facilities could be transitioned overtime to the Golden Mile's side roads, and
- Investigating further the material costs for new pedestrian / public realm spaces, including considering implementing different treatments along the Golden Mile.

12. Recommendations and Next Steps

The next step is for LGWM to consider the technical option preferences identified for each section of the Golden Mile that have been recommended to be advanced to the second stage of the business case. That is, the technical preference to advance Option 3 for Lambton Quay, Willis Street and Courtenay Place and the “All options” option for Manners Street to the second stage of the SSBC (noting that there are opportunities to further refine the design and optimise the phasing of Option 3 during this stage).

It is noted however that affordability and / or funding availability may be key matters needing further consideration by LGWM when considering this report’s recommended technical option preferences. If these matters are ultimately identified to be key determinants in the final decision-making processes for the preferred option(s), one alternative pathway for delivering the option(s) might be for LGWM to consider how it might be phased in overtime. An example of phasing in Option 3 could be:

- Removal of on-street car parks from the Golden Mile (but retaining loading bays and / or taxis stands on the Golden Mile)
- Phasing in closure of side road ends, including using tactical urbanism to help develop proof of concepts
- Phasing in bus stop consolidation and traffic signal phasing changes
- Phasing in build out of pedestrian pavements (or treatments) at key locations, and
- Removing PMVs from parts or all of the Golden Mile.

In the longer term, completing Option 3 could comprise of closure of all side road ends, full removal of PMVs, completing all pavement kerb build outs (including the kerb build outs needed to complete Option 3’s bus lane configurations for Courtenay Place and Lambton Quay) and full relocation of loading bays / taxis stands to side roads.

A

Short List Report Option Drawings

SHORTLIST OPTION OVERVIEW

Remove access for private motor vehicles?

No → 1

Yes → Change street cross-section?

No → 2

Yes → 3

1 REDUCED TRAFFIC

PRIVATE MOTOR VEHICLES
Access is provided, however some movements are restricted

PARKING
Generally reduced with loading bays / taxis / accessible parking relocated to side streets

BUS OPERATIONS
Improvement through reduction in traffic

PEDESTRIAN / URBAN AMENITY / ACTIVE MODES
Localised improvements through in- ll of some loading and parking bays and reduction in traffic

BUS STOPS
Some bus stops removed/relocated to gain efficiency

SERVICING AND TAXIS / RIDE-SHARE
Under all options, service vehicles and taxis could still access the Golden Mile, however time restrictions would apply. Late night pick-up locations could vary, either from side streets or on the Golden Mile, responding to safety considerations.

EMERGENCY VEHICLES
Under all options emergency vehicles will have access at all times. Depending on treatment of side streets (whether these are open, closed as per Grey Street or treated as a shared space with occasional service vehicle use, re-routing may be required.

2 BUS EMPHASIS

PRIVATE MOTOR VEHICLES
Access removed

PARKING
Removed with loading bays / taxis / accessible parking relocated to side streets

BUS OPERATIONS
Step change in bus operations - all lanes re-allocated to buses to maximise physical capacity

PEDESTRIAN / URBAN AMENITY / ACTIVE MODES
Localised improvements through in- ll of loading and parking bays and side street closures (more than option 1)

BUS STOPS
Some bus stops removed/relocated to gain efficiency (more than option 1)

3 BUS + PEDESTRIAN EMPHASIS

PRIVATE MOTOR VEHICLES
Access removed

PARKING
Removed with loading bays / taxis / accessible parking relocated to side streets

BUS OPERATIONS
Step change in bus operations - lanes re-allocated to both bus operations and pedestrians

PEDESTRIAN / URBAN AMENITY / ACTIVE MODES
Signi cant improvements through in- ll of loading and parking bays, side street closures and reallocation of vehicle lanes to pedestrian space

BUS STOPS
Some bus stops removed/relocated to gain efficiency (as per option 2)

STRATEGIC CYCLE NETWORK

COURTENAY PLACE

3a Space made available for cycling / micro-mobility on one side of the street as a bi-directional facility

3b Space made available for cycling / micro-mobility on both sides of the street

WILLIS STREET

3c Space provided for cycling / micro-mobility south of Mercer St

1 REDUCED TRAFFIC

COURTENAY PLACE

Private motor vehicles (PMV) have access with some restrictions. Existing kerb lines are retained, parking and loading re-located to side streets and in- lled to widen footpaths.

Northbound >

< Southbound

SECTION

Existing kerb

Parking / loading bays in lled (pockets of space along length)

LEGEND

SPACES

- Existing pedestrianised street
- Proposed pedestrianised area
  Closed to general traffic. Service access can be retained where required.
- Existing public open space

SIGNALISED CROSSINGS

- Potential to retain
- Potential to remove
- Localised improvements
- Potential new crossing

TRANSPORT MODES

- Bus lane / bus only
- Dual bus lane / bus only
- General lane (bus / general traffic)
- Footpath widening by re-allocating lane
  Loading bays and parking indents not shown due to scale
- Dedicated space for cycles / fast active modes
- Shared zone
  Beside footpath for cycles and faster active modes (slower speed). Could support servicing/emergency resilience for buses.

BUS STOPS

- Potential to retain (includes minor adjustment where footpath widened)
- Potential to remove/relocate along street
- Potential new stop

0 50 100m

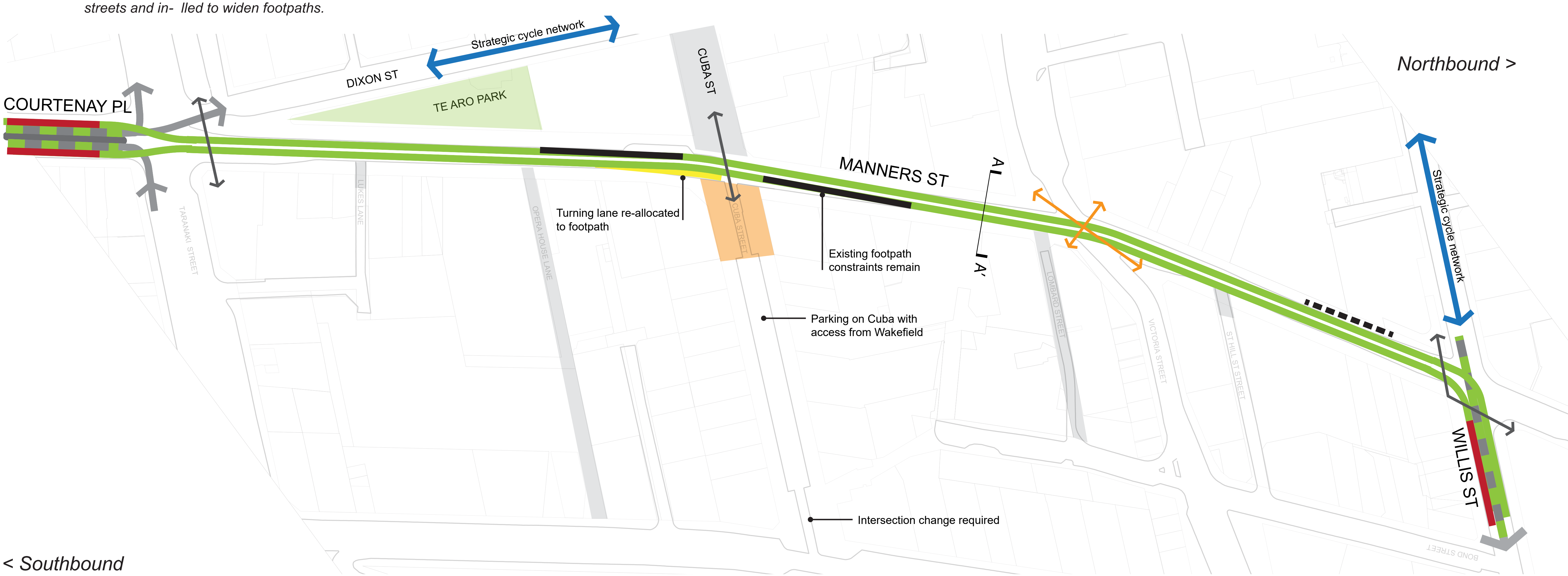
1:1500 @ A3

NORTH

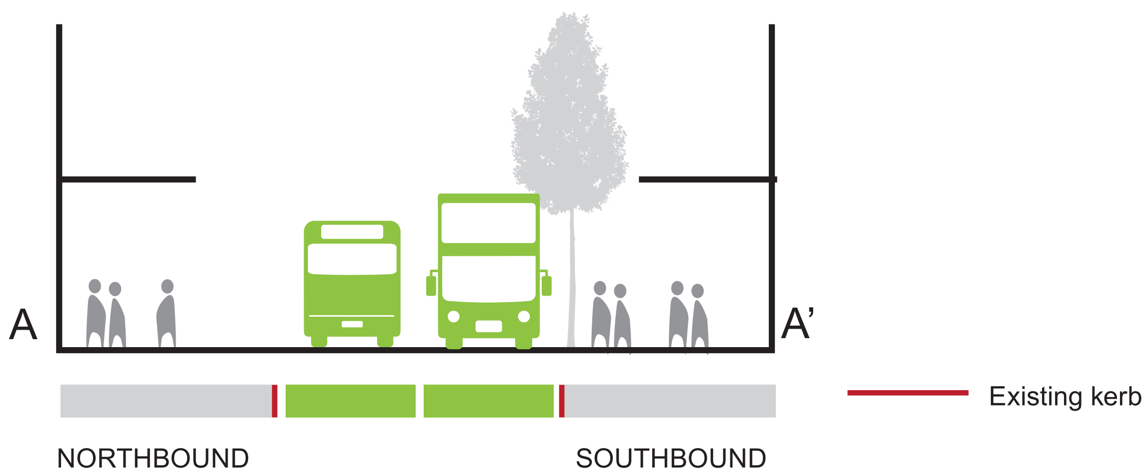
1 REDUCED TRAFFIC

MANNERS STREET

Private motor vehicles (PMV) have access with some restrictions. Existing kerb lines are retained, parking and loading re-located to side streets and in- lled to widen footpaths.



SECTION



LEGEND

SPACES

- Existing pedestrianised street
- Proposed pedestrianised area
  Closed to general traffic. Service access can be retained where required.
- Existing public open space

SIGNALISED CROSSINGS

- Potential to retain
- Potential to remove
- Localised improvements
- Potential new crossing

TRANSPORT MODES

- Bus lane / bus only
- Dual bus lane / bus only
- General lane (bus / general traffic)
- Footpath widening by re-allocating lane
  Loading bays and parking indents not shown due to scale
- Dedicated space for cycles / fast active modes
- Shared zone
  Beside footpath for cycles and faster active modes (slower speed). Could support servicing/emergency resilience for buses.

BUS STOPS

- Potential to retain (includes minor adjustment where footpath widened)
- Potential to remove/relocate along street
- Potential new stop

0 50 100m

1:1500 @ A3

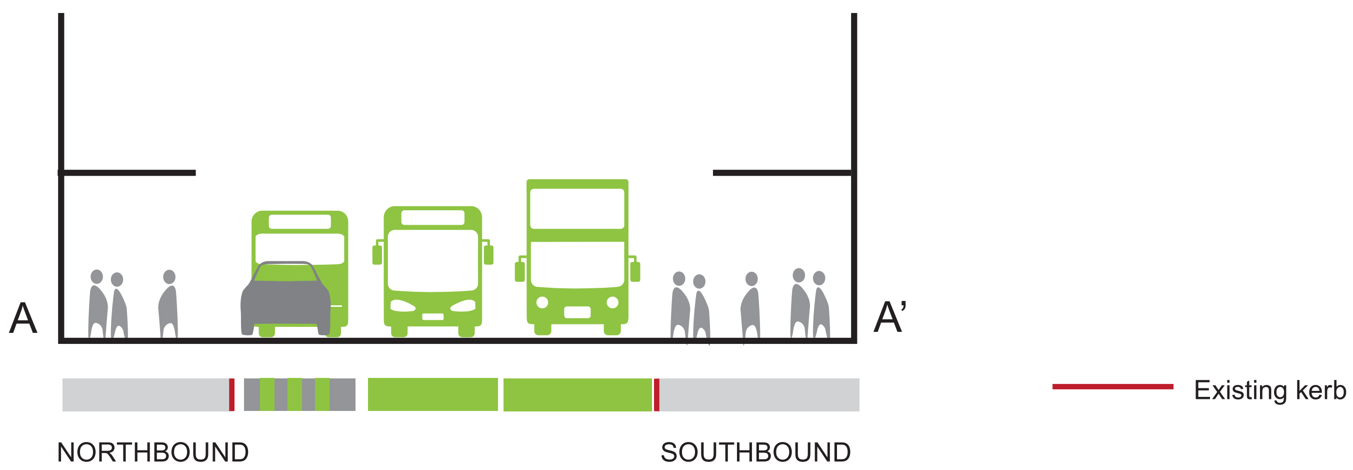
NORTH

1 REDUCED TRAFFIC

WILLIS STREET

Private motor vehicles (PMV) have access with some restrictions. Existing kerb lines are retained, parking and loading re-located to side streets and in- lled to widen footpaths.

SECTION



LEGEND

SPACES

- Existing pedestrianised street
- Proposed pedestrianised area
  Closed to general traffic. Service access can be retained where required.
- Existing public open space

SIGNALISED CROSSINGS

- Potential to retain
- Potential to remove
- Localised improvements
- Potential new crossing

TRANSPORT MODES

- Bus lane / bus only
- Dual bus lane / bus only
- General lane (bus / general traffic)
- Footpath widening by re-allocating lane
  Loading bays and parking indents not shown due to scale
- Dedicated space for cycles / fast active modes
- Shared zone
  Beside footpath for cycles and faster active modes (slower speed). Could support servicing/emergency resilience for buses.

BUS STOPS

- Potential to retain (includes minor adjustment where footpath widened)
- Potential to remove/relocate along street
- Potential new stop

0 50 100m

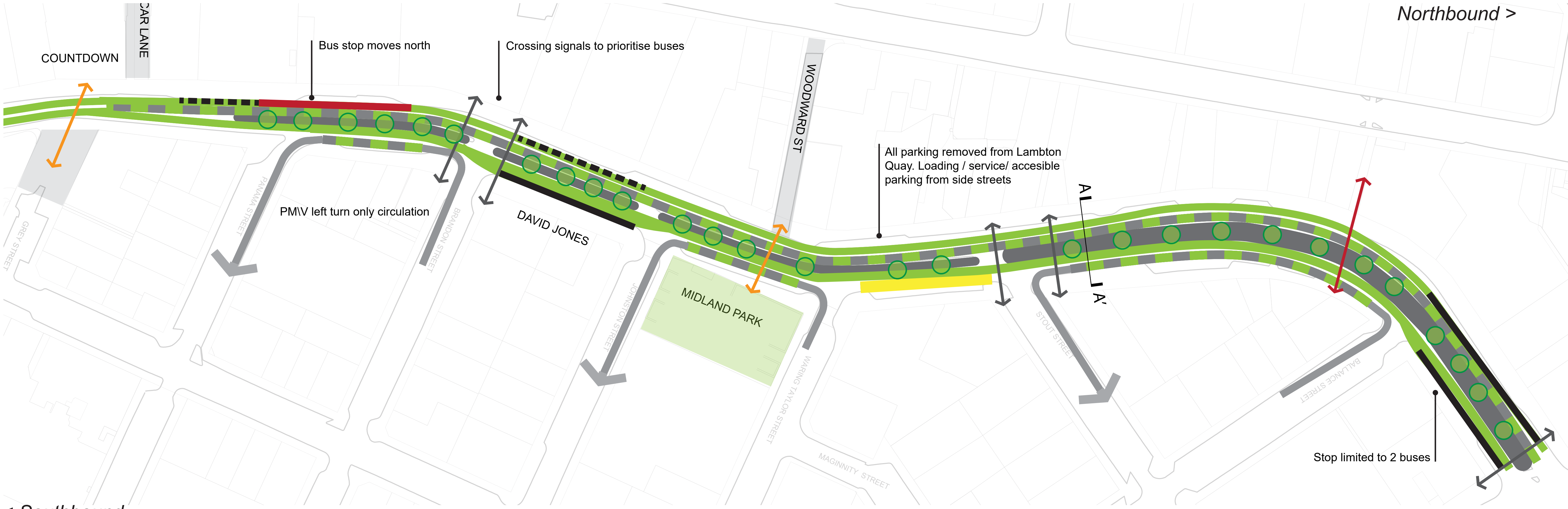
1:1500 @ A3

NORTH

1 REDUCED TRAFFIC

LAMBTON QUAY

Private motor vehicles (PMV) have access with some restrictions. Existing kerb lines are retained, parking and loading re-located to side streets and in- lled to widen footpaths.



SECTION

Existing kerb

Parking / loading bays in lled (pockets of space along length)

LEGEND

SPACES

- Existing pedestrianised street
- Proposed pedestrianised area
  Closed to general traffic. Service access can be retained where required.
- Existing public open space

SIGNALISED CROSSINGS

- Potential to retain
- Potential to remove
- Localised improvements
- Potential new crossing

TRANSPORT MODES

- Bus lane / bus only
- Dual bus lane / bus only
- General lane (bus / general traffic)
- Footpath widening by re-allocating lane
  Loading bays and parking indents not shown due to scale
- Dedicated space for cycles / fast active modes
- Shared zone
  Beside footpath for cycles and faster active modes (slower speed). Could support servicing/emergency resilience for buses.

BUS STOPS

- Potential to retain (includes minor adjustment where footpath widened)
- Potential to remove/relocate along street
- Potential new stop

0 50 100m
1:1500 @ A3

NORTH

2 BUS EMPHASIS

COURTENAY PLACE

Private motor vehicles (PMV) are removed with servicing time restricted. Existing kerb lines are retained, parking and loading re-located to side streets and in- lled to widen footpaths.

< Southbound

SECTION

Existing kerb

Parking / loading bays in lled (pockets of space along length)

LEGEND

SPACES

- Existing pedestrianised street
- Proposed pedestrianised area
  Closed to general traffic. Service access can be retained where required.
- Existing public open space

SIGNALISED CROSSINGS

- Potential to retain
- Potential to remove
- Localised improvements
- Potential new crossing

TRANSPORT MODES

- Bus lane / bus only
- Dual bus lane / bus only
- General lane (bus / general traffic)
- Footpath widening by re-allocating lane
  Loading bays and parking indents not shown due to scale
- Dedicated space for cycles / fast active modes
- Shared zone
  Beside footpath for cycles and faster active modes (slower speed). Could support servicing/emergency resilience for buses.

BUS STOPS

- Potential to retain (includes minor adjustment where footpath widened)
- Potential to remove/relocate along street
- Potential new stop

0 50 100m

1:1500 @ A3

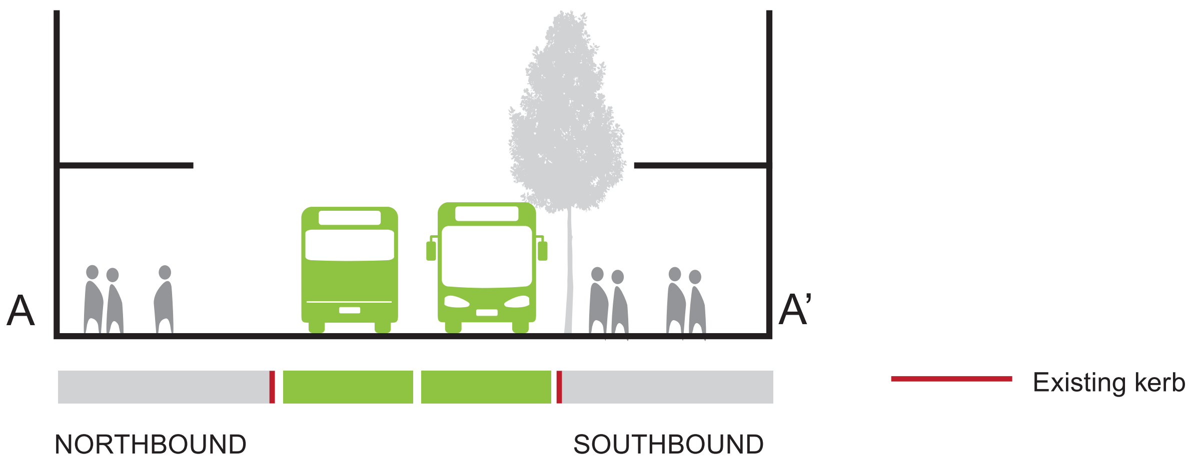
NORTH

2 BUS EMPHASIS

MANNERS STREET

Private motor vehicles (PMV) are removed with servicing time restricted. Existing kerb lines are retained, parking and loading re-located to side streets and in- lled to widen footpaths.

SECTION



LEGEND

SPACES

- Existing pedestrianised street
- Proposed pedestrianised area
  Closed to general traffic. Service access can be retained where required.
- Existing public open space

SIGNALISED CROSSINGS

- Potential to retain
- Potential to remove
- Localised improvements
- Potential new crossing

TRANSPORT MODES

- Bus lane / bus only
- Dual bus lane / bus only
- General lane (bus / general traffic)
- Footpath widening by re-allocating lane
  Loading bays and parking indents not shown due to scale
- Dedicated space for cycles / fast active modes
- Shared zone
  Beside footpath for cycles and faster active modes (slower speed). Could support servicing/emergency resilience for buses.

BUS STOPS

- Potential to retain (includes minor adjustment where footpath widened)
- Potential to remove/relocate along street
- Potential new stop

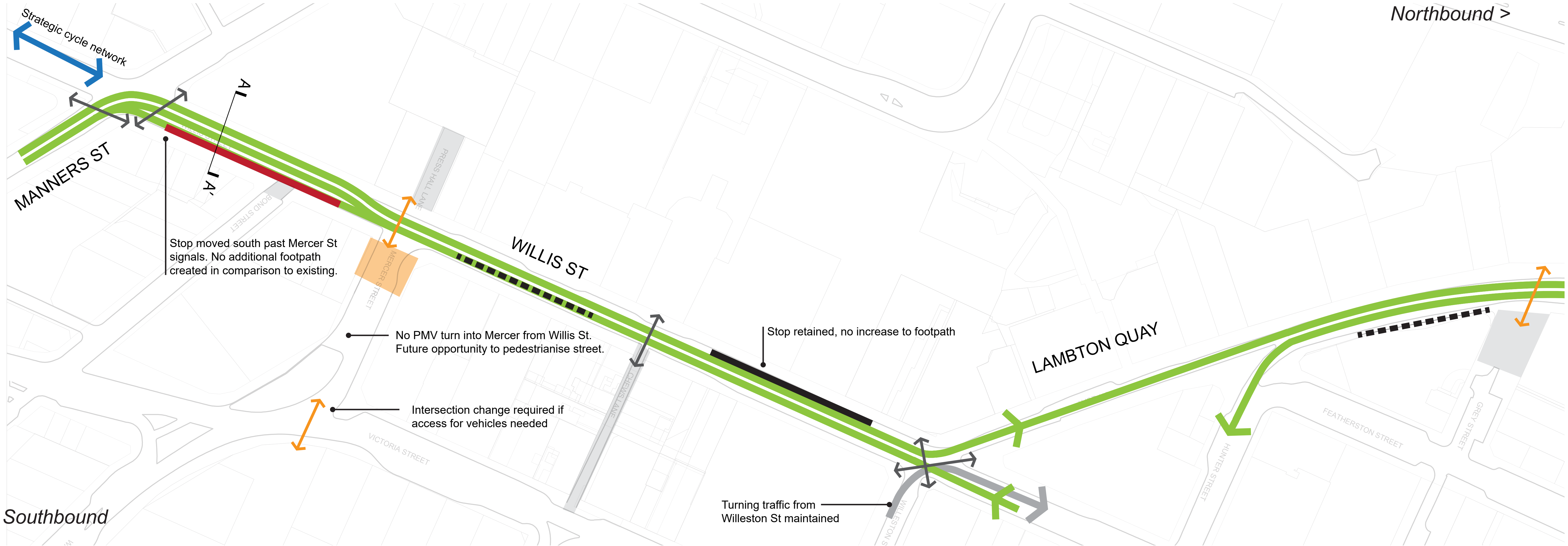
0 50 100m
1:1500 @ A3

NORTH

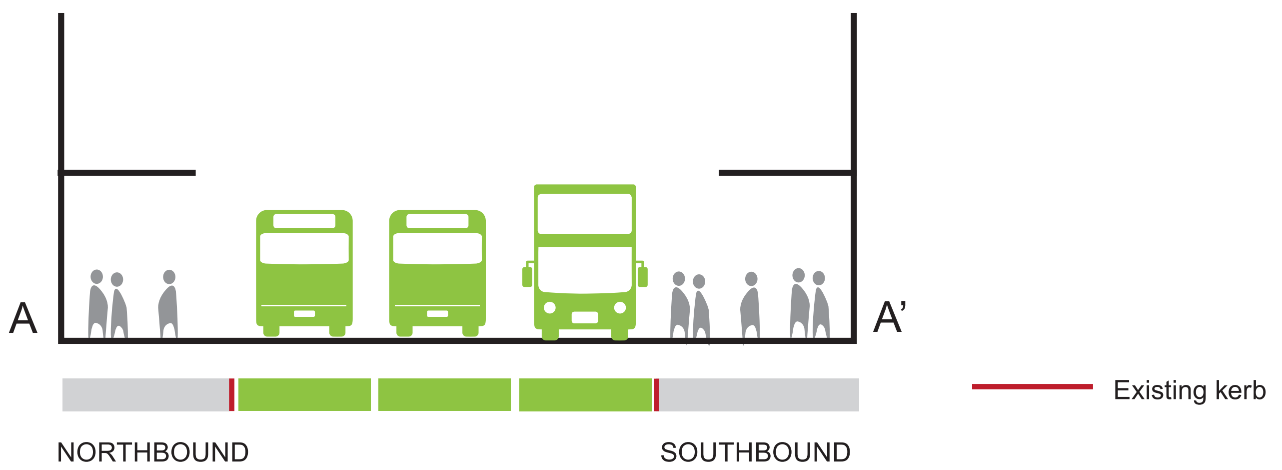
2 BUS EMPHASIS

WILLIS STREET

Private motor vehicles (PMV) are removed with servicing time restricted. Existing kerb lines are retained, parking and loading re-located to side streets and in- lled to widen footpaths.



SECTION



LEGEND

SPACES

- Existing pedestrianised street
- Proposed pedestrianised area
  Closed to general traffic. Service access can be retained where required.
- Existing public open space

SIGNALISED CROSSINGS

- Potential to retain
- Potential to remove
- Localised improvements
- Potential new crossing

TRANSPORT MODES

- Bus lane / bus only
- Dual bus lane / bus only
- General lane (bus / general traffic)
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Parking / loading bays in lled (pockets of space along length)

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3 BUS + PEDESTRIAN EMPHASIS

COURTENAY PLACE

Street becomes 2-lanes with space reallocated to support pedestrians, improve urban amenity and allow safer integration of active modes.

< *Southbound*

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3 BUS + PEDESTRIAN EMPHASIS

MANNERS STREET

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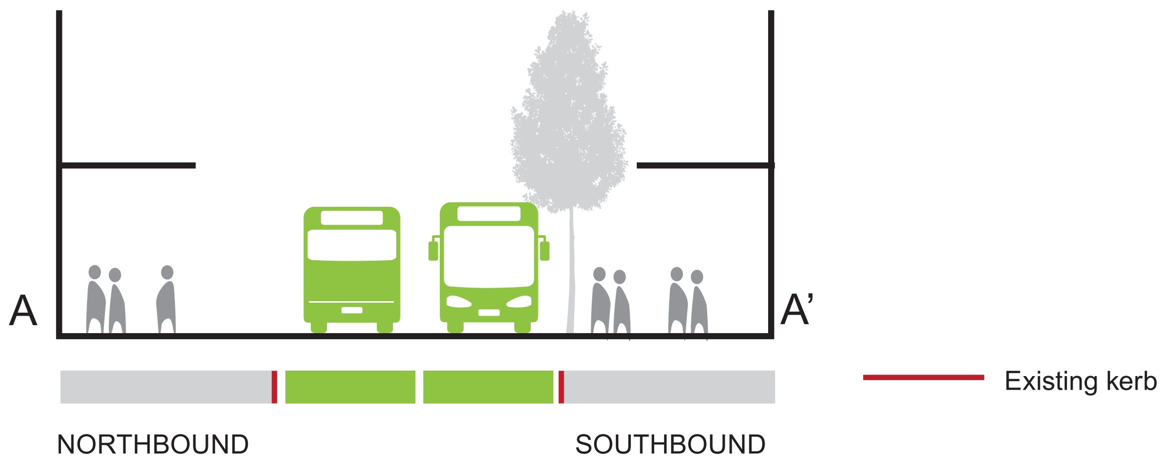
SECTION



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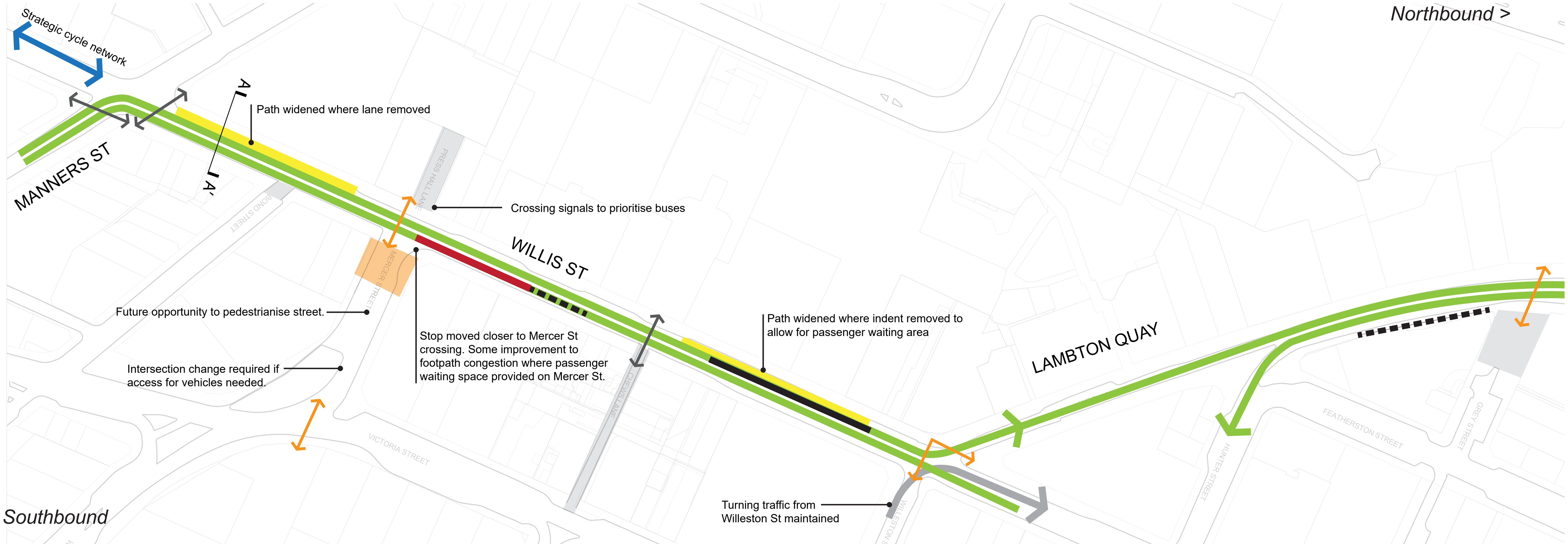

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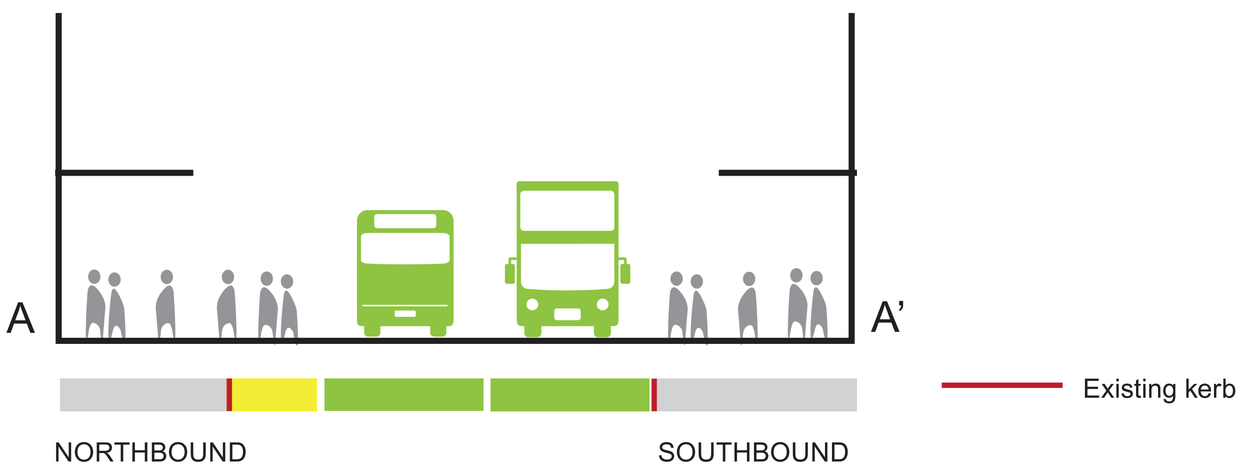

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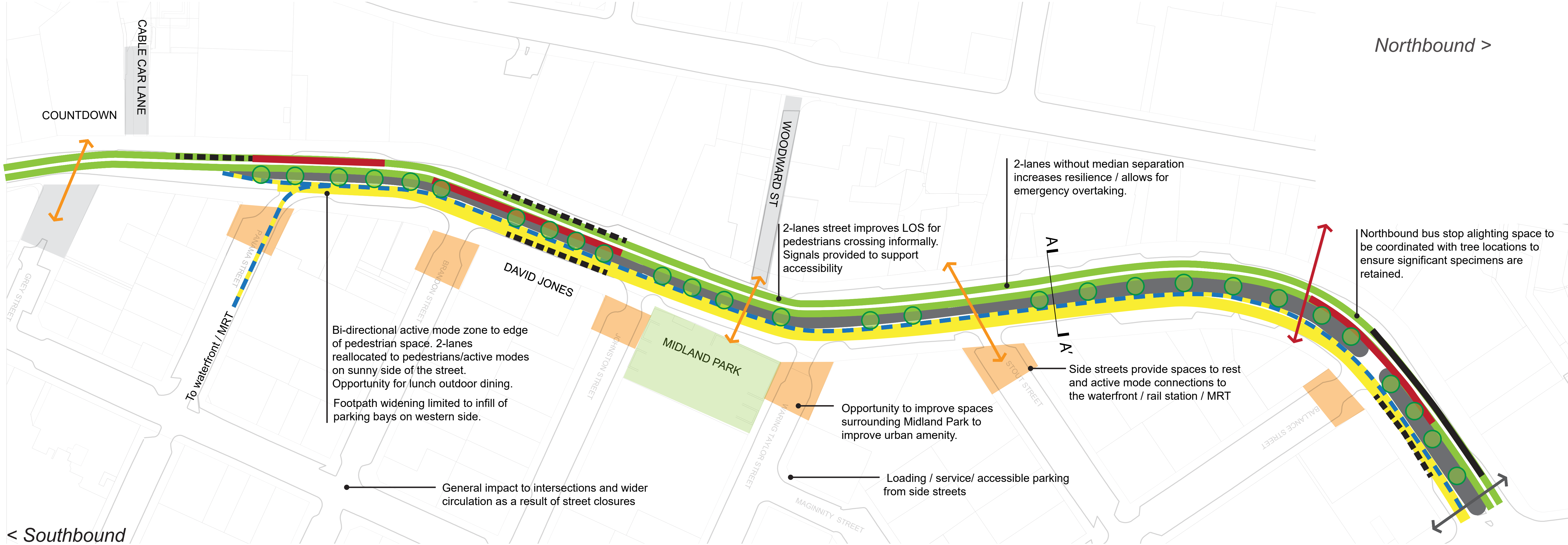

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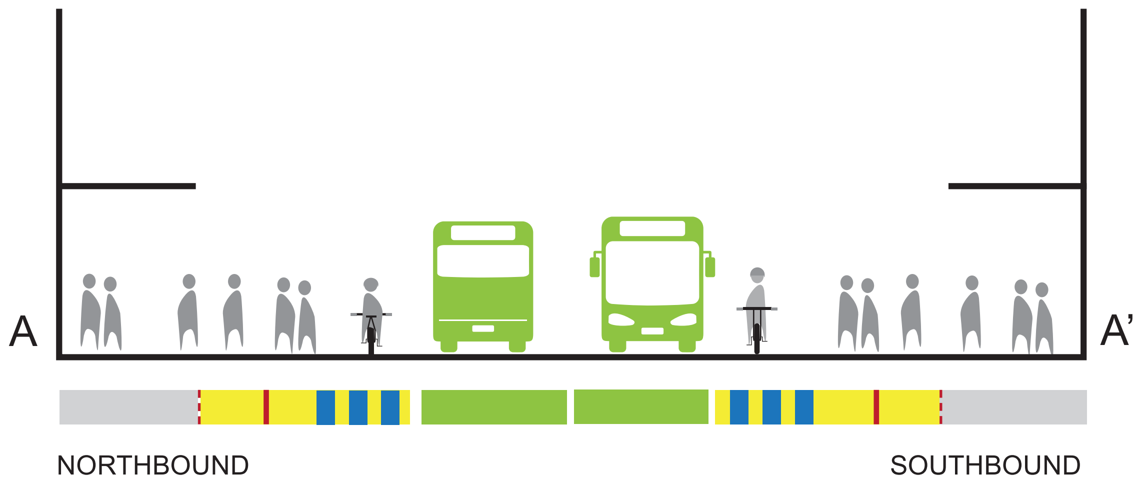
3a STRATEGIC CYCLE NETWORK

COURTENAY PLACE

Street becomes 2-lanes with space reallocated to support pedestrians, improve urban amenity and allow safer integration of active modes.

Space allocated on Courtenay Place and southern Willis Street to support the Strategic Cycle Network

SECTION



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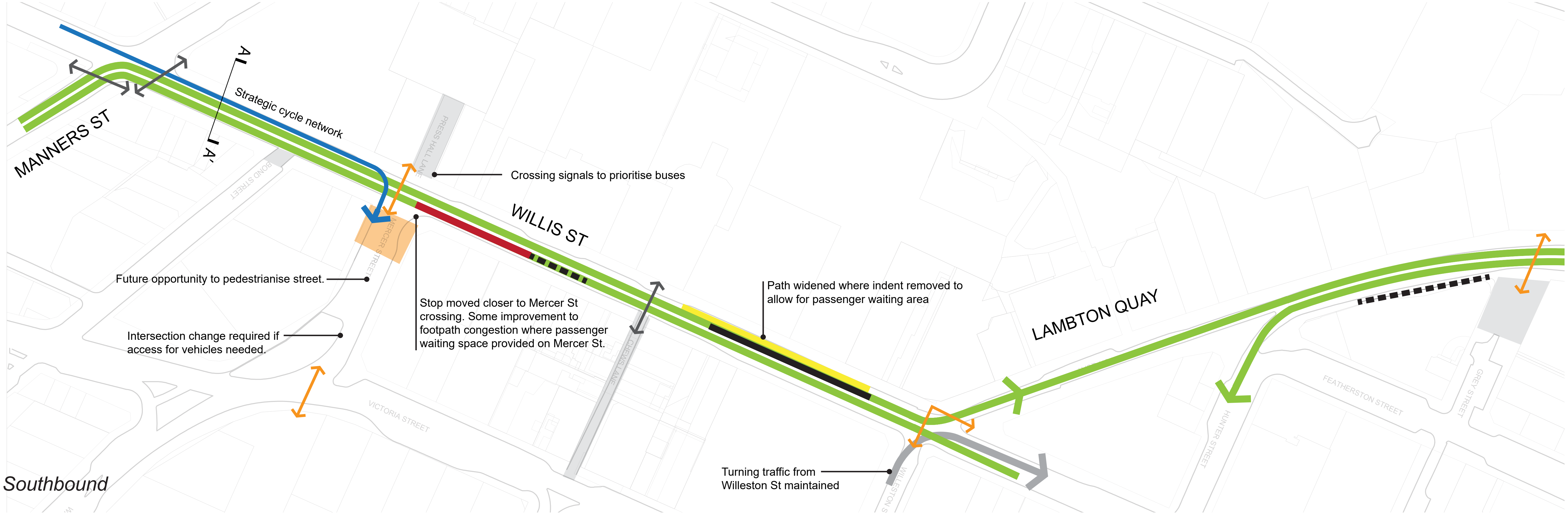
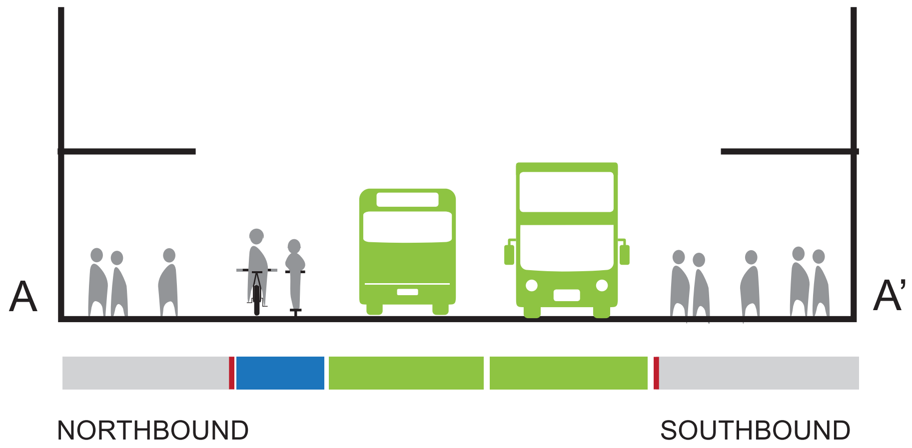
Northbound >



< Southbound

SECTION



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NORTH

B

Project Assumption and Do-Minimum Briefing Note

Stantec

Memo

To:	Eddie Anand Let's Get Wellington Moving	From:	Rowan Schwynn Stantec, Wellington Office
File:	Do Minimum Scenario Definition	Date:	October 6, 2020

Reference: Golden Mile – Do Minimum Scenario Description

RECOMMENDATION

It is recommended that Let's Get Wellington Moving approves the Do Minimum scenario and assumptions described in this memorandum.

Particular attention is brought to the following key assumption that supports the assessment of the do minimum and all options under assessment in the Golden Mile Multi-Criteria Assessment process:

- The capacity of the Golden Mile to accommodate buses is constrained by the available cross section and size and location of bus stops.
- Bus volumes are expected to grow significantly in the future, with the total volume of buses expected to exceed 100 buses per hour northbound by 2022.
- The TRB Transit Capacity of Service Manual indicates bus volumes 90 -100 buses per hour are indicative of 'unstable flow and queuing' and this has been confirmed by independent investigation and observation of bus movements on the Golden Mile.
- It is recommended that increases in bus volumes beyond 100 buses per hour per direction on the Golden Mile should trigger the review and staged relocation of services from the Golden Mile to alternate corridor(s). Ideally, any such change should be undertaken as part of a formal review and in conjunction with other changes to the network.
- Changes to the composition of vehicle fleets, notably an increase in the proportion of high capacity (double decker) buses will increase dwell times and therefore impact bus stop capacity, potentially imposing a requirement for longer bus stops.
- Given these factors, additional bus volumes beyond 100 vehicles per hour, per direction of travel are assumed to use an alternative (unspecified) corridor for the purposes of the do minimum scenario and the assessment of all options under consideration in the Golden Mile Multi-Criteria Analysis.

PURPOSE

This briefing note defines the do minimum scenario that will be applied in the assessment of the options developed for the Golden Mile Project. It also sets out the key project assumptions that underpin the option development and assessment processes for the project.

Reference: Golden Mile – Do Minimum Scenario Description

CONTEXT

A Multi-Criteria Assessment (MCA) process is been undertaken to help assess the improvement options that have been identified for the Let's Get Wellington Moving's (LGWM) Golden Mile Project. The recommendations from the assessment process will then be considered through the prescribed LGWM decision making process.

The do-minimum scenario serves as the comparator for the MCA, with all options assessed with the do-minimum. Scoring will reflect the relative advantages or disadvantages of options contrasted with the do-minimum scenario.

The do minimum will also be used to inform the economic assessment of the preferred option that will be undertaken as part of Stage 2 of the Golden Mile Single Stage Business Case (SSBC).

REFERENCES

The Golden Mile Project Team has referred to the following documents in order to define the do minimum scenario:

- Correspondence with Alex Campbell – 2 October 2020
- Golden Mile Strategic Case – June 2020
- Golden Mile Vision Statement (and principals) – June 2020
- LGWM RPI and Indicative Package Modelling Report – June 2019
- NZTA Contract 1851 RFT Rev 4.1
- LGWM Central Case Do Minimum Testing Paper – August 2017

All modelling cited in this document has been undertaken using the Wellington Transport Strategy Model (WTSM) – a strategic modelling tool developed using the industry standard Emme modelling platform.

PROJECT EXTENT

The geographic scope of the project is shown in Figure 1 below:

Figure 1 - Extent of Golden Mile

The extents of the Golden Mile project includes:

- Golden Mile corridor: Lambton Quay, Old Bank Arcade loop, part of Willis Street, Manner Street and Courtenay Place (including the bus terminal facility).
- Relevant segments of lateral / connecting streets including:
- Blair St / Allen St / Tory St
- Taranaki St / Dixon St / Cuba St / Vitoria St
- Boulcott St / Mercer St / Willeston St / Hunter St
- Panama St / Brandon St / Johnston St / Waring Taylor St. / Farmers Lane / Stout St / Balance St / Whitmore St / Bowen St / Bunny St

PROJECT ASSUMPTIONS

The development of the Do Minimum Scenario and all project options has been informed by the following overarching project assumptions as provided in NZTA Contract 1851 RFT Rev 4.1 :

- The SSBC and project outcomes will be developed based on a long-term solution in accordance with the Golden Mile 2036 vision statement
- It is assumed that Mass Transit is not on the Golden Mile Corridor, although integration with future Mass Transit will need to be considered particularly at the intersection of Manners / Courtenay and Taranaki Street; and potential future desire lines between the Golden Mile and the Quays (East-West desire line)
- Despite the potential for Mass Transit, the Golden Mile is still expected to carry significant public transport capacity and must provide a very high-quality public transport spine
- There is general acceptance of lower/less general traffic access to the Golden Mile
- There is a general acceptance of a reduction / removal in on-street parking where necessary and where this contributes to project objectives
- The assumed design year for the purposes of travel demand and public transport patronage is 2036 to provide consistence with the Golden Mile Vision, and
- Property acquisition is not anticipated and options will be developed to sit within the existing road corridor[1].

In addition to the above, the Project Team in conjunction with LGWM, have excluded the following from the development of options:

- Changes to fares and pricing structures of bus and/or taxi services
- Changes to bus fleet (including use of high capacity buses)
- Changes to bus routes, services and timetables[2]
- The addition of car parks, changes to car park pricing or parking strategies beyond the extent of the Golden Mile (will be guided by the Parking Policy 2020)
- Major grade separation (tunneling or elevated structures) works
- Changes to roads or intersections beyond the extent of the Golden Mile

The project team have also assumed:

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[1] Property acquisition has not been explicitly stated as excluded from project scope, however the overarching project budget and timing rules out significant property acquisition as a feasible consideration.
[2]https://www.metlink.org.nz/assets/Uploads/WRC-Wellington-City-Schematic-Map-A3-FINAL-Feb2019.pdf

- Patronage and growth will return to pre-COVID levels and projections by 2036
- Patterns of employment and employment distribution will return to pre-COVID levels and projections by 2036
- Rates of car ownership and vehicle operating costs will remain consistent with forecasts
- No change to the temporal demand, with AM and PM peak demand periods continuing into 2036.
- **The capacity of the Golden Mile to accommodate buses is constrained and additional bus volumes beyond 100 vehicles per hour, per direction of travel are assumed to use an alternative (unspecified) corridor.**

RELATED PROJECT INFRASTRUCTURE ASSUMPTIONS

In accordance with the NZTA guidelines, the Golden Mile Do Minimum Scenario will **exclude** all major infrastructure changes that have not been committed or funded:

- MRT and the associated feeder bus network and interchange facilities
- State Highway improvements including tunnel duplication, and basin reserve grade separation
- Rail timetable and service improvements beyond Rail Scenario One (RS1)[3]
- Integrated fares and ticketing
- The strategic cycle network[4]
- RS1 timetable and service improvement

The Golden Mile Do Minimum Scenario will **include** the following committed public transport service improvements:

- Committed increases to bus service capacity (due to be implemented by 2022).
- In addition, the Golden Mile Do Minimum Scenario will **include** the forecast capacity increase required to meet demand beyond 2022[5]

These service enhancements will be described in further detail below.

NZTA DO MINIMUM DEFINITION

NZTA states that:

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[3] RS1 service improvements include 10 minute 'clockface' timetables for the Kapiti line and 15 minute headways on the Hutt Valley Line.
[4] The strategic cycle network has not been included in growth forecasts, as it is not a funded and committed project. Options have considered space allocation for the strategic cycle network where space is available.
[5] This is currently unfunded, but is required to maintain a minimum level of service for bus customers.

'The do-minimum option should represent the minimum level of expenditure required to maintain a minimum level of service, not the minimum level of investment required to achieve the investment objectives.

'In theory every option should be compared with the option of doing nothing at all, that is, the do-nothing option; however, for many transport activities it is not practical to do nothing at all.'

'It is important not to overstate the scope of the don-minimum option, that is, it should only include activities that are absolutely essential to preserve a minimum level of service. Where network interdependencies exist, the do-minimum option should take into account other activities elsewhere on the network where these other activities have a commitment to funding, and where they affect the demands and level of service at the location of interest.'

In view of the above definition, a do minimum scenario has developed to represent a minimal level of investment to maintain a minimum level of service for all users on the Golden Mile.

DESIGN YEAR FOR THE GOLDEN MILE DO MINIMUM SCENARIO

The design year for the Do Minimum Scenario is **2036**. This design year will be applied to all comparative option assessments undertaken as part of the MCA and is representative of a time horizon when all infrastructure and service changes associated with the Golden Mile will be implemented and mature.

GROWTH AND DEMAND

Population and Employment Growth

The following tables summarises the forecast change in population and employment by area (Wellington City) and TA(rest for region) for the 2036 forecast year:

Table 1 Population projections by area / TA

	2013 Base	2018 Estimate	2036 Old (PBC)		2036 New (IBC)		2036 P4G[6]		2036 RGF	
			Abs	% Diff	Abs	% Diff	Abs	% Diff	Abs	% Diff
CBD	19,400	22,100	32,500	47%	29,600	34%	26,500	20%	27,000	22%
Inner Suburbs	24,400	26,900	31,000	15%	32,200	20%	32,000	19%	31,100	16%
Eastern	36,800	38,000	40,100	6%	40,300	6%	39,800	5%	36,600	-4%
Southern	30,300	31,200	33,800	8%	34,000	9%	34,300	10%	31,900	2%
Western	25,300	25,700	26,600	4%	26,600	4%	29,500	15%	27,800	8%
Northern	64,100	67,600	77,600	15%	78,100	16%	78,600	16%	76,300	13%
Wellington City	**200,300**	**211,500**	**241,600**	**14%**	**240,800**	**14%**	**240,700**	**14%**	**230,700**	**9%**
Lower Hutt	101,100	107,600	107,300	0%	116,600	8%	116,600	8%	119,600	11%

[6] Provisional and subject to further more detailed guidance from WCC regarding phasing of development within Wellington Inner suburbs

Upper Hutt	41,400	45,300	47,400	5%	47,300	4%	47,300	4%	63,100	39%
Porirua	53,700	58,700	62,600	7%	79,400	35%	79,400	35%	64,400	10%
Kapiti	50,700	55,400	59,600	8%	62,600	13%	62,600	13%	70,000	26%
Wairarapa	42,400	46,700	44,200	-5%	50,900	9%	50,900	9%	49,800	7%
Region	**489,600**	**525,200**	**562,700**	**7%**	**597,600**	**14%**	**597,500**	**14%**	**597,600**	**14%**

Table 2 Forecast employment growth

	2013 Base	2018 Estimate	2036 Old (PBC)		2036 New (IBC)		2036 P4G		2036 RGF	
			Abs	% Diff	Abs	% Diff	Abs	% Diff	Abs	% Diff
CBD	90,400	96,400	107,500	12%	112,400	17%	112,400	17%	100,100	4%
Inner Suburbs	11,300	12,000	13,100	9%	14,300	19%	14,300	19%	13,600	13%
Eastern	10,600	11,300	12,400	10%	12,800	13%	12,800	13%	11,600	3%
Southern	4,600	4,700	4,800	2%	4,900	4%	4,900	4%	5,000	6%
Western	4,100	4,300	4,800	12%	4,900	14%	4,900	14%	5,000	16%
Northern	16,200	16,900	18,000	7%	19,200	14%	19,200	14%	17,900	6%
Wellington City	**137,200**	**145,600**	**160,600**	**10%**	**168,500**	**16%**	**168,500**	**16%**	**153,200**	**5%**
Lower Hutt	40,500	43,300	43,300	0%	46,100	6%	46,100	6%	48,400	12%
Upper Hutt	11,300	12,400	12,000	-3%	12,600	2%	12,600	2%	19,900	60%
Porirua	15,100	16,500	17,100	4%	20,000	21%	20,000	21%	23,900	45%
Kapiti	14,000	15,300	15,500	1%	16,500	8%	16,500	8%	19,800	29%
Wairarapa	17,500	19,100	19,400	2%	21,000	10%	21,000	10%	19,600	3%
Region	**235,600**	**252,200**	**267,900**	**6%**	**284,700**	**13%**	**284,700**	**13%**	**284,800**	**13%**

Public Transport Growth

The WTSM model has been used to forecast the expected increase in public transport patronage to the CBD associated with the increase in population and employment. For the purposes of the Do Minimum Scenario and the MCA assessment this increase in patronage is represented as the increase in inbound passenger volumes for the AM peak (7am to 9am) and is presented by area of origin:

Northern Suburbs	Ngaio, Khandallah, Johnsonville, Churton Park, Newlands, Tawa and the rest of the region (Hutt Valley, Porirua, Kapiti, Wairarapa).
Southern and eastern suburbs	Newton, Berhampore, Iland Bay, Kilbirnie, Miramar, Airport, Hataitai
Western suburbs	Karori, Kelburn, Thorndon, Northland

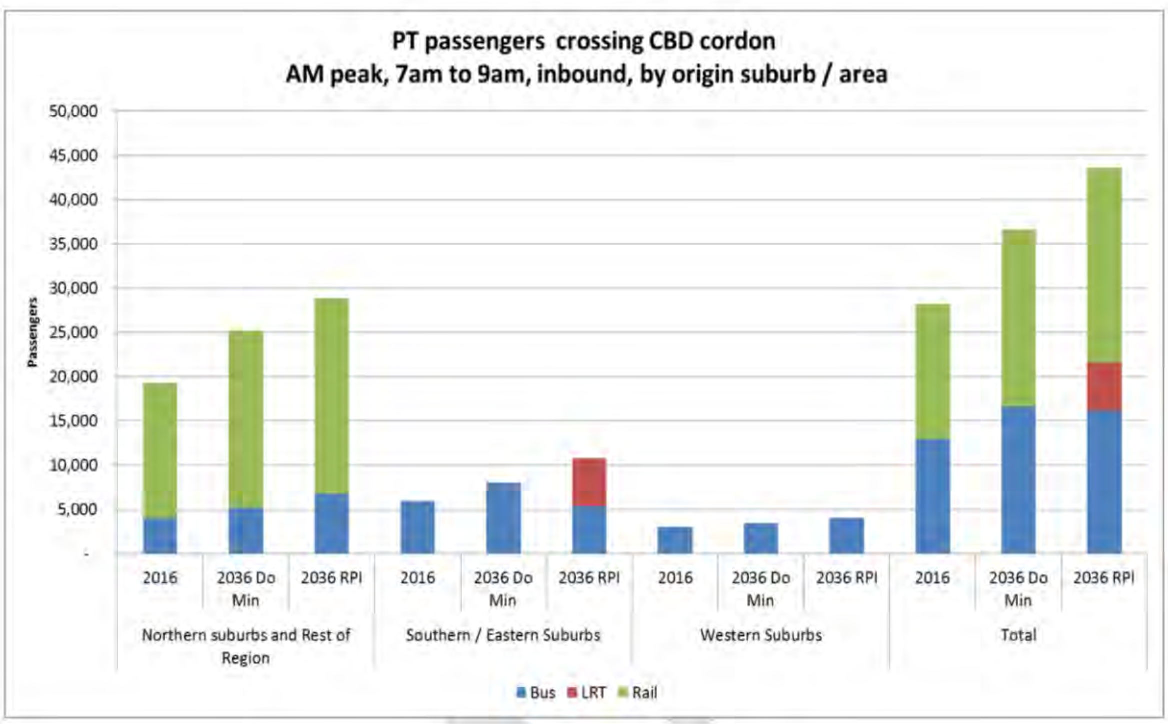


Figure 2 - Forecast Increase in Public Transport Passengers to the CBD

Overall volumes of patronage to the CBD are expected to increase from 28,000 in 2016 to **37,000** in the Do Minimum Scenario (2036).

Growth in Private Vehicles

Figure 3 below shows the forecast increase in private motor vehicles for the AM peak.

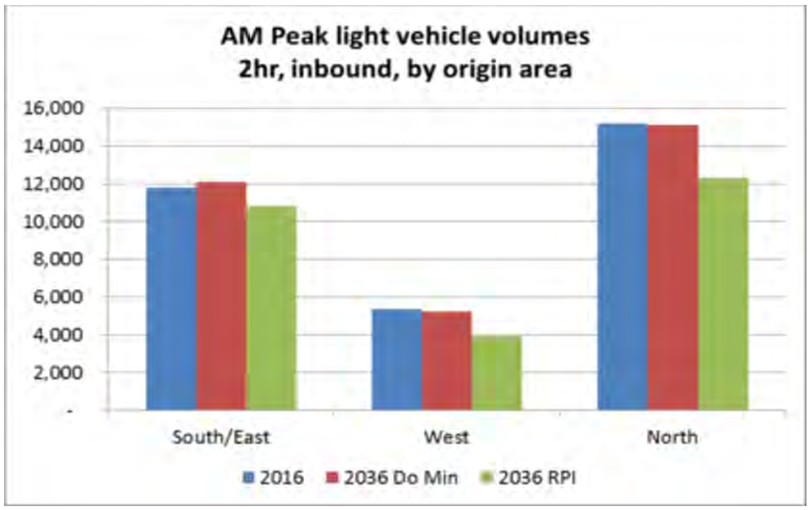


Figure 3 - Forecast Increase in Private Motor Vehicles to the CBD

In the Do Minimum scenario, there is little change forecast in volumes of private motor vehicles entering the CBD in the am peak. This is because capacity is predicted to be constrained on the main arterials leading to the Wellington CBD.

Pedestrian's and cyclists

Figure 4 shows the forecast increase in cyclist and pedestrians entering the CBD.

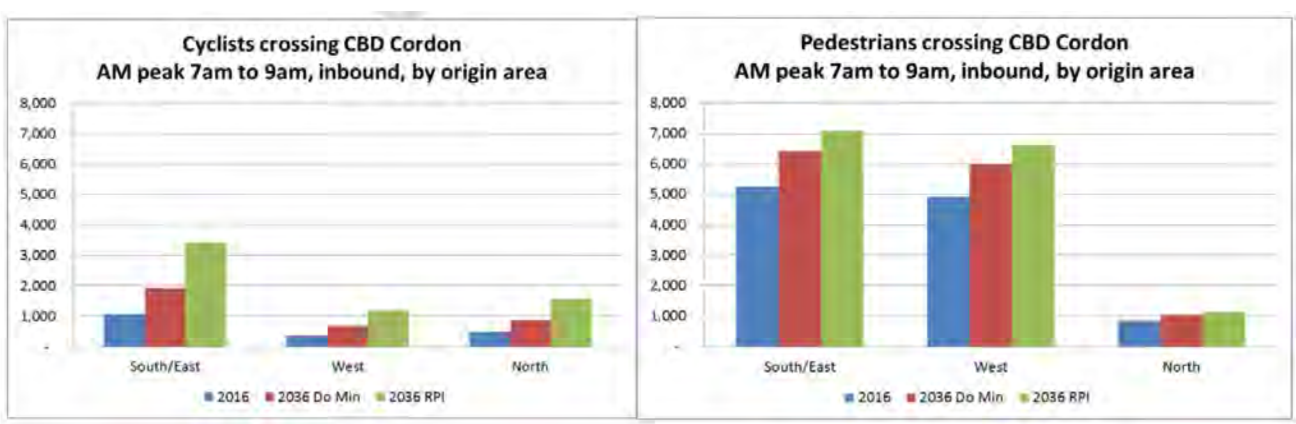


Figure 4 - Forecast Increase in Cyclists and Pedestrians to the CBD

In the Do Minimum scenario, cyclist volumes are expected to increase by 3% per annum in the absence of a connected strategic cycle network, with cyclist volumes to the city expected to double to **2000** by 2036.

Pedestrian volumes are expected to increase from 11,000 (2019) to **13,500** by 3036 under the Do Minimum, which is an increase of 2,500 pedestrians in the CBD.

Mode Share

Total volumes of trips to the CBD is expected to increase from 82,000 to 96,000 in the Do Minimum Scenario, with the following split of mode share:

- Car mode share is expected to drop from 50% to 44% (41,000 to 42,240)
- PT Mode share is expected to increase from 35% to 39% (28,700 to 37,440)
- Active mode share is expected to increase from 15% to 18%. (12,300 to 17,280)

CURRENT AND FUTURE DO MINIMUM BUS VOLUMES

As of October 2020, AM Peak[7] bus flows[8] on the Golden Mile are:

- 88 buses per hour northbound
- 81 buses per hour southbound

In addition to the existing bus volumes, the following committed service enhancements are included in the Do Minimum Scenario:

- Addition of 25 'growth' buses to accommodate forecast increase in patronage. These additional vehicles are contracted and scheduled for delivery between April 2021 and July 2022. Each vehicle will provide one additional AM Peak trip. When existing directional flows are applied, this results in:
  - 101 buses per hour northbound (by 2022)
  - 93 buses per hour southbound (by 2022)

Beyond the committed and contracted additional buses, bus volumes are expected to grow broadly in line with population growth. While the exact number of buses required in future has yet to be confirmed, it is expected that bus volumes along the corridor will exceed 100 buses per hour in either direction by 2036.

Bus volumes in excess 100 buses per hour per direction will start to exceed the capacity of the Golden Mile and will result in significant congestion and break down of flow of buses along the Golden Mile, exacerbated at the key pinch points of Willis Street and Manners Street where lane capacity is limited by the available cross section. In addition with as volumes increase beyond 100 buses per hour, existing bus stop capacity will be exceeded.

[7] The AM peak is defined as 7am to 9am, week days (Monday to Friday)
[8] The bus volumes are already indicative of 'unstable flow and queuing' as defined by the TRB Transit Capacity of Service Manual and confirmed by independent investigation and observation.

Consequently, in acknowledgement of this constraint, bus volumes on the Golden Mile are assumed to be capped at 90 - 100 buses per hour (per direction of travel) with increases in bus volumes above this threshold expected to be accommodated through the utilisation of alternative bus corridors to the Golden Mile.

This assumption is based on investigations to date which indicate instability of flow and a resultant degradation of bus performance start to occur between 90 – 100 buses per hour per direction, with significant negative impacts to bus performance increasing as bus volumes exceed the notional cap of 90 – 100 buses.

This capacity limitation also assumes a similar mix of fleet to that currently in use along the Golden Mile.

Changes in the composition of fleet, notably the use of double decker high capacity bus fleet will introduce increased dwell times and further constrain both individual bus stop capacity and bus capacity along the Golden Mile. Significant increases in the proportion of high capacity bus fleet will result in a requirement for longer bus stops in order to accommodate the longer dwell times associated with this class of vehicle.

DO MINIMUM SCENARIO GOLDEN MILE PHYSICAL CHARACTERISTICS AND INFRASTRUCTURE

The Do Minimum Scenario assumes no significant changes to the patterns of use or character of the Golden Mile in it's current form.

Mix of Uses

The Do Minimum Scenario assumes the maintenance of the current mix of uses along the extent of the golden mile. This is summarized in Table 3 :

Table 3 - Summary of Golden Mile Uses

Location	Summary of Uses
Lambton Quay	• Pedestrians permitted • Cyclists and e-scooters permitted but only on general traffic or bus lanes • Buses permitted both directions • Private motor vehicles permitted • Loading and commercial vehicles permitted, with dedicated loading bays provided • Taxi's permitted with dedicated taxi stands provided • Parking is permitted with metered parking
Willis Street	• Pedestrians permitted • Cyclists and e-scooters permitted but only on general traffic lanes • Private motor vehicles permitted (NB only) • Loading and commercial vehicles permitted (NB only) with dedicated loading bays provided • Taxi's permitted (NB only)

Manners Street	• Pedestrians permitted • Cyclists and e-scooters permitted but only on general traffic lanes • Private motor vehicles permitted (NB only) • Loading and commercial vehicles permitted (NB only) with dedicated loading bays provided • Taxi's permitted (NB only)
Courtenay Place	• Pedestrians permitted • Cyclists and e-scooters permitted but only on general traffic or bus lanes • Buses permitted both directions • Private motor vehicles permitted • Loading and commercial vehicles permitted, with dedicated loading bays provided • Taxi's permitted with dedicated taxi stands provided • Parking is permitted with metered parking

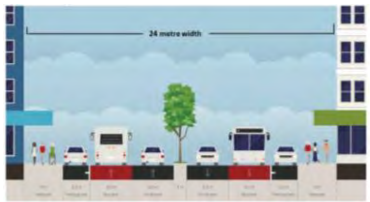
Cross Section

The Do Minimum Scenario will maintain the current cross section of sections of the Golden Mile, including the number lanes, allocation of road space, road widths and pedestrian pavement widths. The Do Minimum Scenario cross sections are summarised in Table 4.

Table 4 - Summary of Golden Mile Cross Sections

Location	Cross Section Description	Cross Section Dimensions
Lambton Quay Cross Section		• Total width of corridor: 25m • Pedestrian pavement: 3.2-3.3m • Parking lane: 2.1m • Bus lane: 3.4m • Drive lane: 3.2m • Median:2m • Cycling permitted in Bus Lanes
Willis Street Cross Section		• Total width of corridor:18m • Pedestrian pavement: 3.4-3.9m • Drive lane: 3.2m • Turn lane (NB only): 3m • Bus Only lane (SB only – cyclists prohibited): 3.3m
Manners Street Cross Section		• Total width of corridor: 17m • Pedestrian pavement: 4.1 – 5.1m • Drive Lane (NB only): 3.4m • Bus Only Lane (SB and NB from Cuba – cyclists prohibited): 3.4m

Reference: Golden Mile – Do Minimum Scenario Description

Courtenay Place Cross Section		• Total width of corridor: 24m • Pedestrian pavement: 3m • Parking lane width: 2.1m • Bus Lane:3.2m • Drive Lane: 3.2m • Median: 1m

Loading, Parking, Taxi Stands and Disability Parking Bays

The Do Minimum Scenario will maintain the current provision of parking, loading and taxi stands along the length of the Golden Mile.

A summary of the parking/loading/tax stand areas is provided in Table 5.

Table 5 - Summary of Parking/Loading/Taxi Stands

Location	No. of Areas
Lambton Quay	• Parking Spaces: 28 • Loading Zones: 11 • Taxi Stands: 4
Willis Street	• Parking Spaces: 0 • Loading Zones: 3 • Taxi Stands: 0
Manners Street	• Parking Spaces: 0 • Loading Zones: 1 • Taxi Stands: 0
Courtenay Place	• Parking Spaces: 52 • Loading Zones: 7 • Taxi Stands: 4 • Disability Parking: 1

Pedestrian Crossings

The Do Minimum Scenario will maintain the current location and extent of pedestrian crossings along the Golden Mile. This includes:

- One signalized pedestrian crossing at Midland Park/Lambton Quay
- One signalized pedestrian crossing at Chews Lane/Willis Street

- One signalized pedestrian crossing mid-block on Courtenay Place between Taranaki St and Tory Street
- One signalized pedestrian crossing at Allen St/Courtenay Place
- One signalized pedestrian crossing at Blair Street/Courtenay Place

Intersection controls

The Do Minimum Scenario will maintain the current configuration of traffic movements and controls along the extent of the Golden Mile. This includes:

- Signalized intersection at Stout/Lambton Quay
- Signalized intersection at Brandon/Lambton Quay
- Signalized intersection at Willis/Lambton Quay
- Signalized intersection at Mercer/Willis Street
- Signalized intersection at Willis/Manners Street
- Signalized intersection at Victoria/Manners Street
- Signalized intersection at Cuba/Manners Street
- Signalized intersection at Taranaki/Courtenay Place
- Signalized intersection at Tory/Courtenay Place

Stantec

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Attachment: Attachment

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C

MCA Workshop Attendees

MCA Workshop Attendee List (30 November 2020)

1. Hilary Fowler (WCC)
2. Soon Teck Kong (WCC)
3. Charles Kingsford (WCC)
4. Jonelle du Pont (WCC)
5. Peter Nunns (WCC)
6. Ben van Bruggen (WCC)
7. Alex Campbell (GWRC)
8. Natasha Hayes (GWRC)
9. Andrew Ford (GWRC)
10. Eddie Anand (LGWM)
11. Adam Nicolls (Waka Kotahi)
12. Neil Beckett (Waka Kotahi)
13. Robert Gear (Waka Kotahi)
14. Ihaia Puketapu (Taranaki Whānui)
15. Leslie Brown (Taranaki Whānui)
16. Natalia Repia (Ngāti Toa)
17. Selwyn Blackmore (FutureGroup)
18. Sam Thornton (FutureGroup)
19. Rowan Schwynn (FutureGroup)
20. Marc Bailey (FutureGroup)
21. Roger Burra (FutureGroup)
22. Alan Kerr (FutureGroup)
23. Andrew McLeod (FutureGroup)
24. Vivienne Ivory (FutureGroup)
25. Rowan Dixon (FutureGroup)
26. David Huang (FutureGroup)
27. Danielle Gatland (FutureGroup)

D

Bus Travel Time, Reliability, Comfort and Convenience Report

GOLDEN MILE MCA – Journey Time and Bus Stop Assessment Report

Rev. no	Date	Description	Prepared by	Checked by	Reviewed by	Approved by
1	4 December 2020	First Draft	Rowan Schwynn			
2	22 April 2021	Final	Rowan Schwynn			

1 Introduction

The Golden Mile Project is part of the Let's Get Wellington Moving (LGWM) early delivery programme. The first phase of the project is for a single stage business case to be delivered by mid 2021.

The Golden Mile plays a vital role in the success of Wellington's transport system, regional economy, and sense of place. It is the busiest pedestrian area in the city and a key shopping and entertainment destination. It is also the main route for buses bringing 37,000 people to the central city on a typical day. Typical users vary between private motor vehicle, bus, pedestrians – ranging from the abled bodied to impaired users, cyclists, elderly and school children to name a few.

The LGWM programme is a joint initiative between Wellington City Council (WCC), Greater Wellington Regional Council (GWRC) and Waka Kotahi NZ Transport Agency (the Transport Agency). The LGWM programme has developed specific objectives for the Golden Mile project to ensure that the transport and public realm outcomes to be pursued for the Golden Mile are aligned with the overall direction of the LGWM programme.

As part of the development and refinement of options developed under the short listing phase of the project, a Multi-Criteria Analysis (MCA) process was undertaken, assessing a range of assessment criteria based on investment objectives, likely effects and delivery, maintenance and operations considerations.

This report will summarise the investigations undertaken in support of the Golden Mile MCA specifically assessing the following criteria:

- Investment Objective – Bus travel time and reliability
- Investment Objective – Bus passenger boarding and alighting comfort and convenience

These investigations informed the scoring of these criteria as part of the overarching Golden Mile Assessment.

2 Approach

2.1 General Approach

The Golden Mile MCA will undertake a comparative assessment of the three fundamental options identified in the Golden Mile short list report as summarised in Figure 1 below:

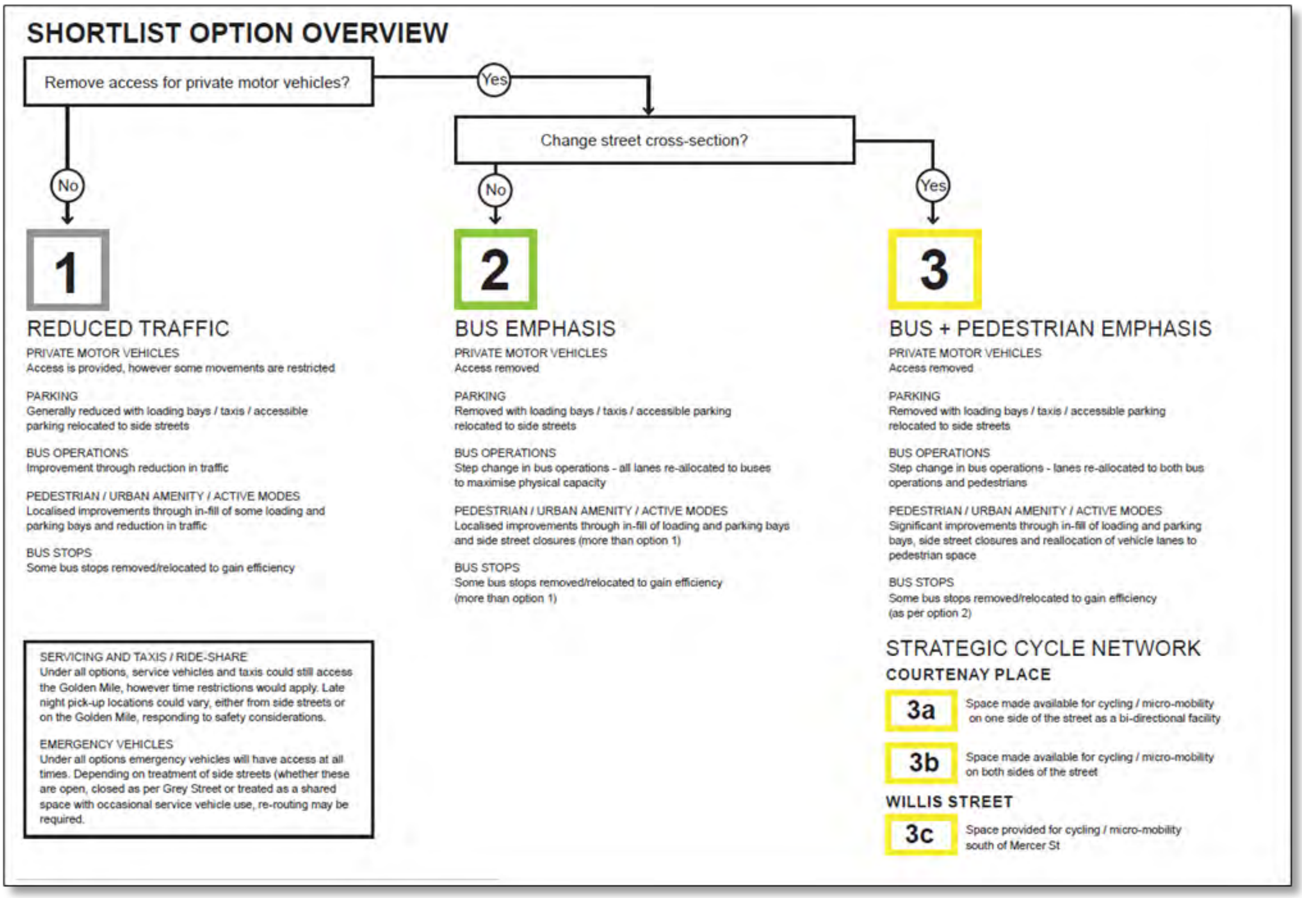


Figure 1: Shortlist Option Overview

For the purposes of assessment and the development of design options, the MCA considered and assess the four constituent elements of the Golden Mile independently. Each of the following four sections of the Golden Mile was assessed independently against the three design concepts described in Figure 1 above:

- Lambton Quay
- Willis Street
- Manners Street[1]
- Courtenay Place

All options were assessed assuming a future reference year of 2036.

For the purposes of a comparative assessment, a do minimum scenario[2] was developed which represented the Golden Mile in the 2036 reference year on the assumption that no intervention had taken place.

2.2 Criteria Assessment Approach

The assessment criteria were reviewed in detail and the sub-considerations (or sub-criteria) that could be used to assess the criteria were identified. Where possible, empirical metrics were identified that could be used to inform a final MCA scoring, however it is important to note that some assessment elements could not be easily or consistently quantified.

[1] Due to the limited cross section of Manners Street, opportunity to implement options are limited. Assessments on Manners Street considered one option only.

[2] Do Minimum Scenario Definition Version 3

Therefore, the assessment adopted both a quantitative and qualitative approach.

A summary of the assessment criteria, associated sub-criteria and the metrics identified ins provided in Table 1 below:

Table 1 - Summary of Criteria Considerations and Metrics

Assessment Criteria	Sub-criteria	Metrics
Bus travel time and reliability	Bus Journey Time – by corridor or link Reliability	Bus Travel Time (by section and corridor) Standard deviation of travel time (as a proxy for reliability)
The convenience and comfort of people waiting for, boarding and alighting buses	Walking distances to stops Bus service rates (rate of arrival and departure of buses) Customer wait times Bus stop crowding Bus stop Amenity	Catchment areas Buses per hour per stop Stop Capacity Passenger wait time Number of waiting passengers and area occupied.

Following the identification of sub-criteria and associated metrics, two models were identified as an assessment requirement:

- A journey time model – A model capable of assessing each delay point along the Golden Mile and assessing the journey time of buses under each option. The model must be capable of emulating variability of delay, representative of variability of signal phasing and must be able to provide a statistical range of potential journey times for the do minimum and each option, including mean, maximum, minimum and a statistical distribution of journey times, including the standard deviation of this distribution.

- A bus stop assessment model – A model capable of assessing relative performance of each bus stop, inclusive of stop capacity, rates of service (the arrival and departure rate of buses at a stop) and passenger volumes and wait times.

The above models will generate the empirical data used to determine the relative performance of each option in the metrics defined in Table 1.

In addition, the concept design plans were used as the basis for a qualitative review, in order to identify and score some of the unquantifiable aspects of the options such as bus stop amenity.

2.3 Key Assumptions

All options assessed, inclusive of the Do Minimum Scenario were informed by the overarching project assumptions provided in NZTA Contract 1851 RFT Rev 4.1:

- The SSBC and project outcomes will be developed based on a long-term solution in accordance with the Golden Mile 2036 vision statement

- It is assumed that Mass Transit is not on the Golden Mile Corridor, although integration with future Mass Transit will need to be considered particularly at the intersection of Manners / Courtenay and Taranaki Street; and potential future desire lines between the Golden Mile and the Quays (East-West desire line)[3]

- Despite the potential for Mass Transit, the Golden Mile is still expected to carry significant public transport capacity and must provide a very high-quality public transport spine

- There is general acceptance of lower/less general traffic access to the Golden Mile

- There is a general acceptance of a reduction / removal in on-street parking where necessary and where this contributes to project objectives

- The assumed design year for the purposes of travel demand and public transport patronage is 2036 to provide consistency with the Golden Mile Vision, and

[3] Subsequent to the RFT, Courtenay Place has been identified as a potential alignment for [redacted] City Streets program is also underdevelopment which will further explore opportunities to improve desire lines between the Golden Mile and a future MRT alignment.

- Property acquisition is not anticipated and options will be developed to sit within the existing road corridor[4].

In addition to the above, the Project Team in conjunction with LGWM, have excluded the following from the development and assessment of options:

- Changes to fares and pricing structures of bus and/or taxi services
- Changes to the composition and mix of bus fleet, with future bus volumes expected contain proportionally the same mix of vehicle classes as is currently used
- Changes to bus routes, services and timetables[5]
- The addition of car parks, changes to car park pricing or parking strategies beyond the extent of the Golden Mile (will be guided by the Parking Policy 2020)
- Major grade separation (tunnelling or elevated structures) works
- Changes to roads or intersections beyond the extent of the Golden Mile

The project team have also assumed:

- Patronage and growth will return to pre-COVID levels and projections by 2036
- Patterns of employment and employment distribution will return to pre-COVID levels and projections by 2036
- No material change in the mix and density of land uses along and in the vicinity of the Golden Mile
- Rates of car ownership and vehicle operating costs will remain consistent with forecasts
- No change to the temporal demand, with AM and PM peak demand periods continuing into 2036.
- The capacity of the Golden Mile to accommodate buses is constrained by the available cross section, size and location of bus stops.
- A second corridor is potentially available to be utilised by buses attending the Wellington CBD.
- For the purposes of assessment, but volumes on the Golden Mile were considered to be capped at 100 vehicles per hour, per direction, with additional bus volumes utilising an unspecified alternate corridor.

The assumptions underpinned both the development and assessment of project options.

[4] Property acquisition has not been explicitly stated as excluded from project scope, however the overarching project budget and timing rules out significant property acquisition as a feasible consideration.
[5]https://www.metlink.org.nz/assets/Uploads/WRC-Wellington-City-Schematic-Map-A3-FINAL-Feb2019.pdf

3 Journey Time Assessment Summary

3.1 Journey Time Model Approach

In order to assess the comparative advantages and disadvantages of each option for each sub section of the Golden Mile, it was necessary to develop a journey time model that could be used as a basis for comparison and to generate an estimate of likely journey times for the do minimum scenario and all assessed options.

As a start point in assessing the relative performance of options, a physics based mathematical model was developed which modelled the deceleration, delay, acceleration and continuation of bus travel speeds at each point of delay under each option (including the do minimum as a reference position) along the golden mile. A model was created for the do minimum and each option, reflecting the location of intersections, pedestrian crossings, bus stops etc. under each option.

Under normal operations there is a degree of variability imposed to travel times, with buses experiencing a range of travel times reflecting the combinations of delay imposed by various attributes along the corridor. In this context, a physics based mathematical model in isolation is overly deterministic. To reflect the variability of travel times, a Monte Carlo model was applied to the physics model – introducing a degree of randomness into bus travel times by applying a probability distribution to potential travel times – reflective of the inherent variability of travel times in shared operational environment[6]. The travel time modelled the distribution of 100 'bus runs' per direction of travel, reflective of the 100 bus per hour per direction cap assumed for the Golden Mile.

The model applied either fixed (constant) probability of delay to certain delay attributes - such as bus stops where it is assumed buses will always be required to stop, or variable delay to delay attributes where some level of randomness is expected – such as signalised intersections where buses may or may not be delayed.

A summary of the delay attributes is provided in Table 2 below:

Table 2 - Summary of Delay Attributes

Fixed Delay probability	Variable Delay
Vehicle characteristics (acceleration, deceleration etc.)	Pedestrian operated signals
Bus stop dwell times	Signal controlled intersection

In addition, overall journey time for buses along the Golden Mile, while assessed by section, are heavily dependent on the relationship between sections and therefore travel times along the entire corridor. In particular, the signal controls that 'join' individual sections are key considerations, as the interrelationship between sections determines the likely signal configuration and journey speed at Willis/Wiliston/Lambton Quay, Willis/Manners/Boulcott and to a lessor extent, Taranaki/Courtenay/Manners.

In order to assess and understand the implications of the various potential combinations of interventions, it was necessary to map and assess each combination of interventions at a corridor level, as described in Table 3.

[6] An environment where a mix of uses, such as private motor vehicles or pedestrians have the potential to impart variability to travel times

Table 3 - Summary of Golden Mile Section Relationships

Golden Mile Segment Relationships and Descriptions

	Lambton Quay Segment		Willis Street Segment		Manners Street Segment		Courtenay Place Segment	
	From: Lambton Quay at Bowen St	To: Lambton Quay/Willis/Willeston St Intersection.	From: Lambton Quay/Willis St (excluding intersection)	To: Willis/Manners Street Intersection	From: Manners St/Willis (excluding intersection)	To: Manners St/Taranaki (excluding intersection	From: Taranaki/Courtenay intersection	To: Courtenay/Cambridge Terrace (excluding intersection).
Variant Number	Lambton Quay	Willis/Willeston/Lambton Quay Intersection	Willis Street	Willis/Manners Intersection	Manners Street		Taranaki/Courtenay/Manners Intersection	Courtenay Place
Base	Do Minimum	Do Minimum	Do Minimum	Do Minimum	Do Minimum		Do Minimum	Do Minimum
1	Option 1 Traffic retained on Lambton	Signal intersection retained in current configuration.	Traffic retained on NB Willis	Signal intersection retained in similar configuation	Bus Only Manners		Signal intersection retained in similar configuration.	Option 1 Traffic retained on Courtenay
2	Option 1 Traffic retained on Lambton	Signal intersection retained in current configuration.	Traffic retained on NB Willis	Signal intersection retained in similar configuation	Bus Only Manners		Signal intersection retained, may be simplified with removal of private motor vehicles from/to Courtenay Place.	Option 2 Traffic removed from Courtenay with 4 lane cross section.
3	Option 1 Traffic retained on Lambton	Signal intersection retained in current configuration.	Traffic retained on NB Willis	Signal intersection retained in similar configuation	Bus Only Manners		Signal intersection retained, may be simplified with removal of private motor vehicles from/to Courtenay Place.	Option 3 Traffic removed from Courtenay with 2 lane cross section.
4	Option 2 Traffic removed from Lambton with 4 lane cross section.	Signal intersection retained but simplified	Traffic removed from Willis	Signalised intersection essentially removed (no conflicting movements with left in, right out bus movements from/to Manners).	Bus Only Manners		Signal intersection retained in similar configuration.	Option 1 Traffic retained on Courtenay
5	Option 2 Traffic removed from Lambton with 4 lane cross section.	Signal intersection retained but simplified	Traffic removed from Willis	Signalised intersection essentially removed (no conflicting movements with left in, right out bus movements from/to Manners).	Bus Only Manners		Signal intersection retained, may be simplified with removal of private motor vehicles from/to Courtenay Place.	Option 2 Traffic removed from Courtenay with 4 lane cross section.
6	Option 2 Traffic removed from Lambton with 4 lane cross section.	Signal intersection retained but simplified	Traffic removed from Willis	Signalised intersection essentially removed (no conflicting movements with left in, right out bus movements from/to Manners).	Bus Only Manners		Signal intersection retained, may be simplified with removal of private motor vehicles from/to Courtenay Place.	Option 3 Traffic removed from Courtenay with 2 lane cross section.
7	Option 3 - Traffic removed from Lambton with 2 lane cross section.	Signal intersection retained but simplified	Traffic removed from Willis	Signalised intersection essentially removed (no conflicting movements with left in, right out bus movements from/to Manners).	Bus Only Manners		Signal intersection retained in similar configuration.	Option 1 Traffic retained on Courtenay
8	Option 3 - Traffic removed from Lambton with 2 lane cross section.	Signal intersection retained but simplified	Traffic removed from Willis	Signalised intersection essentially removed (no conflicting movements with left in, right out bus movements from/to Manners).	Bus Only Manners		Signal intersection retained, may be simplified with removal of private motor vehicles from/to Courtenay Place.	Option 2 Traffic removed from Courtenay with 4 lane cross section.
9	Option 3 - Traffic removed from Lambton with 2 lane cross section.	Signal intersection retained but simplified	Traffic removed from Willis	Signalised intersection essentially removed (no conflicting movements with left in, right out bus movements from/to Manners).	Bus Only Manners		Signal intersection retained, may be simplified with removal of private motor vehicles from/to Courtenay Place.	Option 3 Traffic removed from Courtenay with 2 lane cross section.

The model was developed and coded in the Python programming language by MRCagney.

The physics based Montecarlo model was run to provide individual outputs for northbound and southbound movements, the AM and PM peak and variant (representing the combination of options at a corridor level). This produced the following outputs:

- Mean travel time by corridor and section
- Min travel time by corridor and section
- Max travel time by corridor and section
- Spread of travel time as represented by 10%, 25%, 50%, 75 and 90% travel time distributions by corridor and section
- Standard deviation of the distribution of travel times, by corridor and section

Model outputs were then segregated by section (Lambton Quay, Willis Street, Manners Street and Courtenay) and the variant run's equivalent to each option per section identified. For example, when assessing Lambton Quay, variants 2 and 3 were used as the basis for the assessment of Option 1 etc.

The results from these variants were then averaged and contrasted.

3.2 Model Exclusions

The model excluded the following:

- Delay attributed to mixed traffic congestion[7]
- Loading zone or taxi side friction[8]
- Bus on bus delay[9]

[7] On all sections excluding Willis Street, bus and general traffic movements are isolated where traffic is retained.
[8] The impact of loading zones and taxi stands being retained was assessed qualitatively and subjectively
[9] Bus on bus delay and variable dwell times were considered in the bus stop assessment model

3.3 Model Outcomes

The outcomes by section have been provided below.

3.3.1 Lambton Quay

The assessment of Lambton Quay for the AM peak, northbound and southbound is provided in Figure 2

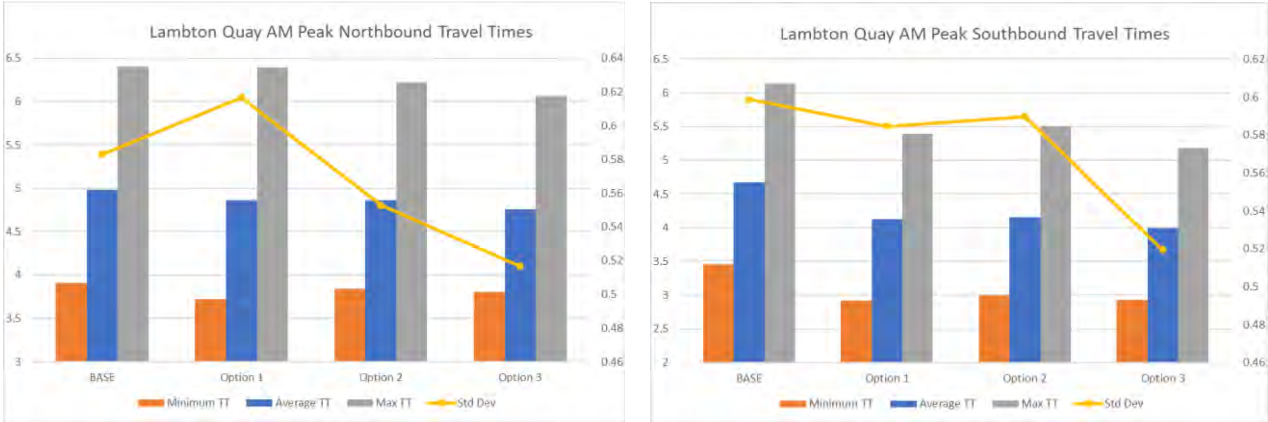


Figure 2 - Lambton Quay AM Peak Northbound and Southbound

The assessment of Lambton Quay for the PM peak, northbound and southbound is provided in Figure 3.

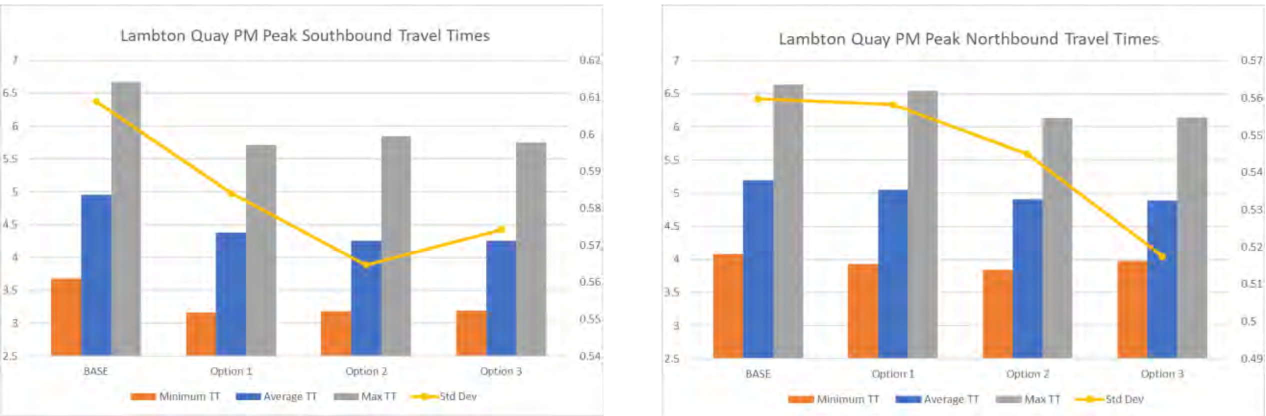


Figure 3 - Lambton Quay PM Peak Northbound and Southbound

3.3.1.1 Key findings

- Options 1, 2 and 3 all provide improvements to travel time in comparison to the base case (do minimum scenario). This is due to the removal of all signalised delay points under all options.
- There is little distinction between options 1,2 and 3 in terms of travel time improvements. This may also be attributed to the consistent approach applied across options to remove signal controls.
- Generally across the three options, Options 2 and 3 provide a decreased standard deviation (used as a proxy for reliability).

3.3.2 Willis Street

The assessment for Willis Street is summarised below. For the purposes of the assessment Only two options were assessed Option 1 (which considered the phasing and signal implications of retaining traffic on Willis Street) and Option 2, which considered the removal of traffic. There was not significant difference in regards between Willis Street Options 2 and 3.

The assessment of Willis Street for the AM peak, northbound and southbound is provided in Figure 4.

Figure 4 -Willis Street AM Peak Northbound and Southbound

The assessment of Willis Street for the AM peak, northbound and southbound is provided in Figure 4.

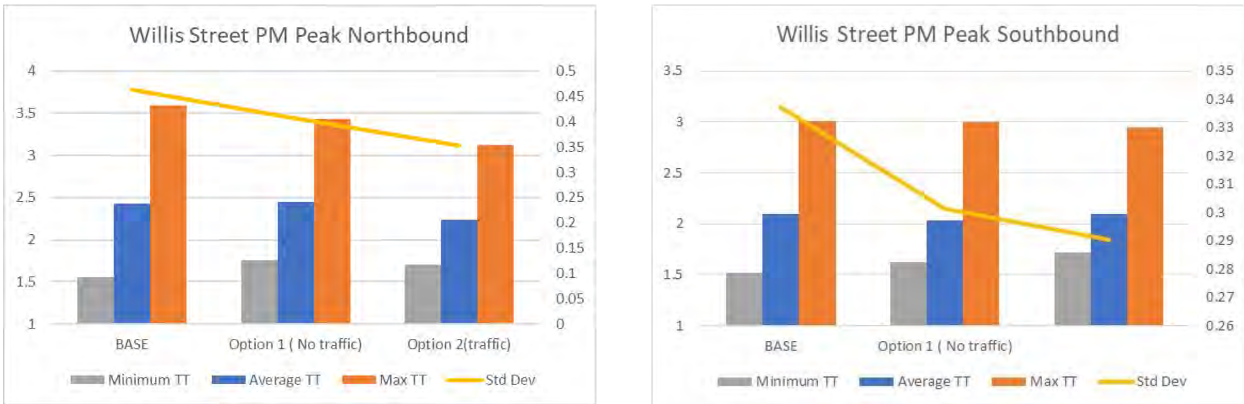


Figure 5 - Willis Street PM peak Northbound and Southbound

3.3.2.1 Key findings

- Option 1 provides no noticeable improvement to bus travel time in comparison to the base (do minimum scenario).
- Option 2 provides improved travel time comparative to option 1 and the base, due to improved signal efficiency enabled by the removal of general traffic.
- There is a marginal improvement in reliability derived from option 1 and 2 comparative to the base.
- Based on observation, bus on bus congestion and traffic congestion are significant factors to bus operations on Willis street which are not accounted for in this model. The stop assessment model does account for these factors.

3.3.3 Manners Street

The assessment of Manners Street is summarised below. As there are limited options for interventions on Manners Street, journey time assessments contrasted only the do minimum scenario (Base) with the intervention scenario (option 1).

The assessment of Willis Street for the AM peak, northbound and southbound is provided in Figure 6

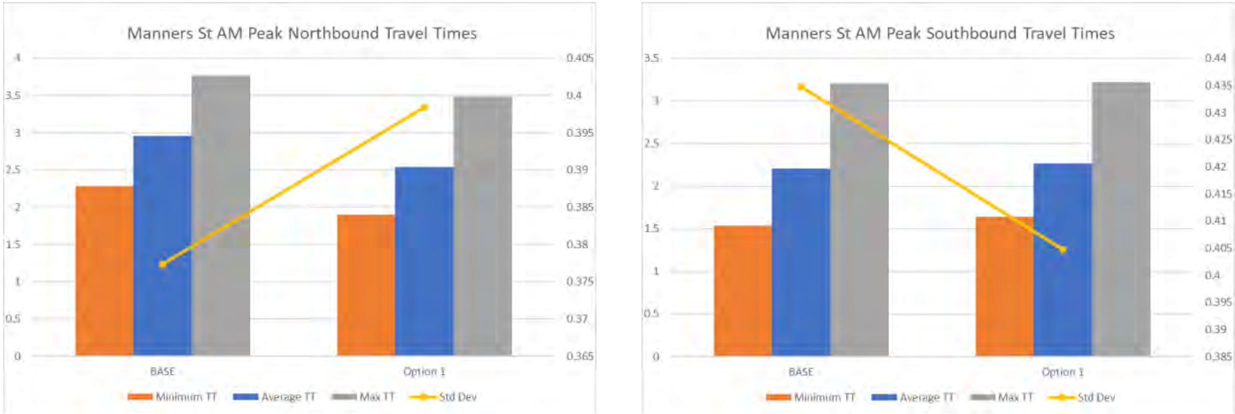


Figure 6 - Manners Street AM Peak Northbound and Southbound

The assessment of Willis Street for the PM peak, northbound and southbound is provided in Figure 7

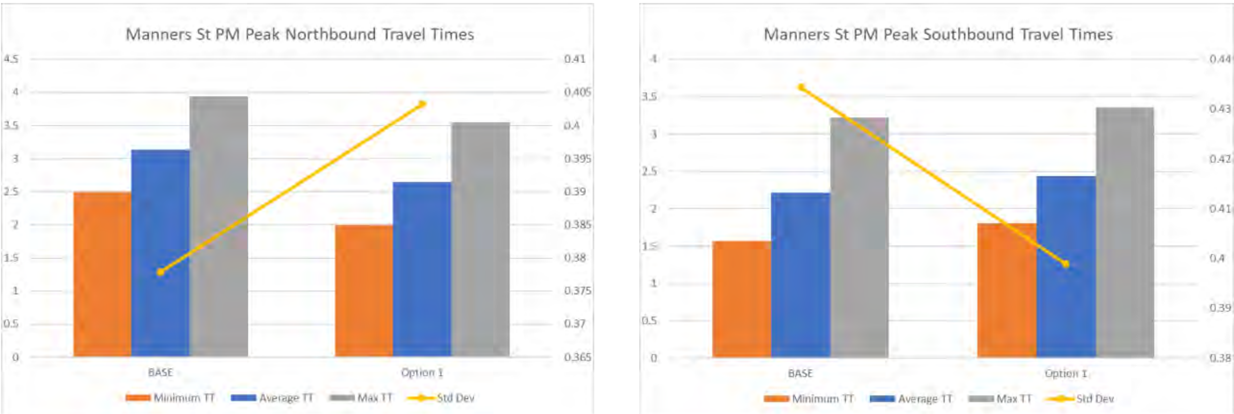


Figure 7 - Manners Street PM Peak Northbound and Southbound

3.3.3.1 Key findings

- The intervention options proposed under option 1 offer some improvements to northbound travel times, due to removal of the orphan stop at the north end of Manners Street and the removal of turning traffic at Cuba Street.

3.3.4 Courtenay Place

The assessment of Courtenay Place for the AM peak, northbound and southbound is provided in Figure 9.

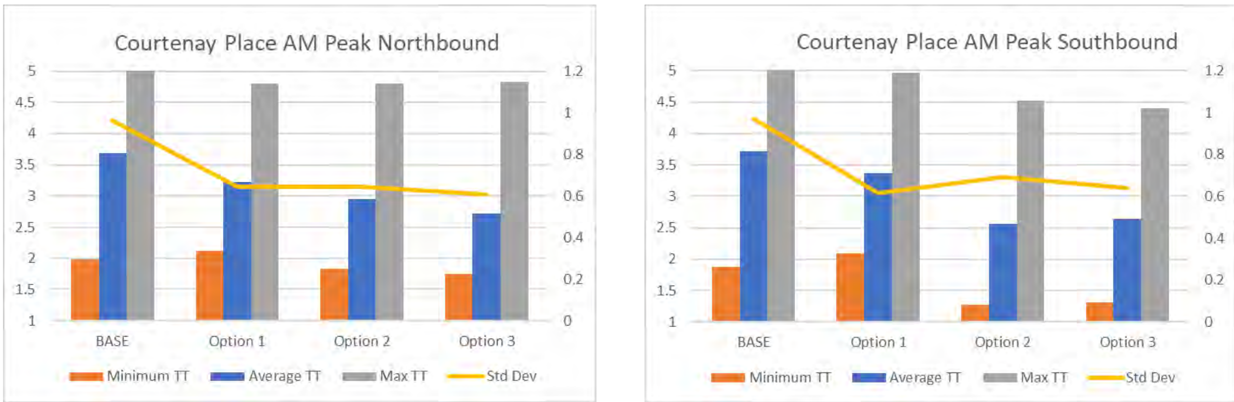


Figure 8 - Courtenay Place AM Peak Northbound and Southbound

The assessment of Courtenay Place for the PM peak, northbound and southbound is provided in Figure 9.

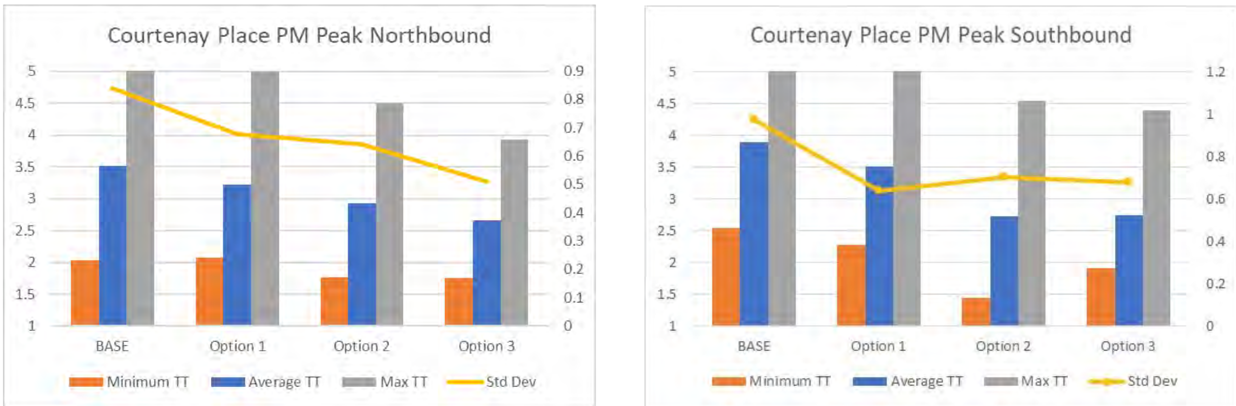


Figure 9 - Courtenay Place PM Peak Northbound and Southbound

3.3.4.1 Key findings

- Options 1, 2 and 3 all provide improvements to travel time in comparison to the base case (do minimum scenario). This is due to the removal of signalised delay points under all options.
- The removal of a stop pair in options 2 and 3 provides travel time improvements.
- Option 3 has marginally faster travel times than Option 2 – this may be attributed to the removal of Tory St intersection controls under this option.
- Generally across the three options, Options 2 and 3 provide a decreased standard deviation (used as a proxy for reliability) in comparison with the do minimum scenario.

4 Bus Stop Assessment

4.1 Bus Stop Assessment Model Approach

A bus stop assessment model was created to assess the comparative difference between the bus stop configurations across the three options and assessed against the do minimum scenario.

The bus stop assessment model specifically sought to quantity the performance of each stop under each option against the following metrics:

- Buses per hour per stop
- Stop Capacity
- Passenger wait time
- Number of waiting passengers and area occupied

To do this, a mathematical model was developed, that assessed the volume of buses each bus stop could serve in a given time period, as well as mathematically modelling the likely delay attributed to each bus, on approach, queue, dwell time and departure. The model considered the physical constraints of the stop, as well as its relationship to other traffic controlling devices.

In contrast with the journey time model, the bus stop assessment assessed each stop location in isolation, to determine the relative performance of each stop, under each option.

The model considers the relative location and configuration of signals on the approach to the bus stop, as these signals will govern the volume and flow of buses on approach to the stop.

The model also considers the location of down stream signals, if any are present, as such signals may limit the ability of buses to depart, imparting additional delay and reducing the overall capacity of the bus stop.

The composition of bus fleet was also a key factor assessed, as the dwell times associated with double decker's a significantly higher than standard buses which in turn impacts bus stop capacity and the potential for bus queuing.

The effect of general traffic was also accounted for - where buses were required to merge into a general traffic lane, an additional delay factor was assigned to reflect the impact of shared traffic lanes on stop capacity.

The model applied a Poisson distribution of probabilities to estimate the variability of signal phasing, arrival rates, fleet composition etc.

The combination of these factors provided an emulation of bus arrivals, queuing and departures at each stop under each option on the Golden Mile.

4.1.1 Patronage

The assessment was undertaken using a 2036 reference year, therefore the patronage estimates used to test performance of bus stops needed to be adjusted to reflect future projections of passenger volumes.

The Wellington Public Transport Model (WPTM) was used as the basis for the estimation of future passenger volumes by stop. The WPTM model is a 4 stage strategic model built using the EMME (Multimodal Transport Planning Software) platform. It has been used to assess public transport performance in scenarios proposed by the LGWM State Highway and MRT Teams and extracts from this model were used to inform the assessment of options for the Golden Mile.

Option assessments utilised patronage estimates sourced from a 'Do Minimum' 2036 reference scenario that modelled a typical week day in March[10]. Patronage estimates include infrastructure projects that are either consented or have a high likelihood of proceeding. Estimates excluded MRT and assumed stop locations equivalent of the existing locations, which were then consolidated and assigned to the new stop configurations for each option.

Bus patronage data for passengers boarding/alighting and remaining on each bus were provided for a two hour PM peak (4pm – 6pm).

[10] This time period is used as a reference as it is representative of a typical period of transport demand, when schools and universities are operating normally

4.1.2 Patronage Assessment of Bus Stops

The relative of performance of a bus stop also requires the consideration of passengers and the interaction of passengers at bus stops. The volume of passengers determines the dwell time[11] of buses at stops and the interaction between passenger volumes and bus arrival and departures determines the wait time experienced by passengers and the occupation of space of passengers at bus stops, which may result in crowding.

The patronage estimations sourced from the WPTM model were applied to the bus stop assessment model in order to assess:

- The performance of bus stops in providing sufficient arrival and departure rates to clear the forecast patronage
- The relative wait time of passengers
- Any occurrence of passenger volumes exceeding the ability of buses to clear passenger numbers which would therefore result in over crowding.

Boarding passenger numbers were the focus of this investigation, as alighting passengers do not need to wait for bus services or contribute to overcrowding.

A standard and non-standard dwell time was applied to passengers, to represent the occasional passenger that may require longer to board the vehicle. For the purposes of the assessment, 93% of passengers were assumed to have a standard boarding time, while the remaining 7% of passengers were assumed to required longer to board.

4.1.3 Assumptions

The following assumptions informed the development and assessment of bus stops:

- Buses were assumed occupy a length of 15m (including clearances) – therefore a 30m stop could simultaneously serve two buses.
- Buses in a queue at a bus stop will not queue jump and arriving buses will attend at the rear of the queue.
- Buses may depart early from a queue, but a time penalty is applied according to the stop and lane configuration of the option.
- Bus fleet composition and bus size were estimated based on current peak vehicle requirements, scaled up to a maximum of 100 buses per hour per direction.
- Double decker buses were assigned a higher dwell time than alternative vehicle types to represent the generally slower dwell times attributed to this vehicle class.
- Bus stops were assumed to have single flag boarding with boarding occurring at the head of the stop.
- Boarding was assumed to be accommodated through the front door only of a vehicle.
- The model could not accommodate the route selection of passengers, passengers were assumed to board any available bus[12].
- Bus stops were assessed in isolation (i.e. were not coordinated with the arrival/departure of bus stops upstream or down stream).

[11] The time required for a bus to hold position or dwell, while passenger boarding or alighting occurs.

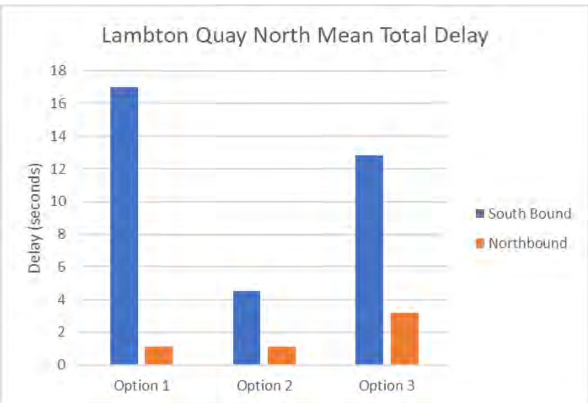
[12] It is recognised that this is overly simplistic and does not represent the actual behaviour of passengers, however insufficient data was available to predict likely passenger behaviour in the 2036 reference year. Patronage numbers were 'stress tested' i.e. tripled to assess stop clearances and overcrowding to partially account for this.

4.2 Model Outcomes

The outcomes of the stop assessment are summarised below.

4.2.1 Lambton Quay

The assessment of the Lambton Quay stop pairs (north and south) for the PM peak are summarised in Figure 10 below



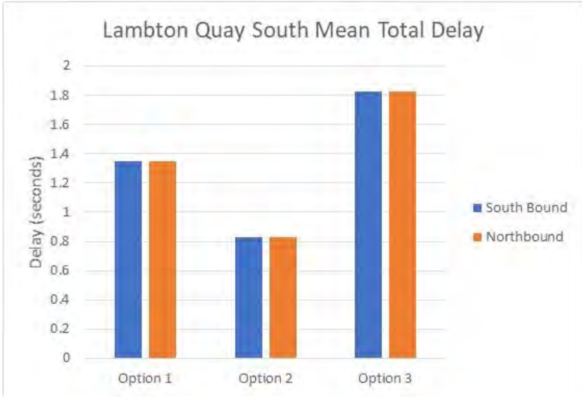


Figure 10 - Lambton Quay Stop Assessment (PM Peak)

4.2.1.1 Key Findings

- The signalised intersection of Bowen Street and Lambton Quay is a key determinate in the performance of bus stops under all options, as this intersection phasing governs the flow of southbound buses onto the Golden Mile.
- The removal of general traffic significantly improves the operation of buses by allowing the optimization of signals at Bowen Street to increase the flow rate of buses onto the Golden Mile – Southbound.
- Option 3 typically performs poorly with regard to the performance of bus stops and passenger delay. This is attributed to the use of inline bus stops.
- Option 2 consistently performs the best of the three options, due to the flexibility in operations provided by the availability of additional lanes and the absence of general traffic.
- All option accommodated forecast passenger volumes with no evidence of overcrowding.

4.2.2 Willis Street

The assessment of the Willis Street Stop pair for the PM peak is summarised in Figure 11 below

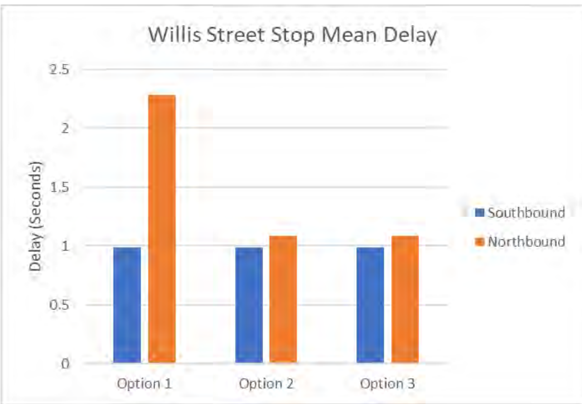


Figure 11 - Willis Street Stop Assessment (Pm Peak)

4.2.2.1 Key Findings

- The retention of general traffic is a key determinate of bus stop delay, with the northbound bus stop in option 1 performing poorly
- There is little qualitative difference between option 2 and option 3 in regards to the performance of bus stops.
- All options accommodated forecast passenger volumes with no evidence of overcrowding.

4.2.3 Manners Street

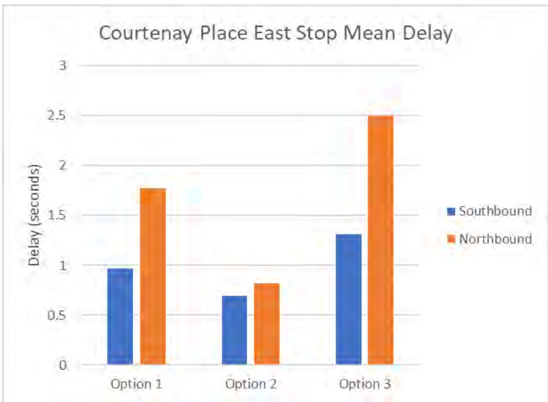
All options applied the stop configuration to Manners Street which included the retention of the stop pair at Cuba Street and the removal of the single (unpaired) northbound stop near Willis Street. While the performance of the remaining Cuba Street stop pair was assessed, there was no point of differentiation across the three options.

4.2.3.1 Key Findings

- The Manner Street stop pair under all options has significant performance and delay issues.
- The primary cause of this is the use of inline bus stops combined with limited carriageway with no overtaking or passing opportunities.

4.2.4 Courtenay Place

The assessment of the Courtenay Place stop pair(s[13] for the PM peak is summarised in Figure 12 below



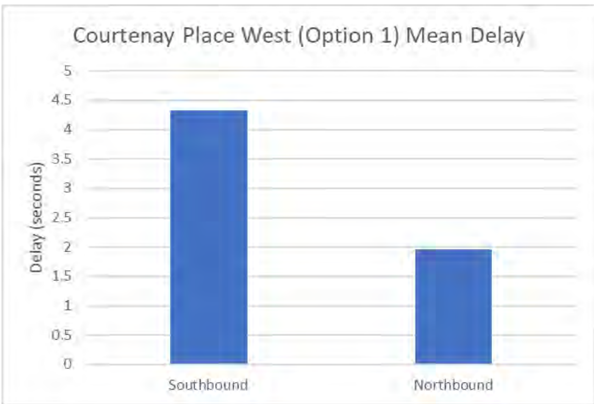


Figure 12 - Courtenay Place Stop Assessment

4.2.4.1 Key Findings

- The signalised intersection of Cambridge Terrace and Courtenay Place is a key determinate in the performance of bus stops under all options, as this intersection phasing governs the flow of southbound buses out of the Golden Mile.
- The removal of general traffic significantly improves the operation of buses by allowing the optimization of signals at Cambridge Terrace to increase the flow rate of buses onto the Golden Mile – northbound.
- Option 3 typically performs poorly with regard to the performance of bus stops and passenger delay. This is attributed to the use of inline bus stops.
- Option 2 consistently performs the best of the three options, due to the flexibility in operations provided by the availability of additional lanes and the absence of general traffic.
- The additional stop pair at Courtenay Place West perform comparatively worse than Courtenay Place East.
- All option accommodated forecast passenger volumes with no evidence of overcrowding.

[13] Option 1 included an additional stop pair near Taranaki street in contrast to options 2 and 3

5 Qualitative Assessment and Catchment Summary

A review of analysis, qualitative review and scoring meeting was held on Friday 27th November 2020.

The MCA assessment team consisted of:

Rowan Schwynn – Principal Transport Planner - Futuregroup
Alex Campbell – Principal Advisor Network Design – Metlink
David Boyd – Manager, Customer Experience – Greater Wellington Council
Stephen Hay – Greater Wellington Council

5.1 Qualitative Assessment

The MCA assessment team was convened to review the analysis findings and to undertake a qualitative review of the amenity of bus stops under each option along the Golden Mile.

The team reviewed the concept plans developed for each option and assessed the relative amenity of bus stops. This assessment was undertaken in conjunction with a review of analysis summarised in previous sections, with all options being scored over the course of the review.

5.1.1 Key Findings

The key observations and findings from the qualitative assessment are:

- The length of bus stops in options 1 and 3 for the north bound Lambton Quay north stops were considered to be too small and would likely impact passenger amenity.
- The provision of additional pedestrian pavement in options 1, 2 and 3 were considered as beneficial to passenger amenity
- The position of southbound bus stop on Lambton Quay in Option 2, between Johnston Street and Brandon Street was the preferred position for this stop and the location of bus stop adjacent to street closures was considered highly advantageous in terms of amenity.
- The position of the southbound bus stop on Willis Street in Option 3 on the approach to Mercer Street was the preferred position for this stop, on the basis that it provided a stronger linkage with the upstream Lambton Quay stop. In was noted that this stop should move closer to Mercer Street to take advantage of the closure to provide enhanced amenity for passengers.
- The position of southbound bus stops closer to Manners Street in Options 1 and 2 was considered sub-optimal.
- The removal of the Courtenay Place West stops as proposed for options 2 and 3 was considered feasible.

5.2 Catchment Assessment

Options 1, 2 and 3 shared a similar configuration of stops with option 1 providing 6 stop pairs[14] and options 2 and 3 providing 5 stop pairs.

5.2.1 Key Findings

- There was little material difference between the options in terms of relative catchments.
- The point of difference between Option 1 and options 2 and 3 was the addition of the Courtenay Place West stops. The location of this stop pair, between the Manners/Cuba stop pair and the Courtenay Place East stops indicated significant overlap in catchment areas and provided a negligible increase in catchment areas.
- All options provided fewer stops than the do minimum scenario, however all options maintained accessibility to bus stops in a five minute walk catchment area,

[14] Option 1 includes an additional stop pair at Courtenay Place West in comparison to Options 1, 2 and 3

6 Moderated Scoring Summary

The MCA assessment team was asked to review the analysis summarised in previous sections and provide a score (-3 to +3) on the following criteria and sub-criteria:

Criteria	Sub-Criteria
IO – Bus Travel Time & Reliability	Journey Time
	Reliability
IO – Bus Passenger, Boarding and Alighting	Bus operational delay at stops
	Qualitative Assessment Score

The MCA assessment time had a moderated discussion of scores for each section and option for these sub-criteria. All scoring was undertaken relative to the Do Minimum Scenario, which was scored as a 0 for all criteria and sub criteria.

Scoring was based on the following scoring framework:

Table 4 - Scoring Framework

Score	Scoring Description	Definition
3	Large Positive	Major positive impacts resulting in substantial and long-term improvements or enhancements of the existing environment.
2	Medium Positive	Moderate positive impact, possibly of short-, medium- or long-term duration. Positive outcome may be in terms of new opportunities and outcomes of enhancement or improvement.
1	Slight Positive	Minimal positive impact, possibly only lasting over the short term. May be confined to a limited area.
0	Neutral	Neutral - no discernible or predicted positive or negative impact
-1	Slight Negative	Minimal negative impact, possibly only lasting over the short term, and definitely able to be managed or mitigated. May be confined to a small area.
-2	Medium Negative	Moderate negative impact. Impacts may be short, medium or long term and are highly likely to respond to management actions.
-3	Large Negative	Impacts with serious, long-term and possibly irreversible effect leading to serious damage, degradation or deterioration of the physical, economic, cultural or social environment. Required major rescope of concept, design, location and justification or requires major commitment to extensive management strategies to mitigate the effect.

Sub-criteria scoring were averaged and rounded to provide a final MCA score for each assessment criteria as summarised below:

Table 5 - Summary of MCA Scores - Lambton Quay

Lambton Quay						
	IO – Bus TT and Reliability			IO – Bus Passenger Boarding and Alighting		
	Journey Time	Reliability	Averaged MCA Score	Bus Operational Delay	Qualitative	Averaged MCA Score
Option 1	1	1	**1**	0	1	**0.5 (1)**
Option 2	1	2	**1.5 (2)**	3	2	**2.5 (3)**
Option 3	1	0	**0.5 (1)**	0.5	2	**1.25 (1)**

Table 6 - Summary of MCA Scores - Willis Street

Willis Street						
	IO – Bus TT and Reliability			IO – Bus Passenger Boarding and Alighting		
	Journey Time	Reliability	Averaged MCA Score	Bus Operational Delay	Qualitative	Averaged MCA Score
Option 1	1	1	**1**	0	1	**0.5 (1)**
Option 2	1	2	**1.5 (2)**	1	1	**1**
Option 3	1	2	**1.5 (2)**	1	2.5	**1.75 (2)**

Table 7 - Summary of MCA Scores - Manners Street

Manners Street						
	IO – Bus TT and Reliability			IO – Bus Passenger Boarding and Alighting		
	Journey Time	Reliability	Averaged MCA Score	Bus Operational Delay	Qualitative	Averaged MCA Score
Option 1	1	1	**1**	1	1	**1**

Table 8 - Summary of MCA Scores - Courtenay Place

Courtenay Place						
	IO – Bus TT and Reliability			IO – Bus Passenger Boarding and Alighting		
	Journey Time	Reliability	Averaged MCA Score	Bus Operational Delay	Qualitative	Averaged MCA Score
Option 1	1	1	**1**	1	2.5	**1.75 (2)**
Option 2	2	2	**2**	2	3	**2.5 (3)**
Option 3	2	2	**2**	1.5	3	**2.25 (2)**

7 Additional Commentary and Conclusions

All options were also reviewed with the following unscored considerations:

- How would the inclusion of provision for loading bays impact the scoring of the options?
- How would the inclusion of loading bays and taxi stands impact the scoring of options?
- How would the retention of Tory Street for through movements only impact the scoring of options?

7.1 Additional Commentary

- Loading access to Lambton Quay, Willis Street and Courtenay Place may slightly impact buses, depending on the specific configuration of bays and restrictions placed on these bays
- Loading bays immediately adjacent to bus stops, notably at Willis Street Northbound, are a concern as their occupation can prevent buses from easily reaching bus bays. Loading bays at these locations may significantly impact bus journey times, reliability and amenity.
- The introduction of loading bays, assuming access to such bays was restricted to out of peak periods, is expected to have a marginal negative impact to scores.
- Taxi's are considered a bigger impediment to buses than loading bays, as taxis more frequently occupy and utilise the Golden Mile and also have historically poor conformance to restrictions. Taxi's frequently occupy bus stops and other areas.
- Taxi access is considered non-viable under option 3, due to the limited carriageway and availability of space for taxi's to store.
- The introduction of taxi's is expected to moderately negatively impact scores for options 1 and 2 and significantly impact scores for option 3.
- The retention of a signal-controlled intersection at Tory Street, limited to through movements only is expected to have a marginal impact to bus travel times and operations.

7.2 Conclusions

This analysis concluded that:

- Option 2 scores highest from the perspective of the assessment criteria for Lambton Quay.
- Option 3 scores highest from the perspective of the assessment criteria for Willis Street
- Interventions options for Manners are expected to be beneficial
- Option 2 scores highest from the perspective of the assessment criteria for Courtenay Place

In addition the assessment noted:

- Many of the negative features of option 3 were attributed to the use of inline bus stops. These issues could be mitigated through the use of indented bays.
- General traffic has a substantial impact to bus operations due to the constraints this places on the signals that govern bus volumes on the Golden Mile.
- Further detailed design is necessary to ensure bus stops are of adequate lengths, particularly at the northern and southern extremes of the Golden Mile.

E

Pedestrian and General (Road) Safety Report

Golden Mile Short List Option: General Road Safety Assessment

This report has been prepared for the benefit of Let's Get Wellington Moving. No liability is accepted by this company or any employee or sub-consultant of this company with respect to its use by any other person.

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Rev. no	Date	Description	Prepared by	Checked by	Reviewed by	Approved by
0	2020/08/10	Draft	A.Mustapha	A. McLeod	M.Smith	A. McLeod
1	2021/01/15	Final	A.Mustapha	A. McLeod	M.Smith	A. McLeod

1 Introduction

The Golden Mile plays a vital role in the success of Wellington's transport system, regional economy, and sense of place. It is the busiest pedestrian area in the city and a key shopping and entertainment destination. It is also the main route for buses bringing 37,000 people to the central city on a typical day. Typical users vary between private motor vehicles, light commercial service vehicles, buses, and pedestrians – ranging from the abled bodied to impaired users, cyclists, elderly and school children to name a few.

The Let's Get Wellington (LGWM) programme is a joint initiative between Wellington City Council (WCC), Greater Wellington Regional Council (GWRC) and Waka Kotahi NZ Transport Agency (Waka Kotahi). The LGWM programme has developed specific objectives for the Golden Mile project to ensure that the transport and public realm outcomes to be pursued for the Golden Mile are aligned with the overall direction of the LGWM programme.

This report focuses on the current and future road safety for general traffic along the Golden Mile.

The existing road safety conditions have been assessed for a ten-year period between 2010-2019. In this study we analysed the crashes, locations, users involved and severity of injury.

The analysis of future state will be undertaken for three short listed corridor options:

1. Reduced Traffic (Option 1),
2. Bus Emphasis (Option 2), and
3. Bus plus Pedestrian Emphasis (Option 3)

The future safety risk was assessed using the existing CAS data and the key changes for each option and is discussed in more detail throughout this report.

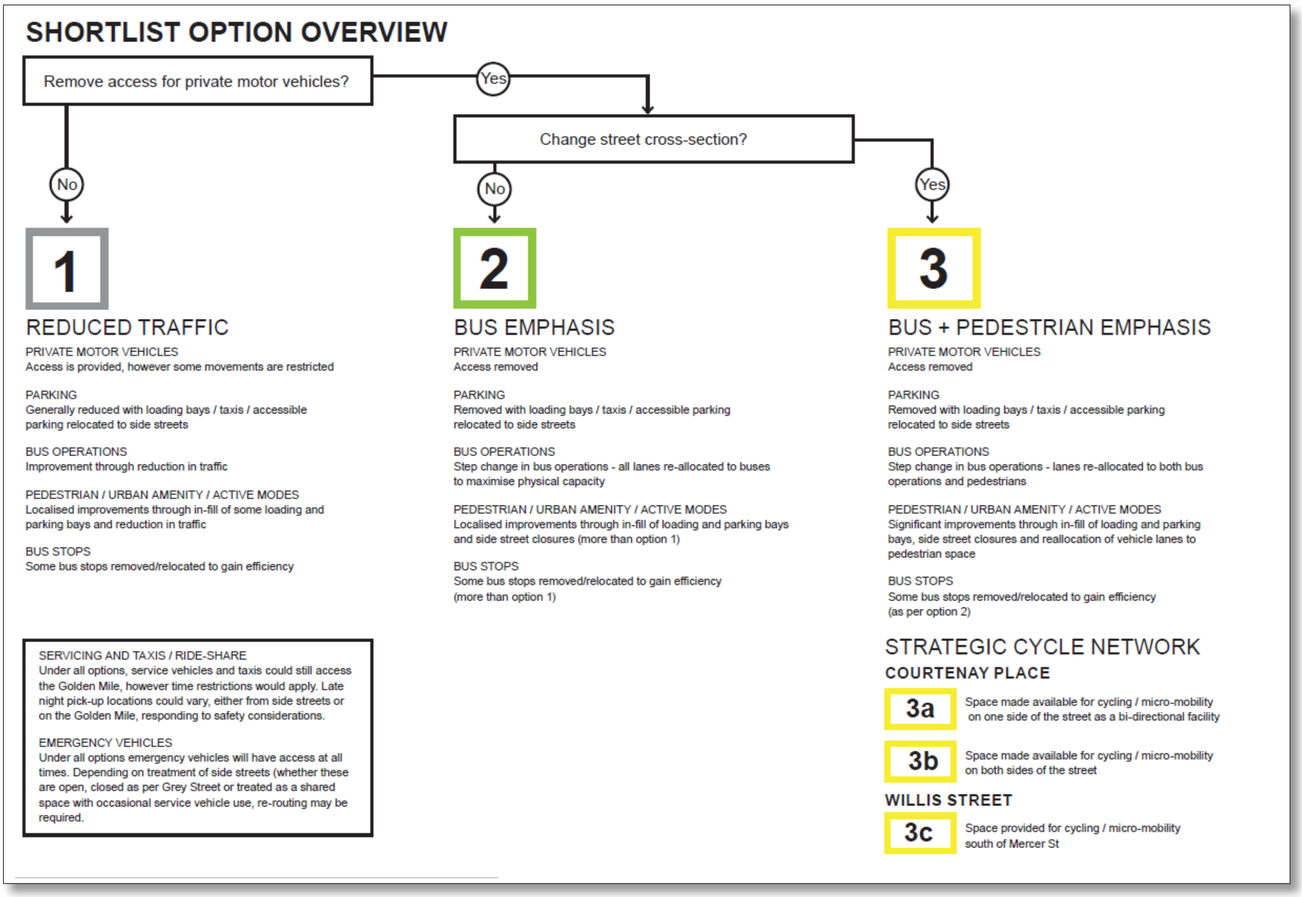

Figure 1-1: Golden Mile Short List Options

2 Assumptions and Limitations

1. Future crashes will follow the same pattern as historic crashes (e.g. people would continue to “jaywalk”)

2. Bus volumes on the Golden Mile are assumed to be capped at 90 to 100 buses per hour (per direction of travel) with any increases in bus volumes above this threshold expected to be accommodated through the utilisation of alternative bus corridors to the Golden Mile. It is understood that the bus volumes along the Golden Mile currently operate at a capacity of 90-100 buses per hour under existing conditions.

3. Where two bus lanes in the same direction are indicated (Option 2) it is understood that one lane will be used for circulation, while the other lane is only used as bus stops and access to and from these, that is, the kerbside lane will not be used for bus circulation.

4. According the ‘Golden Mile - Do Minimum Scenario Description’ Document,

   - The general population in Wellington City will increase between 9 to 14% by 2036, with employment growing between 5 to 16%
   - The pedestrian volumes along the Golden Mile are expected to increase from 11,000 (2019) to 13,500 by 2036 under the Do Minimum, which is an increase of 2,500 pedestrians in the CBD, representing an average growth rate of approximately 20% per annum.
   - There will be little change in forecast volumes of private motor vehicles entering the CBD in the am peak. This is because capacity is predicted to be constrained on the main arterials leading to the Wellington CBD.

5. Where two bus lanes in the same direction are indicated (Option 2) it is understood that one lane will be used for circulation, while the other lane is only used as bus stops and access to and from these, that is, the kerbside lane will not be used for bus circulation.

6. With the minimal growth in general traffic, population and the restriction on buses, it is assumed that the current crash trends for the existing conditions can be applied to the Options, that is, future crashes will also follow the same pattern as historic crashes

7. Crash prediction models were not used in this analysis as they are mainly focused on intersection crashes or rural mid-blocks rather than the Golden Mile’s mix of vehicle and user types, and its highly urbanised environment. In addition, the Safe System Framework Assessment was not undertaken as this assessment requires a level of detail that has not been developed for any of the options.

3 Crash Analysis System

The CAS analysis was undertaken for the period between 2010-2019 along the length of the Golden Mile, shown in image below.

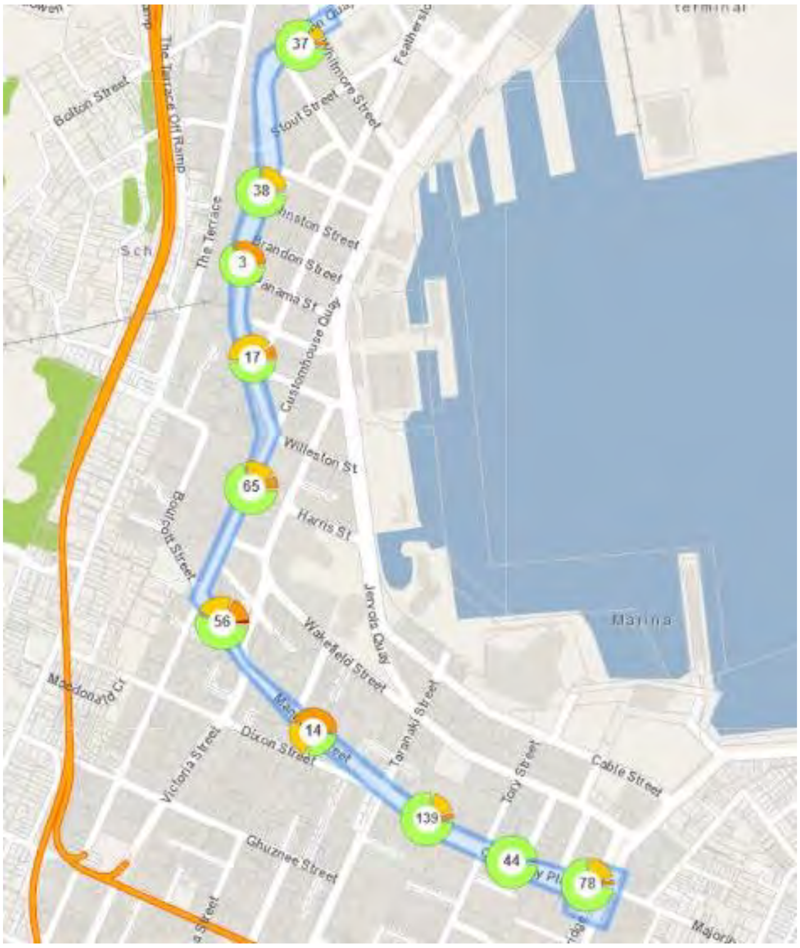

Figure 3-1: CAS Analysis Area

The results showed a total of 491 crashes during this ten year period on and around the Golden Mile, with 484 crashes occuring on the Golden Mile. The additional seven crashes were considered close enough to the Golden Mile to be analysed. The 491 crashes were divided into the four different roads making up the Golden Mile, shown in Table 3-1. The highest number of crashes occurred along Courtenay Place with 263 of the total crashes - over 50%, followed by Lambton Quay with 94 of the total crashes crashes representing less than 20%.

Crashes involving cars equate to approximately 60% of the total crashes along the Golden Mile, with 199 of these crashes occuring along Counteney Place. The next highest number of crashes were those involving buses, where approximately 36% of bus crashes ocurred along Courtenay Place, followed closely by Willis Street with approximately 30% of the total crashes involving buses. Table 3-1 shows a summary of all crashes by vehicle type, while Figure 3-2 provides a detailed breakdown of crashes per vehicle and location.

Table 3-1: Crash data per road along the Golden Mile

Road Names	Total	Tota DSi	Buses	Cars	Trucks	Other
Courteney Place	263	7	52	199	6	6
Manners Street	69	18	25	35	2	7
Willis Street	65	11	43	16	3	3
Lambton Quay	94	8	25	45	8	16
Total	**491**	**44**	**145**	**295**	**19**	**32**

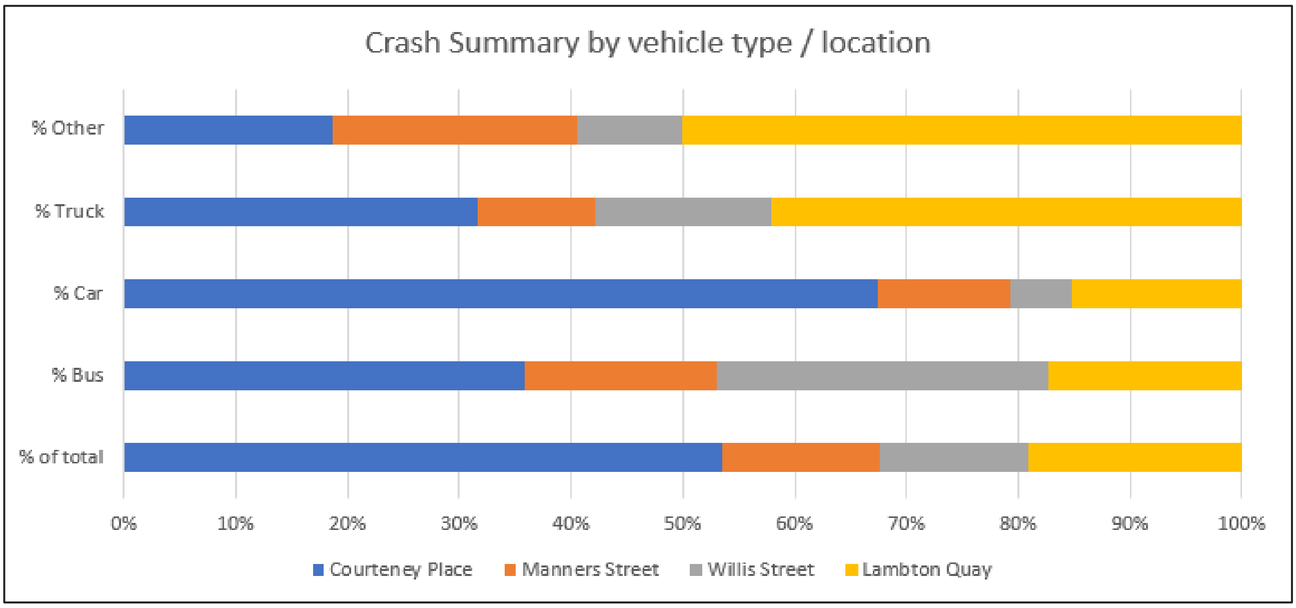

Figure 3-2: Crash summary by vehicle type and location

A review of the crash data for vulnerable users (pedestrian / cyclists) revealed that 25% of all crashes involved pedestrians, with 4% involving cyclists. At 25%, this is an overrepresentation of the vulnerable user, with a National Average of 21%.

3.1 Annual Crash Rate Analysis

The results showed a high volume of crashes in 2010, likely due to the operational changes along the Golden Mile, which included the introduction of buses along the section of Willis Street between Mercer Street and Manners Street, and along Manners Street. There is no long-term increasing or decreasing trend in the number of crashes over the years, however analysis of the higher severity crash injury (Fatal and Serious Injury) indicate a generally upward trend since 2013, albeit small numbers. It is noted that the crash number for these high severity crashes decreased in 2016, which we suspect is as a direct result of the 2016 earthquake.

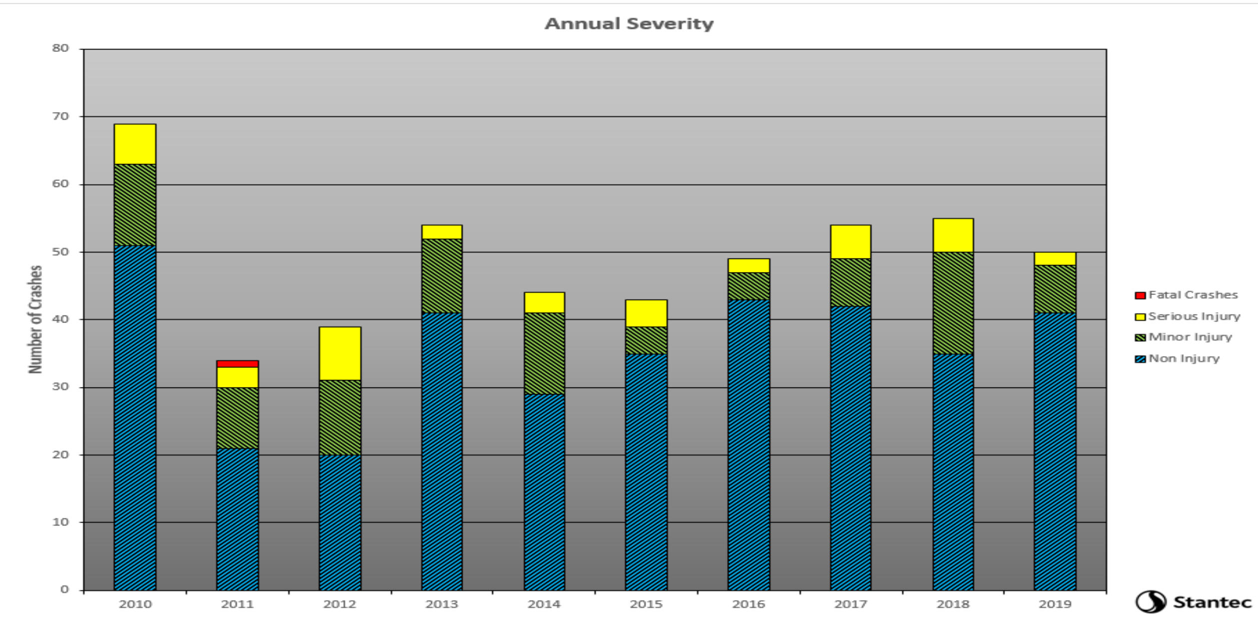

Figure 3-2: Crash Severity between 2019-2019

Fatal and serious injury crashes makeup less than 10% of all crashes along the Golden Mile, with minor injury crashes equating to less than 15%, whereas non-injury crashes account for just over 80% of total crashes.

3.2 Vulnerable Users

Further analysis into the crash data, focusing on vulnerable users showed 125 crashes over the ten year period involving this road user type, shown in **Figure 3-3**. Minor injuries account for 54% of these crashes, followed by non-injury crashes accounting for 23%, serious injuries accounting for approximately 22% of total crashes, with fatal injury crashes following with less than 10%, shown in **Figure 3-4**.

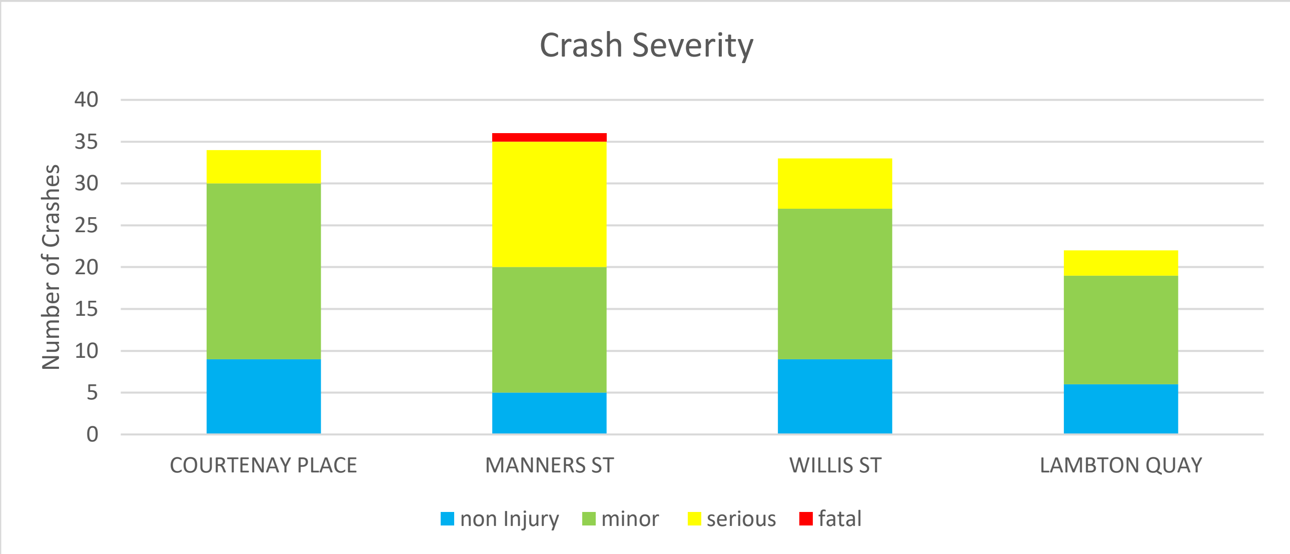

Figure 3-3: Pedestrian Crashes and severity along the Golden Mile

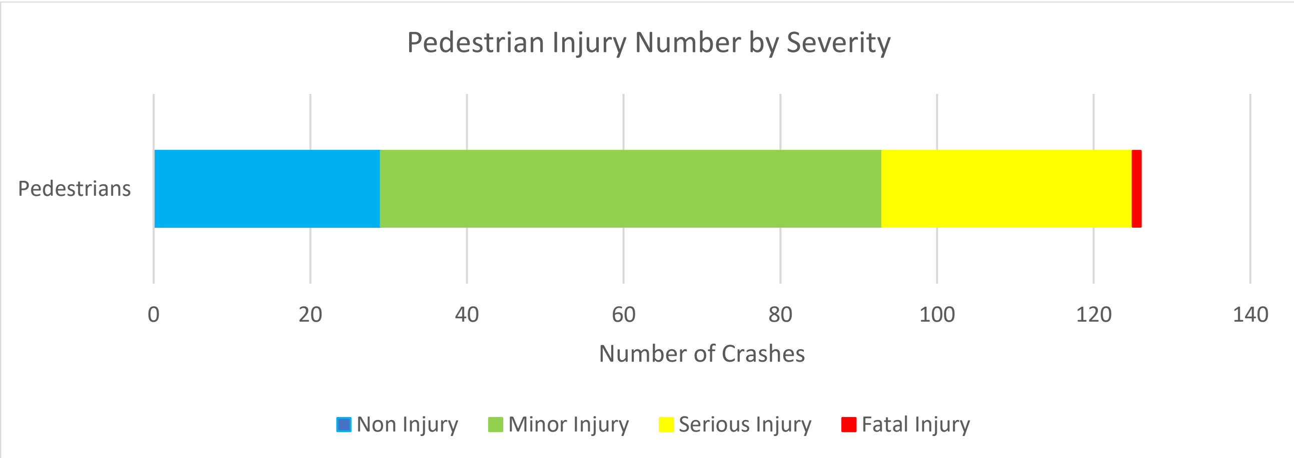

Figure 3-4: Total Injury Crashes by Severity

Deeper analysis revealed that 46% of crashes involving pedestrians also involved buses. A breakdown of the crash severity includes one fatal, 20 serious and 21 minor injury crashes, along with 6 non-injury crashes. This number is concerning, and it represents the highest vehicle type involved in pedestrian crashes. It must be emphasized that these crashes are expected to continue along the Golden Mile, as there are no plans to reduce the number of buses along this route. This implies that the proposed changes to the Golden Mile will not lessen the highest safety risk to pedestrians along the GM.

A close second is pedestrian crashes involving cars with 42% (53/125) of total pedestrian crashes. These results clearly illustrate a conflict between these road users on the existing road infrastructure.

This highlights the need for careful inclusion of these user groups, shown in **Figure 3-5**, needs within the design.

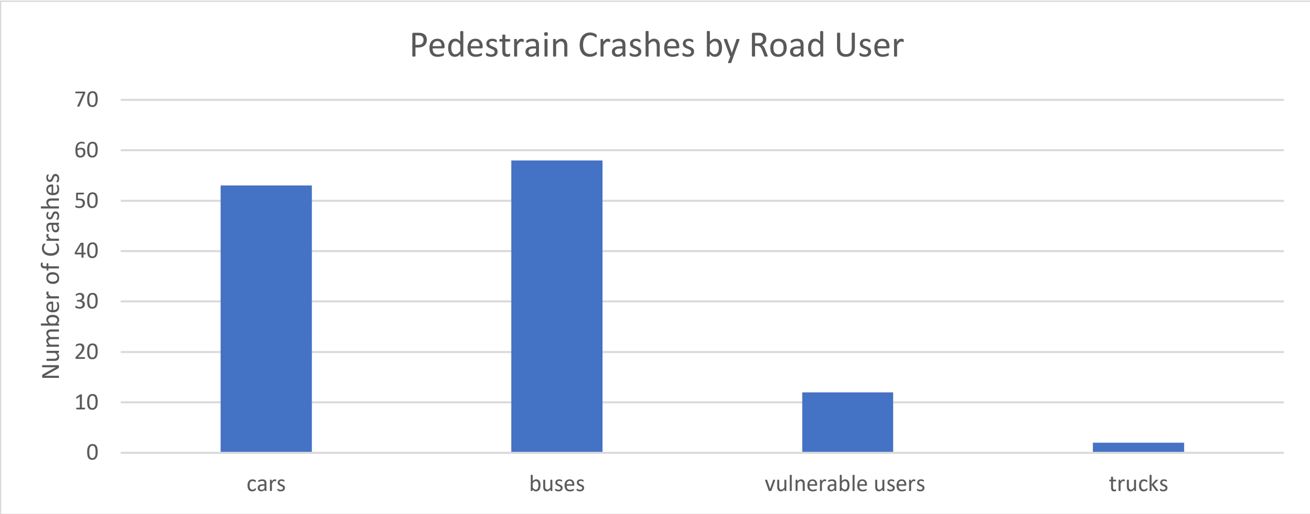

Figure 3-5: Pedestrian Crashes by user type

3.3 Crash Trends

As previously mentioned, traffic along the Golden Mile changed in 2010, with the introduction of buses along the portion of Willis Street between Mercer Street - previously buses did not travel this section of road - and Manners Street of which a section (between Victoria Street and Cuba Street) was a pedestrian mall.

A CAS analysis pre (2005-2009) and post (2010-2014) this operational change was undertaken to determine the impact on the general road safety. The analysis revealed that the number of crashes involving buses more than doubled with pedestrian-bus conflicts increasing from 3 to 17, an increase of more than 5 times. An analysis of the full 10-year data showed that between 2015-2019 there were 16 injury crashes, showing a sustained new trend.

In addition, the analysis shows a fatal crash along Willis Street after the introduction of buses on this road. This illustrates the impact of this operational change on road safety, and especially the safety of vulnerable users. It must be noted that this was an introduction of a new vehicle type onto this portion of Willis Street and Manners Street. Crashes involving other vehicle types recorded a decrease from pre to post the operational changes

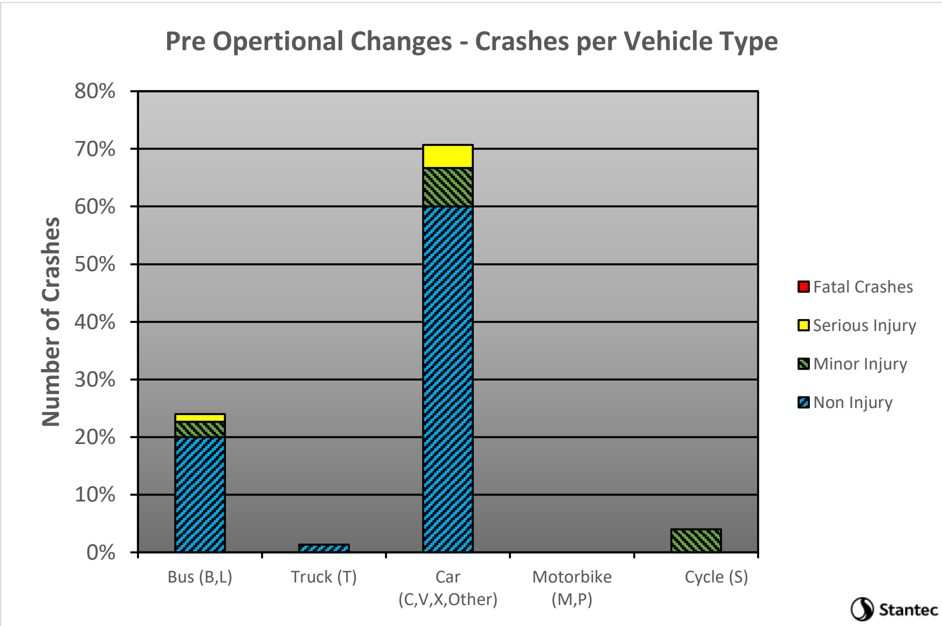

Figure 3-6: 2005 – 2009 Crashes by type

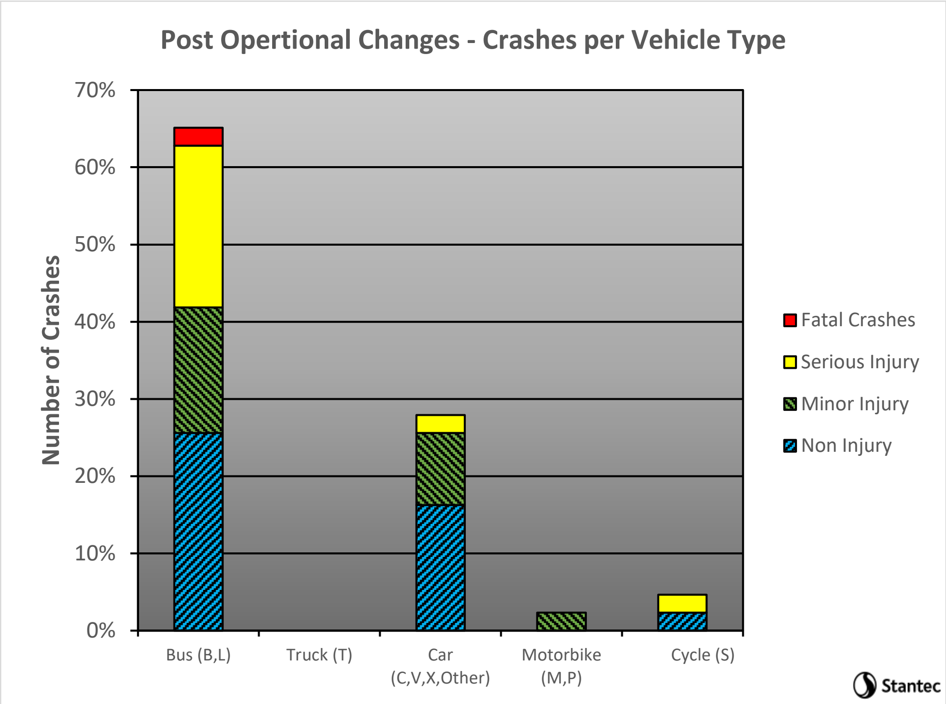

Figure 3-7: 2010 – 2014 Crashes by type

4 Methodology

Assessment was undertaken for the 4 sections that make up the Golden Mile (GM):

1. Lambton Quay
2. Willis Street
3. Manners Street
4. Courtenay Place

A quantitative and qualitative approach was taken to assessing safety along the Golden Mile

- Quantitative using historic crash data along the Golden Mile, route knowledge and stakeholder focus areas (Willis Street and Manners Street)

- Qualitative using WCC Institutional Knowledge and experienced practitioner judgement

The analysis was broken up into four user types, namely:

1. Pedestrians
2. Cyclists
3. Public Transport
4. Other

The key changes to the Golden Mile are shown in Table 4-1 and other changes shown on the concept plans were scored using Table 4-2 for each option

Key changes for the three short list options for the Golden Mile corridor are listed below:

Table 4-1: Description of Short List Options

Short List Option[2]	Overview	Key differences between the options	Key considerations
Option 1 – Reduce Traffic **(Long Report Ref: 1CW7)**	• Retains private motor vehicle access with some restrictions • Bus efficiency improvements through consolidated bus stops (and reduced traffic and reduced parking / relocated loading and taxi bays) • Some localised pedestrian improvements	Provides private motor vehicle access on Lambton Quay, Courtenay Place and Willis Street	• Largely retains existing mix of transport mode uses and access • Small infrastructure implementation requirements • Provides only minor improvements for buses and pedestrians • Not significantly different from the current bus and pedestrian (and other modes) situation
Option 2 - Bus Emphasis **(Long List Report Ref: 2BX8)**	• Private vehicle access removed • Bus efficiency improvements provided through 3 / 4 bus lanes on Courtenay Place, Willis Street, Lambton Quay, consolidation of bus stops (more than Option 1), car parking / loading / taxi bays relocated to side streets • Some localised pedestrian improvements (more than Option 1)	Removes private motor vehicles from the Golden Mile, but generally retains the existing cross sections while reserving this space *exclusively* for buses	• Provides significant step change in bus operation (e.g. reliability and journey time improvements) • Provides additional capacity for increased bus volumes and increased resilience for bus operations • Moderate infrastructure implementation requirements • Provides only moderate improvements to pedestrians
Option 3 – Bus + Pedestrian Emphasis **(Long List Report Ref: 3BX9)**	• Private vehicle access removed • Bus efficiency improvements provided through two dedicated bus lanes along the Golden Mile, consolidation of bus stops (as per Option 2), car parking / loading / taxi bays relocated to side streets • Increased localised pedestrian improvements (i.e. more than Option 2) • Option to provide for Wellington City Council (WCC) Strategic Cycle Network on Courtenay Place and Willis Street (south of Mercer Street)	Removes private motor vehicles from the Golden Mile, but makes greater use of the existing Lambton Quay and Courtenay Place corridor carriageway for pedestrian and urban realm improvements Makes provision for the WCC Strategic Cycle Network	• Provides increased bus operation performance (e.g. reliability and journey time improvements) • Significant improvements for pedestrians and provides opportunities for expanding the urban realm • Makes provision for the WCC Strategic Cycle Network • Reduction in carriageway limits overall bus capacity of the Golden Mile • Large infrastructure implementation requirement

Table 4-2: MCA Score

Score	Scoring Description	Definition
3	Large Positive	Major positive impacts resulting in substantial and long-term improvements or enhancements of the existing environment.
2	Medium Positive	Moderate positive impact, possibly of short-, medium- or long-term duration. Positive outcome may be in terms of new opportunities and outcomes of enhancement or improvement.
1	Slight Positive	Minimal positive impact, possibly only lasting over the short term. May be confined to a limited area.
0	Neutral	Neutral - no discernible or predicted positive or negative impact
-1	Slight Negative	Minimal negative impact, possibly only lasting over the short term, and definitely able to be managed or mitigated. May be confined to a small area.
-2	Medium Negative	Moderate negative impact. Impacts may be short, medium or long term and are highly likely to respond to management actions.
-3	Large Negative	Impacts with serious, long-term and possibly irreversible effect leading to serious damage, degradation or deterioration of the physical, economic, cultural or social environment. Required major rescope of concept, design, location and justification or requires major commitment to extensive management strategies to mitigate the effect.

Table 4-3: Score Criteria

Score	Criteria
3	>100%
2	50%-100%
1	<50%
-1	<-50%
-2	- 50% - -100%
-3	>-100%

5 Overall Road Safety Assessment

5.1 Assessment Results

Overall, all proposed options will perform safely if implemented correctly. As previously mentioned, the Golden Mile carries several vulnerable users that must be carefully considered during implementation. An analysis of the existing crash data for the ten-year period showed a large percentage of bus/pedestrian crashes along the Golden Mile, indicating this is an existing problem, that must be addressed.

Three shortlisted options for the Golden Mile corridor were assessed from a road safety perspective against a 2036 do-minimum scenario.

1. Reduced Traffic,
2. Bus Emphasis, and
3. Bus plus Pedestrian Emphasis

The assessment results showed that Option 3 – Bus plus Pedestrian Emphasis will be safer than the other two options. In general, it is not expected that any option will result in decreased safety along the Golden Mile.

For option 2, where two bus lanes are indicated it is assumed that one lane will be used for circulation, while the other lane is promoted to access and depart bus stops only – acknowledging that other users such as cyclists and scooters will use this ‘access’ lane. If this option changes allowing two bus circulation lanes to operate simultaneously per approach, the scoring would drastically decrease.

General traffic will be partially or totally removed from all options, improving safety along the Golden Mile. This traffic will redirect to other routes within the CBD, increasing the inherent risk to all road users on those routes. This diversion of general traffic to other routes must be considered and designed for to prevent any safety issues arising as a result.

Table 5-1: Overall Road Safety Performance

Road	Pedestrians	Cyclists	PT	General Safety	Overall
Courtenay Place option 1	1	0	1	0	**1**
Courtenay Place option 2	1	0	1	0	**1**
Courtenay Place option 3	2	1	1	0	**2**
Manners Street option 1	1	1	2	0	**1**
Manners Street option 2	1	1	2	0	**1**
Manners Street option 3	1	1	2	0	**1**
Willis Street option 1	1	1	0	0	**1**
Willis Street option 2	1	2	1	0	**1**
Willis Street option 3	1	2	1	0	**1**
Lambton Quay option 1	1	1	1	0	**1**
Lambton Quay option 2	1	1	2	0	**1**
Lambton Quay option 3	2	2	1	0	**2**

5.2 Other road safety considerations

In order for any of the three options to be implemented safely, it is crucial that public awareness is at the forefront, to ensure road users, either drivers or vulnerable users, utilising the Golden Mile corridor are familiar with the proposed changes. Thererfore, public awareness campaigning during the intial operational stages must be undertaken.

In addition, a safe systems approach should be applied to this corridor, with the realisation that road users are human and make mistakes that may lead to crashes, road infrastructure should therefore be forgiving and take into account this vulnerability to avoid serious injury or death during a crash. Therefore, infrastructure, signage and roadmarkings will play a critical role in the transition between existing and future operational systems.

Lastly, considerations to impaired users and universal access must be prioritised to ensure safety for all road users.

Appendix A: Safety Assessment

LEGEND	
Black	Benefits and disbenefits that cannot be minimised through design
Blue	*Disbenefits that can be minimised through design*

OPTION 1					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
Courtenay Place	1. General traffic access to the Golden Mile is retained (200/216 crashes on CP involved general traffic	Benefits: 1. No change in user expectation Disbenefits: 1. General traffic on Courtney Place account for roughly 50% ped crashes. This risk/crash type will remain	Benefits: 1. No change in user expectation Disbenefits: 1. General traffic account for a 55% of cyclist crashes, this crash type will not be removed	Benefits: 1. None Disbenefits: 1. General traffic account for a 70% of bus crashes, this crash type will not be removed *2. Additional side friction caused by general traffic*	Benefits: 1. General traffic retained, no redirecting to different roads Disbenefits: 1. High potential for crashes involving general traffic
	2. Right turns between Courtenay Place and Tory Street are banned	Benefits: 1. This will reduce conflict points for pedestrians Disbenefits: *1. Turning vehicles will reroute to other intersections, increasing risk to peds at those intersections*	Benefits: 1. Reduced conflict points for cyclists at these intersections Disbenefits: *1. Turning vehicles will reroute to other intersection, increasing risk to cyclists at those intersections*	Benefits: 1. Reduced conflict points for buses and general traffic Disbenefits: 1. None - this will not impact PT routes	Benefits: 1. None Disbenefits: *1. Creates confusion to motorists increasing the risk of mistakes* 2. Redirect traffic along routes with reduced capacity
	3. Blair and Allen Street converted to pedestrian areas	Benefits: 1. This will reduce conflict points for pedestrians, 40% of crashes on these roads involve pedestrians Disbenefits: *1. Turning vehicles will reroute traffic to other intersection, increasing risk to peds at those intersections*	Benefits: 1. Reduced conflict points for cyclists Disbenefits: *1. This traffic will be redirected to alternative routes along GM*	Benefits: 1. Reduced conflict points. 70% (14/18) of buses crashes at these intersections involve general traffic Disbenefits: *1. This traffic will be redirected to alternative routes along GM*	Benefits: 1. Remove crashes involving general traffic from these intersections Disbenefits: *1. Create confusion to motorists* *2. Redirect traffic along routes with reduced capacity*

OPTION 1					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
	4. One lane general traffic and one lane bus only	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None
	5. Bus stop lengths increase	Benefits: 1. Increased space for pedestrians to stage safely when waiting for PT Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. Increased side friction for moving cyclists 2. More buses pulling into and out off the bus stops weaving between cyclists	Benefits: 1. Increased space for PT 2. Increased length will allow for more simultaneous loading Disbenefits: 1. Increased side friction, with more buses able to utilise bus stops, pulling in and out of lanes	Benefits: 1. None Disbenefits: 1. Increased side friction, with more buses able to utilise bus stops, pulling in and out of lanes
	6. Crossing signal to priorities buses	Benefits: 1. None Disbenefits: *1. Increase delay time to pedestrians causing increased frustration increasing jaywalking*	Benefits: 1. Shorter waiting times at signals, removing the risk of cyclists running red lights Disbenefits: *1. Increased risk of cyclists hitting jaywalking pedestrians*	Benefits: 1. Increased ability for traffic to flow, reducing risky behavior at signals. Disbenefits: 1. Buses in general traffic lane maneuver into buses only lane to take advantage of the signals without looking for cyclists or pedestrians increasing chances of a crash	Benefits: 1. None Disbenefits: 1. Signal timings optimised for buses will cause vehicles to run red lights and increase other unsafe behavior, increasing crashes along this portion of the road

OPTION 1					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
	7. Most frontages along the Golden Mile will be accessible to people in cars and taxis	Benefits: 1. None Disbenefits: *1. Increased side friction to pedestrians caused by stopped vehicles along the Golden Mile* *2. Increased turning into side roads to park/load passengers increasing risk to crossing pedestrians*	Benefits: 1. None Disbenefits: *1. Increased side friction to cyclists caused by stopped vehicles along the Golden Mile* *2. Parking bays will be removed in along CP, increasing likelihood of vehicles stopping in live traffic lane, opening doors, and stopped vehicles will increase risk to cyclists.*	Benefits: 1. None Disbenefits: *1. Increased side friction to PT caused by stopped vehicles along the Golden Mile since parking bays will be removed in this option.*	Benefits: 1. Disbenefits: *1. Increased side friction to other vehicles caused by stopped vehicles along the Golden Mile since parking bays will be removed in this option.*
	8. Service access is provided in pedestrianised areas.	Benefits: 1. None Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for pedestrians, increasing the risk of vehicle ped crashes*	Benefits: 1. None Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for cyclists, increasing the risk of vehicle ped crashes*	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. Remove the risk of vehicles staging along GM Disbenefits: 1. None
	9. Parking and loading bays removed (18 /168 crashes are parking related along Courtenay Place)	Benefits: 1. Increase space for pedestrian circulation 2. Reduce conflict points for vehicles and pedestrians (11% of parking related crashes involve peds) Disbenefits: 1. None	Benefits: 1. Reduce conflict points for vehicles and cyclists (6% of parking related crashes involve peds) Disbenefits: 1. None	Benefits: 1. Reduce conflict points for buses travelling along this section of the road and vehicles entering/exiting these parking/loading areas (30% of parking related crashes involve buses) Disbenefits: 1. None	Benefits: 1. Reduce conflict points for vehicles travelling along this section of the road and vehicles entering/exiting these areas (63% of parking related crashes involve car on car) Disbenefits: *1. Reduced parking available along route. Commuters will need to find alternative parking spaces, increasing risk on other roads*

OPTION 1					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
Manners Street	1. Intersection of Manners Street and Cuba Street South closed to general traffic	Benefits: 1. No ped crashes at this intersection involved general traffic Disbenefits: *1. Turning vehicles will reroute traffic to other intersection, increasing risk to peds at those intersections*	Benefits: 1. No cyclist crashes at this intersection involved general traffic Disbenefits: *1. Turning vehicles will reroute traffic to other intersection, increasing risk to peds at those intersections*	Benefits: 1. Reduced conflict points (15% of bus crashes involved general traffic) (6% involve cyclists and 79% involve peds) Disbenefits: 1. This traffic will be redirected to alternative routes along GM	Benefits: 1. Provide uniform road restrictions throughout the day Disbenefits: *1. Redirect traffic along routes with reduced capacity*
	2. Traffic access on Manners Street between Taranaki and Cuba Streets closed to general traffic (25 /63 crashes are general traffic related)	Benefits: 1. This will reduce conflict points for pedestrians (5% of this crash type- 1/29 crashes involving peds) Disbenefits: *1. Turning vehicles will reroute traffic to other intersection, increasing risk to peds at those intersections*	Benefits: 1. Reduced conflict points. Reduce 50% of this crash type (1 out of 2 crashes) Disbenefits: *1. This traffic will be redirected to alternative routes along GM*	Benefits: 1. Reduced conflict points (18% of bus crashes involved general traffic_7/40) Disbenefits: *1. This traffic will be redirected to alternative routes along GM*	Benefits: 1. A 40% reduction in crashes along this portion Disbenefits: *1. Create confusion to motorists* *2. Redirect traffic along routes with reduced capacity*
	3. Turning lane reallocated to footpath	Benefits: 1. Increase space for pedestrian circulation Disbenefits: *1. Turning vehicles will reroute to other intersections, increasing risk to peds at those intersections*	Benefits: 1. Reduced conflict points cyclists Disbenefits: *1. Turning vehicles will reroute to other intersection, increasing risk to cyclists at those intersections*	Benefits: 1. Reduced conflict points Disbenefits: 1. None	Benefits: 1. None Disbenefits: *1. Create confusion to motorists* *2. Redirect traffic along routes with reduced capacity*
	4. Service access is provided in pedestrianised areas.	Benefits: 1. None Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for pedestrians, increasing the risk of vehicle ped crashes*	Benefits: 1. None Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for cyclists, increasing the risk of vehicle ped crashes*	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. Remove the risk of vehicles staging along GM Disbenefits: 1. None

OPTION 1					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
Willis Street	1. General traffic retained northbound on Willis Street (59/90 crashes occur in the north bound 47/59 crashes are involved general traffic_nbd 20/31 crashes are involve general traffic_sbd)	Benefits: 1. By removing south bound general traffic, there will be a removal of 22% of all crashes on this road Disbenefits: 1. General traffic on Willis Street account for roughly 55% ped crashes. This crash risk will remain	Benefits: 1. By removing south bound general traffic, there will be a removal of 22% of all crashes on this road Disbenefits: 1. General traffic account for a 75% of cyclist crashes, this crash type will not be removed	Benefits: 1. By removing south bound general traffic, there will be a removal of 22% of all crashes on this road Disbenefits: 1.50% of all bus crashes remain (9/18 bus crashes involving general traffic, 15/31 total crashes involving buses)	Benefits: 1. General traffic retained on north bound, reducing the need for traffic to reroute 2. 22% of general traffic crashes removed Disbenefits: 1. By retaining the north bound movement 52% of crashes involving general traffic is retained on this portion of the road.
	2. Right turn ban from Willis Street to Mercer Street (to reduce bus and pedestrian wait times) - pedestrianised area (20/95 crashes occur in at Mercer Street 2/21 crashes are involve turning traffic)	Benefits: 1. This will reduce conflicts for pedestrians Disbenefits: *1. Turning vehicles will reroute to other intersections, increasing risk to peds at those intersections*	Benefits: 1. 1. No cyclist crashes have been reordered around this area. However, this will reduce the number of conflicts for cyclists Disbenefits: *1. Turning vehicles will reroute to other intersections, increasing risk to cyclists at those intersections*	Benefits: 1. Reduced conflict points Disbenefits: 1. None - this will not impact PT routes	Benefits: 1. None Disbenefits: *1. Creates confusion to motorists* *2. Redirect traffic along routes with reduced capacity*
	3. Bus stop relocated	Benefits: 1. None Disbenefits: 1. Bus stop relocation is not expected to impact pedestrian desire lines or pedestrian crossing facilities at bus stops. All bus stops will have a crossing facility if it has one already.	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None

OPTION 1					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
	4. Most frontages along the Golden Mile will be accessible to people in cars and taxis	Benefits: 1. None Disbenefits: *1. Increased side friction to pedestrians caused by stopped vehicles along the Golden Mile* *2. Increased turning into side roads to park/load passengers increasing risk to crossing pedestrians*	Benefits: 1. None Disbenefits: *1. Increased side friction to cyclists caused by stopped vehicles along the Golden Mile* *2. Parking bays will be removed in along Willis Street, increasing likelihood of vehicles stopping in live traffic lane, opening doors, and stopped vehicles will increase risk to cyclists.*	Benefits: 1. None Disbenefits: *1. Increased side friction to PT caused by stopped vehicles along the Golden Mile since parking bays will be removed in this option.*	Benefits: 1. None Disbenefits: *1. Increased side friction to other vehicles caused by stopped vehicles along the Golden Mile since parking bays will be removed in this option.*
	5. Service access is provided in pedestrianised areas.	Benefits: 1. None Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for pedestrians, increasing the risk of vehicle ped crashes*	Benefits: 1. None Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for cyclists, increasing the risk of vehicle ped crashes*	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. Remove the risk of vehicles staging along GM Disbenefits: 1. None
	6. Strategic cycleway along Dixon Street	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. A dedicated path for cyclists will reduce the risk to cyclists caused by other road users Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None
Lambton Quay	1. General traffic vehicle access retained on Lambton Quay northbound (51/107 crashes occur in the north bound involve general traffic 39/107 crashes are involved general traffic_sbd)	Benefits: 1. By removing south bound general traffic, there will be a removal of 35% of all crashes on this road 2. The removal of 30% of ped crashes are caused by general traffic travelling south bound Disbenefits: 1. General traffic travelling northbound on Lambton Quay account for roughly 30% of ped crashes. These crashes will not be removed	Benefits: 1. By removing south bound general traffic, there will be a removal of 35% of all crashes on this road 2. The removal of 35% of cyclist crashes are caused by general traffic travelling south bound Disbenefits: 1. General traffic travelling northbound on Lambton Quay account for roughly 65% of cyclist crashes. These crashes will not be removed	Benefits: 1. By removing south bound general traffic, there will be a removal of 35% of all crashes on this road 2. The removal of 35% of bus crashes are caused by general traffic travelling south bound Disbenefits: 1. General traffic travelling northbound on Lambton Quay account for roughly 30% of bus crashes. These crashes will not be removed	Benefits: 1. By removing south bound general traffic, there will be a removal of 35% of all crashes on this road Disbenefits: 1. General traffic travelling northbound on Lambton Quay account for roughly 48% of all crashes. These crashes will not be removed

OPTION 1					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
	2. Right turns ban to or from Lambton Quay (left turn only movements between Grey Street and Balance Street)	Benefits: 1. this change will improve pedestrian safety by 10 % 2. Reduce conflict movements caused by general traffic turning right Disbenefits: 1. Turning vehicles will reroute traffic to other intersection, increasing risk to peds at those intersections	Benefits: 1. No cyclist crashes at this intersection involved general traffic 2. Reduce conflict movements caused by general traffic turning right Disbenefits: 1. Turning vehicles will reroute traffic to other intersection, increasing risk to peds at those intersections	Benefits: 1. No crashes involving general traffic and buses include right turning traffic 2. Reduce conflict movements caused by general traffic turning right Disbenefits: 1. This traffic will be redirected to alternative routes along GM	Benefits: 1. Reduce conflict movements to general traffic Disbenefits: 1. Redirect traffic along routes with reduced capacity
	3. One-way streets between Grey Street and Ballance Street along the sunny side of the road	Benefits: 1. Reduce conflict movements caused by general traffic turning right 2. Peds need to be aware of one turning movement, increasing safety Disbenefits: 1. Turning vehicles will reroute traffic to other intersection, increasing risk to peds at those intersections 2. Increase in movements as a result of this one-way restriction	Benefits: 1. Reduce conflict movements caused by general traffic turning right 2. Cyclists need to be aware of one turning movement, increasing safety Disbenefits: 1. Turning vehicles will reroute traffic to other intersection, increasing risk to cyclists at these intersections 2. Increase in movements as a result of this one-way restriction	Benefits: 1. Reduce conflict movements caused by general traffic turning right Disbenefits: 1. None	Benefits: 1. This will create passive movements of general traffic, reducing conflict points and potential crashes Disbenefits: 1. Turning vehicles will reroute traffic to other intersections, increasing risk to safety risk at those intersections 2. Increase in movements as a result of this one-way restriction
	4. No general traffic access, except buses, to Lambton Quay southbound between: - Whitmore and Balance Streets - Stout and Waring Taylor Streets, and - Johnston and Brandon Streets.	Benefits: 1. Ped crashes are primarily with pcv (75%), removing these vehicles will remove this crash risk to peds Disbenefits: 1.Reduced movements for vulnerable users to watch for, peds become complacent 2. This will result in an PT vehicle speed up	Benefits: 1. Cyclist crashes are primarily with pcv (55%), removing these vehicles will remove this crash risk to cyclists Disbenefits: 1. Reduced movements for vulnerable users to watch for, 2. This will result in an PT vehicle speed up	Benefits: 1. Reduced number of vehicles along the GM, reducing the risk of crashes Disbenefits: 1. Drivers attention levels reduced, due to reduced vehicles on GM	Benefits: 1. None Disbenefits: 1. Redirect to other routes which may have reduced capacity increasing safety risk on those roads

OPTION 1					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
	6. Parking and loading bays removed with the potential to introduce additional loading zones on side streets	Benefits: 1. Increase space for pedestrian circulation 2. no crashes between parked vehicles and pedestrians Disbenefits: 1. None	Benefits: 1. Reduce conflict points for vehicles and cyclists (17% of parking related crashes involve peds) Disbenefits: 1. None	Benefits: 1. Reduce conflict points for buses travelling along this section of the road and vehicles entering/exiting these parking/loading areas (50% of parking related crashes involve buses) Disbenefits: 1. None	Benefits: 1. Reduce conflict points for vehicles travelling along this section of the road and vehicles entering/exiting these areas (63% of parking related crashes involve car on car) Disbenefits: *1. Reduced parking available along route. Commuters will need to find alternative parking spaces, increasing risk on other roads*
	7. Most frontages along the Golden Mile will be accessible to people in cars and taxis	Benefits: 1. None Disbenefits: *1. Increased side friction to pedestrians caused by stopped vehicles along the Golden Mile* *2. Increased turning into side roads to park/load passengers increasing risk to crossing pedestrians*	Benefits: 1. None Disbenefits: *1. Increased side friction to cyclists caused by stopped vehicles along the Golden Mile* *2. Parking bays will be removed in along Willis Street, increasing likelihood of vehicles stopping in live traffic lane, opening doors, and stopped vehicles will increase risk to cyclists.*	Benefits: 1. None Disbenefits: *1. Increased side friction to PT caused by stopped vehicles along the Golden Mile since parking bays will be removed in this option.*	Benefits: 1. Disbenefits: *1. Increased side friction to other vehicles caused by stopped vehicles along the Golden Mile since parking bays will be removed in this option.*
	8. Service access is provided in pedestrianised areas.	Benefits: 1. None Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for pedestrians, increasing the risk of vehicle ped crashes*	Benefits: 1. None Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for cyclists, increasing the risk of vehicle ped crashes*	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. Remove the risk of vehicles staging along GM Disbenefits: 1. None

OPTION 2					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
Courtenay Place	1. Access for private motor vehicles removed, with service vehicles limited to out of hours access only	Benefits: 1. Ped crashes are primarily with pcv (50%), removing these vehicles will remove this crash risk to peds 2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: 1.Likely uptake of PT along the GM, buses account for 15% of ped crashes. Assumed a doubling in bus movements will lead to a doubling in this crash type. *2. This reduced number of vehicles will result in an increase in PT speed, increasing the risk of crashes*	Benefits: 1. General traffic account for a 70% of cyclist crashes, this crash type will be removed 2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: 1. This will result in an increase in speed for PT vehicles, this vehicle type counts for 14% cyclist crashes, *2. This reduced number of vehicles will result in an increase in PT speed, increasing the risk of crashes*	Benefits: 1. Reduced number vehicles along the GM, reducing the risk of crashes 2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: *1. Reduction in driver attention due to minimising vehicles on GM*	Benefits: 1. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: *1. Redirect to other routes which may have reduced capacity increasing safety risk on those roads*
	2. Right turns between Courtenay Place and Tory Street are banned	Benefits: 1. This will reduce conflict points for pedestrians Disbenefits: *1. Turning vehicles will reroute to other intersections, increasing risk to peds at those intersections*	Benefits: 1. Reduced conflict points for cyclists at these intersections Disbenefits: *1. Turning vehicles will reroute to other intersection, increasing risk to cyclists at those intersections*	Benefits: 1. Reduced conflict points for buses and general traffic Disbenefits: 1. None - this will not impact PT routes	Benefits: 1. None Disbenefits: *1. Creates confusion to motorists increasing the risk of mistakes* 2. Redirect traffic along routes with reduced capacity
	3. Blair and Allen Street converted to pedestrian areas	Benefits: 1. This will reduce conflict points for pedestrians and service vehicles, 40% of crashes on these roads involve pedestrians Disbenefits: *1. Turning vehicles will reroute traffic to other intersection, increasing risk to peds at those intersections*	Benefits: 1. Reduced conflict points for cyclists and service vehicles Disbenefits: *1. This traffic will be redirected to alternative routes along GM*	Benefits: 1. Reduced conflict points for buses and service vehicles Disbenefits: *1. This traffic will be redirected to alternative routes along GM*	Benefits: 1. Minimise crashes on these roads resulting from service vehicles Disbenefits: *1. Create confusion to motorists* *2. Redirect traffic along routes with reduced capacity*

OPTION 2					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
	4. Dual bus lanes	Benefits: 1. Bigger vehicles easier to see 2. Peds will have to be aware of a single vehicle type. Disbenefits: 1. Two lanes of heavy vehicles for pedestrians to be aware of 2. Crashes with this vehicle type typically lead to injury crashes 3. Reduced visibility of PT in lane due to similarly sized vehicles	Benefits: 1. Bigger vehicles easier to see 2. Cyclists will have to be on the lookout for a single vehicle type. Disbenefits: 1. Two lanes of heavy vehicles for cyclists to be aware of and maneuver between 2. Crashes with this vehicle type typically lead to injury crashes 3. Reduced visibility of PT in lane due to similarly sized vehicles 4. Reduced visibility of cyclists due to size of vehicles	Benefits: 1. Similar driver behavior, likely reduction in vehicle on vehicle crashes Disbenefits: *1. Reduced visibility of other road users (vulnerable users)*	Benefits: 1. None Disbenefits: *1. Creates confusion to motorists increasing the risk of mistakes* 2. Redirect traffic along routes with reduced capacity
	5. Bus stop lengths increase	Benefits: 1. Increased space for pedestrians to stage safely when waiting for PT Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. Increased side friction for moving cyclists 2. More buses stopping	Benefits: 1. Increased space for PT 2. Increased length will allow for more simultaneous loading Disbenefits: 1. Increased side friction, with more buses able to utilise bus stops	Benefits: 1. None Disbenefits: 1. Increased side friction during off peak hours
	6. Reduction in bus stops (i.e. more than Option 1) to improve bus travel times and travel time reliability	Benefits: 1. Reducing the number of crossing points for pedestrians Disbenefits: 1. Increased patrons at stops, may cause passing pedestrians to walk outside footpath area	Benefits: 1. Reduced points of friction along the GM Disbenefits: 1. Over crowd other bus stops	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None

OPTION 2					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
	7. Crossing signal to prioritise buses (assumed no cycle facilities for perpendicular crossing, similar to existing conditions)	Benefits: 1. None Disbenefits: 1. Shorter crossing times for pedestrians in a high density ped area, across two lanes of heavy vehicles *2. Increase delay time to pedestrians causing increased frustration, increasing jaywalking across two lanes of heavy vehicles*	Benefits: 1. Shorter waiting times at signals, removing the risk of cyclists running red lights Disbenefits: *1. Increased risk of cyclists hitting jaywalking pedestrians*	Benefits: 1. Increased ability for traffic to flow, reducing risky behavior at signals. Disbenefits: 1. Buses in general traffic lane maneuver into buses only lane to take advantage of the signals without looking for cyclists or pedestrians increasing chances of a crash	Benefits: 1. None Disbenefits: 1. Signal timings optimised for buses will cause vehicles to run red lights and increase other unsafe behavior, increasing crashes along this portion of the road
	8. Parking and loading bays removed and Parking bays converted to additional footway width	Benefits: 1. Increase space for pedestrian circulation Disbenefits: 1. None	Benefits: 1. None - general traffic removed from this option Disbenefits: 1. None	Benefits: 1. None - general traffic removed from this option Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. Service vehicles will have no parking bays
	9. In-line kerbside bus stops allow buses to pass in the second lane	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. Reduces weaving between bus bay and traffic lanes 2. Easy stop start position of buses with not effort to re-enter live lane Disbenefits: *1.Increased side friction to cyclists caused by stopped vehicles along the Golden Mile* *2. Increased weaving between lanes to avoid delays caused by stopped buses*	Benefits: 1. Reduced bus movement/maneuvering reducing chances of side swipe crashes 2. Easy stop start position of buses with not effort to re-enter live lane Disbenefits: *1.Increased side friction to PT caused by stopped vehicles along the Golden Mile* *2. Increased weaving between lanes to avoid delays caused by stopped buses*	Benefits: 1. None Disbenefits: 1. None
	10. Access for servicing is retained in pedestrianised areas	Benefits: 1. None Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for pedestrians, increasing the risk of vehicle ped crashes*	Benefits: 1. None Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for cyclists, increasing the risk of vehicle ped crashes*	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. Remove the risk of vehicles staging along GM Disbenefits: 1. None

OPTION 2					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
	11. Emergency services would continue to have unrestricted access to the Golden Mile (e.g. providing two lanes in each direction allowing emergency services to pass other vehicles).	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None
Manners Street	1. Intersection of Manners Street and Cuba Street South closed to general traffic	Benefits: 1. No ped crashes at this intersection involved general traffic Disbenefits: *1. Turning vehicles will reroute traffic to other intersection, increasing risk to peds at those intersections*	Benefits: 1. No cyclist crashes at this intersection involved general traffic Disbenefits: *1. Turning vehicles will reroute traffic to other intersection, increasing risk to peds at those intersections*	Benefits: 1. Reduced conflict points (15% of bus crashes involved general traffic) Disbenefits: 1. This traffic will be redirected to alternative routes along GM	Benefits: 1. A 40% reduction in crashes along this portion Disbenefits: *1. Create confusion to motorists* *2. Redirect traffic along routes with reduced capacity*
	2. Access for private motor vehicles removed, with service vehicles limited to out of hours access only	Benefits: 1. This will reduce conflict points for pedestrians (6% of this crash type) Disbenefits: *1. Turning vehicles will reroute traffic to other intersection, increasing risk to peds at those intersections*	Benefits: 1. Reduced conflict points. Reduce 50% of this crash type (1 out of 2 crashes) Disbenefits: *1. This traffic will be redirected to alternative routes along GM*	Benefits: 1. Reduced conflict points (18% of bus crashes involved general traffic_7/40) Disbenefits: *1. This traffic will be redirected to alternative routes along GM*	Benefits: 1. A 40% reduction in crashes along this portion Disbenefits: *1. Create confusion to motorists* *2. Redirect traffic along routes with reduced capacity*
	3. Turning lane reallocated to footpath	Benefits: 1. Increase space for pedestrian circulation Disbenefits: *1. Turning vehicles will reroute to other intersections, increasing risk to peds at those intersections*	Benefits: 1. Reduced conflict points cyclists Disbenefits: *1. Turning vehicles will reroute to other intersection, increasing risk to cyclists at those intersections*	Benefits: 1. Reduced conflict points Disbenefits: 1. None	Benefits: 1. None Disbenefits: *1. Create confusion to motorists* *2. Redirect traffic along routes with reduced capacity*
	4. Service access is provided in pedestrianised areas.	Benefits: 1. None Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for pedestrians, increasing the risk of vehicle ped crashes*	Benefits: 1. None Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for cyclists, increasing the risk of vehicle ped crashes*	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. Remove the risk of vehicles staging along GM Disbenefits: 1. None

OPTION 2					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
	5. Emergency services would continue to have unrestricted access to the Golden Mile (e.g. providing two lanes in each direction allowing emergency services to pass other vehicles).	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None
Willis Street	1. Access for private motor vehicles removed, with service vehicles limited to out of hours access only	Benefits: 1. Ped crashes are primarily with pcv (40%), removing these vehicles will remove this crash risk to peds 2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: 1.Likely uptake of PT along the GM, buses account for 45% of ped crashes. An increase in bus movements will lead to an increase this crash type. *2. This reduced number of vehicles will result in an increase in PT speed, increasing the risk of crashes*	Benefits: 1. General traffic account for a 60% of cyclist crashes, this crash type will be removed 2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: 1. This will result in an increase in speed for PT vehicles, this vehicle type counts for 60% cyclist crashes, *2. This reduced number of vehicles will result in an increase in PT speed, increasing the risk of crashes*	Benefits: 1. 45% of all bus crashes will be removed, these are bus crashes involving general traffic 2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: *1. Reduction in driver attention due to minimising vehicles on GM*	Benefits: 1. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: *1. Redirect to other routes which may have reduced capacity increasing safety risk on those roads*
	2. Right turn ban from Willis Street to Mercer Street (to reduce bus and pedestrian wait times) - pedestrianised area	Benefits: 1. This will reduce conflicts for pedestrians Disbenefits: *1. Turning vehicles will reroute to other intersections, increasing risk to peds at those intersections*	Benefits: 1. 1. No cyclist crashes have been reordered around this area. However, this will reduce the number of conflicts for cyclists Disbenefits: *1. Turning vehicles will reroute to other intersections, increasing risk to cyclists at those intersections*	Benefits: 1. Reduced conflict points Disbenefits: 1. None - this will not impact PT routes	Benefits: 1. None Disbenefits: 1. None
	3. Bus stop locations adjusted to maintain catchment	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None

OPTION 2					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
	4. Access for servicing is retained in pedestrianised areas	Benefits: 1. None Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for pedestrians, increasing the risk of vehicle ped crashes*	Benefits: 1. None Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for cyclists, increasing the risk of vehicle ped crashes*	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. Remove the risk of vehicles staging along GM Disbenefits: 1. None
	5. Emergency services would continue to have unrestricted access to the Golden Mile (e.g. providing two lanes in each direction allowing emergency services to pass other vehicles).	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None
	6. Strategic cycleway along Dixon Street	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. A dedicated path for cyclists will reduce the risk to cyclists caused by other road users Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None
Lambton Quay	1. Access for private motor vehicles removed, with service vehicles limited to out of hours access only	Benefits: 1. Ped crashes are primarily with pcv (60%), removing these vehicles will remove this crash risk to peds 2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: 1.Likely uptake of PT along the GM, buses account for 30% of ped crashes. Assumed a doubling in bus movements will lead to a doubling in this crash type. *2. This reduced number of vehicles will result in an increase in PT speed, increasing the risk of crashes*	Benefits: 1. General traffic account for a 60% of cyclist crashes, this crash type will be removed 2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: 1. This will result in an increase in speed for PT vehicles, this vehicle type counts for 60% cyclist crashes, *2. This reduced number of vehicles will result in an increase in PT speed, increasing the risk of crashes*	Benefits: 1. 60% of all bus crashes will be removed 2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: *1. Reduction in driver attention due to minimising vehicles on GM*	Benefits: 1. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: *1. Redirect to other routes which may have reduced capacity increasing safety risk on those roads*

OPTION 2					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
	2. Two lanes in each direction for buses on Lambton Quay	Benefits: 1. Bigger vehicles easier to see 2. Peds will have to be aware of a single vehicle type. Disbenefits: 1. Two lanes of heavy vehicles for pedestrians to be aware of 2. Crashes with this vehicle type typically lead to injury crashes 3. Reduced visibility of PT in lane due to similarly sized vehicles	Benefits: 1. Bigger vehicles easier to see 2. Cyclists will have to be on the lookout for a single vehicle type. 3. Dedicated cycle path Disbenefits: 1. Two lanes of heavy vehicles for cyclists to be aware of and maneuver between 2. Crashes with this vehicle type typically lead to injury crashes 3. Reduced visibility of PT in lane due to similarly sized vehicles 4. Reduced visibility of cyclists due to size of vehicles	Benefits: 1. Similar driver behavior, likely reduction in vehicle on vehicle crashes Disbenefits: *1. Reduced visibility of other road users (vulnerable users)*	Benefits: 1. None Disbenefits: *1. Creates confusion to motorists increasing the risk of mistakes* 2. Redirect traffic along routes with reduced capacity
	3. Taxi stands, servicing and loading areas provided at the end of closed side roads such as Panama, Brandon, Johnston, and Waring Taylor Streets	Benefits: 1.Designated areas improves safety of for pedestrians catching a cab, etc., in comparison to cabs staging on live traffic lane Disbenefits: *1.Delivery vehicles in pedestrian area will create confusion for pedestrians, increasing the risk of vehicle ped crashes*	Benefits: 1. Loading/servicing will be removed from cyclists path along GM Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for cyclists, increasing the risk of vehicle ped crashes*	Benefits: 1. Removes conflict with service delivery/taxi/loading areas along GM Disbenefits: 1. None	Benefits: 1. Remove the risk of vehicles staging along GM Disbenefits: 1. None
	4. In-line kerbside bus stops allow buses to pass in the second lane	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. Reduces weaving between bus bay and traffic lanes 2. Easy stop start position of buses with not effort to re-enter live lane Disbenefits: *1.Increased side friction to cyclists caused by stopped vehicles along the Golden Mile* *2. Increased weaving between lanes to avoid delays caused by stopped buses*	Benefits: 1. Reduced bus movement/maneuvering reducing chances of side swipe crashes 2. Easy stop start position of buses with not effort to re-enter live lane Disbenefits: *1.Increased side friction to PT caused by stopped vehicles along the Golden Mile* *2. Increased weaving between lanes to avoid delays caused by stopped buses*	Benefits: 1. None Disbenefits: 1. None

OPTION 2					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
	5. Reduction/relocation in bus stops to gain efficiency (i.e. more than Option 1)	Benefits: 1. Reducing the number of crossing points for pedestrians Disbenefits: 1. Increased patrons at stops, may cause passing pedestrians to walk outside footpath area *Note: bus stop relocation is not expected to impact pedestrian desire lines or pedestrian crossing facilities at bus stops. All bus stops will have a crossing facility if it has one already.*	Benefits: 1. Reduced points of friction along the GM Disbenefits: 1. Over crowd other bus stops	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None
	6. Minor side roads closed on the sunny side of street, and footways extended to provide continuous path along the edge.	Benefits: 1. This will reduce conflict points for pedestrians Disbenefits: *1. Vehicles previously utilising these roads will reroute to other roads*	Benefits: 1. This will reduce conflict points for cyclists Disbenefits: *1. Vehicles previously utilising these roads will reroute to other roads*	Benefits: 1. Reduced conflict points for buses Disbenefits: *1. This traffic will be redirected to alternative routes along GM*	Benefits: 1. None Disbenefits: *1. Create confusion to motorists* *2. Redirect traffic along routes with reduced capacity*
	7. Emergency services would continue to have unrestricted access to the Golden Mile (e.g. providing two lanes in each direction allowing emergency services to pass other vehicles).	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None

OPTION 3					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
Courtenay Place	1. Access for private motor vehicles removed, with service vehicles limited to out of hours access only	Benefits: 1. Ped crashes are primarily with pcv (50%), removing these vehicles will remove this crash risk to peds 2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: 1.Likely uptake of PT along the GM, buses account for 15% of ped crashes. Assumed a doubling in bus movements will lead to a doubling in this crash type. *2. This reduced number of vehicles will result in an increase in PT speed, increasing the risk of crashes*	Benefits: 1. General traffic account for a 70% of cyclist crashes, this crash type will be removed 2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: 1. This will result in an increase in speed for PT vehicles, this vehicle type counts for 14% cyclist crashes, *2. This reduced number of vehicles will result in an increase in PT speed, increasing the risk of crashes*	Benefits: 1. Reduced number vehicles along the GM, reducing the risk of crashes 2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: *1. Reduction in driver attention due to minimising vehicles on GM*	Benefits: 1. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: *1. Redirect to other routes which may have reduced capacity increasing safety risk on those roads*
	2. Tory Street closed, and footways extended to provide continuous path along the edge of the Golden Mile	Benefits: 1. This will remove conflict points for pedestrians Disbenefits: *1. Turning vehicles will reroute to other intersections, increasing risk to peds at those intersections*	Benefits: 1. Remove conflict points for cyclists at these intersections Disbenefits: *1. Turning vehicles will reroute to other intersection, increasing risk to cyclists at those intersections*	Benefits: 1. Remove conflict points for buses and general traffic Disbenefits: 1. None - this will not impact PT routes	Benefits: 1. None Disbenefits: *1. Creates confusion to motorists increasing the risk of mistakes* 2. Redirect traffic along routes with reduced capacity
	3. Blair and Allen Street converted to pedestrian areas	Benefits: 1. This will reduce conflict points for pedestrians and service vehicles, 40% of crashes on these roads involve pedestrians Disbenefits: *1. Turning vehicles will reroute traffic to other intersection, increasing risk to peds at those intersections*	Benefits: 1. Reduced conflict points for cyclists and service vehicles Disbenefits: *1. This traffic will be redirected to alternative routes along GM*	Benefits: 1. Reduced conflict points for buses and service vehicles Disbenefits: *1. This traffic will be redirected to alternative routes along GM*	Benefits: 1. Minimise crashes on these road resulting from service vehicles Disbenefits: *1. Create confusion to motorists* *2. Redirect traffic along routes with reduced capacity*
	4. Parking and loading bays removed	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None

OPTION 3

Road Section	Key Change	Pedestrians	Cyclists	PT	Other
	5. One lane in each direction for buses on Courtenay Place	Benefits: 1. Bigger vehicles easier to see 2. Peds will have to be aware of a single vehicle type. Disbenefits: 1. Crashes involving PT and pedestrians typically lead to injures	Benefits: 1. Bigger vehicles easier to see 2. Cyclists will have to be on the lookout for a single vehicle type. Disbenefits: 1. Crashes with this vehicle type typically lead to injury crashes	Benefits: 1. Similar driver behavior, likely reduction in vehicle on vehicle crashes Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None
	6. Footway widened one side of Courtenay Place by one lane	Benefits: 1. Increase space for pedestrian circulation Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None
	7. Dedicated median separated cycleway on one side of Courtenay Place	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. Dedicated space for cyclists to utilise safely, removing likelihood of bus/cycle crashes along this portion of the route Disbenefits: 1. None	Benefits: 1. Reduced conflict points for buses and cyclists Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None
	8. Central median and lighting columns removed along sections of Courtenay Place to maximise ped facilities	Benefits: 1. Increase space for pedestrian circulation Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. Increase the likelihood of head on crashes. 2. increasing side friction	Benefits: 1. None Disbenefits: 1. None
	9. Reduction in bus stops (i.e. more than Option 1) to improve bus travel times and travel time reliability	Benefits: 1. Reducing the number of crossing points for pedestrians Disbenefits: 1. Increased patrons at stops, may cause passing pedestrians to walk outside footpath area	Benefits: 1. Reduced points of friction along the GM Disbenefits: 1. Over crowd other bus stops	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None

OPTION 3					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
	10. Bus stop locations adjusted and lengthened to maintain catchment	Benefits: 1. Increased space for pedestrians to stage safely when waiting for PT Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. Increased side friction for moving cyclists 2. More buses pulling utilising a single bus stop	Benefits: 1. Increased space for PT 2. Increased length will allow for more simultaneous loading Disbenefits: 1. Increased side friction, with more buses able to utilise a single bus stop	Benefits: 1. None Disbenefits: 1. None
	11. Off-line and in-line bus stop options available	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. Reduces weaving between bus bay and traffic lanes 2. Easy stop start position of buses with not effort to re-enter live lane Disbenefits: *1.Increased side friction to cyclists caused by stopped vehicles along the Golden Mile* *2. Increased weaving between lanes to avoid delays caused by stopped buses*	Benefits: 1. Reduced bus movement/maneuvering reducing chances of side swipe crashes 2. Easy stop start position of buses with not effort to re-enter live lane Disbenefits: *1.Increased side friction to PT caused by stopped vehicles along the Golden Mile* *2. Increased weaving between lanes to avoid delays caused by stopped buses*	Benefits: 1. None Disbenefits: 1. None
	12. Carriageway width will allow buses to pass people on bikes or e-scooters	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None
	13. Taxis pick-up and drop offs will be from closed side roads abutting the Golden Mile	Benefits: 1.Designated areas improves safety of for pedestrians catching a cab, etc., in comparison to cabs staging on live traffic lane Disbenefits: *1.Delivery vehicles in pedestrian area will create confusion for pedestrians, increasing the risk of vehicle ped crashes*	Benefits: 1. Loading/servicing will be removed from cyclists path along GM Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for cyclists, increasing the risk of vehicle ped crashes*	Benefits: 1. Removes conflict with service delivery/taxi/loading areas along GM Disbenefits: 1. None	Benefits: 1. Remove the risk of vehicles staging along GM Disbenefits: 1. None
	14. Emergency services will be allowed to access any part of the Golden Mile (footway extensions across closed side roads will be traversable in an emergency)	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None

OPTION 3					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
Manners Street	1. Intersection of Manners Street and Cuba Street South closed to general traffic	Benefits: 1. No ped crashes at this intersection involved general traffic Disbenefits: *1. Turning vehicles will reroute traffic to other intersection, increasing risk to peds at those intersections*	Benefits: 1. No cyclist crashes at this intersection involved general traffic Disbenefits: *1. Turning vehicles will reroute traffic to other intersection, increasing risk to peds at those intersections*	Benefits: 1. Reduced conflict points (15% of bus crashes involved general traffic) Disbenefits: 1. This traffic will be redirected to alternative routes along GM	Benefits: 1. Provide uniform road restrictions throughout the day Disbenefits: *1. Redirect traffic along routes with reduced capacity*
	2. Access for private motor vehicles removed, with service vehicles limited to out of hours access only	Benefits: 1. This will reduce conflict points for pedestrians (6% of this crash type) Disbenefits: *1. Turning vehicles will reroute traffic to other intersection, increasing risk to peds at those intersections*	Benefits: 1. Reduced conflict points. Reduce 50% of this crash type (1 out of 2 crashes) Disbenefits: *1. This traffic will be redirected to alternative routes along GM*	Benefits: 1. Reduced conflict points (18% of bus crashes involved general traffic_7/40) Disbenefits: *1. This traffic will be redirected to alternative routes along GM*	Benefits: 1. A 40% reduction in crashes along this portion Disbenefits: *1. Create confusion to motorists* *2. Redirect traffic along routes with reduced capacity*
	3. Turning lane reallocated to footpath	Benefits: 1. Increase space for pedestrian circulation Disbenefits: *1. Turning vehicles will reroute to other intersections, increasing risk to peds at those intersections*	Benefits: 1. Reduced conflict points cyclists Disbenefits: *1. Turning vehicles will reroute to other intersection, increasing risk to cyclists at those intersections*	Benefits: 1. Reduced conflict points Disbenefits: 1. None	Benefits: 1. None Disbenefits: *1. Create confusion to motorists* *2. Redirect traffic along routes with reduced capacity*
	4. Taxis pick-up and drop offs will be from closed side roads abutting the Golden Mile	Benefits: 1.Designated areas improves safety of for pedestrians catching a cab, etc., in comparison to cabs staging on live traffic lane Disbenefits: *1.Delivery vehicles in pedestrian area will create confusion for pedestrians, increasing the risk of vehicle ped crashes*	Benefits: 1. Loading/servicing will be removed from cyclists path along GM Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for cyclists, increasing the risk of vehicle ped crashes*	Benefits: 1. Removes conflict with service delivery/taxi/loading areas along GM Disbenefits: 1. None	Benefits: 1. Remove the risk of vehicles staging along GM Disbenefits: 1. None
	5. Emergency services will be allowed to access any part of the Golden Mile (footway extensions across closed side roads will be traversable in an emergency)	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None

OPTION 3					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
Willis Street	1. Access for private motor vehicles removed, with service vehicles limited to out of hours access only	Benefits: 1. Ped crashes are primarily with pcv (40%), removing these vehicles will remove this crash risk to peds 2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: 1.Likely uptake of PT along the GM, buses account for 45% of ped crashes. An increase in bus movements will lead to an increase this crash type. *2. This reduced number of vehicles will result in an increase in PT speed, increasing the risk of crashes*	Benefits: 1. General traffic account for a 60% of cyclist crashes, this crash type will be removed 2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: 1. This will result in an increase in speed for PT vehicles, this vehicle type counts for 60% cyclist crashes, *2. This reduced number of vehicles will result in an increase in PT speed, increasing the risk of crashes*	Benefits: 1. 45% of all bus crashes will be removed, these are bus crashes involving general traffic 2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: *1. Reduction in driver attention due to minimising vehicles on GM*	Benefits: 1. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running Disbenefits: *1. Redirect to other routes which may have reduced capacity increasing safety risk on those roads*
	2. Parking and loading bays removed	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None
	3. Portion of the sidewalk increased due to lane reduction	Benefits: 1. Increase space for pedestrian circulation Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None
	4. Bus stop locations adjusted to maintain catchment	Benefits: 1. Increased space for pedestrians to stage safely when waiting for PT Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. Increased side friction for moving cyclists 2. More buses pulling utilising a single bus stop	Benefits: 1. Increased space for PT 2. Increased length will allow for more simultaneous loading Disbenefits: 1. Increased side friction, with more buses able to utilise a single bus stop	Benefits: 1. None Disbenefits: 1. None

OPTION 3					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
	5. Off-line and in-line bus stop options available	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. Reduces weaving between bus bay and traffic lanes 2. Easy stop start position of buses with not effort to re-enter live lane Disbenefits: *1.Increased side friction to cyclists caused by stopped vehicles along the Golden Mile* *2. Increased weaving between lanes to avoid delays caused by stopped buses*	Benefits: 1. Reduced bus movement/maneuvering reducing chances of side swipe crashes 2. Easy stop start position of buses with not effort to re-enter live lane Disbenefits: *1.Increased side friction to PT caused by stopped vehicles along the Golden Mile* *2. Increased weaving between lanes to avoid delays caused by stopped buses*	Benefits: 1. None Disbenefits: 1. None
	6. Right turn ban from Willis Street to Mercer Street (to reduce bus and pedestrian wait times) - pedestrianised area	Benefits: 1. This will reduce conflicts for pedestrians Disbenefits: *1. Turning vehicles will reroute to other intersections, increasing risk to peds at those intersections*	Benefits: 1. 1. No cyclist crashes have been reordered around this area. However, this will reduce the number of conflicts for cyclists Disbenefits: *1. Turning vehicles will reroute to other intersections, increasing risk to cyclists at those intersections*	Benefits: 1. Reduced conflict points Disbenefits: 1. None - this will not impact PT routes	Benefits: 1. None Disbenefits: 1. None
	7. Carriageway width will allow buses to pass people on bikes or e-scooters	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. Increased circulation area for vulnerable users Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None
	8. Taxis pick-up and drop offs will be from closed side roads abutting the Golden Mile	Benefits: 1.Designated areas improves safety of for pedestrians catching a cab, etc., in comparison to cabs staging on live traffic lane Disbenefits: *1.Delivery vehicles in pedestrian area will create confusion for pedestrians, increasing the risk of vehicle ped crashes*	Benefits: 1. Loading/servicing will be removed from cyclists path along GM Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for cyclists, increasing the risk of vehicle ped crashes*	Benefits: 1. Removes conflict with service delivery/taxi/loading areas along GM Disbenefits: 1. None	Benefits: 1. Remove the risk of vehicles staging along GM Disbenefits: 1. None

<table>
<tr><th colspan="6">OPTION 3</th></tr>
<tr><th>Road Section</th><th>Key Change</th><th>Pedestrians</th><th>Cyclists</th><th>PT</th><th>Other</th></tr>
<tr><td rowspan="2"></td><td>9. Emergency services will be allowed to access any part of the Golden Mile (footway extensions across closed side roads will be traversable in an emergency)</td><td>Benefits:
1. None

Disbenefits:
1. None</td><td>Benefits:
1. None

Disbenefits:
1. None</td><td>Benefits:
1. None

Disbenefits:
1. None</td><td>Benefits:
1. None

Disbenefits:
1. None</td></tr>
<tr><td>10. Variants on Option 3 are proposed to provide for the Strategic Cycle Network on Courtenay Place. There is one cycle variant for Willis</td><td>Benefits:
1. None

Disbenefits:
1. None</td><td>Benefits:
1. A dedicated path for cyclists will reduce the risk to cyclists caused by other road users

Disbenefits:
1. None</td><td>Benefits:
1. None

Disbenefits:
1. None</td><td>Benefits:
1. None

Disbenefits:
1. None</td></tr>
<tr><td rowspan="3">Lambton Quay</td><td>1. Access for private motor vehicles removed, with service vehicles limited to out of hours access only</td><td>Benefits:
1. Ped crashes are primarily with pcv (40%), removing these vehicles will remove this crash risk to peds
2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running

Disbenefits:
1.Likely uptake of PT along the GM, buses account for 45% of ped crashes. An increase in bus movements will lead to an increase this crash type.
2. This reduced number of vehicles will result in an increase in PT speed, increasing the risk of crashes</td><td>Benefits:
1. General traffic account for a 60% of cyclist crashes, this crash type will be removed
2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running

Disbenefits:
1. This will result in an increase in speed for PT vehicles, this vehicle type counts for 60% cyclist crashes,
2. This reduced number of vehicles will result in an increase in PT speed, increasing the risk of crashes</td><td>Benefits:
1. 45% of all bus crashes will be removed, these are bus crashes involving general traffic
2. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running

Disbenefits:
1. Reduction in driver attention due to minimising vehicles on GM</td><td>Benefits:
1. Likely reduction in red light running crashes, as general traffic accounts for 95% of crashes caused by red light running

Disbenefits:
1. Redirect to other routes which may have reduced capacity increasing safety risk on those roads</td></tr>
<tr><td>2. Parking and loading bays removed</td><td>Benefits:
1. None

Disbenefits:
1. None</td><td>Benefits:
1. None

Disbenefits:
1. None</td><td>Benefits:
1. None

Disbenefits:
1. None</td><td>Benefits:
1. None

Disbenefits:
1. None</td></tr>
<tr><td>3. Portion of the sidewalk increased due to lane reduction</td><td>Benefits:
1. Increase space for pedestrian circulation

Disbenefits:
1. None</td><td>Benefits:
1. None

Disbenefits:
1. None</td><td>Benefits:
1. None

Disbenefits:
1. None</td><td>Benefits:
1. None

Disbenefits:
1. None</td></tr>
</table>

OPTION 3					
Road Section	**Key Change**	**Pedestrians**	**Cyclists**	**PT**	**Other**
	4. Reduction/relocation in bus stops (i.e. more than Option 1) to improve bus travel times and travel time reliability	Benefits: 1. Reducing the number of crossing points for pedestrians Disbenefits: 1. Increased patrons at stops, may cause passing pedestrians to walk outside footpath area *Note: bus stop relocation is not expected to impact pedestrian desire lines or pedestrian crossing facilities at bus stops. All bus stops will have a crossing facility if it has one already.*	Benefits: 1. Reduced points of friction along the GM Disbenefits: 1. Over crowd other bus stops	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None
	5. Off-line and in-line bus stop options available	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. Reduces weaving between bus bay and traffic lanes 2. Easy stop start position of buses with not effort to re-enter live lane Disbenefits: *1.Increased side friction to cyclists caused by stopped vehicles along the Golden Mile* *2. Increased weaving between lanes to avoid delays caused by stopped buses*	Benefits: 1. Reduced bus movement/maneuvering reducing chances of side swipe crashes 2. Easy stop start position of buses with not effort to re-enter live lane Disbenefits: *1.Increased side friction to PT caused by stopped vehicles along the Golden Mile* *2. Increased weaving between lanes to avoid delays caused by stopped buses*	Benefits: 1. None Disbenefits: 1. None
	6. Minor side roads closed on the sunny side of street, and footways extended to provide continuous path along the edge.	Benefits: 1. This will reduce conflict points for pedestrians Disbenefits: *1. Vehicles previously utilising these roads will reroute to other roads*	Benefits: 1. This will reduce conflict points for cyclists Disbenefits: *1. Vehicles previously utilising these roads will reroute to other roads*	Benefits: 1. Reduced conflict points for buses Disbenefits: *1. This traffic will be redirected to alternative routes along GM*	Benefits: 1. None Disbenefits: *1. Create confusion to motorists* *2. Redirect traffic along routes with reduced capacity*
	7. Carriageway width will allow buses to pass people on bikes or e-scooters	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None

OPTION 3					
Road Section	Key Change	Pedestrians	Cyclists	PT	Other
	8. Taxis pick-up and drop offs will be from closed side roads abutting the Golden Mile	Benefits: 1.Designated areas improves safety of for pedestrians catching a cab, etc., in comparison to cabs staging on live traffic lane Disbenefits: *1.Delivery vehicles in pedestrian area will create confusion for pedestrians, increasing the risk of vehicle ped crashes*	Benefits: 1. Loading/servicing will be removed from cyclists path along GM Disbenefits: *1. Delivery vehicles in pedestrian area will create confusion for cyclists, increasing the risk of vehicle ped crashes*	Benefits: 1. Removes conflict with service delivery/taxi/loading areas along GM Disbenefits: 1. None	Benefits: 1. Remove the risk of vehicles staging along GM Disbenefits: 1. None
	9. Emergency services will be allowed to access any part of the Golden Mile (footway extensions across closed side roads will be traversable in an emergency)	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None
	10. central median relocated to sunny side of street to create barrier between vulnerable users and vehicles	Benefits: 1. Increase space for pedestrian circulation Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. None	Benefits: 1. None Disbenefits: 1. Increase the likelihood of head on crashes. 2. increasing side friction	Benefits: 1. None Disbenefits: 1. None

F

Pedestrian Capacity Report

Lets Get Wellington Moving – Golden Mile MCA

This report has been prepared for the benefit of Lets Get Wellington Moving. No liability is accepted by this company or any employee or sub-consultant of this company with respect to its use by any other person.

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Rev. no	Date	Description	Prepared by	Checked by	Reviewed by	Approved by
0	4/12/2020	Pedestrian Capacity MCA	A Mustapha	A Mustapha	Alan Kerr	Alan Kerr

1 Introduction

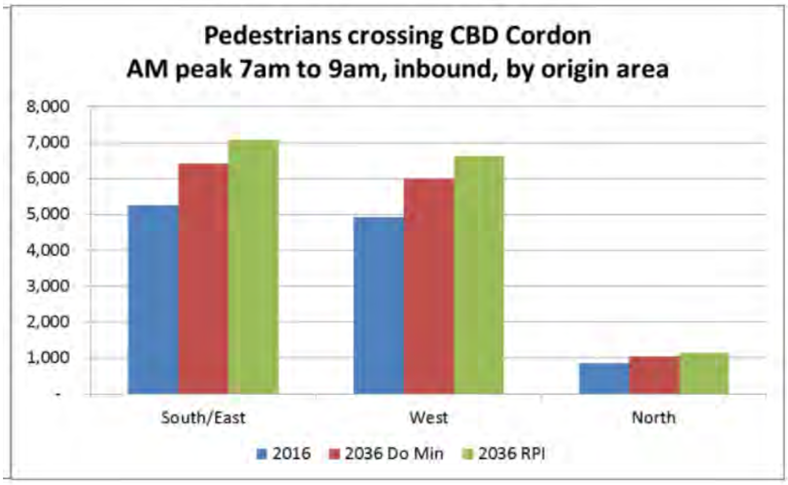
The Golden Mile plays a vital role in the success of Wellington's transport system, regional economy, and sense of place. It is the busiest pedestrian area in the city and a key shopping and entertainment destination. It is also the main route for buses bringing 37,000 people to the central city on a typical day. Typical users vary between private motor vehicle, bus, pedestrians – ranging from the abled bodied to impaired users, cyclists, elderly and school children to name a few.

The LGWM programme is a joint initiative between Wellington City Council (WCC), Greater Wellington Regional Council (GWRC) and Waka Kotahi NZ Transport Agency (the Transport Agency). The LGWM programme has developed specific objectives for the Golden Mile project to ensure that the transport and public realm outcomes to be pursued for the Golden Mile are aligned with the overall direction of the LGWM programme.

This report focuses on the current and future pedestrian capacity along the Golden Mile. Specialists have been asked to assess the proposed three design options against a Do-Minimum scenario, which is **2036**. The do minimum scenario has been developed to represent a minimal level of investment required to maintain a minimum level of service for all users on the Golden Mile. Most of the key assumptions around the do-minimum relate to bus and general vehicle traffic, however, **Table 1: Population projections by area / TA** indicates that the general population in Wellington City will increase between 9-14% by 2036, with employment growing between 5-16%.

According the Golden Mile - Do Minimum Scenario Description Document, the pedestrian volumes along the Golden Mile are expected to increase from 11,000 (2019) to **13,500** by 2036 under the Do Minimum, which is an increase of 2,500 pedestrians in the CBD. Representing an average growth rate of approximately 20%.

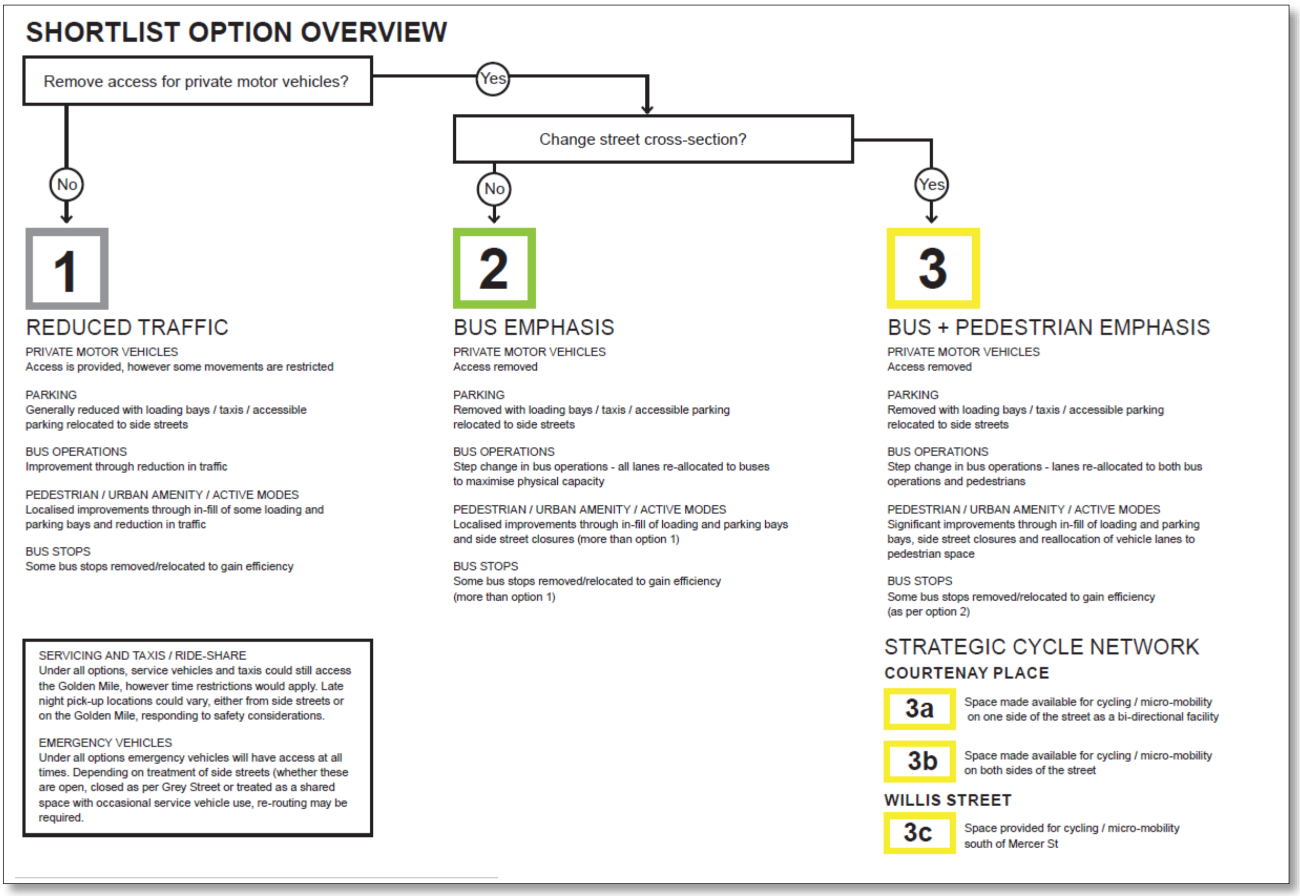
Figure 1-1: Do Minimum Forecast Pedestrian Volumes



The analysis of future state will be undertaken for three short listed corridor options:

1. Reduced Traffic,
2. Bus Emphasis, and
3. Bus plus Pedestrian Emphasis

Figure 1-2: Golden Mile Short List Options



2 Assumptions and Limitations

The following limitations and assumptions have been applied to this assessment:

1. Pedestrian volumes obtained from the LGWM Programme Business Case Active Mode Visualisation tool were found to be lower than the expected demand, therefore these volumes were scaled up based on 2019 March Monitoring volumes.
2. The Golden Mile footpath widths taken from a 2020 topographical survey undertaken by the project team.
3. Footpath furniture was also taken from 2020 topographical survey.
4. The Transport for London, Pedestrian Comfort Guidance for London[1] was considered an applicable guideline as it provides a greater level of granularity than conventional Level of Service calculations (Fruin, for example) which will help with differentiating between options and was used to determine pedestrian level of comfort along the Golden Mile.
5. Future signal timings were taken from the Aimsun Golden Mile traffic model.
6. A conservative approach was taken to determine the number of crossing pedestrians:
   - It was assumed that pedestrians crossing along (parallel) the Golden Mile were the lower of the total ped volume on the sections adjacent to the crossing
   - No data was available for pedestrian crossing across (perpendicular) at designated crossings for both signalised and unsignalized crossing locations, therefore it was assumed that 50% of the pedestrians crossing along (as identified above) would cross across.
7. Snapper data was used to determine rate of boarding at bus stops, this data did not provide granularity in terms of scheduling, in the absence of scheduling data, a uniform boarding rate was applied. Although this may only provide an approximation of bus stop loading, it does provide a consistent approach between the options.
8. Arrival rates were collected at two bus stops, one of either side of the road, on Lambton Quay (stop outside David Jones) and at two on Courtenay Place also on either side of the road. These arrival rates were calibrated using the snapper data. Further it was assumed that Lambton Quay and Willis Street, and Courtenay Place and Manners Street would follow consistent arrival profiles.

[1] http://content.tfl.gov.uk/pedestrian-comfort-guidance-technical-guide.pdf

3 Assessment Methodology

The following assessment methodology was applied to analysis pedestrian capacity on the Golden Mile. The assessment was undertaken for the following four sections that make up the Golden Mile (GM):

1. Lambton Quay
2. Willis Street
3. Manners Street
4. Courtenay Place

The following sub-criteria was used to determine overall pedestrian capacity:

1. Criteria 1: Footpath pedestrian density
2. Criteria 2: Pedestrian delay
3. Criteria 3: Bus stop density

3.1 Scoring

Table 3-1 shows the general scoring used for the Golden Mile MCA process.

Table 3-1: MCA Scoring

Score	Scoring Description	Definition
3	Large Positive	Major positive impacts resulting in substantial and long-term improvements or enhancements of the existing environment.
2	Medium Positive	Moderate positive impact, possibly of short-, medium- or long-term duration. Positive outcome may be in terms of new opportunities and outcomes of enhancement or improvement.
1	Slight Positive	Minimal positive impact, possibly only lasting over the short term. May be confined to a limited area.
0	Neutral	Neutral - no discernible or predicted positive or negative impact
-1	Slight Negative	Minimal negative impact, possibly only lasting over the short term, and definitely able to be managed or mitigated. May be confined to a small area.
-2	Medium Negative	Moderate negative impact. Impacts may be short, medium or long term and are highly likely to respond to management actions.
-3	Large Negative	Impacts with serious, long-term and possibly irreversible effect leading to serious damage, degradation or deterioration of the physical, economic, cultural or social environment. Required major rescope of concept, design, location and justification or requires major commitment to extensive management strategies to mitigate the effect.

3.2 Criteria 1: Footpath pedestrian density

Increasing pedestrian density along the footpath slows the movement of pedestrians. Jan Gehl (Cities for People, 2010) indicates that once density exceeds around 13people/m/min, people are more likely to step onto the road to walk past slower moving pedestrians, which is a much lower number than most LOS type analyses would indicate. Anecdotal evidence suggests that this happens along Willis Street during the weekday and Courtenay Place during evenings and weekends. Although the volume of pedestrians using the Golden Mile is high, there is sufficient space to accommodate these movements along most of the Golden Mile.

Pedestrian volumes from the PBC Active Mode Visualisation tool, example shown in Figure 3-1, were found to be lower than the expected demand, therefore these volumes were scaled up based on 2019 March Monitoring volumes[2], factors shown in Table 3-2.

These volumes and the section granularity shown used in Figure 3-1 were used in the Pedestrian Comfort Guidance for London spreadsheet used to estimate pedestrian Level of Comfort (LoC) for the AM and PM peak hours. The PM peak hour was found to be the busiest peak, with the most disruptions to walking pedestrians. The Transport for London, Pedestrian Comfort Guidance for London was considered an applicable guideline, as it provides a greater level of granularity than conventional LOC which will help with differentiating between options and was used to determine pedestrian level of comfort along the Golden Mile.

An appropriate LoC range was identified based on the Pedestrian Comfort Level area type. High Street was considered the most appropriate area type for this analysis, providing the closest fit to operations along the Golden Mile. This area types.

3.2.1 Methodology Summary

- **Step 1:** Divided GM into sections based on footpath width changes (Topographical survey obtained by project team). This provided a much greater level of granularity than the four sections identified above (as shown in Figure 3-1 below).
- **Step 2**: Categorise each section into 1 of 5 area types, all sections were categorised as High Street (Areas dominated by retail and food and drink)
- **Step 3**: Identify street furniture on each section that would reduce level of comfort
- **Step 4:** Obtain pedestrian counts for the peak and average hour by section (2016 Active Mode Visualisation counts scaled up using March Monitoring data)

[2] Stantec (May, 2020). Transport Monitoring Surveys: March 2020 Survey Results.

Figure 3-1: PBC Beca Active Mode Visualisation Tool

Table 3-2: Uplift Factors applied to the Active Mode Visualisation Tool

Stantec Location	Between	Side of the Road	Peak Hour 2016 (pedestrians)	Peak Hour 2019 IP (pedestrians)	2016 Beca IP (pedestrians)	IP UPLIFT
Lambton Quay	Btn Whitmore and Ballance	West	522	2456.75	870	2.8
Lambton Quay	Btn Waring Taylor and Johnston	West	4455	5030	1085	4.6
Lambton Quay	Btn Brandon and Panama	West	3648	3818	1275	3.0
Lambton Quay	Btn Grey and Hunter	West	3014	3596	1210	3.0
Willis Street	Sth of Williston	West	2699	3043	1085	2.8
Willis Street	Nth of Mercer	West	2702	2618	1015	2.6
Manners Street	Btn Willis and St Hill	South	893	928	645	1.4
Manners Street	Btn Victoria and Cuba	South	2902		390	0.0

Manners Street	Btn Victoria and Cuba	Both (2019 and 2018)		2670	930	2.9
Manners Street	Btn Cuba and Taranaki	South	320	2856	390	7.3
Courtenay Place	Est of Taranaki	South	981	1049	330	3.2
Courtenay Place	East of Tory	South	758	663	595	1.1
Lambton Quay	Btn Whitmore and Ballance	East	2621	683	250	2.7
Lambton Quay	Btn Waring Taylor and Johnston	East	1756	1746	665	2.6
Lambton Quay	Btn Brandon and Panama	East	1468	1305	460	2.8
Lambton Quay	Btn Grey and Hunter	East	1053	1076	530	2.0
Willis Street	Sth of Williston	East	2066	2859	555	5.2
Willis Street	Nth of Mercer	East	2092	2345	630	3.7
Manners Street	Btn Willis and St Hill	North	1386	1350	395	3.4
Manners Street	Btn Victoria and Cuba	North	2897		540	0.0
Manners Street	Btn Cuba and Taranaki	North	1163	1012	680	1.5
Courtenay Place	East of Taranaki	North	818	803	655	1.2
Courtenay Place	East of Tory	North	417	531	400	1.3

Figure 3-2: LoC based on Pedestrian Comfort Guidance for London

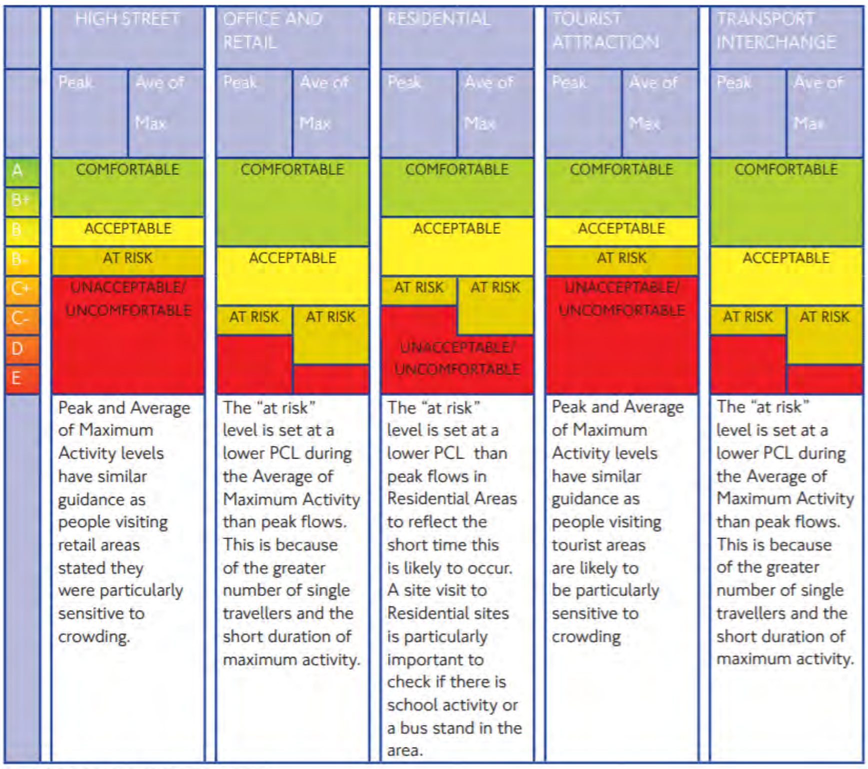


Figure 9 Guidance for different area types

3.2.2 Results

Key notes for criterion 1 results:

- Scores based on percentage improvement compared to existing conditions
- Increase in footpath widths improved an already good overall Level of Comfort along the GM
- Increases in footpath width along Willis Street and Lambton Quay have the greatest impact LoC
- Changes to Manners Street are minimal and will have a negligible impact on pedestrian LoC

Table 3-3: Score Criteria

Criteria	Score
> 25%	3
10-25%	2
< 10%	1
0	0
< - 10%	-1
10-25%	-2
> - 25%	-3

Table 3-4: Criteria 1 Scores

GM Section	Option 1	Option 2	Option 3
Lambton Quay	2	2	2
Willis Street	0	0	2
Manners Street	0	0	0
Courtenay Place	1	1	1

3.3 Criteria 2: Pedestrian delay

Pedestrian crossings along the corridor in certain locations result in pedestrian delays along the corridor. This is locationally specific, for example Willis Street where there is more pedestrian delay as the Golden Mile crosses key traffic routes. A spreadsheet assessment was developed to look at pedestrian delay per crossing, using Pretty's (1979) Method outlined in the HCM and current signal time obtained by WTOC and future signal timings taken from the Aimsun Golden Mile traffic model.

A conservative approach was taken to determine the number of crossing pedestrians:

- It was assumed that pedestrians crossing along (parallel) the Golden Mile were the lower of the total ped volume on the sections adjacent to the crossing

- No data was available for pedestrian crossing across (perpendicular) at designated crossings for both signalised and unsignalized, therefore it was assumed that 50% of the pedestrians crossing along (as identified above) would cross across.

No jaywalking was considered, as this is difficult to quantify without obtaining a large amount of data.

3.3.1 Methodology Summary

- **Step 1:** Identify all legal crossing opportunities for pedestrians
- **Step 2:** Categorise each crossing location into signalised, unsignalised or zebra crossings
- **Step 3:** Modelled signal data was used to determine proposed signal timings for Options 1 to 3 (proposed signal timings were constant for each option)
- **Step 4:** Delay at unsignalised/zebra crossings were estimated (across=20s and along=10s)
- **Step 5:** Determine number of pedestrians' crossings (scaled ped volumes were used, 50% of the along volumes were used for the ped crossing across)

3.3.2 Results

Key notes for criterion 2 results:

- Scores based on percentage improvement compared to existing conditions
- Option 2 and 3 along Lambton Quay have more side roads converted to pedestrian areas removing delay along the GM
- Side road closures and signal time reduction along Willis Street and Manners Street will result in a reduction in pedestrian delays
- Option 3 compared slightly better than Option 2 along Courtenay Place, due to Tory Street becoming a ped area – however the improvement did not warrant a different score

Table 3-5: Score Criteria

Criteria	Score
> 100%	3
51-100%	2
< 50%	1
0	0
< - 50%	-1
51-100%	-2
> - 100%	-3

Table 3-6: Criteria 2 Scores

GM Section	Option 1	Option 2	Option 3
Lambton Quay	1	3	3
Willis Street	3	3	3
Manners Street	2	2	2
Courtenay Place	1	2	2

3.4 Criteria 3: Bus stop density

Pedestrian queuing at bus stops creates localized bottlenecks that slow the movement of pedestrians. This is an issue in the PM peak predominately and causes congestion all along the Golden Mile. A targeted spreadsheet analysis was undertaken to estimate typical levels of accumulation, areas taken up by accumulating people and residual width for movement.

Snapper data was used to determine boarding at bus stops, this data did not provide granularity in terms of scheduling, in the absence of scheduling data, a uniform boarding rate was applied

Arrival rates were collected at two bus stops, one of either side of the road, on Lambton Quay (stop outside David Jones) and on Courtenay Place also on either side of the road. These arrival rates were calibrated using the snapper data. Further it was assumed that Lambton Quay and Willis Street, and Courtenay Place and Manners Street would follow consistent arrival profiles

3.4.1.1 Methodology Summary

- **Step 1:** Determined arrival rate of patrons (an arrival rate survey was done at two stops on Lambton Quay and Courtney Place, one on each side of the road)
- **Step 2:** Determined boarding rates per stop along the GM using snapper data
- **Step 3:** Assumed a max queue length on 10m to determine width of queuing patrons (personal area assumed at 1m2 pp)
- **Step 4:** Based on the above calculated residual available walking space per option was calculated

3.4.2 Results

Key notes for criterion 3 results:

- Scores based on percentage improvement compared to existing conditions
- The increase in footpath width along Lambton Quay and Courtenay Place will increase available area for passing pedestrians
- Option 3 allows for an increase in footpath widths along Willis Street increasing available walking space at bus stops
- Changes to Manners Street are minimal and will have a negligible impact on delays

Table 3-7: Score Criteria

Criteria	Score
> 50%	3
25-50%	2
<25%	1
0	0
<-25%	-1
25-50%	-2
> -50%	-3

Table 3-8: Criteria 3 Scores

GM Section	Option 1	Option 2	Option 3

Lambton Quay	1	1	1
Willis Street	0	0	2
Manners Street	0	0	0
Courtenay Place	2	2	2

4 Overall

The key notes for the overall results are:

- All options perform well in terms of pedestrian comfort and delays
- Willis Street will have the most benefit from footpath widths
- Sensitivity testing was undertaken for Courtenay Place to simulate nighttime pedestrian density, showing an increased benefit in footpath widths
- On average Option 3 marginally outranks Option 2

Table 4-1: Overall Scores

GM Section	Criteria	Option 1	Option 2	Option 3
Lambton Quay	1	2	2	2
	2	1	3	3
	3	1	1	1
	OVERALL	**1**	**2**	**2**
Willis Street	1	0	0	2
	2	3	3	3
	3	0	0	2
	OVERALL	**1**	**1**	**2**
Manners Street	1	0	0	0
	2	2	2	2
	3	0	0	0
	OVERALL	**1**	**1**	**1**
Courtenay Place	1	1	1	1
	2	1	2	2
	3	2	2	2
	OVERALL	**1**	**2**	**2**

Appendix A: Criteria 1

A.1 AM Peak Do Minimum

Location Name		Location Type	Area Type	Average Flow (ADT)	AM Peak Hour Flow	Clear Footway Width	Peak Hour PCL	Total Width Required for PCL B+	Clear Width Required For PCL B+
7	Lambton Quay East 3	Full Footway Width	High Street	947	950	4	A	1.50	1.50
8	Lambton Quay East 4	Full Footway Width	High Street	947	950	3.7	A	3.80	1.50
9	Lambton Quay East 5	Full Footway Width	High Street	879	900	4.2	A	2.10	1.50
10	Lambton Quay East 6	Full Footway Width	High Street	879	900	2.8	A	2.50	1.50
11	Lambton Quay East 7	Full Footway Width	High Street	879	900	4.5	A	2.50	1.50
12	Lambton Quay East 8	Full Footway Width	High Street	879	900	3.6	A	2.50	1.50
13	Lambton Quay East 9	Full Footway Width	High Street	879	900	8.3	A+	2.10	1.50
14	Lambton Quay East 10	Full Footway Width	High Street	879	900	4.9	A	3.70	1.50
15	Lambton Quay West 1	Full Footway Width	High Street	4066	4479	5.7	B	6.23	6.23
16	Lambton Quay West 2	Full Footway Width	High Street	4066	4479	3.6	C	7.03	6.23
17	Lambton Quay West 3	Full Footway Width	High Street	2589	3721	5.3	B	6.67	5.17
18	Lambton Quay West 4	Full Footway Width	High Street	2165	2325	7.8	A	3.83	3.23
19	Lambton Quay West 5	Full Footway Width	High Street	2165	2325	3.4	B+	4.03	3.23
20	Lambton Quay West 6	Full Footway Width	High Street	2165	2325	4.6	A-	5.43	3.23
21	Lambton Quay West 7	Full Footway Width	High Street	2165	2325	3.5	B+	4.03	3.23
22	Lambton Quay West 8	Full Footway Width	High Street	2165	2325	5.3	A-	3.83	3.23
23	Lambton Quay West 9	Full Footway Width	High Street	2165	2325	4.3	B+	4.73	3.23
24	Lambton Quay West 10	Full Footway Width	High Street	2165	2325	9.9	A	3.83	3.23
25	Lambton Quay Mid East 1	Full Footway Width	High Street	1671	1810	6	A	6.02	2.52
26	Lambton Quay Mid East 2	Full Footway Width	High Street	1671	1810	3.3	B+	3.32	2.52
27	Lambton Quay Mid East 3	Full Footway Width	High Street	1671	1810	3.8	A-	6.12	2.52
28	Lambton Quay Mid East 4	Full Footway Width	High Street	1733	1842	4	A-	5.16	2.56
29	Lambton Quay Mid East 5	Full Footway Width	High Street	1733	1842	3.8	A-	3.56	2.56
30	Lambton Quay Mid East 6	Full Footway Width	High Street	1733	1842	5.5	A-	2.56	2.56
31	Lambton Quay Mid East 7	Full Footway Width	High Street	1785	1858	9.1	A	2.58	2.58
32	Lambton Quay Mid East 8	Full Footway Width	High Street	1785	1858	5.6	A-	3.88	2.58
33	Lambton Quay Mid East 9	Full Footway Width	High Street	1522	1523	7.9	A	2.12	2.12
34	Lambton Quay Mid East 10	Full Footway Width	High Street	1522	1523	4.7	A	2.12	2.12
35	Lambton Quay Mid West 1	Full Footway Width	High Street	5401	6391	3.8	D	8.88	8.88
36	Lambton Quay Mid West 2	Full Footway Width	High Street	5401	6391	5.2	C+	12.28	8.88
37	Lambton Quay Mid West 3	Full Footway Width	High Street	5068	4892	4.2	C+	9.00	6.80
38	Lambton Quay Mid West 4	Full Footway Width	High Street	4744	3393	4	B	4.72	4.72
39	Lambton Quay Mid West 5	Full Footway Width	High Street	4744	3393	4	B	7.32	4.72
40	Lambton Quay Mid West 6	Full Footway Width	High Street	3653	2721	6.5	A-	5.18	3.78
41	Lambton Quay Mid West 7	Full Footway Width	High Street	3653	2721	5.1	B+	6.68	3.78
42	Lambton Quay Mid West 8	Full Footway Width	High Street	3653	2721	4.4	B+	4.58	3.78
43	Lambton Quay Mid West 9	Full Footway Width	High Street	3653	2721	5.5	A-	5.28	3.78
44	Lambton Quay South East 1	Full Footway Width	High Street	1347	1211	3.8	A	3.29	1.69
45	Lambton Quay South East 2	Full Footway Width	High Street	1347	1211	3	A-	2.69	1.69
46	Lambton Quay South East 3	Full Footway Width	High Street	839	632	2	A	2.50	1.50
47	Lambton Quay South East 4	Full Footway Width	High Street	839	632	3.9	A	2.10	1.50
48	Lambton Quay South East 5	Full Footway Width	High Street	839	632	2.3	A	1.50	1.50
49	Lambton Quay South East 6	Full Footway Width	High Street	839	632	2.2	A	2.30	1.50
50	Lambton Quay South East 7	Full Footway Width	High Street	839	632	5.9	A+	4.50	1.50
51	Lambton Quay South East 8	Full Footway Width	High Street	839	632	5.7	A+	2.50	1.50
52	Lambton Quay South East 9	Full Footway Width	High Street	839	632	4.4	A+	2.50	1.50
53	Lambton Quay South East 10	Full Footway Width	High Street	839	632	4.5	A+	2.50	1.50
54	Lambton Quay South West 1	Full Footway Width	High Street	3626	2719	3.3	B	7.38	3.78
55	Lambton Quay South West 2	Full Footway Width	High Street	3626	2719	4.1	B+	4.78	3.78
56	Lambton Quay South West 3	Full Footway Width	High Street	2928	2719	4.8	B+	4.78	3.78
57	Lambton Quay South West 4	Full Footway Width	High Street	2928	2719	4.2	B+	6.48	3.78

58	Willis St East 1	Full Footway Width	High Street	2335	2860	2.1	C	4.98	3.98
59	Willis St East 2	Full Footway Width	High Street	2335	2860	4.5	B+	4.98	3.98
60	Willis St East 3	Full Footway Width	High Street	3057	3111	3.4	B-	5.33	4.33
61	Willis St East 4	Full Footway Width	High Street	3057	3111	3.4	B-	5.73	4.33
62	Willis St East 5	Full Footway Width	High Street	2506	2339	6.9	A-	3.25	3.25
63	Willis St East 6	Full Footway Width	High Street	2506	2339	9.8	A	3.25	3.25
64	Willis St East 7	Full Footway Width	High Street	2798	2429	3.3	B	5.38	3.38
65	Willis St East 8	Full Footway Width	High Street	2798	2429	3.4	B	5.78	3.38
66	Willis St East 9	Full Footway Width	High Street	2798	2429	5.2	A-	3.78	3.38
67	Willis St East 10	Full Footway Width	High Street	2798	2429	7.1	A-	3.38	3.38
68	Willis St West 1	Full Footway Width	High Street	2730	3763	3.9	B-	6.03	5.23
69	Willis St West 2	Full Footway Width	High Street	2865	3473	3	C+	8.83	4.83
70	Willis St West 3	Full Footway Width	High Street	2635	3194	2.3	C	6.04	4.44
71	Willis St West 4	Full Footway Width	High Street	2760	2910	5	B+	4.65	4.05
72	Willis to Manners East 1	Full Footway Width	High Street	2798	2429	3.1	B	4.78	3.38
73	Willis to Manners East 2	Full Footway Width	High Street	2798	2429	4.1	B+	4.48	3.38
74	Willis to Manners East 3	Full Footway Width	High Street	1293	1189	2.9	A-	3.26	1.66
75	Willis to Manners East 4	Full Footway Width	High Street	1293	1189	4.5	A	3.06	1.66
76	Willis to Manners East 5	Full Footway Width	High Street	1293	1189	4.4	A	3.06	1.66
77	Willis to Manners East 6	Full Footway Width	High Street	1293	1189	3.3	A-	2.46	1.66
78	Willis to Manners East 7	Full Footway Width	High Street	1421	1383	5	A	1.93	1.93
79	Willis to Manners East 8	Full Footway Width	High Street	1421	1383	3.3	A-	3.33	1.93
80	Willis to Manners West 1	Full Footway Width	High Street	458	430	3.3	A+	1.50	1.50
81	Willis to Manners West 2	Full Footway Width	High Street	458	430	2.5	A	1.50	1.50
82	Willis to Manners West 3	Full Footway Width	High Street	791	570	2.1	A	2.10	1.50
83	Willis to Manners West 4	Full Footway Width	High Street	791	570	4.5	A+	3.80	1.50
84	Willis to Manners West 5	Full Footway Width	High Street	791	570	2.2	A	4.00	1.50
85	Willis to Manners West 6	Full Footway Width	High Street	791	570	5.2	A+	2.90	1.50
86	Willis to Manners West 7	Full Footway Width	High Street	947	683	9.3	A+	3.70	1.50
87	Manners West 1	Full Footway Width	High Street	947	683	4.5	A	1.50	1.50
88	Manners West 2	Full Footway Width	High Street	947	683	3.4	A	1.50	1.50
89	Manners West 3	Full Footway Width	High Street	2416	1742	2.8	B+	6.02	2.42
90	Manners West 4	Full Footway Width	High Street	2416	1742	7.1	A	11.92	2.42
91	Manners West 5	Full Footway Width	High Street	2416	1742	2.1	B	2.62	2.42
92	Manners West 6	Full Footway Width	High Street	2416	1742	5.4	A	3.82	2.42
93	Manners East 7	Full Footway Width	High Street	910	917	3.7	A	1.90	1.50
94	Manners East 8	Full Footway Width	High Street	910	917	3.6	A	3.70	1.50
95	Manners East 9	Full Footway Width	High Street	910	917	2.9	A	2.10	1.50
96	Courtenay North 1	Full Footway Width	High Street	876	792	3.1	A	1.50	1.50
97	Courtenay North 2	Full Footway Width	High Street	876	792	2	A-	3.20	1.50
98	Courtenay North 3	Full Footway Width	High Street	694	628	9.4	A+	3.60	1.50
99	Courtenay North 4	Full Footway Width	High Street	510	463	3.5	A+	1.70	1.50
100	Courtenay North 5	Full Footway Width	High Street	510	463	2.9	A	3.80	1.50
101	Courtenay North 6	Full Footway Width	High Street	564	448	3.7	A+	1.90	1.50
102	Courtenay North 7	Full Footway Width	High Street	564	448	2.3	A	6.30	1.50
103	Courtenay North 8	Full Footway Width	High Street	564	448	4.2	A+	7.70	1.50
104	Courtenay North 9	Full Footway Width	High Street	564	448	1.5	A	3.80	1.50
105	Courtenay North 10	Full Footway Width	High Street	564	448	4	A+	1.50	1.50
106	Courtenay South 1	Full Footway Width	High Street	344	271	2.5	A+	15.00	1.50
107	Courtenay South 2	Full Footway Width	High Street	975	640	2.1	A	2.90	1.50
108	Courtenay South 3	Full Footway Width	High Street	975	640	3.5	A	4.10	1.50
109	Courtenay South 4	Full Footway Width	High Street	1505	1357	4.8	A	2.49	1.89
110	Courtenay South 5	Full Footway Width	High Street	1505	1357	3.8	A-	1.89	1.89
111	Courtenay South 6	Full Footway Width	High Street	1505	1357	7.7	A	1.89	1.89
112	Courtenay South 7	Full Footway Width	High Street	1505	1357	5.5	A	1.89	1.89
113	Courtenay South 8	Full Footway Width	High Street	1505	1357	2.7	A-	2.89	1.89
114	Courtenay South 9	Full Footway Width	High Street	1505	1357	4.4	A	1.89	1.89
115	Courtenay South 10	Full Footway Width	High Street	1505	1357	6.2	A	14.39	1.89

A.2 AM Peak Option 1

Location Name		Location Type	Area Type	Average Flow (ADT)	AM Peak Hour Flow	Clear Footway Width	Peak Hour PCL	Total Width Required for PCL B+	Clear Width Required For PCL B+
7	Lambton Quay East 3	Full Footway Width	High Street	947	950	6	A	1.50	1.50
8	Lambton Quay East 4	Full Footway Width	High Street	947	950	3.7	A	3.80	1.50
9	Lambton Quay East 5	Full Footway Width	High Street	879	900	4.2	A	2.10	1.50
10	Lambton Quay East 6	Full Footway Width	High Street	879	900	5.8	A	2.50	1.50
11	Lambton Quay East 7	Full Footway Width	High Street	879	900	7.5	A+	2.50	1.50
12	Lambton Quay East 8	Full Footway Width	High Street	879	900	8.6	A+	2.50	1.50
13	Lambton Quay East 9	Full Footway Width	High Street	879	900	9.3	A+	2.10	1.50
14	Lambton Quay East 10	Full Footway Width	High Street	879	900	5.9	A	3.70	1.50
15	Lambton Quay West 1	Full Footway Width	High Street	4066	4479	5.7	B	6.23	6.23
16	Lambton Quay West 2	Full Footway Width	High Street	4066	4479	3.6	C	7.03	6.23
17	Lambton Quay West 3	Full Footway Width	High Street	2589	3721	5.3	B	6.67	5.17
18	Lambton Quay West 4	Full Footway Width	High Street	2165	2325	10.8	A	3.83	3.23
19	Lambton Quay West 5	Full Footway Width	High Street	2165	2325	7.4	A	4.03	3.23
20	Lambton Quay West 6	Full Footway Width	High Street	2165	2325	6.6	A-	5.43	3.23
21	Lambton Quay West 7	Full Footway Width	High Street	2165	2325	7.5	A	4.03	3.23
22	Lambton Quay West 8	Full Footway Width	High Street	2165	2325	8.3	A	3.83	3.23
23	Lambton Quay West 9	Full Footway Width	High Street	2165	2325	6.3	A-	4.73	3.23
24	Lambton Quay West 10	Full Footway Width	High Street	2165	2325	11.9	A	3.83	3.23
25	Lambton Quay Mid East 1	Full Footway Width	High Street	1671	1810	6	A	6.02	2.52
26	Lambton Quay Mid East 2	Full Footway Width	High Street	1671	1810	7.3	A	3.32	2.52
27	Lambton Quay Mid East 3	Full Footway Width	High Street	1671	1810	3.8	A-	6.12	2.52
28	Lambton Quay Mid East 4	Full Footway Width	High Street	1733	1842	4	A-	5.16	2.56
29	Lambton Quay Mid East 5	Full Footway Width	High Street	1733	1842	5.8	A	3.56	2.56
30	Lambton Quay Mid East 6	Full Footway Width	High Street	1733	1842	5.5	A-	2.56	2.56
31	Lambton Quay Mid East 7	Full Footway Width	High Street	1785	1858	9.1	A	2.58	2.58
32	Lambton Quay Mid East 8	Full Footway Width	High Street	1785	1858	6.6	A	3.88	2.58
33	Lambton Quay Mid East 9	Full Footway Width	High Street	1522	1523	9.9	A	2.12	2.12
34	Lambton Quay Mid East 10	Full Footway Width	High Street	1522	1523	7.7	A	2.12	2.12
35	Lambton Quay Mid West 1	Full Footway Width	High Street	5401	6391	7.8	B	8.88	8.88
36	Lambton Quay Mid West 2	Full Footway Width	High Street	5401	6391	6.2	B-	12.28	8.88
37	Lambton Quay Mid West 3	Full Footway Width	High Street	5068	4892	8.2	B+	9.00	6.80
38	Lambton Quay Mid West 4	Full Footway Width	High Street	4744	3393	8	A-	4.72	4.72
39	Lambton Quay Mid West 5	Full Footway Width	High Street	4744	3393	5	B+	7.32	4.72
40	Lambton Quay Mid West 6	Full Footway Width	High Street	3653	2721	7.5	A-	5.18	3.78
41	Lambton Quay Mid West 7	Full Footway Width	High Street	3653	2721	6.1	A-	6.68	3.78
42	Lambton Quay Mid West 8	Full Footway Width	High Street	3653	2721	6.4	A-	4.58	3.78
43	Lambton Quay Mid West 9	Full Footway Width	High Street	3653	2721	5.5	A-	5.28	3.78
44	Lambton Quay South East 1	Full Footway Width	High Street	1347	1211	3.8	A	3.29	1.69
45	Lambton Quay South East 2	Full Footway Width	High Street	1347	1211	3	A-	2.69	1.69
46	Lambton Quay South East 3	Full Footway Width	High Street	839	632	2	A	2.50	1.50
47	Lambton Quay South East 4	Full Footway Width	High Street	839	632	3.9	A	2.10	1.50
48	Lambton Quay South East 5	Full Footway Width	High Street	839	632	2.3	A	1.50	1.50
49	Lambton Quay South East 6	Full Footway Width	High Street	839	632	2.2	A	2.30	1.50
50	Lambton Quay South East 7	Full Footway Width	High Street	839	632	5.9	A+	4.50	1.50
51	Lambton Quay South East 8	Full Footway Width	High Street	839	632	5.7	A+	2.50	1.50
52	Lambton Quay South East 9	Full Footway Width	High Street	839	632	4.4	A+	2.50	1.50
53	Lambton Quay South East 10	Full Footway Width	High Street	839	632	4.5	A+	2.50	1.50
54	Lambton Quay South West 1	Full Footway Width	High Street	3626	2719	3.3	B	7.38	3.78
55	Lambton Quay South West 2	Full Footway Width	High Street	3626	2719	4.1	B+	4.78	3.78
56	Lambton Quay South West 3	Full Footway Width	High Street	2928	2719	4.8	B+	4.78	3.78
57	Lambton Quay South West 4	Full Footway Width	High Street	2928	2719	4.2	B+	6.48	3.78

58	Willis St East 1	Full Footway Width	High Street	2335	2860	2.1	C	4.98	3.98
59	Willis St East 2	Full Footway Width	High Street	2335	2860	4.5	B+	4.98	3.98
60	Willis St East 3	Full Footway Width	High Street	3057	3111	3.4	B-	5.33	4.33
61	Willis St East 4	Full Footway Width	High Street	3057	3111	3.4	B-	5.73	4.33
62	Willis St East 5	Full Footway Width	High Street	2506	2339	6.9	A-	3.25	3.25
63	Willis St East 6	Full Footway Width	High Street	2506	2339	9.8	A	3.25	3.25
64	Willis St East 7	Full Footway Width	High Street	2798	2429	3.3	B	5.38	3.38
65	Willis St East 8	Full Footway Width	High Street	2798	2429	3.4	B	5.78	3.38
66	Willis St East 9	Full Footway Width	High Street	2798	2429	5.2	A-	3.78	3.38
67	Willis St East 10	Full Footway Width	High Street	2798	2429	7.1	A-	3.38	3.38
68	Willis St West 1	Full Footway Width	High Street	2730	3763	3.9	B-	6.03	5.23
69	Willis St West 2	Full Footway Width	High Street	2865	3473	3	C+	8.83	4.83
70	Willis St West 3	Full Footway Width	High Street	2635	3194	2.3	C	6.04	4.44
71	Willis St West 4	Full Footway Width	High Street	2760	2910	5	B+	4.65	4.05
72	Willis to Manners East 1	Full Footway Width	High Street	2798	2429	4.1	B+	4.78	3.38
73	Willis to Manners East 2	Full Footway Width	High Street	2798	2429	4.1	B+	4.48	3.38
74	Willis to Manners East 3	Full Footway Width	High Street	1293	1189	2.9	A-	3.26	1.66
75	Willis to Manners East 4	Full Footway Width	High Street	1293	1189	4.5	A	3.06	1.66
76	Willis to Manners East 5	Full Footway Width	High Street	1293	1189	4.4	A	3.06	1.66
77	Willis to Manners East 6	Full Footway Width	High Street	1293	1189	3.3	A-	2.46	1.66
78	Willis to Manners East 7	Full Footway Width	High Street	1421	1383	5	A	1.93	1.93
79	Willis to Manners East 8	Full Footway Width	High Street	1421	1383	3.3	A-	3.33	1.93
80	Willis to Manners West 1	Full Footway Width	High Street	458	430	3.3	A+	1.50	1.50
81	Willis to Manners West 2	Full Footway Width	High Street	458	430	2.5	A	1.50	1.50
82	Willis to Manners West 3	Full Footway Width	High Street	791	570	2.1	A	2.10	1.50
83	Willis to Manners West 4	Full Footway Width	High Street	791	570	4.5	A+	3.80	1.50
84	Willis to Manners West 5	Full Footway Width	High Street	791	570	2.2	A	4.00	1.50
85	Willis to Manners West 6	Full Footway Width	High Street	791	570	5.2	A+	2.90	1.50
86	Willis to Manners West 7	Full Footway Width	High Street	947	683	9.3	A+	3.70	1.50
87	Manners West 1	Full Footway Width	High Street	947	683	4.5	A	1.50	1.50
88	Manners West 2	Full Footway Width	High Street	947	683	3.4	A	1.50	1.50
89	Manners West 3	Full Footway Width	High Street	2416	1742	7.8	A	6.02	2.42
90	Manners West 4	Full Footway Width	High Street	2416	1742	7.1	A	11.92	2.42
91	Manners West 5	Full Footway Width	High Street	2416	1742	2.1	B	2.62	2.42
92	Manners West 6	Full Footway Width	High Street	2416	1742	5.4	A	3.82	2.42
93	Manners East 7	Full Footway Width	High Street	910	917	3.7	A	1.90	1.50
94	Manners East 8	Full Footway Width	High Street	910	917	3.6	A	3.70	1.50
95	Manners East 9	Full Footway Width	High Street	910	917	2.9	A	2.10	1.50
96	Courtenay North 1	Full Footway Width	High Street	876	792	3.1	A	1.50	1.50
97	Courtenay North 2	Full Footway Width	High Street	876	792	3	A	3.20	1.50
98	Courtenay North 3	Full Footway Width	High Street	694	628	10.4	A+	3.60	1.50
99	Courtenay North 4	Full Footway Width	High Street	510	463	6.5	A+	1.70	1.50
100	Courtenay North 5	Full Footway Width	High Street	510	463	2.9	A	3.80	1.50
101	Courtenay North 6	Full Footway Width	High Street	564	448	5.7	A+	1.90	1.50
102	Courtenay North 7	Full Footway Width	High Street	564	448	2.3	A	6.30	1.50
103	Courtenay North 8	Full Footway Width	High Street	564	448	4.2	A+	7.70	1.50
104	Courtenay North 9	Full Footway Width	High Street	564	448	1.5	A	3.80	1.50
105	Courtenay North 10	Full Footway Width	High Street	564	448	11	A+	1.50	1.50
106	Courtenay South 1	Full Footway Width	High Street	344	271	6.5	A+	15.00	1.50
107	Courtenay South 2	Full Footway Width	High Street	975	640	4.1	A	2.90	1.50
108	Courtenay South 3	Full Footway Width	High Street	975	640	3.5	A	4.10	1.50
109	Courtenay South 4	Full Footway Width	High Street	1505	1357	6.8	A	2.49	1.89
110	Courtenay South 5	Full Footway Width	High Street	1505	1357	6.8	A	1.89	1.89
111	Courtenay South 6	Full Footway Width	High Street	1505	1357	9.7	A+	1.89	1.89
112	Courtenay South 7	Full Footway Width	High Street	1505	1357	9.5	A+	1.89	1.89
113	Courtenay South 8	Full Footway Width	High Street	1505	1357	12.7	A+	2.89	1.89
114	Courtenay South 9	Full Footway Width	High Street	1505	1357	15.4	A+	1.89	1.89
115	Courtenay South 10	Full Footway Width	High Street	1505	1357	11.2	A+	14.39	1.89

A.3 AM Peak Option 2

Location Name		Location Type	Area Type	Average Flow (ADT)	AM Peak Hour Flow	Clear Footway Width	Peak Hour PCL	Total Width Required for PCL B+	Clear Width Required For PCL B+
7	Lambton Quay East 3	Full Footway Width	High Street	947	950	6	A	1.50	1.50
8	Lambton Quay East 4	Full Footway Width	High Street	947	950	3.7	A	3.80	1.50
9	Lambton Quay East 5	Full Footway Width	High Street	879	900	4.2	A	2.10	1.50
10	Lambton Quay East 6	Full Footway Width	High Street	879	900	5.8	A	2.50	1.50
11	Lambton Quay East 7	Full Footway Width	High Street	879	900	7.5	A+	2.50	1.50
12	Lambton Quay East 8	Full Footway Width	High Street	879	900	8.6	A+	2.50	1.50
13	Lambton Quay East 9	Full Footway Width	High Street	879	900	9.3	A+	2.10	1.50
14	Lambton Quay East 10	Full Footway Width	High Street	879	900	5.9	A	3.70	1.50
15	Lambton Quay West 1	Full Footway Width	High Street	4066	4479	5.7	B	6.23	6.23
16	Lambton Quay West 2	Full Footway Width	High Street	4066	4479	3.6	C	7.03	6.23
17	Lambton Quay West 3	Full Footway Width	High Street	2589	3721	5.3	B	6.67	5.17
18	Lambton Quay West 4	Full Footway Width	High Street	2165	2325	10.8	A	3.83	3.23
19	Lambton Quay West 5	Full Footway Width	High Street	2165	2325	7.4	A	4.03	3.23
20	Lambton Quay West 6	Full Footway Width	High Street	2165	2325	6.6	A-	5.43	3.23
21	Lambton Quay West 7	Full Footway Width	High Street	2165	2325	7.5	A	4.03	3.23
22	Lambton Quay West 8	Full Footway Width	High Street	2165	2325	8.3	A	3.83	3.23
23	Lambton Quay West 9	Full Footway Width	High Street	2165	2325	7.3	A	4.73	3.23
24	Lambton Quay West 10	Full Footway Width	High Street	2165	2325	12.9	A	3.83	3.23
25	Lambton Quay Mid East 1	Full Footway Width	High Street	1671	1810	6	A	6.02	2.52
26	Lambton Quay Mid East 2	Full Footway Width	High Street	1671	1810	7.3	A	3.32	2.52
27	Lambton Quay Mid East 3	Full Footway Width	High Street	1671	1810	3.8	A-	6.12	2.52
28	Lambton Quay Mid East 4	Full Footway Width	High Street	1733	1842	6	A	5.16	2.56
29	Lambton Quay Mid East 5	Full Footway Width	High Street	1733	1842	5.8	A	3.56	2.56
30	Lambton Quay Mid East 6	Full Footway Width	High Street	1733	1842	6.5	A	2.56	2.56
31	Lambton Quay Mid East 7	Full Footway Width	High Street	1785	1858	9.1	A	2.58	2.58
32	Lambton Quay Mid East 8	Full Footway Width	High Street	1785	1858	6.6	A	3.88	2.58
33	Lambton Quay Mid East 9	Full Footway Width	High Street	1522	1523	9.9	A	2.12	2.12
34	Lambton Quay Mid East 10	Full Footway Width	High Street	1522	1523	7.7	A	2.12	2.12
35	Lambton Quay Mid West 1	Full Footway Width	High Street	5401	6391	7.8	B	8.88	8.88
36	Lambton Quay Mid West 2	Full Footway Width	High Street	5401	6391	6.2	B-	12.28	8.88
37	Lambton Quay Mid West 3	Full Footway Width	High Street	5068	4892	8.2	B+	9.00	6.80
38	Lambton Quay Mid West 4	Full Footway Width	High Street	4744	3393	8	A-	4.72	4.72
39	Lambton Quay Mid West 5	Full Footway Width	High Street	4744	3393	5	B+	7.32	4.72
40	Lambton Quay Mid West 6	Full Footway Width	High Street	3653	2721	7.5	A-	5.18	3.78
41	Lambton Quay Mid West 7	Full Footway Width	High Street	3653	2721	6.1	A-	6.68	3.78
42	Lambton Quay Mid West 8	Full Footway Width	High Street	3653	2721	7.4	A-	4.58	3.78
43	Lambton Quay Mid West 9	Full Footway Width	High Street	3653	2721	5.5	A-	5.28	3.78
44	Lambton Quay South East 1	Full Footway Width	High Street	1347	1211	3.8	A	3.29	1.69
45	Lambton Quay South East 2	Full Footway Width	High Street	1347	1211	3	A-	2.69	1.69
46	Lambton Quay South East 3	Full Footway Width	High Street	839	632	2	A	2.50	1.50
47	Lambton Quay South East 4	Full Footway Width	High Street	839	632	3.9	A	2.10	1.50
48	Lambton Quay South East 5	Full Footway Width	High Street	839	632	2.3	A	1.50	1.50
49	Lambton Quay South East 6	Full Footway Width	High Street	839	632	2.2	A	2.30	1.50
50	Lambton Quay South East 7	Full Footway Width	High Street	839	632	5.9	A+	4.50	1.50
51	Lambton Quay South East 8	Full Footway Width	High Street	839	632	5.7	A+	2.50	1.50
52	Lambton Quay South East 9	Full Footway Width	High Street	839	632	4.4	A+	2.50	1.50
53	Lambton Quay South East 10	Full Footway Width	High Street	839	632	4.5	A+	2.50	1.50
54	Lambton Quay South West 1	Full Footway Width	High Street	3626	2719	3.3	B	7.38	3.78
55	Lambton Quay South West 2	Full Footway Width	High Street	3626	2719	4.1	B+	4.78	3.78
56	Lambton Quay South West 3	Full Footway Width	High Street	2928	2719	4.8	B+	4.78	3.78
57	Lambton Quay South West 4	Full Footway Width	High Street	2928	2719	4.2	B+	6.48	3.78

58	Willis St East 1	Full Footway Width	High Street	2335	2860	2.1	C	4.98	3.98
59	Willis St East 2	Full Footway Width	High Street	2335	2860	4.5	B+	4.98	3.98
60	Willis St East 3	Full Footway Width	High Street	3057	3111	3.4	B-	5.33	4.33
61	Willis St East 4	Full Footway Width	High Street	3057	3111	3.4	B-	5.73	4.33
62	Willis St East 5	Full Footway Width	High Street	2506	2339	6.9	A-	3.25	3.25
63	Willis St East 6	Full Footway Width	High Street	2506	2339	9.8	A	3.25	3.25
64	Willis St East 7	Full Footway Width	High Street	2798	2429	3.3	B	5.38	3.38
65	Willis St East 8	Full Footway Width	High Street	2798	2429	3.4	B	5.78	3.38
66	Willis St East 9	Full Footway Width	High Street	2798	2429	5.2	A-	3.78	3.38
67	Willis St East 10	Full Footway Width	High Street	2798	2429	7.1	A-	3.38	3.38
68	Willis St West 1	Full Footway Width	High Street	2730	3763	3.9	B-	6.03	5.23
69	Willis St West 2	Full Footway Width	High Street	2865	3473	3	C+	8.83	4.83
70	Willis St West 3	Full Footway Width	High Street	2635	3194	2.3	C	6.04	4.44
71	Willis St West 4	Full Footway Width	High Street	2760	2910	5	B+	4.65	4.05
72	Willis to Manners East 1	Full Footway Width	High Street	2798	2429	4.1	B+	4.78	3.38
73	Willis to Manners East 2	Full Footway Width	High Street	2798	2429	4.1	B+	4.48	3.38
74	Willis to Manners East 3	Full Footway Width	High Street	1293	1189	2.9	A-	3.26	1.66
75	Willis to Manners East 4	Full Footway Width	High Street	1293	1189	4.5	A	3.06	1.66
76	Willis to Manners East 5	Full Footway Width	High Street	1293	1189	4.4	A	3.06	1.66
77	Willis to Manners East 6	Full Footway Width	High Street	1293	1189	3.3	A-	2.46	1.66
78	Willis to Manners East 7	Full Footway Width	High Street	1421	1383	5	A	1.93	1.93
79	Willis to Manners East 8	Full Footway Width	High Street	1421	1383	3.3	A-	3.33	1.93
80	Willis to Manners West 1	Full Footway Width	High Street	458	430	3.3	A+	1.50	1.50
81	Willis to Manners West 2	Full Footway Width	High Street	458	430	2.5	A	1.50	1.50
82	Willis to Manners West 3	Full Footway Width	High Street	791	570	2.1	A	2.10	1.50
83	Willis to Manners West 4	Full Footway Width	High Street	791	570	4.5	A+	3.80	1.50
84	Willis to Manners West 5	Full Footway Width	High Street	791	570	2.2	A	4.00	1.50
85	Willis to Manners West 6	Full Footway Width	High Street	791	570	5.2	A+	2.90	1.50
86	Willis to Manners West 7	Full Footway Width	High Street	947	683	9.3	A+	3.70	1.50
87	Manners West 1	Full Footway Width	High Street	947	683	4.5	A	1.50	1.50
88	Manners West 2	Full Footway Width	High Street	947	683	3.4	A	1.50	1.50
89	Manners West 3	Full Footway Width	High Street	2416	1742	7.8	A	6.02	2.42
90	Manners West 4	Full Footway Width	High Street	2416	1742	7.1	A	11.92	2.42
91	Manners West 5	Full Footway Width	High Street	2416	1742	2.1	B	2.62	2.42
92	Manners West 6	Full Footway Width	High Street	2416	1742	5.4	A	3.82	2.42
93	Manners East 7	Full Footway Width	High Street	910	917	3.7	A	1.90	1.50
94	Manners East 8	Full Footway Width	High Street	910	917	3.6	A	3.70	1.50
95	Manners East 9	Full Footway Width	High Street	910	917	2.9	A	2.10	1.50
96	Courtenay North 1	Full Footway Width	High Street	876	792	3.1	A	1.50	1.50
97	Courtenay North 2	Full Footway Width	High Street	876	792	3	A	3.20	1.50
98	Courtenay North 3	Full Footway Width	High Street	694	628	10.4	A+	3.60	1.50
99	Courtenay North 4	Full Footway Width	High Street	510	463	5.5	A+	1.70	1.50
100	Courtenay North 5	Full Footway Width	High Street	510	463	4.9	A+	3.80	1.50
101	Courtenay North 6	Full Footway Width	High Street	564	448	5.7	A+	1.90	1.50
102	Courtenay North 7	Full Footway Width	High Street	564	448	4.3	A+	6.30	1.50
103	Courtenay North 8	Full Footway Width	High Street	564	448	12.2	A+	7.70	1.50
104	Courtenay North 9	Full Footway Width	High Street	564	448	9.5	A+	3.80	1.50
105	Courtenay North 10	Full Footway Width	High Street	564	448	14	A+	1.50	1.50
106	Courtenay South 1	Full Footway Width	High Street	344	271	2.5	A+	15.00	1.50
107	Courtenay South 2	Full Footway Width	High Street	975	640	4.1	A	2.90	1.50
108	Courtenay South 3	Full Footway Width	High Street	975	640	4.5	A+	4.10	1.50
109	Courtenay South 4	Full Footway Width	High Street	1505	1357	6.8	A	2.49	1.89
110	Courtenay South 5	Full Footway Width	High Street	1505	1357	5.8	A	1.89	1.89
111	Courtenay South 6	Full Footway Width	High Street	1505	1357	12.7	A+	1.89	1.89
112	Courtenay South 7	Full Footway Width	High Street	1505	1357	8.5	A	1.89	1.89
113	Courtenay South 8	Full Footway Width	High Street	1505	1357	12.7	A+	2.89	1.89
114	Courtenay South 9	Full Footway Width	High Street	1505	1357	16.4	A+	1.89	1.89
115	Courtenay South 10	Full Footway Width	High Street	1505	1357	11.2	A+	14.39	1.89

A.4 AM Peak Option 3

Location Name		Location Type	Area Type	Average Flow (ADT)	AM Peak Hour Flow	Clear Footway Width	Peak Hour PCL	Total Width Required for PCL B+	Clear Width Required For PCL B+
7	Lambton Quay East 3	Full Footway Width	High Street	947	950	8	A+	1.50	1.50
8	Lambton Quay East 4	Full Footway Width	High Street	947	950	5.7	A	3.80	1.50
9	Lambton Quay East 5	Full Footway Width	High Street	879	900	7.2	A+	2.10	1.50
10	Lambton Quay East 6	Full Footway Width	High Street	879	900	8.8	A+	2.50	1.50
11	Lambton Quay East 7	Full Footway Width	High Street	879	900	9.5	A+	2.50	1.50
12	Lambton Quay East 8	Full Footway Width	High Street	879	900	10.6	A+	2.50	1.50
13	Lambton Quay East 9	Full Footway Width	High Street	879	900	12.3	A+	2.10	1.50
14	Lambton Quay East 10	Full Footway Width	High Street	879	900	8.9	A+	3.70	1.50
15	Lambton Quay West 1	Full Footway Width	High Street	4066	4479	5.7	B	6.23	6.23
16	Lambton Quay West 2	Full Footway Width	High Street	4066	4479	3.6	C	7.03	6.23
17	Lambton Quay West 3	Full Footway Width	High Street	2589	3721	5.3	B	6.67	5.17
18	Lambton Quay West 4	Full Footway Width	High Street	2165	2325	9.8	A	3.83	3.23
19	Lambton Quay West 5	Full Footway Width	High Street	2165	2325	7.4	A	4.03	3.23
20	Lambton Quay West 6	Full Footway Width	High Street	2165	2325	6.6	A-	5.43	3.23
21	Lambton Quay West 7	Full Footway Width	High Street	2165	2325	8.5	A	4.03	3.23
22	Lambton Quay West 8	Full Footway Width	High Street	2165	2325	9.3	A	3.83	3.23
23	Lambton Quay West 9	Full Footway Width	High Street	2165	2325	7.3	A	4.73	3.23
24	Lambton Quay West 10	Full Footway Width	High Street	2165	2325	12.9	A	3.83	3.23
25	Lambton Quay Mid East 1	Full Footway Width	High Street	1671	1810	6	A	6.02	2.52
26	Lambton Quay Mid East 2	Full Footway Width	High Street	1671	1810	9.3	A	3.32	2.52
27	Lambton Quay Mid East 3	Full Footway Width	High Street	1671	1810	6.8	A	6.12	2.52
28	Lambton Quay Mid East 4	Full Footway Width	High Street	1733	1842	8	A	5.16	2.56
29	Lambton Quay Mid East 5	Full Footway Width	High Street	1733	1842	7.8	A	3.56	2.56
30	Lambton Quay Mid East 6	Full Footway Width	High Street	1733	1842	9.5	A	2.56	2.56
31	Lambton Quay Mid East 7	Full Footway Width	High Street	1785	1858	12.1	A	2.58	2.58
32	Lambton Quay Mid East 8	Full Footway Width	High Street	1785	1858	9.6	A	3.88	2.58
33	Lambton Quay Mid East 9	Full Footway Width	High Street	1522	1523	10.9	A+	2.12	2.12
34	Lambton Quay Mid East 10	Full Footway Width	High Street	1522	1523	9.7	A	2.12	2.12
35	Lambton Quay Mid West 1	Full Footway Width	High Street	5401	6391	7.8	B	8.88	8.88
36	Lambton Quay Mid West 2	Full Footway Width	High Street	5401	6391	8.2	B	12.28	8.88
37	Lambton Quay Mid West 3	Full Footway Width	High Street	5068	4892	8.2	B+	9.00	6.80
38	Lambton Quay Mid West 4	Full Footway Width	High Street	4744	3393	8	A-	4.72	4.72
39	Lambton Quay Mid West 5	Full Footway Width	High Street	4744	3393	6	B+	7.32	4.72
40	Lambton Quay Mid West 6	Full Footway Width	High Street	3653	2721	7.5	A-	5.18	3.78
41	Lambton Quay Mid West 7	Full Footway Width	High Street	3653	2721	6.1	A-	6.68	3.78
42	Lambton Quay Mid West 8	Full Footway Width	High Street	3653	2721	6.4	A-	4.58	3.78
43	Lambton Quay Mid West 9	Full Footway Width	High Street	3653	2721	5.5	A-	5.28	3.78
44	Lambton Quay South East 1	Full Footway Width	High Street	1347	1211	3.8	A	3.29	1.69
45	Lambton Quay South East 2	Full Footway Width	High Street	1347	1211	3	A-	2.69	1.69
46	Lambton Quay South East 3	Full Footway Width	High Street	839	632	2	A	2.50	1.50
47	Lambton Quay South East 4	Full Footway Width	High Street	839	632	3.9	A	2.10	1.50
48	Lambton Quay South East 5	Full Footway Width	High Street	839	632	2.3	A	1.50	1.50
49	Lambton Quay South East 6	Full Footway Width	High Street	839	632	2.2	A	2.30	1.50
50	Lambton Quay South East 7	Full Footway Width	High Street	839	632	5.9	A+	4.50	1.50
51	Lambton Quay South East 8	Full Footway Width	High Street	839	632	5.7	A+	2.50	1.50
52	Lambton Quay South East 9	Full Footway Width	High Street	839	632	4.4	A+	2.50	1.50
53	Lambton Quay South East 10	Full Footway Width	High Street	839	632	4.5	A+	2.50	1.50
54	Lambton Quay South West 1	Full Footway Width	High Street	3626	2719	3.3	B	7.38	3.78
55	Lambton Quay South West 2	Full Footway Width	High Street	3626	2719	4.1	B+	4.78	3.78
56	Lambton Quay South West 3	Full Footway Width	High Street	2928	2719	4.8	B+	4.78	3.78
57	Lambton Quay South West 4	Full Footway Width	High Street	2928	2719	4.2	B+	6.48	3.78
58	Willis St East 1	Full Footway Width	High Street	2335	2860	2.1	C	4.98	3.98
59	Willis St East 2	Full Footway Width	High Street	2335	2860	4.5	B+	4.98	3.98
60	Willis St East 3	Full Footway Width	High Street	3057	3111	3.4	B-	5.33	4.33

61	Willis St East 4	Full Footway Width	High Street	3057	3111	3.4	B-	5.73	4.33
62	Willis St East 5	Full Footway Width	High Street	2506	2339	7.9	A	3.25	3.25
63	Willis St East 6	Full Footway Width	High Street	2506	2339	10.8	A	3.25	3.25
64	Willis St East 7	Full Footway Width	High Street	2798	2429	4.3	B+	5.38	3.38
65	Willis St East 8	Full Footway Width	High Street	2798	2429	4.4	B+	5.78	3.38
66	Willis St East 9	Full Footway Width	High Street	2798	2429	6.2	A-	3.78	3.38
67	Willis St East 10	Full Footway Width	High Street	2798	2429	8.1	A	3.38	3.38
68	Willis St West 1	Full Footway Width	High Street	2730	3763	6.9	B+	6.03	5.23
69	Willis St West 2	Full Footway Width	High Street	2865	3473	6	B+	8.83	4.83
70	Willis St West 3	Full Footway Width	High Street	2635	3194	4.3	B	6.04	4.44
71	Willis St West 4	Full Footway Width	High Street	2760	2910	7	A-	4.65	4.05
72	Willis to Manners East 1	Full Footway Width	High Street	2798	2429	3.1	B	4.78	3.38
73	Willis to Manners East 2	Full Footway Width	High Street	2798	2429	4.1	B+	4.48	3.38
74	Willis to Manners East 3	Full Footway Width	High Street	1293	1189	2.9	A-	3.26	1.66
75	Willis to Manners East 4	Full Footway Width	High Street	1293	1189	4.5	A	3.06	1.66
76	Willis to Manners East 5	Full Footway Width	High Street	1293	1189	4.4	A	3.06	1.66
77	Willis to Manners East 6	Full Footway Width	High Street	1293	1189	3.3	A-	2.46	1.66
78	Willis to Manners East 7	Full Footway Width	High Street	1421	1383	5	A	1.93	1.93
79	Willis to Manners East 8	Full Footway Width	High Street	1421	1383	3.3	A-	3.33	1.93
80	Willis to Manners West 1	Full Footway Width	High Street	458	430	3.3	A+	1.50	1.50
81	Willis to Manners West 2	Full Footway Width	High Street	458	430	2.5	A	1.50	1.50
82	Willis to Manners West 3	Full Footway Width	High Street	791	570	2.1	A	2.10	1.50
83	Willis to Manners West 4	Full Footway Width	High Street	791	570	4.5	A+	3.80	1.50
84	Willis to Manners West 5	Full Footway Width	High Street	791	570	2.2	A	4.00	1.50
85	Willis to Manners West 6	Full Footway Width	High Street	791	570	5.2	A+	2.90	1.50
86	Willis to Manners West 7	Full Footway Width	High Street	947	683	9.3	A+	3.70	1.50
87	Manners West 1	Full Footway Width	High Street	947	683	4.5	A	1.50	1.50
88	Manners West 2	Full Footway Width	High Street	947	683	5.4	A+	1.50	1.50
89	Manners West 3	Full Footway Width	High Street	2416	1742	7.8	A	6.02	2.42
90	Manners West 4	Full Footway Width	High Street	2416	1742	7.1	A	11.92	2.42
91	Manners West 5	Full Footway Width	High Street	2416	1742	2.1	B	2.62	2.42
92	Manners West 6	Full Footway Width	High Street	2416	1742	5.4	A	3.82	2.42
93	Manners East 7	Full Footway Width	High Street	910	917	3.7	A	1.90	1.50
94	Manners East 8	Full Footway Width	High Street	910	917	3.6	A	3.70	1.50
95	Manners East 9	Full Footway Width	High Street	910	917	2.9	A	2.10	1.50
96	Courtenay North 1	Full Footway Width	High Street	876	792	5.1	A	1.50	1.50
97	Courtenay North 2	Full Footway Width	High Street	876	792	8	A+	3.20	1.50
98	Courtenay North 3	Full Footway Width	High Street	694	628	15.4	A+	3.60	1.50
99	Courtenay North 4	Full Footway Width	High Street	510	463	9.5	A+	1.70	1.50
100	Courtenay North 5	Full Footway Width	High Street	510	463	7.9	A+	3.80	1.50
101	Courtenay North 6	Full Footway Width	High Street	564	448	10.7	A+	1.90	1.50
102	Courtenay North 7	Full Footway Width	High Street	564	448	6.3	A+	6.30	1.50
103	Courtenay North 8	Full Footway Width	High Street	564	448	6.2	A+	7.70	1.50
104	Courtenay North 9	Full Footway Width	High Street	564	448	8.5	A+	3.80	1.50
105	Courtenay North 10	Full Footway Width	High Street	564	448	11	A+	1.50	1.50
106	Courtenay South 1	Full Footway Width	High Street	344	271	2.5	A+	15.00	1.50
107	Courtenay South 2	Full Footway Width	High Street	975	640	2.1	A	2.90	1.50
108	Courtenay South 3	Full Footway Width	High Street	975	640	3.5	A	4.10	1.50
109	Courtenay South 4	Full Footway Width	High Street	1505	1357	4.8	A	2.49	1.89
110	Courtenay South 5	Full Footway Width	High Street	1505	1357	3.8	A-	1.89	1.89
111	Courtenay South 6	Full Footway Width	High Street	1505	1357	11.7	A+	1.89	1.89
112	Courtenay South 7	Full Footway Width	High Street	1505	1357	6.5	A	1.89	1.89
113	Courtenay South 8	Full Footway Width	High Street	1505	1357	9.7	A+	2.89	1.89
114	Courtenay South 9	Full Footway Width	High Street	1505	1357	13.4	A+	1.89	1.89
115	Courtenay South 10	Full Footway Width	High Street	1505	1357	12.2	A+	14.39	1.89

A.5 PM Peak Do Minimum

Location Name		Location Type	Area Type	Average Flow (ADT)	AM Peak Hour Flow	Clear Footway Width	Peak Hour PCL	Total Width Required for PCL B+	Clear Width Required For PCL B+
7	Lambton Quay East 3	Full Footway Width	High Street	947	1683	4	A-	2.34	2.34
8	Lambton Quay East 4	Full Footway Width	High Street	947	1683	3.7	A-	4.64	2.34
9	Lambton Quay East 5	Full Footway Width	High Street	879	1067	4.2	A	2.10	1.50
10	Lambton Quay East 6	Full Footway Width	High Street	879	1067	2.8	A-	2.50	1.50
11	Lambton Quay East 7	Full Footway Width	High Street	879	1067	4.5	A	2.50	1.50
12	Lambton Quay East 8	Full Footway Width	High Street	879	1067	3.6	A	2.50	1.50
13	Lambton Quay East 9	Full Footway Width	High Street	879	1067	8.3	A+	2.10	1.50
14	Lambton Quay East 10	Full Footway Width	High Street	879	1067	4.9	A	3.70	1.50
15	Lambton Quay West 1	Full Footway Width	High Street	4066	4048	5.7	B	5.63	5.63
16	Lambton Quay West 2	Full Footway Width	High Street	4066	4048	3.6	C+	6.43	5.63
17	Lambton Quay West 3	Full Footway Width	High Street	2589	2894	5.3	B+	5.52	4.02
18	Lambton Quay West 4	Full Footway Width	High Street	2165	2722	7.8	A-	4.39	3.79
19	Lambton Quay West 5	Full Footway Width	High Street	2165	2722	3.4	B	4.59	3.79
20	Lambton Quay West 6	Full Footway Width	High Street	2165	2722	4.6	B+	5.99	3.79
21	Lambton Quay West 7	Full Footway Width	High Street	2165	2722	3.5	B	4.59	3.79
22	Lambton Quay West 8	Full Footway Width	High Street	2165	2722	5.3	B+	4.39	3.79
23	Lambton Quay West 9	Full Footway Width	High Street	2165	2722	4.3	B+	5.29	3.79
24	Lambton Quay West 10	Full Footway Width	High Street	2165	2722	9.9	A	4.39	3.79
25	Lambton Quay Mid East 1	Full Footway Width	High Street	1671	2242	6	A-	6.62	3.12
26	Lambton Quay Mid East 2	Full Footway Width	High Street	1671	2242	3.3	B+	3.92	3.12
27	Lambton Quay Mid East 3	Full Footway Width	High Street	1671	2242	3.8	B+	6.72	3.12
28	Lambton Quay Mid East 4	Full Footway Width	High Street	1733	2370	4	B+	5.90	3.30
29	Lambton Quay Mid East 5	Full Footway Width	High Street	1733	2370	3.8	B+	4.30	3.30
30	Lambton Quay Mid East 6	Full Footway Width	High Street	1733	2370	5.5	A-	3.30	3.30
31	Lambton Quay Mid East 7	Full Footway Width	High Street	1785	2498	9.1	A	3.47	3.47
32	Lambton Quay Mid East 8	Full Footway Width	High Street	1785	2498	5.6	A-	4.77	3.47
33	Lambton Quay Mid East 9	Full Footway Width	High Street	1522	2457	7.9	A	3.42	3.42
34	Lambton Quay Mid East 10	Full Footway Width	High Street	1522	2457	4.7	B+	3.42	3.42
35	Lambton Quay Mid West 1	Full Footway Width	High Street	5401	6787	3.8	D	9.43	9.43
36	Lambton Quay Mid West 2	Full Footway Width	High Street	5401	6787	5.2	C	12.83	9.43
37	Lambton Quay Mid West 3	Full Footway Width	High Street	5068	7522	4.2	D	12.65	10.45
38	Lambton Quay Mid West 4	Full Footway Width	High Street	4744	8285	4	D	11.51	11.51
39	Lambton Quay Mid West 5	Full Footway Width	High Street	4744	8285	4	D	14.11	11.51
40	Lambton Quay Mid West 6	Full Footway Width	High Street	3653	5991	6.5	B-	9.73	8.33
41	Lambton Quay Mid West 7	Full Footway Width	High Street	3653	5991	5.1	C+	11.23	8.33
42	Lambton Quay Mid West 8	Full Footway Width	High Street	3653	5991	4.4	C	9.13	8.33
43	Lambton Quay Mid West 9	Full Footway Width	High Street	3653	5991	5.5	C+	9.83	8.33
44	Lambton Quay South East 1	Full Footway Width	High Street	1347	2007	3.8	B+	4.39	2.79
45	Lambton Quay South East 2	Full Footway Width	High Street	1347	2007	3	B+	3.79	2.79
46	Lambton Quay South East 3	Full Footway Width	High Street	839	1127	2	B+	2.57	1.57
47	Lambton Quay South East 4	Full Footway Width	High Street	839	1127	3.9	A	2.17	1.57
48	Lambton Quay South East 5	Full Footway Width	High Street	839	1127	2.3	A-	1.57	1.57
49	Lambton Quay South East 6	Full Footway Width	High Street	839	1127	2.2	B+	2.37	1.57
50	Lambton Quay South East 7	Full Footway Width	High Street	839	1127	5.9	A	4.57	1.57
51	Lambton Quay South East 8	Full Footway Width	High Street	839	1127	5.7	A	2.57	1.57
52	Lambton Quay South East 9	Full Footway Width	High Street	839	1127	4.4	A	2.57	1.57
53	Lambton Quay South East 10	Full Footway Width	High Street	839	1127	4.5	A	2.57	1.57
54	Lambton Quay South West 1	Full Footway Width	High Street	3626	3608	3.3	C+	8.62	5.02
55	Lambton Quay South West 2	Full Footway Width	High Street	3626	3608	4.1	B-	6.02	5.02
56	Lambton Quay South West 3	Full Footway Width	High Street	2928	3608	4.8	B	6.02	5.02
57	Lambton Quay South West 4	Full Footway Width	High Street	2928	3608	4.2	B	7.72	5.02
58	Willis St East 1	Full Footway Width	High Street	2335	2608	2.1	C	4.63	3.63
59	Willis St East 2	Full Footway Width	High Street	2335	2608	4.5	B+	4.63	3.63
60	Willis St East 3	Full Footway Width	High Street	3057	4588	3.4	C	7.38	6.38

61	Willis St East 4	Full Footway Width	High Street	3057	4588	3.4	C	7.78	6.38
62	Willis St East 5	Full Footway Width	High Street	2506	3973	6.9	B+	5.52	5.52
63	Willis St East 6	Full Footway Width	High Street	2506	3973	9.8	A-	5.52	5.52
64	Willis St East 7	Full Footway Width	High Street	2798	4609	3.3	C	8.41	6.41
65	Willis St East 8	Full Footway Width	High Street	2798	4609	3.4	C	8.81	6.41
66	Willis St East 9	Full Footway Width	High Street	2798	4609	3.1	C-	8.91	6.41
67	Willis St East 10	Full Footway Width	High Street	2798	4609	7.1	B+	6.41	6.41
68	Willis St West 1	Full Footway Width	High Street	2730	2515	3.9	B+	4.30	3.50
69	Willis St West 2	Full Footway Width	High Street	2865	3541	3	C+	8.92	4.92
70	Willis St West 3	Full Footway Width	High Street	2635	3257	2.3	C-	6.13	4.53
71	Willis St West 4	Full Footway Width	High Street	2760	4201	5	B	6.44	5.84
72	Willis to Manners East 1	Full Footway Width	High Street	2798	4609	3.1	C-	7.81	6.41
73	Willis to Manners East 2	Full Footway Width	High Street	2798	4609	4.1	C+	7.51	6.41
74	Willis to Manners East 3	Full Footway Width	High Street	1293	1898	2.9	B+	4.24	2.64
75	Willis to Manners East 4	Full Footway Width	High Street	1293	1898	4.5	A-	4.04	2.64
76	Willis to Manners East 5	Full Footway Width	High Street	1293	1898	4.4	A-	4.04	2.64
77	Willis to Manners East 6	Full Footway Width	High Street	1293	1898	3.3	B+	3.44	2.64
78	Willis to Manners East 7	Full Footway Width	High Street	1421	1926	5	A-	2.68	2.68
79	Willis to Manners East 8	Full Footway Width	High Street	1421	1926	3.3	B+	4.08	2.68
80	Willis to Manners West 1	Full Footway Width	High Street	458	676	3.3	A	1.50	1.50
81	Willis to Manners West 2	Full Footway Width	High Street	458	676	2.5	A	1.50	1.50
82	Willis to Manners West 3	Full Footway Width	High Street	791	1193	2.1	B+	2.26	1.66
83	Willis to Manners West 4	Full Footway Width	High Street	791	1193	4.5	A	3.96	1.66
84	Willis to Manners West 5	Full Footway Width	High Street	791	1193	2.2	B+	4.16	1.66
85	Willis to Manners West 6	Full Footway Width	High Street	791	1193	5.2	A	3.06	1.66
86	Willis to Manners West 7	Full Footway Width	High Street	947	1418	9.3	A	4.18	1.98
87	Manners West 1	Full Footway Width	High Street	947	1418	4.5	A	1.98	1.98
88	Manners West 2	Full Footway Width	High Street	947	1418	3.4	A-	1.98	1.98
89	Manners West 3	Full Footway Width	High Street	2416	3618	2.8	C	8.63	5.03
90	Manners West 4	Full Footway Width	High Street	2416	3618	7.1	A-	14.53	5.03
91	Manners West 5	Full Footway Width	High Street	2416	3618	2.1	D	5.23	5.03
92	Manners West 6	Full Footway Width	High Street	2416	3618	5.4	B+	6.43	5.03
93	Manners East 7	Full Footway Width	High Street	910	1180	3.7	A	2.04	1.64
94	Manners East 8	Full Footway Width	High Street	910	1180	3.6	A	3.84	1.64
95	Manners East 9	Full Footway Width	High Street	910	1180	2.9	A-	2.24	1.64
96	Courtenay North 1	Full Footway Width	High Street	876	1435	3.1	A-	2.00	2.00
97	Courtenay North 2	Full Footway Width	High Street	876	1435	2	B	3.70	2.00
98	Courtenay North 3	Full Footway Width	High Street	694	1076	9.4	A+	3.60	1.50
99	Courtenay North 4	Full Footway Width	High Street	510	717	3.5	A	1.70	1.50
100	Courtenay North 5	Full Footway Width	High Street	510	717	2.9	A	3.80	1.50
101	Courtenay North 6	Full Footway Width	High Street	564	1016	3.7	A	1.90	1.50
102	Courtenay North 7	Full Footway Width	High Street	564	1016	2.3	A-	6.30	1.50
103	Courtenay North 8	Full Footway Width	High Street	564	1016	4.2	A	7.70	1.50
104	Courtenay North 9	Full Footway Width	High Street	564	1016	1.5	B+	3.80	1.50
105	Courtenay North 10	Full Footway Width	High Street	564	1016	4	A	1.50	1.50
106	Courtenay South 1	Full Footway Width	High Street	344	485	9	A+	8.50	1.50
107	Courtenay South 2	Full Footway Width	High Street	975	1648	2.1	B	3.69	2.29
108	Courtenay South 3	Full Footway Width	High Street	975	1648	3.5	A-	4.89	2.29
109	Courtenay South 4	Full Footway Width	High Street	1505	1842	4.8	A-	3.16	2.56
110	Courtenay South 5	Full Footway Width	High Street	1505	1842	3.8	A-	2.56	2.56
111	Courtenay South 6	Full Footway Width	High Street	1505	1842	7.7	A	2.56	2.56
112	Courtenay South 7	Full Footway Width	High Street	1505	1842	5.5	A-	2.56	2.56
113	Courtenay South 8	Full Footway Width	High Street	1505	1842	2.7	B+	3.56	2.56
114	Courtenay South 9	Full Footway Width	High Street	1505	1842	4.4	A-	2.56	2.56
115	Courtenay South 10	Full Footway Width	High Street	1505	1842	6.2	A	15.06	2.56

A.6 PM Peak Option 1

Location Name		Location Type	Area Type	Average Flow (ADT)	AM Peak Hour Flow	Clear Footway Width	Peak Hour PCL	Total Width Required for PCL B+	Clear Width Required For PCL B+
7	Lambton Quay East 3	Full Footway Width	High Street	947	1683	6	A	2.34	2.34
8	Lambton Quay East 4	Full Footway Width	High Street	947	1683	3.7	A-	4.64	2.34
9	Lambton Quay East 5	Full Footway Width	High Street	879	1067	4.2	A	2.10	1.50
10	Lambton Quay East 6	Full Footway Width	High Street	879	1067	5.8	A	2.50	1.50
11	Lambton Quay East 7	Full Footway Width	High Street	879	1067	7.5	A+	2.50	1.50
12	Lambton Quay East 8	Full Footway Width	High Street	879	1067	8.6	A+	2.50	1.50
13	Lambton Quay East 9	Full Footway Width	High Street	879	1067	9.3	A+	2.10	1.50
14	Lambton Quay East 10	Full Footway Width	High Street	879	1067	5.9	A	3.70	1.50
15	Lambton Quay West 1	Full Footway Width	High Street	4066	4048	5.7	B	5.63	5.63
16	Lambton Quay West 2	Full Footway Width	High Street	4066	4048	3.6	C+	6.43	5.63
17	Lambton Quay West 3	Full Footway Width	High Street	2589	2894	5.3	B+	5.52	4.02
18	Lambton Quay West 4	Full Footway Width	High Street	2165	2722	10.8	A	4.39	3.79
19	Lambton Quay West 5	Full Footway Width	High Street	2165	2722	7.4	A-	4.59	3.79
20	Lambton Quay West 6	Full Footway Width	High Street	2165	2722	6.6	A-	5.99	3.79
21	Lambton Quay West 7	Full Footway Width	High Street	2165	2722	7.5	A-	4.59	3.79
22	Lambton Quay West 8	Full Footway Width	High Street	2165	2722	8.3	A	4.39	3.79
23	Lambton Quay West 9	Full Footway Width	High Street	2165	2722	6.3	A-	5.29	3.79
24	Lambton Quay West 10	Full Footway Width	High Street	2165	2722	11.9	A	4.39	3.79
25	Lambton Quay Mid East 1	Full Footway Width	High Street	1671	2242	6	A-	6.62	3.12
26	Lambton Quay Mid East 2	Full Footway Width	High Street	1671	2242	7.3	A	3.92	3.12
27	Lambton Quay Mid East 3	Full Footway Width	High Street	1671	2242	3.8	B+	6.72	3.12
28	Lambton Quay Mid East 4	Full Footway Width	High Street	1733	2370	4	B+	5.90	3.30
29	Lambton Quay Mid East 5	Full Footway Width	High Street	1733	2370	5.8	A-	4.30	3.30
30	Lambton Quay Mid East 6	Full Footway Width	High Street	1733	2370	5.5	A-	3.30	3.30
31	Lambton Quay Mid East 7	Full Footway Width	High Street	1785	2498	9.1	A	3.47	3.47
32	Lambton Quay Mid East 8	Full Footway Width	High Street	1785	2498	6.6	A-	4.77	3.47
33	Lambton Quay Mid East 9	Full Footway Width	High Street	1522	2457	9.9	A	3.42	3.42
34	Lambton Quay Mid East 10	Full Footway Width	High Street	1522	2457	7.7	A	3.42	3.42
35	Lambton Quay Mid West 1	Full Footway Width	High Street	5401	6787	7.8	B-	9.43	9.43
36	Lambton Quay Mid West 2	Full Footway Width	High Street	5401	6787	6.2	C+	12.83	9.43
37	Lambton Quay Mid West 3	Full Footway Width	High Street	5068	7522	8.2	B-	12.65	10.45
38	Lambton Quay Mid West 4	Full Footway Width	High Street	4744	8285	8	B-	11.51	11.51
39	Lambton Quay Mid West 5	Full Footway Width	High Street	4744	8285	5	D	14.11	11.51
40	Lambton Quay Mid West 6	Full Footway Width	High Street	3653	5991	7.5	B	9.73	8.33
41	Lambton Quay Mid West 7	Full Footway Width	High Street	3653	5991	6.1	B-	11.23	8.33
42	Lambton Quay Mid West 8	Full Footway Width	High Street	3653	5991	6.4	B-	9.13	8.33
43	Lambton Quay Mid West 9	Full Footway Width	High Street	3653	5991	5.5	C+	9.83	8.33
44	Lambton Quay South East 1	Full Footway Width	High Street	1347	2007	3.8	B+	4.39	2.79
45	Lambton Quay South East 2	Full Footway Width	High Street	1347	2007	3	B+	3.79	2.79
46	Lambton Quay South East 3	Full Footway Width	High Street	839	1127	2	B+	2.57	1.57
47	Lambton Quay South East 4	Full Footway Width	High Street	839	1127	3.9	A	2.17	1.57
48	Lambton Quay South East 5	Full Footway Width	High Street	839	1127	2.3	A-	1.57	1.57
49	Lambton Quay South East 6	Full Footway Width	High Street	839	1127	2.2	B+	2.37	1.57
50	Lambton Quay South East 7	Full Footway Width	High Street	839	1127	5.9	A	4.57	1.57
51	Lambton Quay South East 8	Full Footway Width	High Street	839	1127	5.7	A	2.57	1.57
52	Lambton Quay South East 9	Full Footway Width	High Street	839	1127	4.4	A	2.57	1.57
53	Lambton Quay South East 10	Full Footway Width	High Street	839	1127	4.5	A	2.57	1.57
54	Lambton Quay South West 1	Full Footway Width	High Street	3626	3608	3.3	C+	8.62	5.02
55	Lambton Quay South West 2	Full Footway Width	High Street	3626	3608	4.1	B-	6.02	5.02
56	Lambton Quay South West 3	Full Footway Width	High Street	2928	3608	4.8	B	6.02	5.02
57	Lambton Quay South West 4	Full Footway Width	High Street	2928	3608	4.2	B	7.72	5.02
58	Willis St East 1	Full Footway Width	High Street	2335	2608	2.1	C	4.63	3.63
59	Willis St East 2	Full Footway Width	High Street	2335	2608	4.5	B+	4.63	3.63

60	Willis St East 3	Full Footway Width	High Street	3057	4588	3.4	C	7.38	6.38
61	Willis St East 4	Full Footway Width	High Street	3057	4588	3.4	C	7.78	6.38
62	Willis St East 5	Full Footway Width	High Street	2506	3973	6.9	B+	5.52	5.52
63	Willis St East 6	Full Footway Width	High Street	2506	3973	9.8	A-	5.52	5.52
64	Willis St East 7	Full Footway Width	High Street	2798	4609	3.3	C	8.41	6.41
65	Willis St East 8	Full Footway Width	High Street	2798	4609	3.4	C	8.81	6.41
66	Willis St East 9	Full Footway Width	High Street	2798	4609	3.1	C-	8.91	6.41
67	Willis St East 10	Full Footway Width	High Street	2798	4609	7.1	B+	6.41	6.41
68	Willis St West 1	Full Footway Width	High Street	2730	2515	3.9	B+	4.30	3.50
69	Willis St West 2	Full Footway Width	High Street	2865	3541	3	C+	8.92	4.92
70	Willis St West 3	Full Footway Width	High Street	2635	3257	2.3	C-	6.13	4.53
71	Willis St West 4	Full Footway Width	High Street	2760	4201	5	B	6.44	5.84
72	Willis to Manners East 1	Full Footway Width	High Street	2798	4609	4.1	C+	7.81	6.41
73	Willis to Manners East 2	Full Footway Width	High Street	2798	4609	4.1	C+	7.51	6.41
74	Willis to Manners East 3	Full Footway Width	High Street	1293	1898	2.9	B+	4.24	2.64
75	Willis to Manners East 4	Full Footway Width	High Street	1293	1898	4.5	A-	4.04	2.64
76	Willis to Manners East 5	Full Footway Width	High Street	1293	1898	4.4	A-	4.04	2.64
77	Willis to Manners East 6	Full Footway Width	High Street	1293	1898	3.3	B+	3.44	2.64
78	Willis to Manners East 7	Full Footway Width	High Street	1421	1926	5	A-	2.68	2.68
79	Willis to Manners East 8	Full Footway Width	High Street	1421	1926	3.3	B+	4.08	2.68
80	Willis to Manners West 1	Full Footway Width	High Street	458	676	3.3	A	1.50	1.50
81	Willis to Manners West 2	Full Footway Width	High Street	458	676	2.5	A	1.50	1.50
82	Willis to Manners West 3	Full Footway Width	High Street	791	1193	2.1	B+	2.26	1.66
83	Willis to Manners West 4	Full Footway Width	High Street	791	1193	4.5	A	3.96	1.66
84	Willis to Manners West 5	Full Footway Width	High Street	791	1193	2.2	B+	4.16	1.66
85	Willis to Manners West 6	Full Footway Width	High Street	791	1193	5.2	A	3.06	1.66
86	Willis to Manners West 7	Full Footway Width	High Street	947	1418	9.3	A	4.18	1.98
87	Manners West 1	Full Footway Width	High Street	947	1418	4.5	A	1.98	1.98
88	Manners West 2	Full Footway Width	High Street	947	1418	8.4	A	1.98	1.98
89	Manners West 3	Full Footway Width	High Street	2416	3618	2.8	C	8.63	5.03
90	Manners West 4	Full Footway Width	High Street	2416	3618	7.1	A-	14.53	5.03
91	Manners West 5	Full Footway Width	High Street	2416	3618	2.1	D	5.23	5.03
92	Manners West 6	Full Footway Width	High Street	2416	3618	5.4	B+	6.43	5.03
93	Manners East 7	Full Footway Width	High Street	910	1180	3.7	A	2.04	1.64
94	Manners East 8	Full Footway Width	High Street	910	1180	3.6	A	3.84	1.64
95	Manners East 9	Full Footway Width	High Street	910	1180	2.9	A-	2.24	1.64
96	Courtenay North 1	Full Footway Width	High Street	876	1435	3.1	A-	2.00	2.00
97	Courtenay North 2	Full Footway Width	High Street	876	1435	3	A-	3.70	2.00
98	Courtenay North 3	Full Footway Width	High Street	694	1076	10.4	A+	3.60	1.50
99	Courtenay North 4	Full Footway Width	High Street	510	717	6.5	A+	1.70	1.50
100	Courtenay North 5	Full Footway Width	High Street	510	717	2.9	A	3.80	1.50
101	Courtenay North 6	Full Footway Width	High Street	564	1016	5.7	A	1.90	1.50
102	Courtenay North 7	Full Footway Width	High Street	564	1016	2.3	A-	6.30	1.50
103	Courtenay North 8	Full Footway Width	High Street	564	1016	4.2	A	7.70	1.50
104	Courtenay North 9	Full Footway Width	High Street	564	1016	1.5	B+	3.80	1.50
105	Courtenay North 10	Full Footway Width	High Street	564	1016	11	A+	1.50	1.50
106	Courtenay South 1	Full Footway Width	High Street	344	485	13	A+	8.50	1.50
107	Courtenay South 2	Full Footway Width	High Street	975	1648	4.1	A-	3.69	2.29
108	Courtenay South 3	Full Footway Width	High Street	975	1648	3.5	A-	4.89	2.29
109	Courtenay South 4	Full Footway Width	High Street	1505	1842	6.8	A	3.16	2.56
110	Courtenay South 5	Full Footway Width	High Street	1505	1842	6.8	A	2.56	2.56
111	Courtenay South 6	Full Footway Width	High Street	1505	1842	9.7	A	2.56	2.56
112	Courtenay South 7	Full Footway Width	High Street	1505	1842	9.5	A	2.56	2.56
113	Courtenay South 8	Full Footway Width	High Street	1505	1842	12.7	A+	3.56	2.56
114	Courtenay South 9	Full Footway Width	High Street	1505	1842	15.4	A+	2.56	2.56
115	Courtenay South 10	Full Footway Width	High Street	1505	1842	11.2	A	15.06	2.56

A.7 PM Peak Option 2

Location Name		Location Type	Area Type	Average Flow (ADT)	AM Peak Hour Flow	Clear Footway Width	Peak Hour PCL	Total Width Required for PCL B+	Clear Width Required For PCL B+
7	Lambton Quay East 3	Full Footway Width	High Street	947	1683	6	A	2.34	2.34
8	Lambton Quay East 4	Full Footway Width	High Street	947	1683	3.7	A-	4.64	2.34
9	Lambton Quay East 5	Full Footway Width	High Street	879	1067	4.2	A	2.10	1.50
10	Lambton Quay East 6	Full Footway Width	High Street	879	1067	5.8	A	2.50	1.50
11	Lambton Quay East 7	Full Footway Width	High Street	879	1067	7.5	A+	2.50	1.50
12	Lambton Quay East 8	Full Footway Width	High Street	879	1067	8.6	A+	2.50	1.50
13	Lambton Quay East 9	Full Footway Width	High Street	879	1067	9.3	A+	2.10	1.50
14	Lambton Quay East 10	Full Footway Width	High Street	879	1067	5.9	A	3.70	1.50
15	Lambton Quay West 1	Full Footway Width	High Street	4066	4048	5.7	B	5.63	5.63
16	Lambton Quay West 2	Full Footway Width	High Street	4066	4048	3.6	C+	6.43	5.63
17	Lambton Quay West 3	Full Footway Width	High Street	2589	2894	5.3	B+	5.52	4.02
18	Lambton Quay West 4	Full Footway Width	High Street	2165	2722	10.8	A	4.39	3.79
19	Lambton Quay West 5	Full Footway Width	High Street	2165	2722	7.4	A-	4.59	3.79
20	Lambton Quay West 6	Full Footway Width	High Street	2165	2722	6.6	A-	5.99	3.79
21	Lambton Quay West 7	Full Footway Width	High Street	2165	2722	7.5	A-	4.59	3.79
22	Lambton Quay West 8	Full Footway Width	High Street	2165	2722	8.3	A	4.39	3.79
23	Lambton Quay West 9	Full Footway Width	High Street	2165	2722	7.3	A-	5.29	3.79
24	Lambton Quay West 10	Full Footway Width	High Street	2165	2722	12.9	A	4.39	3.79
25	Lambton Quay Mid East 1	Full Footway Width	High Street	1671	2242	6	A-	6.62	3.12
26	Lambton Quay Mid East 2	Full Footway Width	High Street	1671	2242	7.3	A	3.92	3.12
27	Lambton Quay Mid East 3	Full Footway Width	High Street	1671	2242	3.8	B+	6.72	3.12
28	Lambton Quay Mid East 4	Full Footway Width	High Street	1733	2370	6	A-	5.90	3.30
29	Lambton Quay Mid East 5	Full Footway Width	High Street	1733	2370	5.8	A-	4.30	3.30
30	Lambton Quay Mid East 6	Full Footway Width	High Street	1733	2370	6.5	A-	3.30	3.30
31	Lambton Quay Mid East 7	Full Footway Width	High Street	1785	2498	9.1	A	3.47	3.47
32	Lambton Quay Mid East 8	Full Footway Width	High Street	1785	2498	6.6	A-	4.77	3.47
33	Lambton Quay Mid East 9	Full Footway Width	High Street	1522	2457	9.9	A	3.42	3.42
34	Lambton Quay Mid East 10	Full Footway Width	High Street	1522	2457	7.7	A	3.42	3.42
35	Lambton Quay Mid West 1	Full Footway Width	High Street	5401	6787	7.8	B-	9.43	9.43
36	Lambton Quay Mid West 2	Full Footway Width	High Street	5401	6787	6.2	C+	12.83	9.43
37	Lambton Quay Mid West 3	Full Footway Width	High Street	5068	7522	8.2	B-	12.65	10.45
38	Lambton Quay Mid West 4	Full Footway Width	High Street	4744	8285	8	B-	11.51	11.51
39	Lambton Quay Mid West 5	Full Footway Width	High Street	4744	8285	5	D	14.11	11.51
40	Lambton Quay Mid West 6	Full Footway Width	High Street	3653	5991	7.5	B	9.73	8.33
41	Lambton Quay Mid West 7	Full Footway Width	High Street	3653	5991	6.1	B-	11.23	8.33
42	Lambton Quay Mid West 8	Full Footway Width	High Street	3653	5991	7.4	B	9.13	8.33
43	Lambton Quay Mid West 9	Full Footway Width	High Street	3653	5991	5.5	C+	9.83	8.33
44	Lambton Quay South East 1	Full Footway Width	High Street	1347	2007	3.8	B+	4.39	2.79
45	Lambton Quay South East 2	Full Footway Width	High Street	1347	2007	3	B+	3.79	2.79
46	Lambton Quay South East 3	Full Footway Width	High Street	839	1127	2	B+	2.57	1.57
47	Lambton Quay South East 4	Full Footway Width	High Street	839	1127	3.9	A	2.17	1.57
48	Lambton Quay South East 5	Full Footway Width	High Street	839	1127	2.3	A-	1.57	1.57
49	Lambton Quay South East 6	Full Footway Width	High Street	839	1127	2.2	B+	2.37	1.57
50	Lambton Quay South East 7	Full Footway Width	High Street	839	1127	5.9	A	4.57	1.57
51	Lambton Quay South East 8	Full Footway Width	High Street	839	1127	5.7	A	2.57	1.57
52	Lambton Quay South East 9	Full Footway Width	High Street	839	1127	4.4	A	2.57	1.57
53	Lambton Quay South East 10	Full Footway Width	High Street	839	1127	4.5	A	2.57	1.57
54	Lambton Quay South West 1	Full Footway Width	High Street	3626	3608	3.3	C+	8.62	5.02
55	Lambton Quay South West 2	Full Footway Width	High Street	3626	3608	4.1	B-	6.02	5.02
56	Lambton Quay South West 3	Full Footway Width	High Street	2928	3608	4.8	B	6.02	5.02
57	Lambton Quay South West 4	Full Footway Width	High Street	2928	3608	4.2	B	7.72	5.02
58	Willis St East 1	Full Footway Width	High Street	2335	2608	2.1	C	4.63	3.63
59	Willis St East 2	Full Footway Width	High Street	2335	2608	4.5	B+	4.63	3.63

60	Willis St East 3	Full Footway Width	High Street	3057	4588	3.4	C	7.38	6.38
61	Willis St East 4	Full Footway Width	High Street	3057	4588	3.4	C	7.78	6.38
62	Willis St East 5	Full Footway Width	High Street	2506	3973	6.9	B+	5.52	5.52
63	Willis St East 6	Full Footway Width	High Street	2506	3973	9.8	A-	5.52	5.52
64	Willis St East 7	Full Footway Width	High Street	2798	4609	3.3	C	8.41	6.41
65	Willis St East 8	Full Footway Width	High Street	2798	4609	3.4	C	8.81	6.41
66	Willis St East 9	Full Footway Width	High Street	2798	4609	3.1	C-	8.91	6.41
67	Willis St East 10	Full Footway Width	High Street	2798	4609	7.1	B+	6.41	6.41
68	Willis St West 1	Full Footway Width	High Street	2730	2515	3.9	B+	4.30	3.50
69	Willis St West 2	Full Footway Width	High Street	2865	3541	3	C+	8.92	4.92
70	Willis St West 3	Full Footway Width	High Street	2635	3257	2.3	C-	6.13	4.53
71	Willis St West 4	Full Footway Width	High Street	2760	4201	5	B	6.44	5.84
72	Willis to Manners East 1	Full Footway Width	High Street	2798	4609	4.1	C+	7.81	6.41
73	Willis to Manners East 2	Full Footway Width	High Street	2798	4609	4.1	C+	7.51	6.41
74	Willis to Manners East 3	Full Footway Width	High Street	1293	1898	2.9	B+	4.24	2.64
75	Willis to Manners East 4	Full Footway Width	High Street	1293	1898	4.5	A-	4.04	2.64
76	Willis to Manners East 5	Full Footway Width	High Street	1293	1898	4.4	A-	4.04	2.64
77	Willis to Manners East 6	Full Footway Width	High Street	1293	1898	3.3	B+	3.44	2.64
78	Willis to Manners East 7	Full Footway Width	High Street	1421	1926	5	A-	2.68	2.68
79	Willis to Manners East 8	Full Footway Width	High Street	1421	1926	3.3	B+	4.08	2.68
80	Willis to Manners West 1	Full Footway Width	High Street	458	676	3.3	A	1.50	1.50
81	Willis to Manners West 2	Full Footway Width	High Street	458	676	2.5	A	1.50	1.50
82	Willis to Manners West 3	Full Footway Width	High Street	791	1193	2.1	B+	2.26	1.66
83	Willis to Manners West 4	Full Footway Width	High Street	791	1193	4.5	A	3.96	1.66
84	Willis to Manners West 5	Full Footway Width	High Street	791	1193	2.2	B+	4.16	1.66
85	Willis to Manners West 6	Full Footway Width	High Street	791	1193	5.2	A	3.06	1.66
86	Willis to Manners West 7	Full Footway Width	High Street	947	1418	9.3	A	4.18	1.98
87	Manners West 1	Full Footway Width	High Street	947	1418	4.5	A	1.98	1.98
88	Manners West 2	Full Footway Width	High Street	947	1418	8.4	A	1.98	1.98
89	Manners West 3	Full Footway Width	High Street	2416	3618	2.8	C	8.63	5.03
90	Manners West 4	Full Footway Width	High Street	2416	3618	7.1	A-	14.53	5.03
91	Manners West 5	Full Footway Width	High Street	2416	3618	2.1	D	5.23	5.03
92	Manners West 6	Full Footway Width	High Street	2416	3618	5.4	B+	6.43	5.03
93	Manners East 7	Full Footway Width	High Street	910	1180	3.7	A	2.04	1.64
94	Manners East 8	Full Footway Width	High Street	910	1180	3.6	A	3.84	1.64
95	Manners East 9	Full Footway Width	High Street	910	1180	2.9	A-	2.24	1.64
96	Courtenay North 1	Full Footway Width	High Street	876	1435	3.1	A-	2.00	2.00
97	Courtenay North 2	Full Footway Width	High Street	876	1435	3	A-	3.70	2.00
98	Courtenay North 3	Full Footway Width	High Street	694	1076	10.4	A+	3.60	1.50
99	Courtenay North 4	Full Footway Width	High Street	510	717	5.5	A+	1.70	1.50
100	Courtenay North 5	Full Footway Width	High Street	510	717	4.9	A+	3.80	1.50
101	Courtenay North 6	Full Footway Width	High Street	564	1016	5.7	A	1.90	1.50
102	Courtenay North 7	Full Footway Width	High Street	564	1016	4.3	A	6.30	1.50
103	Courtenay North 8	Full Footway Width	High Street	564	1016	12.2	A+	7.70	1.50
104	Courtenay North 9	Full Footway Width	High Street	564	1016	9.5	A+	3.80	1.50
105	Courtenay North 10	Full Footway Width	High Street	564	1016	14	A+	1.50	1.50
106	Courtenay South 1	Full Footway Width	High Street	344	485	9	A+	8.50	1.50
107	Courtenay South 2	Full Footway Width	High Street	975	1648	4.1	A-	3.69	2.29
108	Courtenay South 3	Full Footway Width	High Street	975	1648	4.5	A-	4.89	2.29
109	Courtenay South 4	Full Footway Width	High Street	1505	1842	6.8	A	3.16	2.56
110	Courtenay South 5	Full Footway Width	High Street	1505	1842	5.8	A	2.56	2.56
111	Courtenay South 6	Full Footway Width	High Street	1505	1842	12.7	A+	2.56	2.56
112	Courtenay South 7	Full Footway Width	High Street	1505	1842	8.5	A	2.56	2.56
113	Courtenay South 8	Full Footway Width	High Street	1505	1842	12.7	A+	3.56	2.56
114	Courtenay South 9	Full Footway Width	High Street	1505	1842	16.4	A+	2.56	2.56
115	Courtenay South 10	Full Footway Width	High Street	1505	1842	11.2	A	15.06	2.56

A.8 PM Peak Option 3

Location Name		Location Type	Area Type	Average Flow (ADT)	AM Peak Hour Flow	Clear Footway Width	Peak Hour PCL	Total Width Required for PCL B+	Clear Width Required For PCL B+
7	Lambton Quay East 3	Full Footway Width	High Street	947	1683	8	A	2.34	2.34
8	Lambton Quay East 4	Full Footway Width	High Street	947	1683	5.7	A	4.64	2.34
9	Lambton Quay East 5	Full Footway Width	High Street	879	1067	7.2	A+	2.10	1.50
10	Lambton Quay East 6	Full Footway Width	High Street	879	1067	8.8	A+	2.50	1.50
11	Lambton Quay East 7	Full Footway Width	High Street	879	1067	9.5	A+	2.50	1.50
12	Lambton Quay East 8	Full Footway Width	High Street	879	1067	10.6	A+	2.50	1.50
13	Lambton Quay East 9	Full Footway Width	High Street	879	1067	12.3	A+	2.10	1.50
14	Lambton Quay East 10	Full Footway Width	High Street	879	1067	8.9	A+	3.70	1.50
15	Lambton Quay West 1	Full Footway Width	High Street	4066	4048	5.7	B	5.63	5.63
16	Lambton Quay West 2	Full Footway Width	High Street	4066	4048	3.6	C+	6.43	5.63
17	Lambton Quay West 3	Full Footway Width	High Street	2589	2894	5.3	B+	5.52	4.02
18	Lambton Quay West 4	Full Footway Width	High Street	2165	2722	9.8	A	4.39	3.79
19	Lambton Quay West 5	Full Footway Width	High Street	2165	2722	7.4	A-	4.59	3.79
20	Lambton Quay West 6	Full Footway Width	High Street	2165	2722	6.6	A-	5.99	3.79
21	Lambton Quay West 7	Full Footway Width	High Street	2165	2722	8.5	A	4.59	3.79
22	Lambton Quay West 8	Full Footway Width	High Street	2165	2722	9.3	A	4.39	3.79
23	Lambton Quay West 9	Full Footway Width	High Street	2165	2722	7.3	A-	5.29	3.79
24	Lambton Quay West 10	Full Footway Width	High Street	2165	2722	12.9	A	4.39	3.79
25	Lambton Quay Mid East 1	Full Footway Width	High Street	1671	2242	6	A-	6.62	3.12
26	Lambton Quay Mid East 2	Full Footway Width	High Street	1671	2242	9.3	A	3.92	3.12
27	Lambton Quay Mid East 3	Full Footway Width	High Street	1671	2242	6.8	A	6.72	3.12
28	Lambton Quay Mid East 4	Full Footway Width	High Street	1733	2370	8	A	5.90	3.30
29	Lambton Quay Mid East 5	Full Footway Width	High Street	1733	2370	7.8	A	4.30	3.30
30	Lambton Quay Mid East 6	Full Footway Width	High Street	1733	2370	9.5	A	3.30	3.30
31	Lambton Quay Mid East 7	Full Footway Width	High Street	1785	2498	12.1	A	3.47	3.47
32	Lambton Quay Mid East 8	Full Footway Width	High Street	1785	2498	9.6	A	4.77	3.47
33	Lambton Quay Mid East 9	Full Footway Width	High Street	1522	2457	10.9	A	3.42	3.42
34	Lambton Quay Mid East 10	Full Footway Width	High Street	1522	2457	9.7	A	3.42	3.42
35	Lambton Quay Mid West 1	Full Footway Width	High Street	5401	6787	7.8	B-	9.43	9.43
36	Lambton Quay Mid West 2	Full Footway Width	High Street	5401	6787	8.2	B	12.83	9.43
37	Lambton Quay Mid West 3	Full Footway Width	High Street	5068	7522	8.2	B-	12.65	10.45
38	Lambton Quay Mid West 4	Full Footway Width	High Street	4744	8285	8	B-	11.51	11.51
39	Lambton Quay Mid West 5	Full Footway Width	High Street	4744	8285	6	C	14.11	11.51
40	Lambton Quay Mid West 6	Full Footway Width	High Street	3653	5991	7.5	B	9.73	8.33
41	Lambton Quay Mid West 7	Full Footway Width	High Street	3653	5991	6.1	B-	11.23	8.33
42	Lambton Quay Mid West 8	Full Footway Width	High Street	3653	5991	6.4	B-	9.13	8.33
43	Lambton Quay Mid West 9	Full Footway Width	High Street	3653	5991	5.5	C+	9.83	8.33
44	Lambton Quay South East 1	Full Footway Width	High Street	1347	2007	3.8	B+	4.39	2.79
45	Lambton Quay South East 2	Full Footway Width	High Street	1347	2007	3	B+	3.79	2.79
46	Lambton Quay South East 3	Full Footway Width	High Street	839	1127	2	B+	2.57	1.57
47	Lambton Quay South East 4	Full Footway Width	High Street	839	1127	3.9	A	2.17	1.57
48	Lambton Quay South East 5	Full Footway Width	High Street	839	1127	2.3	A-	1.57	1.57
49	Lambton Quay South East 6	Full Footway Width	High Street	839	1127	2.2	B+	2.37	1.57
50	Lambton Quay South East 7	Full Footway Width	High Street	839	1127	5.9	A	4.57	1.57
51	Lambton Quay South East 8	Full Footway Width	High Street	839	1127	5.7	A	2.57	1.57
52	Lambton Quay South East 9	Full Footway Width	High Street	839	1127	4.4	A	2.57	1.57
53	Lambton Quay South East 10	Full Footway Width	High Street	839	1127	4.5	A	2.57	1.57
54	Lambton Quay South West 1	Full Footway Width	High Street	3626	3608	3.3	C+	8.62	5.02
55	Lambton Quay South West 2	Full Footway Width	High Street	3626	3608	4.1	B-	6.02	5.02
56	Lambton Quay South West 3	Full Footway Width	High Street	2928	3608	4.8	B	6.02	5.02
57	Lambton Quay South West 4	Full Footway Width	High Street	2928	3608	4.2	B	7.72	5.02
58	Willis St East 1	Full Footway Width	High Street	2335	2608	2.1	C	4.63	3.63

59	Willis St East 2	Full Footway Width	High Street	2335	2608	4.5	B+	4.63	3.63
60	Willis St East 3	Full Footway Width	High Street	3057	4588	3.4	C	7.38	6.38
61	Willis St East 4	Full Footway Width	High Street	3057	4588	3.4	C	7.78	6.38
62	Willis St East 5	Full Footway Width	High Street	2506	3973	7.9	A-	5.52	5.52
63	Willis St East 6	Full Footway Width	High Street	2506	3973	10.8	A-	5.52	5.52
64	Willis St East 7	Full Footway Width	High Street	2798	4609	4.3	C+	8.41	6.41
65	Willis St East 8	Full Footway Width	High Street	2798	4609	4.4	B-	8.81	6.41
66	Willis St East 9	Full Footway Width	High Street	2798	4609	4.1	C+	8.91	6.41
67	Willis St East 10	Full Footway Width	High Street	2798	4609	8.1	B+	6.41	6.41
68	Willis St West 1	Full Footway Width	High Street	2730	2515	6.9	A-	4.30	3.50
69	Willis St West 2	Full Footway Width	High Street	2865	3541	6	B+	8.92	4.92
70	Willis St West 3	Full Footway Width	High Street	2635	3257	4.3	B	6.13	4.53
71	Willis St West 4	Full Footway Width	High Street	2760	4201	7	B+	6.44	5.84
72	Willis to Manners East 1	Full Footway Width	High Street	2798	4609	3.1	C-	7.81	6.41
73	Willis to Manners East 2	Full Footway Width	High Street	2798	4609	4.1	C+	7.51	6.41
74	Willis to Manners East 3	Full Footway Width	High Street	1293	1898	2.9	B+	4.24	2.64
75	Willis to Manners East 4	Full Footway Width	High Street	1293	1898	4.5	A-	4.04	2.64
76	Willis to Manners East 5	Full Footway Width	High Street	1293	1898	4.4	A-	4.04	2.64
77	Willis to Manners East 6	Full Footway Width	High Street	1293	1898	3.3	B+	3.44	2.64
78	Willis to Manners East 7	Full Footway Width	High Street	1421	1926	5	A-	2.68	2.68
79	Willis to Manners East 8	Full Footway Width	High Street	1421	1926	3.3	B+	4.08	2.68
80	Willis to Manners West 1	Full Footway Width	High Street	458	676	3.3	A	1.50	1.50
81	Willis to Manners West 2	Full Footway Width	High Street	458	676	2.5	A	1.50	1.50
82	Willis to Manners West 3	Full Footway Width	High Street	791	1193	2.1	B+	2.26	1.66
83	Willis to Manners West 4	Full Footway Width	High Street	791	1193	4.5	A	3.96	1.66
84	Willis to Manners West 5	Full Footway Width	High Street	791	1193	2.2	B+	4.16	1.66
85	Willis to Manners West 6	Full Footway Width	High Street	791	1193	5.2	A	3.06	1.66
86	Willis to Manners West 7	Full Footway Width	High Street	947	1418	9.3	A	4.18	1.98
87	Manners West 1	Full Footway Width	High Street	947	1418	4.5	A	1.98	1.98
88	Manners West 2	Full Footway Width	High Street	947	1418	8.4	A	1.98	1.98
89	Manners West 3	Full Footway Width	High Street	2416	3618	2.8	C	8.63	5.03
90	Manners West 4	Full Footway Width	High Street	2416	3618	7.1	A-	14.53	5.03
91	Manners West 5	Full Footway Width	High Street	2416	3618	2.1	D	5.23	5.03
92	Manners West 6	Full Footway Width	High Street	2416	3618	5.4	B+	6.43	5.03
93	Manners East 7	Full Footway Width	High Street	910	1180	3.7	A	2.04	1.64
94	Manners East 8	Full Footway Width	High Street	910	1180	3.6	A	3.84	1.64
95	Manners East 9	Full Footway Width	High Street	910	1180	2.9	A-	2.24	1.64
96	Courtenay North 1	Full Footway Width	High Street	876	1435	5.1	A	2.00	2.00
97	Courtenay North 2	Full Footway Width	High Street	876	1435	8	A	3.70	2.00
98	Courtenay North 3	Full Footway Width	High Street	694	1076	15.4	A+	3.60	1.50
99	Courtenay North 4	Full Footway Width	High Street	510	717	9.5	A+	1.70	1.50
100	Courtenay North 5	Full Footway Width	High Street	510	717	7.9	A+	3.80	1.50
101	Courtenay North 6	Full Footway Width	High Street	564	1016	10.7	A+	1.90	1.50
102	Courtenay North 7	Full Footway Width	High Street	564	1016	6.3	A	6.30	1.50
103	Courtenay North 8	Full Footway Width	High Street	564	1016	6.2	A	7.70	1.50
104	Courtenay North 9	Full Footway Width	High Street	564	1016	8.5	A+	3.80	1.50
105	Courtenay North 10	Full Footway Width	High Street	564	1016	11	A+	1.50	1.50
106	Courtenay South 1	Full Footway Width	High Street	344	485	9	A+	8.50	1.50
107	Courtenay South 2	Full Footway Width	High Street	975	1648	2.1	B	3.69	2.29
108	Courtenay South 3	Full Footway Width	High Street	975	1648	3.5	A-	4.89	2.29
109	Courtenay South 4	Full Footway Width	High Street	1505	1842	4.8	A-	3.16	2.56
110	Courtenay South 5	Full Footway Width	High Street	1505	1842	3.8	A-	2.56	2.56
111	Courtenay South 6	Full Footway Width	High Street	1505	1842	11.7	A	2.56	2.56
112	Courtenay South 7	Full Footway Width	High Street	1505	1842	6.5	A	2.56	2.56
113	Courtenay South 8	Full Footway Width	High Street	1505	1842	9.7	A	3.56	2.56
114	Courtenay South 9	Full Footway Width	High Street	1505	1842	13.4	A+	2.56	2.56
115	Courtenay South 10	Full Footway Width	High Street	1505	1842	12.2	A	15.06	2.56

Appendix B: Criteria 2

B.1 AM peak Pedestrian delays along the Golden Mile

GM	Side Street	Control	Green ped phase	Section demand PER HOUR			Signal/Delay time (seconds)				Average delay (seconds)				Total delay for all people (seconds)			
				North/East	South/West	Total crossing	Base	Option 1	Option 2	Option 3	Base	Option 1	Option 2	Option 3	Base	Option 1	Option 2	Option 3
Lambton Quay	Whitmore Street	1-signal	12	867	950	867	107	107	107	107	42	42	42	42	36,547	36,547	36,547	36,547
	Ballance Street	2-unsignalised	0	950	900	900	10	10	-	-	10	10	-	-	8,999	8,999	-	-
	Stout Street	1-signal	23	900	1,810	900	48	44	-	-	7	5	-	-	5,859	4,510	-	-
	Waring Taylor Street	2-unsignalised	0	1,810	1,842	1,810	10	10	-	-	10	10	-	-	18,095	18,095	-	-
	Woodward Street	1-signal	19	1,842	1,842	1,842	-	-	-	-	-	-	-	-	-	-	-	-
	Johnston Street	2-unsignalised	0	1,842	1,858	1,842	10	10	-	-	10	10	-	-	18,416	18,416	-	-
	Brandon Street	1-signal	22	1,858	1,523	1,523	65	44	-	-	14	6	-	-	21,656	8,374	-	-
	Panama Street	2-unsignalised	0	1,523	1,211	1,211	10	10	-	-	10	10	-	-	12,111	12,111	-	-
	Grey Street	1-signal	15	1,211	632	632	-	-	-	-	-	-	-	-	-	-	-	-
	Hunter Street	1-signal	17	632	632	632	75	75	75	75	22	22	22	22	14,168	14,168	14,168	14,168
LAMBTON QUAY TOTALS											**125**	**115**	**65**	**65**	**135,851**	**121,220**	**50,714**	**50,714**
Willis Street	Customhouse Quay/Willeston Street	1-signal	23	632	3,111	632	78	70	70	70	19	16	16	16	12,250	9,968	9,968	9,968
	Chews Lane	1-signal	14	3,111	2,339	2,339	-	-	-	-	-	-	-	-	-	-	-	-
	Mercer Street	1-signal	20	2,339	2,429	2,339	78	-	-	-	22	-	-	-	50,431	-	-	-
	Bond Street	2-unsignalised	0	2,429	2,429	2,429	-	-	-	-	-	-	-	-	-	-	-	-
	Manners Street	1-signal	17	2,429	950	950	78	71	57	57	24	21	14	14	22,658	19,507	13,332	13,332
WILLIS STREET											**65**	**36**	**30**	**30**	**85,339**	**29,475**	**23,300**	**23,300**
Manners Street	St Hill Street	3-no traffic	0	950	950	950	-	-	-	-	-	-	-	-	-	-	-	-
	Victoria Street	1-signal	17	950	1,383	950	79	79	79	79	24	24	24	24	23,111	23,111	23,111	23,111
	Lombard Street	3-no traffic	0	1,383	1,383	1,383	-	-	-	-	-	-	-	-	-	-	-	-
	Cuba Street	1-signal	38	1,383	917	917	61	-	-	-	4	-	-	-	3,975	-	-	-
	Opera House Lane	3-no traffic	0	917	917	917	-	-	-	-	-	-	-	-	-	-	-	-
	Lukes Lane	3-no traffic	0	917	917	917	-	-	-	-	-	-	-	-	-	-	-	-
	Taranaki Street	1-signal	12	917	792	792	168	84	84	84	72	31	31	31	57,379	24,445	24,445	24,445
MANNERS STREET											**101**	**55**	**55**	**55**	**84,464**	**47,556**	**47,556**	**47,556**
Courtenay Place	CP 1	1-signal	19	792	463	463	56	56	56	56	12	12	12	12	5,664	5,664	5,664	5,664
	Tory Street	1-signal	12	463	448	448	112	57	57	-	45	18	18	-	20,019	7,965	7,965	-
	CP 2	1-signal	19	448	448	448	95	56	56	56	30	12	12	12	13,632	5,481	5,481	5,481
	Allen Street	2-unsignalised	0	448	448	448	10	10	-	-	10	10	-	-	4,484	4,484	-	-
	Blair Street	2-unsignalised	0	448	448	448	10	10	-	-	10	10	-	-	4,484	4,484	-	-
	Kent Terrace	1-signal	15	448	448	448	116	116	116	116	44	44	44	44	19,717	19,717	19,717	19,717
COURTENAY PLACE											**151**	**106**	**86**	**68**	**68,000**	**47,796**	**38,827**	**30,862**

B.2 AM peak Pedestrian delays across the Golden Mile

GM	Side Street	Control	Green ped phase	Section demand PER HOUR	Signal/Delay time (seconds)				Average delay (seconds)				Total delay for all people (seconds)			
				Total crossing	Base	Option 1	Option 2	Option 3	Base	Option 1	Option 2	Option 3	Base	Option 1	Option 2	Option 3
Lambton Quay	Whitmore Street	1-signal	25	433	107	107	107	107	31	31	31	31	13,614	13,614	13,614	13,614
	Ballance Street	2-unsignalised	0	450	20	20	20	20	20	20	20	20	8,999	8,999	8,999	8,999
	Stout Street	1-signal	23	450	48	44	44	44	7	5	5	5	2,929	2,255	2,255	2,255
	Waring Taylor Street	2-unsignalised	0	905	20	20	20	20	20	20	20	20	18,095	18,095	18,095	18,095
	Woodward Street	1-signal	19	921	44	44	44	44	7	7	7	7	6,540	6,540	6,540	6,540
	Johnston Street	2-unsignalised	0	921	20	20	-	-	20	20	-	-	18,416	18,416	-	-
	Brandon Street	1-signal	22	761	65	44	44	44	14	6	6	6	10,828	4,187	4,187	4,187
	Panama Street	2-unsignalised	0	606	-	-	-	-	-	-	-	-	-	-	-	-
	Grey Street	1-signal	15	316	38	38	38	38	7	7	7	7	2,199	2,199	2,199	2,199
	Hunter Street	1-signal	17	316	75	75	75	75	22	22	22	22	7,084	7,084	7,084	7,084
LAMBTON QUAY									**149**	**138**	**118**	**118**	**88704**	**81389**	**62973**	**62973**
Willis Street	Customhouse Quay/willeston Street	1-signal	23	316	78	70	70	70	19	16	16	16	6,125	4,984	4,984	4,984
	Chews Lane	1-signal	14	1,169	39	39	39	39	8	8	8	8	9,370	9,370	9,370	9,370
	Mercer Street	1-signal	20	1,169	78	39	39	39	22	5	5	5	25,216	5,412	5,412	5,412
	Bond Street	2-unsignalised	0	1,215	-	-	-	-	-	-	-	-	-	-	-	-
	Manners Street	1-signal	17	475	78	71	57	57	24	21	14	14	11,329	9,753	6,666	6,666
WILLIS STREET									**73**	**49**	**42**	**42**	**52039**	**29519**	**26432**	**26432**
Manners Street	St Hill Street	3-no traffic	0	475	-	-	-	-	-	-	-	-	-	-	-	-
	Victoria Street	1-signal	17	475	79	79	79	79	24	24	24	24	11,555	11,555	11,555	11,555
	Lombard Street	3-no traffic	0	692	-	-	-	-	-	-	-	-	-	-	-	-
	Cuba Street	1-signal	38	458	61	61	61	61	4	4	4	4	1,987	1,987	1,987	1,987
	Opera House Lane	3-no traffic	0	458	-	-	-	-	-	-	-	-	-	-	-	-
	Lukes Lane	3-no traffic	0	458	-	-	-	-	-	-	-	-	-	-	-	-
	Taranaki Street	1-signal	12	396	168	84	84	84	72	31	31	31	28,689	12,223	12,223	12,223
MANNERS STREET									**101**	**60**	**60**	**60**	**42232**	**25765**	**25765**	**25765**
Courtenay Place	CP 1	1-signal	19	232	56	56	56	56	12	12	12	12	2,832	2,832	2,832	2,832
	Tory Street	1-signal	12	224	112	57	57	57	45	18	18	18	10,009	3,983	3,983	3,983
	CP 2	1-signal	19	224	95	56	56	56	30	12	12	12	6,816	2,741	2,741	2,741
	Allen Street	2-unsignalised	0	224	20	20	20	20	20	20	20	20	4,484	4,484	4,484	4,484
	Blair Street	2-unsignalised	0	224	20	20	20	20	20	20	20	20	4,484	4,484	4,484	4,484
	Kent Terrace	1-signal	15	224	116	116	116	116	44	44	44	44	9,858	9,858	9,858	9,858
COURTENAY PLACE									**171**	**126**	**126**	**126**	**38484**	**28382**	**28382**	**28382**

B.3 PM peak Pedestrian delays along the Golden Mile

GM	Side Street	Control	Green ped phase	Section demand PER HOUR			Signal/Delay time (seconds)				Average delay (seconds)				Total delay for all people (seconds)			
				North/East	South/West	Total crossing	Base	Option 1	Option 2	Option 3	Base	Option 1	Option 2	Option 3	Base	Option 1	Option 2	Option 3
Lambton Quay	Whitmore Street	1-signal	25	1,283	1,683	1,283	98	98	98	98	27	27	27	27	34,889	34,889	34,889	34,889
	Ballance Street	2-unsignalised	0	1,683	1,067	1,067	10	10	-	-	10	10	-	-	10,666	10,666	-	-
	Stout Street	1-signal	23	1,067	2,242	1,067	52	49	20	20	8	7	0	0	8,625	7,357	240	240
	Waring Taylor Street	2-unsignalised	0	2,242	2,370	2,242	10	10	-	-	10	10	-	-	22,419	22,419	-	-
	Woodward Street	1-signal	19	2,370	2,370	2,370	-	-	-	-	-	-	-	-	-	-	-	-
	Johnston Street	2-unsignalised	0	2,370	2,498	2,370	10	10	-	-	10	10	-	-	23,700	23,700	-	-
	Brandon Street	1-signal	22	2,498	2,457	2,457	66	49	20	20	15	7	0	0	36,035	18,276	246	246
	Panama Street	2-unsignalised	0	2,457	2,007	2,007	10	10	-	-	10	10	-	-	20,070	20,070	-	-
	Grey Street	1-signal	15	2,007	1,127	1,127	-	-	-	-	-	-	-	-	-	-	-	-
	Hunter Street	1-signal	18	1,127	1,127	1,127	72	72	72	72	20	20	20	20	22,826	22,826	22,826	22,826
LAMBTON QUAY											**110**	**102**	**48**	**48**	**179230**	**160204**	**58201**	**58201**
Willis Street	Customhouse Quay/willeston Street	1-signal	24	1,127	4,588	1,127	75	70	70	70	17	15	15	15	19,546	17,037	17,037	17,037
	Chews Lane	1-signal	13	4,588	3,973	3,973	-	-	-	-	-	-	-	-	-	-	-	-
	Mercer Street	1-signal	20	3,973	4,609	3,973	80	-	-	-	23	-	-	-	89,403	-	-	-
	Bond Street	2-unsignalised	0	4,609	4,609	4,609	-	-	-	-	-	-	-	-	-	-	-	-
	Manners Street	1-signal	18	4,609	1,127	1,127	81	74	56	56	25	21	13	13	27,617	23,885	14,533	14,533
WILLIS STREET											**64**	**36**	**28**	**28**	**136566**	**40922**	**31570**	**31570**
Manners Street	St Hill Street	3-no traffic	0	1,127	1,127	1,127	-	-	-	-	-	-	-	-	-	-	-	-
	Victoria Street	1-signal	17	1,127	1,926	1,127	81	81	81	81	25	25	25	25	28,501	28,501	28,501	28,501
	Lombard Street	3-no traffic	0	1,926	1,926	1,926	-	-	-	-	-	-	-	-	-	-	-	-
	Cuba Street	1-signal	32	1,926	1,180	1,180	55	-	-	-	5	-	-	-	5,674	-	-	-
	Opera House Lane	3-no traffic	0	1,180	1,180	1,180	-	-	-	-	-	-	-	-	-	-	-	-
	Lukes Lane	3-no traffic	0	1,180	1,180	1,180	-	-	-	-	-	-	-	-	-	-	-	-
	Taranaki Street	1-signal	12	1,180	1,435	1,180	176	88	88	88	76	33	33	33	90,153	38,721	38,721	38,721
MANNERS STREET											**107**	**58**	**58**	**58**	**124328**	**67222**	**67222**	**67222**
Courtenay Place	CP 1	1-signal	19	1,435	717	717	61	61	61	61	14	14	14	14	10,374	10,374	10,374	10,374
	Tory Street	1-signal	12	717	1,193	717	146	61	61	-	61	20	20	-	44,120	14,120	14,120	-
	CP 2	1-signal	19	1,193	1,193	1,193	73	61	61	61	20	14	14	14	23,833	17,254	17,254	17,254
	Allen Street	2-unsignalised	0	1,193	1,193	1,193	10	10	-	-	10	10	-	-	11,933	11,933	-	-
	Blair Street	2-unsignalised	0	1,193	1,193	1,193	10	10	-	-	10	10	-	-	11,933	11,933	-	-
	Kent Terrace	1-signal	15	1,193	1,193	1,193	118	118	118	118	45	45	45	45	53,642	53,642	53,642	53,642
COURTENAY PLACE											**161**	**114**	**94**	**74**	**155833**	**119255**	**95389**	**81269**

B.4 PM peak Pedestrian delays across the Golden Mile

GM	Side Street	Control	Green ped phase	Section demand PER HOUR	Signal/Delay time (seconds)				Average delay (seconds)				Total delay for all people (seconds)			
				Total crossing	Base	Option 1	Option 2	Option 3	Base	Option 1	Option 2	Option 3	Base	Option 1	Option 2	Option 3
Lambton Quay	Whitmore Street	1-signal	25	433	98	98	98	98	27	27	27	27	11,781	11,781	11,781	11,781
	Ballance Street	2-unsignalised	0	450	20	20	20	20	20	20	20	20				
	Stout Street	1-signal	23	450	52	49	49	49	8	7	7	7	3,639	3,104	3,104	3,104
	Waring Taylor Street	2-unsignalised	0	905	20	20	20	20	20	20	20	20				
	Woodward Street	1-signal	19	921	49	49	49	49	9	9	9	9	8,456	8,456	8,456	8,456
	Johnston Street	2-unsignalised	0	921	20	20	-	-	20	20	-	-				
	Brandon Street	1-signal	22	761	66	49	49	49	15	7	7	7	11,166	5,663	5,663	5,663
	Panama Street	2-unsignalised	0	606												
	Grey Street	1-signal	15	316	40	40	40	40	8	8	8	8	2,468	2,468	2,468	2,468
	Hunter Street	1-signal	18	316	72	72	72	72	20	20	20	20	6,396	6,396	6,396	6,396
LAMBTON QUAY									147	139	119	119	43905	37868	37868	37868
Willis Street	Customhouse Quay/willeston Street	1-signal	24	316	75	70	70	70	17	15	15	15	5,477	4,774	4,774	4,774
	Chews Lane	1-signal	13	1,169	45	45	45	45	11	11	11	11	13,304	13,304	13,304	13,304
	Mercer Street	1-signal	20	1,169	80	45	45	45	23	7	7	7	26,310	8,120	8,120	8,120
	Bond Street	2-unsignalised	0	1,215												
	Manners Street	1-signal	18	475	81	74	56	56	25	21	13	13	11,636	10,064	6,124	6,124
WILLIS STREET									76	55	46	46	56728	36263	32323	32323
Manners Street	St Hill Street	3-no traffic	0	475												
	Victoria Street	1-signal	17	475	81	81	81	81	25	25	25	25	12,009	12,009	12,009	12,009
	Lombard Street	3-no traffic	0	692												
	Cuba Street	1-signal	32	458	55	55	55	55	5	5	5	5	2,204	2,204	2,204	2,204
	Opera House Lane	3-no traffic	0	458												
	Lukes Lane	3-no traffic	0	458												
	Taranaki Street	1-signal	12	396	176	88	88	88	76	33	33	33	30,266	12,999	12,999	12,999
MANNERS STREET									107	63	63	63	44479	27212	27212	27212
Courtenay Place	CP 1	1-signal	19	232	61	61	61	61	14	14	14	14	3,350	3,350	3,350	3,350
	Tory Street	1-signal	12	224	146	61	61	61	61	20	20	20	13,787	4,413	4,413	4,413
	CP 2	1-signal	19	224	73	61	61	61	20	14	14	14	4,478	3,242	3,242	3,242
	Allen Street	2-unsignalised	0	224	20	20	20	20	20	20	20	20				
	Blair Street	2-unsignalised	0	224	20	20	20	20	20	20	20	20				
	Kent Terrace	1-signal	15	224	118	118	118	118	45	45	45	45	10,079	10,079	10,079	10,079
COURTENAY PLACE									181	134	134	134	31694	21083	21083	21083

Appendix C: Criteria 1

Place Quality Report

MCA REPORT URBAN AMENITY [DRAFT]

GOLDEN MILE LGWM

1. PURPOSE

The following report describes the method used and the outcomes of an MCA of the urban amenity criteria performance of the 3 options for the Golden Mile (GM) LGWM project. The note defines urban amenity first then provides an attached tabulated assessment including a score and notes for each of the 3 options being assessed.

The MCA process has included:

- Review of the 3 options by urban designers to understand its elements and differences between
- Confirmation of the criteria and preliminary assessment in discussions with WCC and LGWM
- Assessment of each option by urban designers using a +3 to -3 range against the criteria with associated notes
- Review and moderation as appropriate of the evaluation in a joint workshop of TAG and OIMs and others

2. URBAN AMENITY ATTRIBUTES for GOLDEN MILE

The agreed definition of Urban Amenity and its component attributes for LGWM has been used to assess the Golden Mile options. We note that additional consideration is being given by LGWM at a programme level to consider a broader set of attributes for the 'Liveability" programme objective. Urban Amenity is part of this broader definition for the programme and the diagram attached reflects the current state of play on this work. However, at this time it is considered appropriate to focus on the Urban Amenity attributes used here. The attributes used have been calibrated to the GM specifically and how this context can be influenced by, or have an influence on, the options. The attributes are consistently applied across all the LGWM programme - being composition, connectedness, activity, and comfort. The following are the specific attributes and indicators identified for the Golden Mile at this time in the MCA process.

Amenity Attributes	Includes:	Assessment	Indicator measures (current v proposed in each option)
Composition	• Character distinctiveness • Green Infrastructure • Legibility and Wayfinding	How easy to interpret space – this will be assisted by for example ability to see to waterfront – street closures allows for pause and sighting/interpretation and wider space allocation to ped/public realm of GM allows old shoreline and heritage buildings. corners to be 'read'.	• Number of side streets closed + other improved connections

		What green infrastructure is there currently, may be affected and opportunity for future.	
Comfort	• Noise/dominance • Personal safety • Climate	How much of the GM space is 'habitable' – typically sun, separation from busy traffic and how safe is it for personal safety (CPTED)	• % of street space that is in sun (LQ) and (CP) – measure at a few indicator spots. • % of length of GM where buffer of 3m or more from moving vehicles
Connectedness	• Allocation of space • Desire lines • Crossing points	How easy to cross over GM and move about within the space – typically about desire lines and how many lanes to cross over, and formal crossing facility frequency	• Number of signalised crossings • Number lanes to cross
Activation	• Trading space • Active edge opportunity • Space for events/activity	How much opportunity space for shops to spill out, for street buskers in addition to functional movement space and how many dwelling spots are available where groups can gather	• % of ped/public linear realm street space that is additional to (4m clear wide) foot path width • M2 of area of area for 'dwelling' (eg street stop ends)

3. KEY SUMMARY POINTS

The primary differentiators within the 3 options are summarised as:

a. Where there is greater space allocation within the public realm of the street space to non-vehicle modes there is a greater benefit in the scores. Although at this time the details are not known, there is the greatest propensity for this space to have better amenity.

b. The greater space allocation to non-vehicular modes also generates, even without the detail of the design known, fundamental benefits in comfort through reduced vehicle dominance and separation from moving large objects (buses), and ability to find sun, out in the street and side streets, simplicity of space/decluttering.

c. The lesser number of moving vehicle lanes there are, the easier it will be to cross the street informally. It is an important aspect of the GM that people can bounce backwards and forwards across the street as part of their experience of the street and wider city.

d. The positive influence to the trading and business vibrancy from the GM options is best where there is most space allocated to public realm where space can be used at the street wall as spill out trading area (eg displays, hospitality etc) as well as to allow kiosk and support smaller businesses within new space to increase the diversity of use and improve street customer experience. Also programmed events and activities would add to the attractiveness of the area for people spending day and night time within the GM space.

e. There is a public life opportunity in the options where greater areas of space are enabled for reuse as green and other public spaces that allow people to spend time there – taking break from shopping, having lunch, attending an event, connecting to destinations (Embassy, St James etc). Currently many spaces (a few exceptions like Midland Park) within the public realm for dwelling are café/bar edges which implicates a cost and type of user experience which is more transactional than building a broader community of city inhabitants.

f. There are opportunities for some elements of the options to also enable other city context benefits. These include the utilisation of Mercer Street to both connect to Te Ngakau (Civic Sq) as well as reorder the Wakefield/Victoria Street intersection which is currently poor for desire lines. Redevelopment of the library will allow a piggy-back opportunity. An extension of this Mercer Street change is the opportunity to address the "missing link" between Lambton Quay and Courtenay Place with easier/legible walking movement between Willis Street laterally towards Cuba/Manners Street. If the GM (as a bus route) takes on a the character wherein the bus movements in the section from Victoria along Manners St to Manners/Willis to Bond/Mercer Street is about bus movement, and the GM (walk link) between Mercer/Bond, towards Lower Cuba Street takes on a more people orientated format then the sense of GM being more continuous as an experience would be an good outcome.

g. The implementation of the GM work can be staged, but also conceptually can take on a different character than the typical street works rebuild. To allow the benefits of reallocating street space to generate better urban amenity there can be a more temporal or simpler approach. This may be more in the form of a tactical urbanism where street surfaces and drainage are left, but new moveable furniture is developed, kiosks deployed and simple road closures employed with cones and planters. This will get quick benefits and also allow some 'settling' to occur, and adjustments to be made in response to dynamic city conditions.

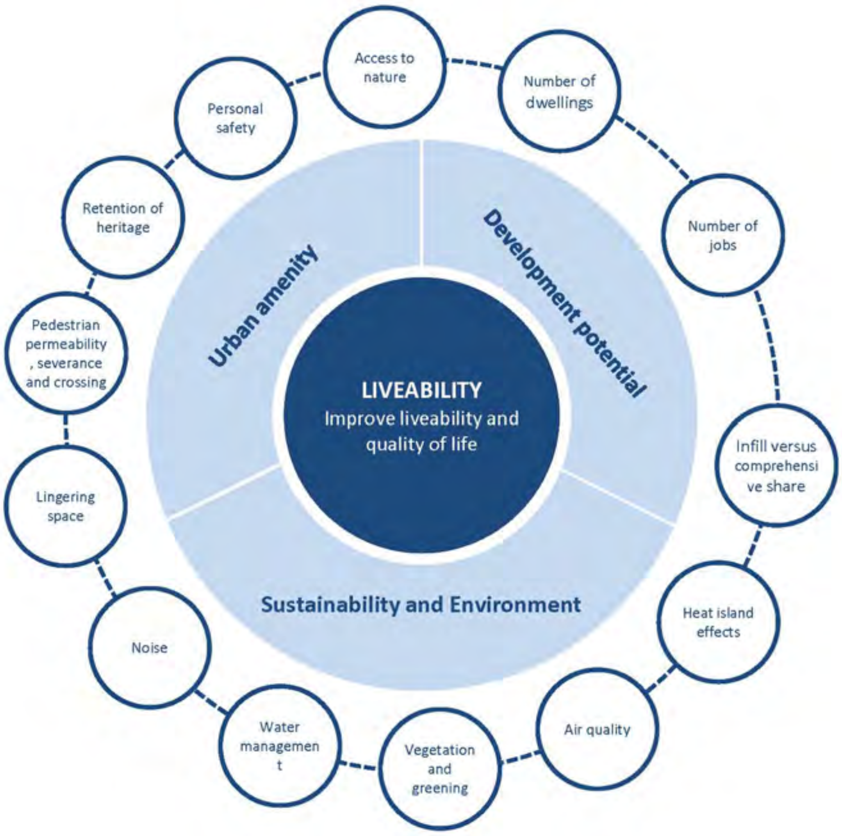
h. There is an important consideration to be made in regard to the capacity of the GM to accommodate both a reasonable level of urban amenity and the volume and speed of bus and other vehicle movements. The current volume, type and space allocation for vehicles is inhibiting the quality of the space to spend time. Bus and other vehicle users upon exiting or waiting for the vehicle contribute to the success of the GM as a vibrant and active space. However, these are more movements focussed and the future success of the GM relies on it being a good place to be – to spend time in and within a variety of spaces generating a variety of experiences. This will be good for businesses, support a more diverse mix of land uses which generate more density of living, and improve city identity. Option 3 does this best by this assessment of Urban Amenity.

4. SUMMARY SCORES

The summary scores are provided in the table below (refer to spreadsheet attached for detail) Options 1 generates little additional space to enable improved public amenity outcomes and Option 3 does this best.

Lambton Quay			Willis Street			Manners Street	Courtenay Place		
Option 1	2	3	1	2	3	All Options	1	2	3
0	2	3	1	1	1	0	0	1	3

MENU OF LIVEABILITY ATTRIBUTES -WORK IN PROGRESS BEING DEVELOPED BY LGWM



			Courtenay Place						Manners St			
			Option 1 - Streamline		**Option 2 - Prioritise**		**Option 3 - Transform**		**Option 1 - Streamline**		**Option 2 - Prioritise**	
			Score	**Comment**	**Score**	**Comment**	**Score**	**Comment**	**Score**	**Comment**	**Score**	**Comment**
Attributes	**Assessment**	**Indicator measures (current v proposed in each option)**										
Composition	Character distinctiveness Green Infrastructure Legibility and Wayfinding How easy to interpret space – this will be assisted by for example ability to see to waterfront – street closures allows for pause and sighting/interpretation and wider space allocation to ped/public realm of GM and CP allows old shoreline and heritage buildings or cultural values to be 'read'. What green infrastructure is there currently, may be affected and opportunity for future.	Number of side streets closed + other improved connections. Space available for green infrastructure. Simplification of space - ability to read and distinctive features more observable	0	Minimal change	2	Side street closures Allen, Blair Street simplfy the way this area of CP is interpreted - during crowded times the and reduce confusion at to interpretation of the CP space at this east end. Allows the watefront connection and old warehouse heritage to be better seen.	3	Side street closures Allen, Blair Street simplify the way this area of CP is interpreted - during crowded times the and reduce confusion at to interpretation of the CP space at this east end. Allows the waterfront connection and old warehouse heritage to be better seen. With further allocation of space to public realm for non vehicular use there is additional clarity to the composition of the space - the sightlines to terminating vista to Embassy will be better revealed and the bookending triangle spaces at each end of CP better able to be composed. As noted previously in relation to Manners St. the relationship of CP at the west end/Taranaki St to Te Aro Park and any future MRT will need integrated design to generate the best composition.	0	Cuba Street end closed, but the influence is not significant given the current composition is already favouring public realm along Manners/Cuba intersection and conflicting vehicle numbers are relatively low. If all of lower Cuba Street was pedestrianised this would potentially have a more positive score. The opportunity to redress issues with Te Aro Park is wider than the GM scope but, also in consideration with MRT, needs integration in design to bring wider compositional benefits.	0	As with option 1
Comfort	How much of the GM space is 'habitable' as public realm - good to have sun access, separation distance from buses/ traffic , feeling safe (CPTED), noise, wind	% of street space that is in sun Presence/impact of traffic volume. Potential to address CPTED issues - quality environments	0	Minimal change	1	Some additional space is created that can be reprogrammed for habitable space at the end of streets. Less car movements makes a more comfortable and predictable space, however 4 lanes of buses still impacts comfort. Minimal change to CPTED issues.	3	The most space possible reallocated to people, (without completely removing traffic - which is beyond scope). Good opportunity for public as well as hospitality space. Good opportunity to improve CPTED issues - space to reduce friction, public eyes on street and diversity of activity will change culture. There is sufficient space to generate public realm that allows people to socialise or spend time in the space without a need to do so as a function of a food and/or beverage transaction - introduces more equitability into the space.	0	Minimal change	0	Minimal change
Connectedness	How easy to cross over GM and move about within the space – typically about desire lines and how many lanes to cross over, and formal crossing facility frequency	Number lanes to cross. Impact of vehicle movements on crossing. Number of times lights create gaps flow to support informal crossing. Volume of vehicles.	0	Fewer signalised crossings, which is reduction in accessibility for vulnerable people and creates less gaps in the flow for informal crossing. The Allen and Blair Street stoppings enhance connectedness for a linear moevement along CP. Maybe score balances out rather than negative?	1	Fewer signalised crossings, which reduces accessibility and creates less gaps in the flow for informal crossing. However, removal of cars improves informal crossing options. Opportunity to better enable signtlines and median continuity across CP with removed private vehciles.	3	Fewer signalised crossings as with Options 1 and 2. However, with only 2 active bus lanes and the remainder of the space allocated to non-vehcilar uses then there is more opportunity for informal movements across CP. Opportunity to better enable signtlines and median continuity across CP with removed private vehciles.	0	Minimal change	0	Minimal change
Activation	How much opportunity space for shops to spill out/supprt business and public life of the street, for events (day to day like street buskers or bigger events like parades or fairs)and in addition to functional movement space, 'eddies' away from main movements paths where sitting and social interactions are supported.	Additional area provided for dwelling/activity rather than facilitating pedestrian movement. Ability to street to support events - capacity flexibility.	0	Minimal change	1	Parking bays infilled however given to 'movement' rather than 'dwelling'. Side street closures create space.	3	As much space as possible reallocated to people while allowing for bus movement. Public space as well as occupiable space for hospitality, supports diversity of public life. Side street closures create space. Flexibility to support destination venues, crowds (Embassy, St James, cinema, etc)	0	Although Cuba Street/Manner Street vehicle connection is stopped, there is little other activation space generated.	0	As with option 1
		Total	0		1		3		0		0	

		Willis St						Lambton Quay					
Option 3 - Transform		**Option 1 - Streamline**		**Option 2 - Prioritise**		**Option 3 - Transform**		**Option 1 - Streamline**		**Option 2 - Prioritise**		**Option 3 - Transform**	
Score	**Comment**	**Score**	**Comment**	**Score**	**Comment**	**Score**	**Comment**	**Score**	**Comment**	**Score**	**Comment**	**Score**	**Comment**
0	As with option 1 and 2	0	Mercer St closed which will benefit the opportunity to simplify and bring an adjacency to Te Ngākau (Civic Sq)	0	as per option 1	0	as per option 1	0	Minimal change	2	Opportunities to see waterfront from side road closures and 'connect' this with the Quay being once the shoreline, removed car parks are given to effective footpath space, rather than increasing green infrastructure. Heritage buildings and sense of the Quay shoreline may be more easily read in long view.	3	Continuous space that offers areas where people can dwell and contemplate surroundings. Waterfront connections are clear and connect back to the Quay as old shoreline. Being able to get out from underneath the awnings allows long views of Quay to understand the sinuous old shoreline. Space to reveal more of the cultural and natural heritage values (eg old streams). Heritage buildings on the corner sites where grid meeting the old shoreline to generate triangles are more easily read (eg Public Trust, MLC, Old BNZ). Space for WSD planting is made and this can also be used to enhance the sense of the place.
0	Minimal change	1	Mercer St being closed may generate some additional comfort in terms of seperation from traffic. Its not a street that has good sun access though so maybe less 'habitable' than other side streets where closure is an option. Willis Street still has all modes traffic (cars north bound) in this option which makes the comfort factor challenging to improve significantly	1	Mercer St being closed may generate some additional comfort in terms of seperation from traffic. Its not a street that has good sun access though so maybe less 'habitable' than other side streets where closure is an option. Reduced mode mix (cars out) may make the comfort levels a little better than current, but the constrained space means that with bus movements a priority that getting people able to move with some separation away from big vehicles moving through (ie buses) will be limited.	1	Additional footpath width where bus stops become in line which will assist the useable space for walkers and relieve crowding at times. Has the benefits of Mercer St closed too like options 1 and 2 , but the extra footpath does not push it to a (2).	0	Minimal change to habitable area and the various modes of vehicle traffic dominate the space relative to 'people' space. Some minor change to habitable area as public realm.	1	Additional space is created in side streets. No active lanes reallocated. Comfort improved by removal of private vehicles, buses (assumed 100 bph) still have a negative impact on comfort. Could see adverse affect at night to feeling of safety because space unlikely to become an after hours destination without significant reallocation of space, supporting business investment. Removal of cars could result in less presence of natural surveillance at night. Consideration to allowing service traffic during evening and night and taxis to support natural surveillance.	3	Significant increase in space provided on LQ and midday sun enabled access to for 'dwelling' space. As with much of Quay afternoon/evening becomes shaded (as it is now). Utilisation of additional space additional kiosk type businesses or for existing business extensions may enable more comfortable dwelling places. The additional space can enable more comfortable areas to be designed for bus users too. These can be better sheltered, have better supporting infrastructure and potentially be positioned for sun access and intervisibility/CPTED. The use of trees as additional green infrastructure may also assist with wind mitigation. Potential for more sheltering elements too. The widths of Q vary, but the wider areas will allow people inhabiting the
0	Minimal change	0	Mercer Street closed will enhance connectedness for people moving through to Te Ngākau (Civic Sq). It will also make an uninterrupted footpath on the east side of Willis Street from Manners to Williston Street). Moving backwards and forwards across Willis Street will remain a challenge. In an area-wide sense, for people walking from Willis Street towards Courtenay Pl/ Cuba/Manners St (a key desire line direction) the street network wayfinding and legibility is poor and allocation of space is not well configured to this purpose currently. If the concept is running buses efficiently	0	as with option 1	0	as with option 1 and 2	1	Fewer signalised crossings, which is reduction in accessibility for vulnerable people and creates less gaps in the flow for informal crossing. However less traffic improves informal crossing.	1	Fewer signalised crossings, which is reduction in accessibility for vulnerable people and creates less gaps in the flow for informal crossing. However no private cars improve informal crossing. The side street closer on the east side of the Q contribute positively to the connectedness at these points to waterfront and along the Q	3	Crossing backwards and forwards over LQ is an important functionality to retain and support - currently evidenced by desire lines across the medians. Fewer signalised crossings to provide formal crossings are proposed, but with only 2 bus lanes to cross and no general traffic to watch out for and the distance to cross traffic narrowed significantly the permeability of the Q will be significantly increased. Active mode provision on the Q is (as with all the options- problematic in that the space varies for allocation. Unless can provide a consistent and continuous lane then best that cycles are enabled to share the space as they do other streets (like Willis) - cyclists and scooters etc will be present so better to permit them so behaviour expectations of all users are
0	As with option 1 and 2	1	Mercer St closed generates opportunities for improved activation. There is space to the south side of Mercer Street where there is planting that could be incorporated. The redevelopment of library and Te Ngākau is an opportunity to be connected with to reveal the best opportunities for activation	1	as with option 1	1	as with option 1 and 2	0	Minimal change	1	Parking bays infilled however given to 'movement' rather than 'dwelling'. Side street closures create space. There are a number of these that has a strong positive influence, however not well supported by the character of the street itself, which is movement oriented, not likely to generate change in character to a more activated, people focussed	3	Approximately double the space available for people as public realm with combination of linear and side street closures creating space. Opportunities for business extension. The cost of retail space on LQ is high. Potential to generate kiosk like spaces or ephemeral uses in the areas created to provide less expensive business opportunities (perhaps less of the mainstream) for those uses that support existing businesses -
0		1		1	0	1		0		2		3	
											unsure about 1 or two, can't deny that change is significant		

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Social Report

Golden Mile Shortlist Options: Social effects assessment

Completed by Dr Vivienne Ivory Technical Principal - Social Science, Resilience, and Public Health., WSP
3 December 2020

1 Purpose and scope

The purpose of the Golden Mile 3 options social effects assessment is to consider

1. the effect on equitable access to social and economic opportunities such as employment, retail, health and cultural opportunities. For the purposes of this assessment, 'equitable access' needs to consider different sectors of society including mobility impaired, income groups, age groups, etc. 'Access' needs to consider changes in the number and location of mobility parks, bicycle parks, motorcycle parks, public on-street car parks, public off-street car parks, bus stop locations

2. the effect on social connectedness

2 Methodology

The assessment was desktop-based drawing on expert knowledge and existing engagement reports and submissions.

1. An expert review panel (latent demand, safety, behavioural, public health) reviewed the options against investment objectives and social effects mechanisms (such as accessibility) and identified target groups most likely to be impacted positively or negatively by each option compared with 'do minimum'.

   The expert panel comprised of a a multi-disciplinary team including:

   - Vivienne Ivory (public health)
   - Bill Frith (safety and parking)
   - Joel Burton (behavioural science and mobility)
   - Jean Beetham (latent demand and mobility)

2. Existing reports and submissions were identified and reviewed, including:

   - Golden Mile Engagement Report
   - Mobility Parking Spaces: Report on the 2019 mobility parking spaces review (WCC)
   - Preliminary Literature review Relating to the effect of Removing Parking from the Golden Mile (memo, June 2020. WSP)
   - Johnsonville Community Association (JRA)

- Mt Victoria Residents Association (MVRA)
- Victoria University of Wellington Students Association
- Living Streets
- Regional Public Health
- Capital & Coast District Health Board
- Automobile Association
- Connect Wellington
- Te Aro Rawhiti Neighbourhood
- CCS Disability Action
- Generation Zero
- Blind Citizens NZ, Wellington Branch
- Inner City Wellington

3. The reports and submissions were assessed for stakeholder & community feedback for coverage and content across different community groups to identify commonalities and differences in responses and preferences.

   The assessment was undertaken for the whole corridor, with consideration to how specific zones contribute to the whole.

   Assessment also identified specific issues and recommendations for consideration in the more detailed design phases to address the social and distributional effects identified.

3 Key assumptions and criteria

The following factors were identified as key mechanisms affecting the social impact of changes to the Golden Mile. Considerations included the extent to which each option was expected to provide

- Providing a variety of public spaces that meet the diverse needs for people to gather (e.g., that meet the needs of youth)
- Space for appropriate amenities to be provided and for people to be able to move freely and safely
- Reliable travel times for through travellers
- For Active transport (AT) mode users to move safely, have connection to networks, and have access to active transport facilities such as bike parks in the right places
- Public transport (PT) users have reliable travel times and easy access to bus stops

Based on the above, the following target groups and their needs were considered for equity implications:

Group	*Needs*

Youth:	Getting to their destinations in and through the Golden Mile, e.g., schools, university, casual/part time work
	Sense of belonging to Wellington and the CBD as a place to meet and gather in groups that is affordable, comfortable, and legitimate
	Able to engage with places in different ways - resting, actively, explore and enquire
Family groups:	Affordable, safe options for moving around as a mixed ability group (in keeping with the "8yrs – 80yrs" principle)
	Facilities to rest, recreate, play
	Access to services (toilets etc)
	Attend events affordably and reliably
Mobility impaired (disabled, impaired, challenged)	Ease of using private and public transport
	Ease of moving along the Golden Mile pavement - having enough space to navigate comfortably and smoothly
	Ease of getting around the CBD in vehicles (private & public) - smooth passage, reduced stopping and starting
	Comfort for lingering and mingling - providing multiple opportunities
Inner city residents, particularly those in affordable housing:	Quality public places to balance smaller private space to enhance the liveability of the CBD
	Reduced noise and congestion
	Affordable and effective AT & PT connections to services and destinations beyond the CBD
Non-private motor vehicle (PMV) users:	Safe, comfortable, efficient routes
	Facilities to support active, shared, and public transport modes in the right places
	Viable mode choice (affordable, reliable, accessible, safe)
Travellers to hospital, university, airport destinations beyond the CBD:	Reliable travel time
	Easy changes
	Affordable AT & PT mode choices

4 Evaluation outcomes

4.1 Commonalities and differences

Needs common to all groups were:

- Increased PT reliability
- More space for public realm
- Improved pedestrian LOS
- Separation between modes and speeds

While no contradictory needs were identified across the groups, some option features could have greater significance for mobility impaired people and family groups. They included the location of bus stops, access to parking in side streets, and drop-off/pick-up access in side streets.

There is also a potential conflict between the needs of those going through (Pedestrian and PT efficiency & travel time) and those on the Golden Mile (accessibility and quality) .

4.2 Zones

4.2.1 Courtenay Place

Option	Score	Reasons
Option 1	1	Improvements in PT reliability will make bus travel to and along CP a more viable option for youth and non-PMV users to access employment, entertainment, & hospitality opportunities. Reduced traffic would provide a quieter environment and increase the sociability of moving along the Golden Mile for all
Option 2	2	This option builds on Option 1 with further improvements in PT reliability and provides some increase in space for pedestrians across the side streets.
Option 3	3	Increasing the walkability of the GM will reflect youth sustainability values and have greater coherence with the wider Wellington walkability aspirations and culture. Increased space for walking and public realm amenities will promote sense of belonging, social connectedness and the liveability of the central city area, as well as increase the accessibility of the Golden Mile to mobility impaired people and families. Increased space to separate pavement users of different speeds and abilities from faster modes will provide a more relaxed, less stressful environment for vulnerable pedestrians. Improved capacity to integrate history and water sensitive design (for example) features into places reflect sustainability values. Space to provide micro mobility facilities to promote active modes as a viable choice. More pedestrian space on CP will provide safer places at night with lighting and security and reducing crowding.

		Providing dedicated drop-off/pickup zones in side streets will help • meet the needs of more vulnerable / less confident people to participate in the night-time economy and events • allow for access to health and other services located in the CBD • allow for provision of key services to residents • ensure access to pickups to get to hospital etc. Increased reliability of PT for mobility impaired, through travellers, and students will promote PT as a viable mode choice. Improved connectivity to cycle networks will improve the viability of active modes for non-PMV users to access the city centre and for those living in the city centre to access services and amenities further afield.

4.2.2 Manners Street

Option	Score	Reasons
Option 1	0	Minimal change
Option 2	0	Minimal change
Option 3	0	Minimal change

4.2.3 Willis Street

Option	Score	Reasons
Option 1	1	Increased space in Mercer street and better connection to Civic Square could provide sheltered, sunny space for events and public realm improvements.
Option 2	2	This builds on Option 1, with further improvements in PT reliability.
Option 3	2	Increased space across Mercer St and along some sections of Willis St will make it easier and more comfortable for pedestrians in some places. More space means greater opportunity to use Mercer St as a significant place for events, provide amenity for children and youth, provide a relatively sheltered and sunny public realm space for informal activities, and additional amenity to support AT in Mercer and Willis Streets.

4.2.4 Lambton Quay

Option	Score	Reasons
Option 1	0	Improved PT but little change in public space
Option 2	1	Improved PT reliability and some increase in space across side streets. The positives may be negated by a reduced number of formal crossings may reduce accessibility and safety for mobility impaired and families
Option 3	3	Increasing the walkability of the GM will reflect youth values and have greater coherence with the wider Wellington walkability aspiration. Significantly increased space for walking and public realm amenities will help youth develop a sense of belonging and improve the liveability of the central city area for residents living in small apartments. Increased opportunity to create more spaces with different character and configurations to meet diverse needs and uses. Increase opportunity and space to improve the accessibility and wayfinding of the Golden Mile to mobility impaired people and families, city visitors, & regular users. Increased space to separate pavement users of different speeds and abilities from faster modes will provide a more relaxed, less stressful environment for vulnerable pedestrians. Improved capacity to integrate history and water sensitive design (for example) features will enhance access to cultural opportunities. Space to provide micro mobility facilities to promote active modes as a viable choice, including the safety & affordability for the independent mobility of youth to engage in employment and recreational opportunities Providing dedicated drop-off/pickup zones in side streets will help • meet the needs of more vulnerable / less confident people to participate in the night-time economy and events • allow for access to health and other services located in the CBD • allow for provision of key services to residents Improved connectivity to cycle networks will improve the viability of active modes for non-PMV users to access the city centre and for those living in the city centre to access services and amenities further afield.

4.3 Comments and considerations

The addition of taxi stands would have a minimal change to scores

- Taxi stands on CP could improve access for mobility impaired people to entertainment opportunities – Opera House etc

- Taxi bay and accessible / priority parking on side streets rather than Lambton Quay etc to ensure participation and provision of essential services

For further consideration:
- Recommend separation of walking and all other modes for greater safety and comfort for mobility impaired people and families
- Recommend distance to bus stops should not be based on 'average' walking speed of PT is to be a viable option for mobility impaired people and families. Reduced formal crossing opportunities and bus stops could reduce accessibility and viability of PT for mobility impaired people and family groups. This could be significant enough to reduce the score from 3 to 2 for Lambton Quay in particular.
- Future increased densification means the need for quality public realm for residents will increase

5 Appendix 1: Submission comments

Detailed extraction of key points by submitters that are relevant for each target group are available in the accompanying spreadsheet 'Submission points_Social-effects-GM'.

	Submitters and preferred option: Submission points relating to needs of target equity groups												
Target equity groups and needs	Blind Citizens - option 3	VUW students assoc Option 2 - except Courtney Pl - option 3	Johnsonville Community Association - option 2	Mt Victoria Residents Assoc - no preference stated	Living Streets - no preference stated	Regional Public Health - option 3	CCDHB - no preference stated	Te Aro Rawhiti Option 1 (least harm)	AA - no preference stated	Connect Wellington - option 3	CCS disability action Option 3	Generation Zero - option 3	Inner City Wellington - Option 3
Youth: Getting to their destinations in and through the Golden Mile, e.g., schools, university, casual/part time work Sense of belonging to Wellington and the CBD as a place to meet and gather in groups that is affordable, comfortable, and legitimate Able to engage with places in different ways - resting, actively, explore and enquire		Reliability, safety, efficiency of PT and walking routes Safety of Courtney Pl at night time - pedestrianizing will help. Lighting and security. Need pick up places for shared mobility (uber)			Play places Sitting spaces Child focused activities	Space for events						Creating public spaces on GM and side streets Designing with māna whenua Telling the history of the area Water sensitive design Safety and security on Courtney Pl Accessible taxi pickups	
Family groups: Affordable, safe options for moving around as a mixed ability group (in keeping with the 8-80 principle) Facilities to rest, recreate, play Access to services (toilets etc) Attend events affordably and reliably				Few places for children to play (Courtney Pl)		Shared spaces must meet needs of most vulnerable More space makes it more relaxed for everyone				Don't encourage higher speed buses and give families can have enough time to get on and off buses Easily walkable distances to PT for children and buggies			

Mobility impaired (disabled, impaired, challenged). Getting to the CBD: Ease of using private and public transport Ease of moving along the Golden Mile pavement - having enough space to navigate comfortably and smoothly Ease of getting around the CBD in vehicles (private & public) - smooth passage, reduced stopping and starting Comfort for lingering and mingling - providing multiple opportunities	Need drop off points well spaced in every side street for those who cannot walk long distances Need walkable bus stop distances, Improved footpaths, wayfinding, enough space for pedestrians as well as amenities (reduce clutter) Traffic light phasing to reduce pedestrian delay	Pick-up places for mobility impaired will help them participate in night time social scene		Ensuring access mobility impaired parking Separating pedestrians from all wheels Viable access to bus stops Traffic light phasing to support all pedestrian needs Better footpaths and kerbs for impaired mobility		Reduced access to services for mobility impaired? Shared spaces must meet needs of most vulnerable Provide a more relaxed walking environment for vulnerable users			Access to drop offs for Courtney pl so less mobile can attend theatre etc	Maintaining access to the GM for all. Bus stop access for users should be viable for all abilities reduce crowding on pavements to assist those with mobility aids Accessible parking in side streets to allow equitable access	Bus stop locations to meet all needs More and better pedestrian space Traffic light phasing and tech to meet the needs of all pedestrians Dedicated walking and small wheel spaces Public space not taken over by business and well lighted for security	Accessible parking , footpaths, wayfinding Bus stop locations to avoid congestion but still be accessible	
Affordable housing inner city residents: Quality public places to balance smaller private space to enhance the liveability of the CBD		Green spaces Places to socialise & enjoy,		GM needs more than just commercial space Retain amenities with thriving businesses - neighbourhood needs, encouraging visits & lingering	Provide shade & shelter , including wind No play places	Reduced emissions Space for events	Providing services to high needs residents needs provision for	Neighbourhood accessibility (in to and within) could be harder Transfer of traffic to other streets		Investing in public			Having more green space and public amenity to make up for reduced private outdoor and community space in apartment dwelling. Side streets could be used for this rather than be taken over by commercial activity.

Reduced noise and congestion Affordable and effective AT & PT connections to services and destinations beyond the CBD		Community connectivity & resilience		Green spaces - e.g., ends of side streets Reliable PT and access to bus stops Reduce clutter on Courtney Pl to make a more pleasant environment More space for all activity	Sitting spaces More green space		needs provision for parking for specialist / essential healthcare workers			investing in public realm			This need will only become greater with future densification Resilience - need safe places for residents and others to evacuate to and congregate in following emergencies and disasters
Non-car drivers: Safe, comfortable, efficient routes Facilities to support active, shared, and public transport modes in the right places Viable mode choice (affordable, reliable, accessible)	Key PT spine - improved bus service. Provide bus Overtaking where possible. Separated spaces for walking & bikes	Cycling less of a priority Reliable routes Safe bus stops Maximising pedestrian space for enjoyment, efficiency, accessibility, especially in peak times		Do not support using GM as a through route for cycling on bus lanes- need clear cycling routes Providing bike parks Space for scooters & separate from pedestrians	Congestion at bus stops Recognising variation in walking speed and routes to get to bus stops Peak time crowding Connecting with city cycle network Separated spaces & facilities between peds & wheels & buses Reduce clutter Improved pedestrian LOS Traffic phasing	Safer for walking & cycling Dedicated space for small wheels				Dedicated lanes for small wheels, not in conflict with pedestrians or buses Bus stop access that doesn't put PT users in conflict with other modes on and off boarding		Pedestrians highest priority over small wheels - segregated lanes Bike and scooter parking on side streets Removing shared vehicles from GM to reduce slow downs and conflicts with buses	
Hospital, university, airport destinations beyond the CBD:					Link from Courtney Pl to Mt Victoria	More connected PT routes for those in peripheral areas				Bus efficiency		Link modes and routes strategically	

Reliable travel time Easy changes Affordable AT & PT mode choices		Reliability	PT reliability and capacity		Connecting with city cycle network, bike access to waterfront Clear alternative routes for private vehicles across town Easy flow at Railway station end Cable car transport link	Reliable, affordable, sustainable			Reducing bus delays	Easy connections to other modes Keep strategic cycle network separate for through users		Connection with the waterfront Have a viable high speed route for cyclists off the GM	

Retail Impacts Report

Golden Mile Retail Impact Assessment

Let's Get Wellington Moving

December 2020

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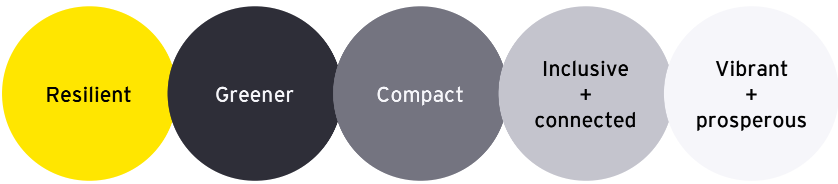
Executive summary

Executive summary

Vision for the Golden Mile

Wellington City Council's "Our City Tomorrow" community engagement process was a strategy to establish five new operational and design goals for the city. These goals have informed Let's Get Wellington Moving's Vision for the Golden Mile, being intentionally reflected in the way the options for the Golden Mile have been designed. These are; resilient, green, compact, inclusive and connected, and vibrant and prosperous.[1]

Figure 1: Golden Mile design principles



> "Connecting large numbers of people to and through the central city with reliable and affordable public transport while providing safe, accessible and attractive streets and spaces".

The request

EY was commissioned by WSP as a sub-consultant to undertake a retail impact assessment against the proposed options for the Golden Mile (defined as the road corridor from Lambton Quay to Courtenay Place).

Our assessment was required in order to provide a retail perspective for the Multi-criteria Analysis ("MCA") workshop, scheduled for 30 November 2020. The purpose of the MCA assessment was to determine the long-term effects, benefits, and risks of each of the proposed improvement options on Golden Mile retailers and businesses. EY attended the MCA workshop to provide views on the high-level economic impacts, including positive and negative effects, informed through a full market assessment, case study identification and research, and impacts analysis.

This, together with the results of the MCA assessment, has led EY to develop this report outlining findings on the proposed improvement options to retailers along the Golden Mile.

Our approach

EY undertook desktop research and analysis to identify how the proposed process improvements would impact retailers along the Golden Mile.

Through external supporting data provided by MRCagney and WSP New Zealand, this retail impact assessment report has focused on delivering upon two core workstreams consisting of:

1. A market assessment to outline the current state of the Golden Mile retail precinct and market overall
2. Case study research and an assessment of local and international best practise to outline the benefits, risks, and impacts to retailers assuming the proposed process improvements are completed

The two workstreams outlined above were combined to assess and develop a position of assessment on the economic impacts on retailers from the proposed changes to the Golden Mile transport corridor.

As part of our engagement, EY attended the MCA workshop to provide a retail perspective from supporting evidence, pertaining to the two workstreams outlined above.

[1] Let's Get Wellington Moving Vision Statement June 2020. Accessed through: Vision-2036-April-2020.pdf (lgwm.nz)

Our approach to this report was to outline how the proposed process improvements would impact retailers along the Golden Mile, with support from specific domestic and international evidence where similar infrastructure improvements have been undertaken.

Our findings have been developed and informed by desktop research, external documentation supplied by WSP New Zealand and MRCagney, and supportive market evidence. Our views do not indicate a firm position on any of the proposed options and only provide an assessment of the retail sector based on market knowledge, research, and case study evidence.

Due to the challenges of obtaining quantitative research in this area, arising from the limited time involved, case study evidence has been used as a substantive comparative basis throughout this report to inform and support our assessment of proposed improvement options on Wellington's current retail and commercial sector.

Our findings

This report begins by addressing the current retail environment with respect to COVID-19. The global pandemic has thrown retailers an unexpectedly difficult operating environment that could compound potential positive or negative effects found in this report. The report addresses this uncertainty as a global phenomenon on the retail sector and outlines the clear risk presented from the pandemic on business stability and probability of failure.

The report goes on to discuss the state of the Wellington retail market. Face rents, lease demand growth, tenancy trends and vacancy rate patterns over the past 24 months have been analysed from property sector reports, however no specific directional patterns could be found to conclude a clear trend.

This assessment specifically highlights expectations that landlords and tenants can have as a result of the proposed options. Landlords could expect greater lease demand, lower vacancy rates and increased rental appreciation, where tenants could expect increased rents and competition for space, higher sales volumes as a result of revitalised urban landscapes and increased pedestrian footfall and modal share.

Case study research, particularly of customers on Bloor St, Toronto, which was redesigned to allow dedicated cycle and bus lanes, brought out the perceived negative of carpark removal from stakeholders, including current retailers and industry lobbyists. This highlighted that such parties tend to overestimate the importance or value of private carparks and private car access on revenue generation. This finding is supported by Wellington's shopper demographics, where 35% of the estimated spend in the Golden Mile comes from visitors who have walked/jogged/cycled/scooted, 32% from visitors who used the bus or train and 23% from visitors who drove a private vehicle. 6% used an Uber/Taxi and 4% were passengers in a private vehicle.[2]

A key recommendation from this study was that retailers would benefit from tailoring their offering to customers arriving by these means, through improving bike lane accessibility, adding bike parking outside stores, or offering loyalty discounts to bus commuters.

Share of spend by visitor mode of transport

35%
walk/jog/cycle/scoot

23%
drove a private vehicle

32%
used the bus or train

"It appears in the best interest of retailers to favour reallocating space toward more frequent and higher spending customers, in this case, pedestrians and cyclists".

[2] MRCagney research on estimated spend by mode of transport, November 2020

Context

Overview – The Golden Mile

The Golden Mile is imperative to the vibrancy and economic sustainability of the Wellington CBD. The "Golden Mile" refers to the main retail and commercial corridor extending from the Cenotaph near Parliament Buildings, to the eastern end and entertainment hub of Courtenay Place. It is split into four streets; Lambton Quay, Willis Street, Manners Street and Courtenay Place.

The Golden Mile has been identified in the District Plan specifically as a key retail destination which promotes the nearby location of office activities, enhancements to the pedestrian environment and the roll-out of quality public transport infrastructure.[3] Wellington is known for its prominence of government departments, with this being the largest sector of economic activity. This, combined with strong private economic activity, makes the capital one of the busiest cities in New Zealand, with a concentration of office workers.

Of total retail in Wellington City, the Golden Mile provides 54% of retailing, 27% of dining hospitality and 47% of evening hospitality (pubs, taverns, bars and clubs).[4] The Golden Mile consists of over 98,000 sqm of floor space within 554 stores.[5]

In addition to its geographical segments, the Golden Mile comprises three distinctive retail functions:

- Large, established brands/high quality retail; mostly in the prime portion, along Lambton Quay
- Evening hospitality; mainly in the Courtenay Place area which concentrates 25% of the city's evening hospitality
- General/smaller retailers

Figure 2: Courtenay Place, retrieved from Wellington City Council

[3] Wellington City Council 2017 Baseline report: Land use and urban form. Accessed through: https://lgwm.nz/assets/Uploads/Baseline-report-Land-uses-v6.pdf
[4] Wellington City Council 2017 Baseline report: Land use and urban form. Accessed through: https://lgwm.nz/assets/Uploads/Baseline-report-Land-uses-v6.pdf
[5] Wellington City Council 2017 Baseline report: Land use and urban form. Accessed through: https://lgwm.nz/assets/Uploads/Baseline-report-Land-uses-v6.pdf

The options

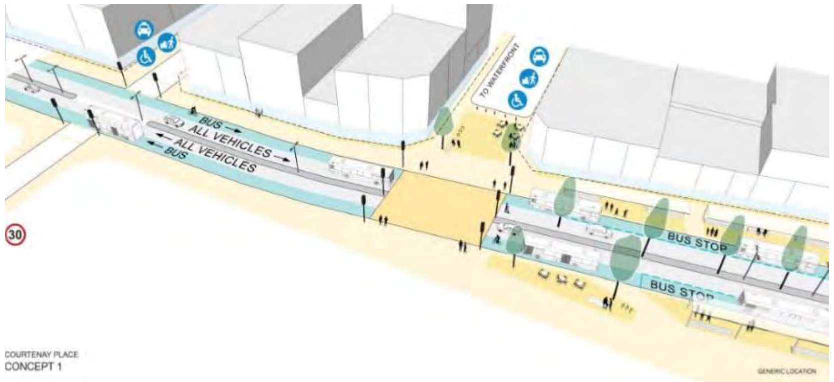
Three options have been proposed for transforming the Golden Mile transport corridor. They are named Streamline, Prioritise and Transform, ranging from Option One (least transformative) to Option Three (most transformative). They offer different options and combinations of private vehicle access, bus and bike lane prioritisation, footpath widening and streetscape design.

Option One: Streamline[6]

Option One proposes the fewest changes to the Golden Mile transport corridor. The option aims to streamline the corridor, with general traffic including private vehicles still able to drive down parts of the Golden Mile (from Lambton Quay to Willis Street). The ends of some side streets from Willis Street south would also be closed.

Bus stops would be consolidated, and bus reliability improved. It would be no more than a five-minute walk to a bus stop for someone walking at an average speed from anywhere along the corridor.

Carparks, loading bays and taxi stands would be relocated to side streets, giving rise to 30% more footpath space. More space would be added along Manners St and Courtenay Place for people to sit, spend time, or access businesses by repurposing the ends of closed side streets. It should be noted that emergency service vehicles would always maintain full access to the corridor.



Key features

Only parts of the corridor would be open to general traffic and private vehicles, some side streets would be closed, and footpaths would be 30% wider.

[6] Images retrieved from the Golden Mile Engagement Summary Report (August 2020)

Option Two: Prioritise[7]

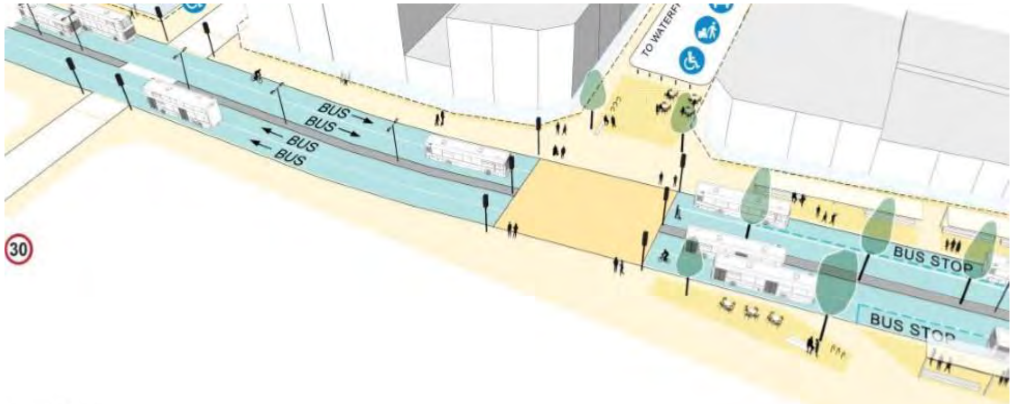
In Option two, significant changes to the road layout are presented, including removing all general traffic and private vehicle use and closing the ends of most side streets. Additionally, two bus lanes would be constructed in each direction on Courtenay Place and on most of Lambton Quay, prioritising buses as the preferred mode of transport use.

Bus stops are consolidated to increase reliability. Pedestrian space would also be increased around bus stops, with no more than a five-minute walk to a bus stop for someone walking at an average speed from anywhere along the corridor.

Option Two converts carparks to footpaths and relocates loading bays and taxi parks to side streets, providing up to 30% more footpath space. More space to sit, spend time, or access businesses by repurposing the ends of closed side streets would provide more accessibility to shops. Emergency service vehicles would always maintain full access to the corridor.

Key features

Changes to road usage to improve transit links with the removal of general traffic. Two bus lanes would run in each direction for most of the Golden Mile and footpaths would be 30% wider.



COURTENAY PLACE
CONCEPT 2

CONCEPT 2

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[7] Images retrieved from the Golden Mile Engagement Summary Report (August 2020)

Option Three: Transform[8]

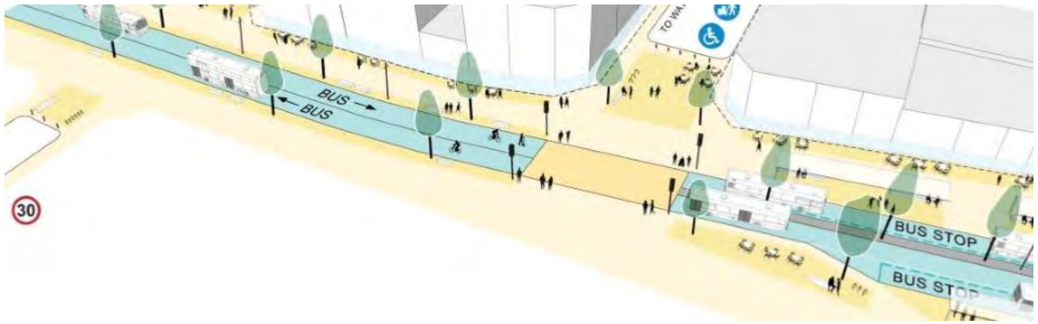
Option Three proposes a transformative corridor mode shift. All general traffic and private vehicles are to be removed from the precinct. Numerous side streets are to be closed, and one bus lane will be extended in each direction and changed to a footpath, increasing pedestrian access and walkability. It is likely that buses would stop in the lane to pick people up causing some delays and congestion.

Bus stops would be consolidated to increase reliability and space between stops. There would be no more than a five-minute walk to a bus stop for someone walking at an average speed, from anywhere along the corridor.

The conversion of the extra bus lane and carparks to footpath and streetscape has been designed to enable aesthetically pleasing urban design elements. The option also proposes relocation of loading bays and taxi parking to side streets. This would provide 75% more footpath, a portion of which could be used for people biking and on scooters. More space is allocated for people to sit, spend time, or access businesses by repurposing the ends of closed side streets.

Key features

General traffic would be removed, and one lane would run each way for buses, with the additional lane changed to a footpath. 75% wider footpaths built, with the possibility of dedicated or shared spaces for bikes and scooters on some parts of the Golden Mile.



[8] Images retrieved from the Golden Mile Engagement Summary Report (August 2020)

Our approach

This Report focusses on two core workstreams: a market assessment outlining the current state of the Golden Mile and an economic impact analysis assuming the proposed process improvements are completed.

Market assessment

The first workstream examined the current state of real estate characteristics in the Golden Mile and retailers and businesses in the area. Retailers and businesses included in our assessment were limited to those that undertake retail activities as part of their day to day trading, in both weekday and weekend daytime and night-time economies.

The market assessment analysed the Golden Mile precinct from a real estate lens to understand current market activity. This included, but was not limited to:

- Current market rents, lease demand, growth rates, vacancy rates and tenancy trends.
- Benchmarking of income/return metrics against other comparable NZ retail precincts.
- Understand current trends and predict future trends (part of economics impact analysis) including sales volumes, pedestrian traffic and turnover rent.
- Discussions with leasing agents in the Wellington City market to understand critical retail market drivers within the precinct surrounding the Golden Mile.

Case studies

The second workstream included case study research and an assessment of local and international best practise to try to outline the benefits, risks, and impacts to retailers assuming the proposed process improvements are completed.

This report includes two domestic case studies (Queen Street and Various) and five international case studies (Melbourne, Vancouver, Toronto, Dublin and London).

Impact assessment

The outcomes of both workstreams were examined to determine the potential impacts that could occur, assuming the proposed improvements are completed, specifically focusing on the following:

- Impact on retailers and businesses including positive and negatives of increased pedestrian traffic and less motor vehicle usage as a result of the improvements.
- Impact on landlords and tenants in the Golden Mile such as expected rent trends and lease demand.
- Future economic impact on the Golden Mile area overall including the flow on effects of increased urban amenity and economic vitality.

Limitations of this assessment

Quantitative analysis such as benefits and costs arising from the impacts of the proposed improvements are difficult to quantify and have been proven the same in various case study examples.[9] Additionally, quantifying impacts is further challenged by the difficulty in isolating variables, leakage effects and the long-term nature of the impacts being measured, which often goes beyond the evaluation period.

As a result, EY has not quantified any economic impacts on retailers and instead obtained quantitative data in the form of impacts on retail spend from MRCagney. This modelling looked at four scenarios; whereby all options, *bar* the Option 3 Pessimistic Scenario, showed increases in estimated change of retail spend. It is crucial to note, the pessimistic scenario is highly unlikely to eventuate, and was developed to stress test the model for the purposes of the MCA process.

[9] Living Streets 2018 The Pedestrian Pound: The business case for better streets and places. Accessed through: https://www.livingstreets.org.uk/media/3890/pedestrian-pound-2018.pdf

1 Market assessment

Market parameters

Insight into the current retail environment and property market to wholly understand potential impacts on retailers.

Covid-19 impacts

The global pandemic has caused major disruption to economies, businesses, and residents in New Zealand and around the world.

New Zealand was able to curb the spread of Covid-19 and limit lockdown periods for retailers and businesses across the country. However, the lockdown periods placed significant stress on the retail market, as employees were mandated to work remotely and trading activity for non-essential retailers and businesses was restricted.

At Alert Level 2, no more than 100 people could gather, and hospitality businesses were legally required to keep groups of customers separated, seated, and served by a single person. At Alert Level 3, retailers and businesses were only allowed to operate in a contactless way.

Although Alert Level 2 was less restrictive, retailers and businesses in Wellington saw a greater than 50% decrease in customers, apart from their regulars.[10] The move from Alert Level 2 to 1 saw a 30% increase in pedestrian flow in the CBD, emphasising the impact of Alert Levels on patronage.[11]

Electronic card spending data further illustrates the impact, with overall spending in April 2020 falling by 44% compared with April 2019. In April 2020, spending in the hospitality sector fell by just under 95%.[12]

The first and second lockdowns spanned approximately 11 and 5 weeks respectively at Levels 2 and above for the Wellington region[13], as depicted by Figure 3: Wellington Lockdown Timeline. For traders that did not have online or contactless operations, this would have severely impacted them, even after accounting for Government subsidies and support for businesses.

In discussions with property experts it's clearly apparent that all retail markets across New Zealand felt the impact of Covid-19. Leasing agents in Wellington noted landlords have been more willing to accommodate shorter lease terms between 18 to 24 months instead of longer 5 to 6-year term structures as future uncertainty for the sector remains. Large format stores and well-established brands appear to have greater bargaining power to negotiate rents and rental abatements. However, this is not always the case – especially for smaller retailers.

Figure 3: Wellington lockdown timeline

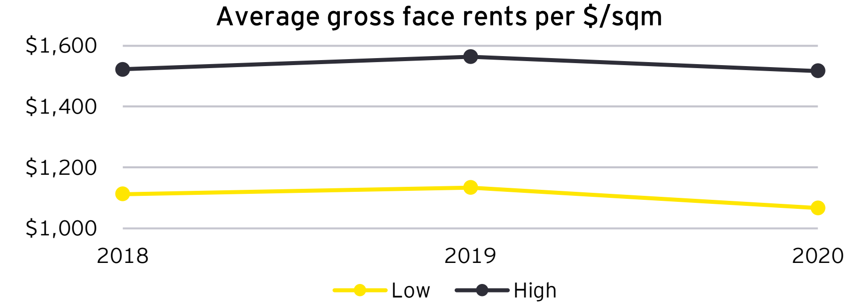
[10] Radio NZ 2020 Alert level 2 familiar but concerning for Wellington Hospitality industry. Accessed through: https://www.rnz.co.nz/news/business/423425/alert-level-2-familiar-but-concerning-for-wellington-hospitality-industry
[11] JLL 2020 Wellington rising to retail challenge with significant city pedestrian surge. Accessed through: https://www.jll.nz/en/trends-and-insights/cities/wellington-pedestrian-count
[12] Colliers International 2020 NZ Research Report – June 2020. Accessed through: https://www.colliers.co.nz/en-nz/research/new-zealand-research-report-june-2020
[13] Radio NZ 2020 Coronavirus Timeline. Accessed through: https://shorthand.radionz.co.nz/coronavirus-timeline/

As part of the Government's support for small businesses, temporary law changes and subsidies for arbitration/mediation were introduced, to help commercial tenants and landlords share the financial impact of Covid-19. These law changes were backdated to 1 April 2020 and include:

- More time for commercial tenants to catch up on overdue rent.
- Longer notice period for cancelling a lease because of overdue rent, up from 10 working days to 30 working days.
- More time for mortgage borrowers, including landlords, to catch up on overdue mortgage payments.

Current market rents

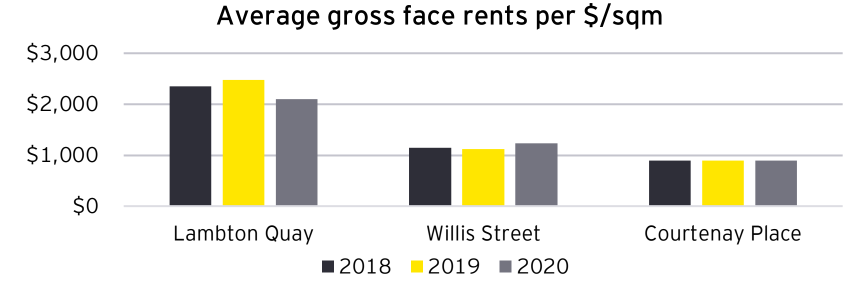
The retail market is showing a minor decline in light of Covid-19 with prime CBD gross face rents per/sqm slightly dropping in the second half of 2020 compared to 2019.[14] Rental decline this year is being accounted to lower face rents and increasing incentives.[15] It is worth noting retail net effective rents have decreased in all submarkets.[16]



According to CBRE's Q2 market report, the Courtenay Place precinct suffered the largest decrease of 6.7% during Q2, primarily due to the impact of the Covid-19 lockdown. Prime and secondary CBD rents also decreased by 3.1% and 6.0% respectively.

[14] Colliers International 2020 Colliers Essentials: Wellington Retail Report 2020. Accessed through: https://www.colliers.co.nz/en-nz/research/colliers-essentials-wellington-retail-report-second-half-2020
[15] CBRE 2020 Market View Wellington Q2, 2020. Accessed through: https://www.cbre.co.nz/research-reports/Wellington-MarketView-Q2-2020
[16] CBRE 2020 Market View Wellington Q2, 2020. Accessed through: https://www.cbre.co.nz/research-reports/Wellington-MarketView-Q2-2020

The second half of 2020 is projected to see both declining face and effective rents in an environment of lower sales and higher vacancies.[17] Rental softening arising from Covid-19 is forecast to be material in the short term but return to positive growth beyond 2021.[18]



Most retail rent lease structures in the Wellington CBD are based on traditional fixed rents with very few landlords using turnover rentals. Considering the impact of Covid-19 on sales, the variable nature of turnover rentals is even more prominent, however many landlords have factored in rent abatements with fixed rents.

Lease demand

Prime retail along the Golden Mile is the most sought-after space and therefore commands the highest rents in the area.[19] In our site survey we observed very few vacancies and in discussions with leasing agents were informed that an increasing number of local retailers are expressing interest and looking to lease space, especially around Lower Cuba street which has seen a major resurgence and demand.

Approximately 1,100 sqm of prime retail space will be added to the Cuba precinct in the coming months when refurbishment works on the ex-Farmers site completes, as well as an uptake of space in Lower Cuba including the Regional Council and other office/retail tenants. Leasing agents also noted increasing retail lease demand as commercial tenants and their employees return to their offices.

[17] CBRE 2020 Market View Wellington Q2, 2020. Accessed through: https://www.cbre.co.nz/research-reports/Wellington-MarketView-Q2-2020
[18] CBRE 2020 Market View Wellington Q2, 2020. Accessed through: https://www.cbre.co.nz/research-reports/Wellington-MarketView-Q2-2020
[19] Colliers International 2019 Commercial Property Review – Retail Market. Accessed through: https://www.colliers.co.nz/en-nz/news/2019-commercial-property-review-nz-retail-market

Growth rates

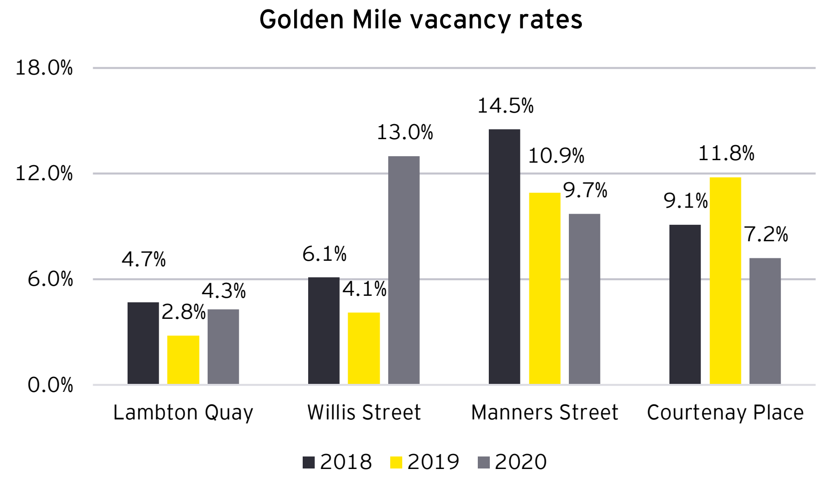
Growth rates in the area are predicted to increase due to rising lease demand and limited market supply. Wellington's retail sector faces similar issues to the city's office sector around low NBS rated stock. Persistently high construction costs have kept supply bottlenecked, though the sector is unlikely to stagnate completely given the reasonably high levels of stock in the pipeline at various stages of planning and construction.[20]

Tenancy trends

Covid-19 enforced lockdowns have highlighted the importance to retailers of having a strong online presence.[21] Retailers which do not trade online were found to report a fall in sales whereas those trading online were likely to report higher sales.[22] Aside from full online operations, hospitality businesses especially have adapted to create contactless methods of order and payment, and also made more usage of food delivery apps such as Uber Eats.

Vacancy rates

Across the Golden Mile, vacancy rates have held relatively stable from 2018, fluctuating between 0.8% to 4.6% at most for Lambton Quay, Manners Street and Courtenay Place. Overall vacant space in the Wellington CBD increased to over 7,000 sqm in the June 2020 quarter reflecting a vacancy rate of 6.7% compared to the 4.1% recorded in the December quarter last year. The increase was largely influenced by a small number of larger units which have become available in the Willis Street precinct, reflecting its 9% vacancy increase this year.[23]



Furthermore, circa 1000 sqm of stock has been removed for refurbishment.[24] Prior to Covid-19, in 2019, the Golden Mile saw a 9-year low vacancy rate of 4.1% stemmed from high tenant demand and a static supply pipeline.[25]

Conclusion

Retailers face a more difficult operating environment and could see continued decreased sales volumes as the impacts of Covid-19 are felt on consumers. Vacancy rates are expected to increase for the rest of the year, with predictions based on fewer tenants in the market and increased pressure on current businesses.[26] For retailers, landlords may be open and more willing to offer rent abatements rather than lose tenants.

[20] JLL 2020 Wellington Retail Market. Accessed through: https://www.jll.nz/en/trends-and-insights/research/wellington-retail-market-snapshot-2q20
[21] Colliers International 2020 Colliers Essentials: Wellington Retail Report 2020. Accessed through: https://www.colliers.co.nz/en-nz/research/colliers-essentials-wellington-retail-report-second-half-2020
[22] CBRE 2020 Market View Wellington Q2, 2020. Accessed through: https://www.cbre.co.nz/research-reports/Wellington-MarketView-Q2-2020
[23] Colliers International 2020 Colliers Essentials: Wellington Retail Report 2020. Accessed through: https://www.colliers.co.nz/en-nz/research/colliers-essentials-wellington-retail-report-second-half-2020
[24] Colliers International 2020 Colliers Essentials: Wellington Retail Report 2020. Accessed through: https://www.colliers.co.nz/en-nz/research/colliers-essentials-wellington-retail-report-second-half-2020
[24] JLL 2020 Wellington Retail Market Snapshot Q2 2020. Accessed through https://www.jll.nz/en/trends-and-insights/research/wellington-retail-market-snapshot-2q20
[25] Colliers International 2019 Colliers Essentials: Wellington Retail Report 2019. Accessed through: https://www.colliers.co.nz/en-nz/research/colliers-essentials-wellington-retail-report-second-half-2019
[26] JLL 2020 Wellington Retail Market Snapshot Q3 2020. Accessed through: Wellington Retail market snapshot Q3 2020 | JLL NZ

Benchmarking

Relevant metric benchmarking against Auckland City prime retail over the past 24 months.

Wellington is home to a thriving and diverse retail market in New Zealand, second only to Auckland in comparison. The Wellington CBD is a major retail destination for the greater Wellington Region and local tourism. Unlike Auckland, which has several high-end central shopping centres such as Newmarket and Ponsonby, boutique and high-end retail is primarily concentrated in the Wellington CBD. EY has relied on comparable retail data solely from Auckland given the lack of comparable retail data and commercial publications on other retail markets across NZ.

Table 1: Retail comparison data[27]

	Auckland			Wellington		
	2H 2020	2H 2019	2H 2018	2H 2020	2H 2019	2H 2018
Avg. net face rents ($/SQM)	$1,250 - $4,300	$1,250 - $4,300	$1,250 - $4,300	$1,067 - $1,517	$1,134 - $1,564	$1,113 - $1,523
Avg. yields	5.0% - 6.0%	4.5% - 6.0%	4.5% - 6.0%	6.3% - 7.3%	6.2% - 7.2%	6.4% - 7.2%
Avg. net capital values ($/SQM)	$20,833 - $86,000	$23,810- $81,905	$23,810- $81,905	$14,932- $24,404	$15,820 - $25,270	$15,530- $23,990
Vacancy rates	2.2%	0.9%	2.6%	6.7%	4.2%	6.8%

In both regions, statistics on prime CBD retail is tabulated above. The Auckland region has a population of ~1.7 million whereas the Wellington region has a population of ~0.5 million. Characteristically, Auckland is New Zealand's largest city and accordingly commands higher rents, higher capital values and lower yields. Rental rates have taken a slight drop in Wellington following the impacts of Covid-19 whereas Auckland rents have remained relatively stable. Yields have remained relatively stable for both regions, slightly softening in Auckland by 5 bps for the lower end of the average. This is primarily due to a lack of transactional evidence in the market as investors and occupiers continue to wait until the effects of Covid-19 unfold and markets begin to recover.

Even though Wellington is a much smaller area compared to Auckland, market parameters indicate that the retail market in Wellington has grown over the years, illustrated by increasing net rents, net capital values and strong yields (pre-Covid-19).

[27] All data sourced from Colliers International.

Golden Mile retail landscape

Physical observations

On Wednesday the 11th of November 2020, representatives from EY walked the Golden Mile and collected data on retailer types, counts, vacant properties, parking availability and side street retailers. By observing the Golden Mile in person, we were able to gain a more holistic view of the current environment and how the proposed options could impact retailers.

At the top of Lambton Quay, we observed many name brand retailers on the north side of Lambton and commercial offices and government occupiers on the south side. Lambton Quay has a significant amount of lane ways, side streets and access ways to the adjacent Terrace street north of Lambton Quay, further adding to its diverse retail offering and accessibility attributes. Retailers along Lambton Quay benefit from these access points as an alternative usage opportunity for loading bays and public parking.

Willis Street contains similar levels of retail amenities and subsequently tapers off towards the end of Willis Street becoming more hospitality centric. This trend continues through Manners Street where a decrease in area character amenity is apparent.

Courtenay Place encompasses mainly retail offerings on the west side and hospitality offerings such as restaurants and bars to the east. Courtenay Place is also home to various entertainment outlets such as Saint James Theatre.

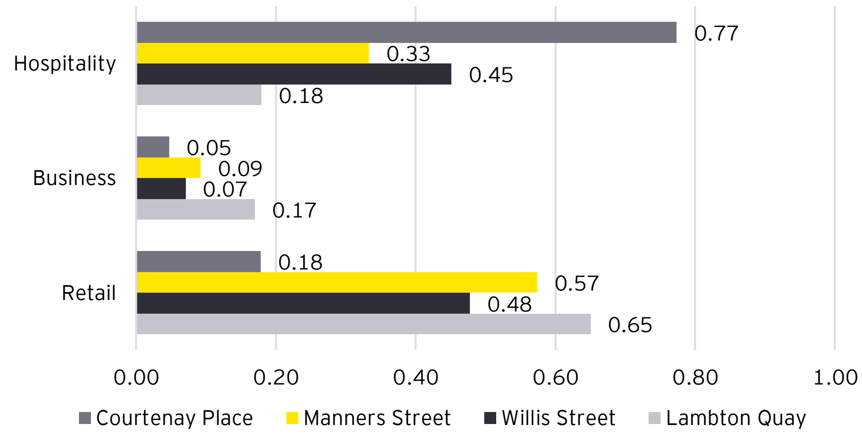
Although these four streets are defined as the "Golden Mile", the Wellington CBD retail landscape goes well beyond this corridor and extends into side streets such as Victoria, Featherston and Cuba Street, to name a few. These areas have begun to attract various premium and boutique retailers seeking proximity to the foot traffic around the Golden Mile.

As part of our observation, we conducted a survey to approximate the commercial mix of shops along the Golden Mile. These street front units were noted and classified as either:

1. Hospitality – encompassing food, beverage and accommodation
2. Business – not classed as either hospitality or retail
3. Retail – shops providing goods or services of a retail nature e.g. clothing, hairdressing, consumer products etc.
4. Note: Shops on the ground floor of the Golden Mile and shops that had clear signage on the Golden Mile and street facing were counted.

The graph below depicts the observation of tenant mixes on the Golden Mile. Lambton Quay and Manners Street are majority retail focussed whereas Courtenay Place is dominated by hospitality amenities. Willis Street is almost evenly split between retail and hospitality, the reasoning for which could be based on its central location within the Golden Mile and proximity to and presence of commercial office space.

Golden Mile street frontage breakdown



Observations of current amenities

A summary of our findings on the level of current amenities and offerings are tabulated below. These categories represent the primary process improvements being proposed by the Golden Mile improvements. The categories include parking, loading bays, pedestrian flow, walkability and area character. EY has rated these categories on a scale ranging from very high to very low in terms of presence and amenity. These ratings are based on EY's interpretation and site survey findings.

Very high | High | Moderate | Low | Very low

	Lambton Quay	Willis Street	Manners Street	Courtenay Place
Parking	Low	Very low	Very low	Moderate
Loading bays	High	Moderate	Moderate	High
Pedestrian flow	Very high	Very high	Moderate	Low
Bus stops	Very high	Moderate	Low	Low
Walkability	High	Moderate	Moderate	Moderate
Area character	High	High	Moderate	Low

1. Parking, including taxi and mobility parking

Little to no parking was observed on both sides of Lambton Quay, Willis Street and Manners Street. However, there is extensive parking available within side streets of Golden Mile streets, including both public and private parking such Wilson parking lots and Wellington City Council parking. Courtenay Place has sufficient on-street parking with ample side street parking throughout.[28]

There is only one mobility park directly on the Golden Mile. This was found mostly vacant during weekdays, 85% of the time, and otherwise occupied by mainly private vehicles for an average of 33 minutes during weekdays, and an average of 70 minutes during weekends.[29]

"Taxi parks are utilised during weekdays by taxis 40% of the time, and by other vehicles 10% of the time. These zones are vacant for the remaining 50% of the time."

Section	Parking spaces
Lambton Quay	28
Willis Street	0
Manners Street	0
Courtenay Place	52

2. Loading bays

Lambton Quay and Courtenay Place have the most loading bays with 11 and 7 respectively, whereas Willis and Manners Street have 3 and 1 respectively. During our site survey on the 11th of November, we noted the loading bays on Lambton Quay and Willis Street were highly used whereas on Manners and Courtenay Street their usage was low to moderate.

Other external surveys found loading bays throughout the Golden Mile to be highly utilised during the week (max 40 vehicles daily, then decreasing during the weekend (as expected due to the commercial vehicle usage). Loading bays are mostly utilised during weekdays by private and commercial/heavy trucks 65% of the time, and by taxi's 10% of the time.[30]

[28] Refer to Appendix A for map of loading bays and taxi stands.
[29] WSP 2020 Quick literature review; Golden Mile parking removal and impact on business.

[30] Stantec (2020) Golden Mile Surveys: Restricted Parking Occupancy & Bus Queue Behaviour.

3. Pedestrian flow

Very high pedestrian flow was observed on Lambton Quay and Willis Street whereas noticeably less was observed on Manners Street and Courtenay Place. Pedestrian count data obtained from leasing agents also showed a weekly average of 96,000 pedestrians on Lambton Quay compared to 73,000 on Manners Street (rounded to the nearest '000). Hence, the top half of the Golden Mile shows more pedestrian flow than the bottom half.

4. Bus stops

Lambton Quay has 17 bus stops followed by Willis and Manners Street which have 3 each, then Courtenay Place which has 4, as shown in Appendix A. Bus stops were highly utilised by pedestrians and busses were observed as the prominent mode of transport present on the Golden Mile.

Section	Bus stops
Lambton Quay	17
Willis Street	3
Manners Street	3
Courtenay Place	4

5. Walkability

Willis Street has slightly narrower footpaths in comparison to Lambton Quay, whereas Manners Street and Courtenay Place both have a mix of wider and narrower footpaths, with noticeable uneven brick paving in some parts.

"Proposed changes to increase footpath space by 30% across the Golden Mile pose no risks to retailers in the long term, only benefits."

6. Area character

The Lambton Quay and Willis Street areas are well-kept and clean throughout. Pathways and frontages are all in excellent condition with very little to no signs of damage or wear and tear. There is a slight decrease in area character along Manners Street with a change in retail mix from high end, branded retailers to mostly secondary retail stores in less appealing/modern conditions and fit outs.

The retail mix and area character of Courtenay Place is like Manners Street. However, there is a visible, lower area character felt.

2 Case studies

Overview

Methodology

Case studies were developed and retrieved from a desktop research scan, initially into New Zealand literature on the effects of retailers from road corridor changes. A limited amount of information was found, causing an extension to the literature scan to include international examples. Relevance and comparability to Wellington's Golden Mile was considered by choosing examples from similar geographies, with similar retail amenity, demographics and transport modal breakdowns. This report includes two domestic case study examples and five international case study examples, outlining the relevance to the Golden Mile of each one, including caveats and considerations when taking this into account.

Approach

The case studies that follow were chosen as comparable retail precincts to the corridor of interest - the Golden Mile in Wellington. They were selected from international and domestic research of precincts that had undergone transformation in recent years to cater more exclusively for bicycles, scooters, pedestrians with more footpath amenities. The case studies chosen highlight both the positive and negative considerations of transforming retail precincts to the local economy, and while the chosen geographies were the most comparable studies available, topographic distinctions of the Golden Mile and demographic public transport patterns specific to Wellington mean that all case studies should be treated as unique and the reader should be aware of biases or assumptions that are specific to the case study geography of interest.

Australia

Lygon St, Melbourne, Victoria

New Zealand

Queen St, Auckland
Karangahape Rd, Auckland
Takapuna, Auckland
Cuba St, Wellington
Hereford St, Christchurch
Colombo St, Christchurch

UK & Ireland

Grafton St, Dublin
Henry St, Dublin
London, UK

Canada

Bloor St, Toronto, Ontario
Hornby St, Vancouver, British Colombia

Domestic case studies

Queen Street Retail Precinct, Auckland, New Zealand[31]

Situation

Commissioned by Auckland Council, this project aimed to understand the value of walking to Auckland city centre's retail economy. The study aimed to discover if agglomeration economics and retail economic productivity responded better if the city was more walkable.

Work performed

The work set out to understand the value of the urban realm, through statistics such as future user numbers, effective footpath width, personal security, sense of place and feeling of comfort. Scenarios were compared to understand the change in annual and lifetime benefit to the economy. Designated cycle zones and footpath widening with an allocation for green spaces was explored along Auckland's Queen Street Retail Precinct. Calculation of the cost of delay per year to the corridor through private vehicle use and poor road layout was undertaken. Non-tangible benefits of walking were explored, such that it facilitates personal and business networking within business centres.

Result and key takeaways

The survey and related report indicated that walkability and slower modes of transport drove higher rents, and ground rents could be a proxy for walkability for retail located in areas with high pedestrian traffic. Additionally, real estate prices could be used as a proxy for productivity. The number of pedestrians on Queen Street has doubled since 2012. Since 2010, there has been a 49% increase in retail spending, a 41% increase in café seats and a 61% increase in public seating across the city centre. Estimated that designated cycle zones, lower parking and taxi stops, and increased footpath width with added green space would deliver $700k annual benefit, and $15.2m lifetime benefit to the local economy. An estimated avoided cost of delay over the lifetime of the study of $186m.

"The survey and related report indicated that walkability and slower modes of transport drove higher rents, and ground rents could be a proxy for walkability for retail located in areas with high pedestrian traffic."

2x
number of pedestrians on Queen St since 2012

61%
increase in public seating across the city centre

49%
increase in retail spending across the city centre

Relevance to the Golden Mile

The Queen Street shopping corridor is a highly comparable area to the Golden Mile. Consumers are in the same retail market conditions as in Wellington, so retail lease demand and occupancy rates can easily be compared. Additionally, changes to city transport corridors occurred in a similar pattern to options being planned for the Golden Mile, with parking on Queen Street previously removed to make space for cycle lanes and widen the footpath.

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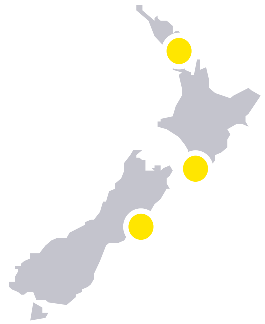
[31] Auckland Council 2018 Business Case for Walking. Accessed through: https://infocouncil.aucklandcouncil.govt.nz/Open/2017/08/CEN_20170823_AGN_7016_AT_files/CEN_20170823_AGN_7016_AT_Attachment_55166_1.PDF



Various, Auckland, Wellington and Christchurch, New Zealand[32]

Situation

The study aimed to investigate the economic impact of transport choice and road space allocation on retail activity in shopping areas located in central cities and along major road corridors in the central New Zealand cities of Auckland, Wellington and Christchurch.

Work performed

To achieve this, research focused on three key research areas:

1. Identify relevant New Zealand and overseas research/case studies on economics and road space allocation.
2. Assess the economic impact of users by transport mode in New Zealand shopping areas.
3. Investigate how road space allocation/street design influences use of shopping areas.

A total of nine shopping areas in Auckland, Christchurch and Wellington were selected, located along arterial corridors and in central city locations.

Result and key takeaways

The data indicated that cycle trips account for the highest non-private car user spend in central locations and only currently account for 2% of total travel. It was noted that spend by sustainable transport mode users (bicycles, scooters and walkers) was higher in overseas case studies possibly due to the ease of which these can be used for shopping trips.

This was concluded to be perhaps because of the layout of New Zealand cities, transport infrastructure etc.

The study suggested designing key retail corridors towards sustainable transport users with higher disposable income, but also noted that cyclists, scooters and pedestrians tend to spend in short, sharp bursts but private car users tend to spend in bulk due to being able to transport large buys home.

Retailers generally overestimate importance of on-street parking outside shops when nearby parking is enough, and shoppers' value high-quality urban design features near retail more than they value parking.

> "Retailers generally overestimate importance of on-street parking outside shops when nearby parking is enough, and shoppers' value high-quality urban design features near retail more than they value parking."

Relevance to the Golden Mile

This study by the New Zealand Transport Agency is the largest study undertaken on the economic impact to retailers of transport use types in New Zealand. The study investigated nine shopping areas across three major cities, with 1744 shopper and 144 retailer surveys completed.

[32] Waka Kotahi New Zealand Transport Agency 2013 Reallocation of road space. Accessed through https://infocouncil.aucklandcouncil.govt.nz

International case studies

Lygon St, Melbourne, Victoria, Australia[33]

Situation

This case study used a novel test to justifying public space use in retail precincts based on the economic productivity and required space for different travel modes. It was hoped that the research would be a catalyst for a reallocation of public space from car parking to bike parking in Melbourne. It was also hoped that the research would provide an argument that there was no economic basis for the existing allocation of public space to car parking.

Work performed

Significant amounts of data available suggested that cycling infrastructure changes travel behaviour. People choose to cycle because the paths and places to park are available, and norms have expanded to encompass cycling as a legitimate travel mode, particularly its convenience and sociality. This was shown internationally and in a Melbourne context. The study looked at benefits of carparking to the community and whether it was a fair use of public land. Depictions of opinions in the media suggested that car parking benefits the community as it provides convenience and possibly even a necessity for shoppers who do not have access to other transport modes. The second opinion displayed by traders in the media suggested that car parking is of a benefit to the business community as without it they would be financially disadvantaged.

Result and key takeaways

Little evidence was found to prove or disprove that carparking produces an economic advantage to retailers. However, in Stroget, Copenhagen, some economic upturns were immediately experienced from removing private vehicle access and transforming the area to allow bicycle access. The study goes further to suggest that while bicycles and pedestrians spend less per trip than one person in a private vehicle ($27 vs. $16.20), private vehicle parking is not an efficient use of public land as up to six bicycles could be parked in one carpark, or up to twelve pedestrians could stand in one carpark, this number should be increased to $97.20 for bicyclists. The caveat of this study, it should be noted, is the appetite for cycling in Melbourne may exceed the Golden Mile in Wellington, due to Melbourne's flat topography.

$27

average retail spend per carpark, given access to one car

$97.2

average retail spend per carpark, given access to six bicycles

Relevance to the Golden Mile

Melbourne is a city with similar demographic preferences to Wellington. Sustainable transport is highly utilised and public space in the central city is at a premium. The report is particularly informative to policymakers, urban place makers and public space planners.

[33] University of Melbourne 2008 Economic contribution of cyclists. Accessed through: http://colabradio.mit.edu/wp-content/uploads/2010/12/Final_Thesis_Alison_Lee.pdf

Hornby St, Vancouver, British Colombia, Canada[34]

Situation

The Vancouver long-term transportation plan (adopted in 1997) was initiated to increase mode share of cycling, implementing two separated two-way bike lanes in Vancouver's downtown core in 2010. The first was built along Dunsmuir St and the second along Hornby St. To make space for the bike lanes, road space was reallocated, parking spaces moved or eliminated, illegal use of loading bays was prevented and turning restrictions introduced.

Work performed

In October 2010, prior to bike lane installation, the City of Vancouver conducted a business impact study, through Stantec. This measured the business impacts of separated bike lanes and proposed mitigation strategies to address negative impacts. This was the first such study in North America, focusing on such impacts. Economic data was collected on rents, sales, vacancy and lease rates.

Result and key takeaways

The survey was returned by 32% of retailers in the area, the percentage change in annual sales was indicated as:

Section	YoY change in sales
Hornby St	-11%
Howe St (comparator to Hornby St)	-1%
Dunsmuir St	-2%
West Georgia St (comparator to Dunsmuir St)	2%
Other locations impacted	2%
Average	-5%

The financial impact of the bike lanes was a loss of sales and profit, with loss of sales estimated at $2.4m over a year, and loss in profit of $480k over the year. It was mentioned that this is relatively moderate based on industry standards and insufficient to create persistent vacancies.

> "The city should move quickly to meet with the businesses that have been particularly impacted, to mitigate sales loss, lower revenue and increase vacancies."

A shopping habits survey was also carried out in the area after the bike lanes were constructed. 79% of respondents on Dunsmuir and 76% of respondents on Hornby St reportedly did not change their shopping habits due to easier bike access, safety improvements and a more pleasant environment for pedestrians.

Relevance to the Golden Mile

The Vancouver study proposes some mitigants to negative impacts on retailers, in the case of a downturn in sales or profits. These are globally relevant, and Wellington could implement some if negative impacts were felt. To minimise negative impacts, the study proposes monitoring traffic flow and making evidence-based changes, creating a list of hot spots and consulting with businesses one on one and considering the parking and loading bay changes one by one and on a case by case basis.

[34] Stantec 2011 Vancouver Separated Bike Lane Business Impact Study. Accessed through: https://council.vancouver.ca/20110728/documents/penv3-BusinessImpactStudyReportDowntownSeparatedBicycleLanes-StantecReport.pdf

Bloor St, Toronto, Ontario, Canada[35]

Situation

The goal of this study was to project the impacts on retail activity of reallocation of space from on-street parking to other travel modes such as a bike lane or a wider footpath. From an economic perspective, in order to maximise commercial activity, prioritisation of space should shift to mode of travel used by the majority of patrons. 90% of patrons (cyclists and pedestrians) do not need parking. Providing mode space and allocating space to amenities like benches, waste, planting and bicycle parking attracts pedestrians.

Work performed

The survey shows that patrons arriving by foot and bicycle visit most often and spend the most money.

	Live or work in the area (294)	Live and work in the area (242)	Walk (246)	Bicycle (64)	Public transit (171)	Car (55)	Total (536)
<$25	6%	31%	8%	11%	29%	24%	17%
$25-$99	21%	35%	16%	39%	37%	37%	27%
$100-$499	50%	29%	52%	42%	28%	30%	41%
$500-$999	14%	5%	17%	3%	3%	4%	10%
$1,000	9%	0%	7%	5%	3%	5%	5%

It appears in the best interest of retailers to favour reallocating space toward more frequent and higher spending customers, in this case, pedestrians and cyclists.

"It appears in the best interest of retailers to favour reallocating space toward more frequent and higher spending customers, in this case, pedestrians and cyclists."

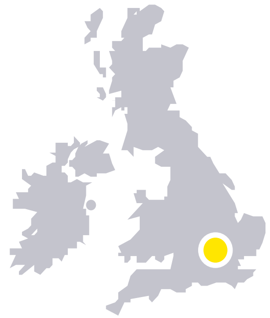
Result and key takeaways

Surveys were conducted with 61 merchants and 538 patrons on Bloor Street in Toronto. It was found that only 10% of patrons drove to the shopping area, and that those arriving by foot and bicycle spent the most money per month. The report concluded that converting street parking into a bike lane in the area was "unlikely" to have a negative impact on business and that, on the contrary, "this change will likely increase commercial activity."

Relevance to the Golden Mile

This report aims to understand the economic impact of reallocating road space to bike lanes. Bloor St has a similar upscale rental market to Wellington, voted as the most expensive street in Canada. It contains a similar mix of boutique, unique and large retailers. It should be noted, however, that this study is by the Clean Air Partnership, and forms a slightly biased opinion in favour of sustainable transport options for their environmental benefit.

[35] Clean Air Partnership 2009 Bike Lanes, On-Street Parking and Businesses. Accessed through: http://colabradio.mit.edu/wp-content/uploads/2010/12/Final_Thesis_Alison_Lee.pdf



Grafton St and Henry St, Dublin, Ireland[36]

Situation

The perception of many city centre retail businesses is that a significant share of their customer base arrives to the city centre by car. In support of this assumption many store owners frequently lobby for the provision of greater road access and more parking in the city centre. On the contrary, increasing car priority can restrict overall access as well as disrupt the environmental quality of the city centre. This is a sensitive issue as retailing is a business vulnerable to competition from other locations and channels. Dublin, Ireland was used as a case study for this report from Technological University Dublin.

Work performed

Consumer behaviour was studied along two shopping avenues in Dublin: Grafton Street and Henry Street. Merchants overestimated how many of their customers arrived by car—they guessed 13% on Grafton Street (it was 10%) and 19% on Henry Street (it was 9%). They also underestimated the numbers of bicycle patrons in the area. On Grafton Street, with better bike infrastructure, monthly cyclist spending was nearly even with driver spending: 228 compared to 237 Euros, and Dublin Bike (local bike service) were the highest spenders at 250 Euros per month.

	Perceived (Grafton, Henry)		Actual (Grafton, Henry)	
Private vehicles	13%	19%	10%	9%
Pedestrians	11%	6%	20%	19%

The work performed was largely comparing perceived with actual number of customers arriving via each mode of transport. Number of travellers arriving by bus and walking greatly exceeded perceived levels, showing that retailers would likely increase revenue if they catered more specifically to bus and foot shoppers.

Result and key takeaways

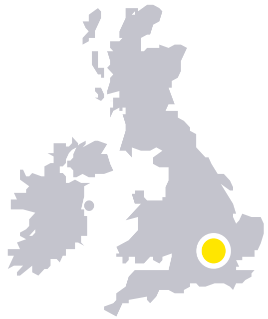
Traders on Dublin's two main shopping streets considerably over estimate spending by shoppers travelling by car while significantly undervaluing the spend of bus passengers and pedestrians. Busses carried 35% of shoppers to Grafton Street and 49% to Henry Street; compared to public perceptions that 31% and 40% did so. Measured in value terms, transportation by bus proved the most lucrative mode to both streets, delivering 38% of the total spend by modal share.

"Number of travellers arriving by bus and walking greatly exceeded perceived levels, showing that retailers would likely increase revenue if they catered to bus and foot shoppers."

Relevance to the Golden Mile

Grafton and Henry Streets in Dublin are similarly central city shopping areas to the Golden Mile. Retailer perceptions are comparable to those on the Golden Mile in Wellington due to the nature of multi-modal transport options and current modal share. Additionally, the tendency to overestimate the number of shoppers requiring private car infrastructure (particularly private carparking) was found to be a global phenomenon.

36 TU Dublin 2011 Report on shopper travel behaviour in Dublin City Centre. Accessed through: http://colabradio.mit.edu/wp-content/uploads/2010/12/Final_Thesis_Alison_Lee.pdf



Various, London, United Kingdom[37]

Situation

A major rationale for the supply of parking spaces in city shopping precincts is that customers will avoid the area without them. Retailers commonly believe that most consumers arrive by car and believe free or cheap parking plays a major role in choosing a destination. However, evidence on this topic is minimal. A review of retail precincts in Greater London, concludes that retailers often overestimate the role free parking plays in their success.

Work performed

The review was conducted by the cross-party policy group London Councils. The group performed a thorough meta-analysis of the existing academic and public agency research on the role of parking in urban commerce. It also sent parking questionnaires to all 33 London boroughs (comprising the CBD, as well as inner and outer areas) and conducted market research with shoppers at three retail precincts in the outer regions. The findings can be reduced to four main reasons retailers don't need free parking to thrive.

A few caveats to the research are that London is a very transit-friendly city, more than most cities. Also, several of the studies considered by the group found that outer shopping precincts need parking to entice shoppers who might otherwise visit competitor shopping precincts. However, parking was still not seen as critical to the success of a business.

Result and key takeaways

The review reduced findings down to four main reasons central city shopping precincts thrive without parking:

1. "Free parking" can be quite expensive as when offset by higher retail prices, those who drive get a subsidy and those who do not get an additional cost. This incentive to drive pressures local authorities into transforming space to roads.
2. Retailers overestimate how many customers drive. In London, research showed that more shoppers reach town centres by public transport, walking or biking, and logically the modes which are used more often should be provided for.
3. Retailers overestimate how much private car customers spend. They spend more per visit but not more overall per month.
4. Range of shops is more important to customers than parking availability.

£226	£282	£373
Monthly total average spend of visitors by private car	Monthly total average spend of visitors by bus	Monthly total average spend of visitors by bus

Relevance to the Golden Mile

This study is the largest of its kind, undertaking surveys of 2,000 shoppers and 15 major town centres. It should be noted that London is a very transit-friendly city, much more than most cities. Additionally, the results were split, with outer shopping centres needing parking to entice shoppers that might otherwise shop elsewhere.

[37] Bloomberg Citylab 2012. Accessed through: https://www.bloomberg.com/news/articles/2012-11-26/4-reasons-retailers-don-t-need-free-parking-to-thrive

3 Impacts assessment

Overview

The Impacts Assessment provides a deeper review of the current amenities on the Golden Mile and likely impacts of proposed options for corridor transformation on retailers.

Throughout late 2020, EY developed findings presented in this report that would support our scores for the three transformation options proposed at Let's Get Wellington Moving's Golden Mile Multi-Criteria Analysis workshop, held on Monday 30th November.

A range of sources supported our findings, including:

- Manual data collection of amenities along the Golden Mile from in-situ observations
- Domestic and international case study research
- Desktop analysis of publicly available papers and reports on transformational corridor change and likely effects on the retail sector
- Quantitative modelling on changes in retail spend obtained from MRCagney

This section concludes that retailers (landlords and tenants) could be exposed to a range of impacts compared to the present, including:

Landlords:

- Greater lease demand and favourable lease terms
- Lower vacancy rates
- Increased rent appreciation and property values

Tenants:

- Increased competition for retail spaces and higher rents
- Higher sales volumes and retail exposure from increased pedestrian traffic

Case studies support the notion that retailers perceive removing parking from the immediate vicinity of their shops will lead to fewer customer purchases. The positive impacts identified from the economic impact analysis would likely outweigh any perceived negatives that exist.

Overall, it was found that option three proposes the most potential positive impact for retailers along the corridor. Overseas and domestic case studies recommend that retailers should tailor their offering to the most popular means of customer spend by arrival; in this case walking and public transit shoppers. Option Three caters best to these modes through 75% footpaths and a dedicated lane for bus, cycling and scootering.

Perspective on changes

1. Parking, including taxi and mobility parking

Key risks of changes:

The removal of parking and general traffic from the Golden Mile could result in a decrease of customers for retailers, especially those who require on street parking for mobility or short-term parking e.g. pick-ups and drop offs. However, this is offset by the abundance of side street parking around the Golden Mile.

Perspective on changes:

The removal of metered parking space from the Golden Mile are only a small proportion of the total parking supply in the area and therefore considered immaterial with little to no impact to retailers.[38] There is an abundance of side street parking in very close proximity off the Golden Mile that can be used by customers instead.

Similarly, the removal of one mobility park is likely to have an immaterial effect on retailers. Mobility parks are still present and provide access to the Golden Mile via side streets. Taxi parking is only being utilised 50% of the time, hence the relocation of this to nearby side streets would also have minimal impact on retailers.

2. Loading bays

Key risks of changes:

Loading bays provide spaces and increased accessibility options for retailers to receive their delivered goods. Relocating loading bays to side streets and removing general traffic could result in lower operational efficiency for businesses, as delivery drivers would have to walk further for drop offs, risk damage (weather circumstances, slippery surfaces for trolleys, theft from pedestrian congestion etc.) to items as distance from the loading bay to retailers increase.

Perspective on changes:

The relocation of loading bays and removal of general traffic would see an impact on courier/delivery drivers as they would be most affected by this change. Longer distances to transport goods on foot from side streets on the Golden Mile bring additional risks to retailers surrounding the safety of their goods. However, seeing as relocations would be made to nearby side streets, risks from proposed changes could be low for retailers whereas increased time and effort for courier/delivery drivers would have a more significant impact.

3. Pedestrian flow

Key risks of changes:

Proposed changes to increase footpath space by 30% across the Golden Mile appear to pose no risks to retailers in the long term, only benefits. However, in the short term, during the construction period to extend footpath space, retailers risk seeing declines in customer levels due to difficult accessibility from construction. Since this would be a risk that affects all retailers on the Golden Mile, project leads should have appropriate access in place for pedestrians and customers to access retailers during construction.

Perspective on changes:

Long term benefits of increased footpath space will allow for better pedestrian flow and walkability, especially for the top half of the Golden Mile which exhibits high pedestrian flow. Short term risks to retailers can be mitigated by effective project management during the construction period.

[38] WSP 2020 Quick literature review; Golden Mile parking removal and impact on business.

4. Bus stops

Key risks of changes:

The consolidation of bus stops could lead to greater pedestrian congestion around bus stops, potentially negatively impacting customers trying to access retailers. However, there is a low risk of this occurring per each proposed option as footpaths would be widened adding 30% more footpath space, potentially offsetting congestion risk.

Perspective on changes:

Consolidating bus stops, especially on Lambton Quay where there are 17 currently present is proposed to increase space, reliability and efficiency of bus movement along the Golden Mile. Irrespective of the number of bus stops removed, pedestrian congestion is unlikely to have an impact on retailers as this would likely be offset by increased footpath space.

5. Walkability

Key risks of changes:

Proposed changes to increase footpath space by 30% across the Golden Mile pose no risks to retailers in the long term, only benefits. However, in the short term, during the construction period to extend footpath space, retailers risk seeing declines in customer activity from accessibility constraints due to construction.

Since this would be a risk that affects all retailers on the Golden Mile, project leads should have appropriate access in place for pedestrians and customers to access retailers during construction.

> "Proposed changes to increase footpath space by 30% across the Golden Mile pose no risks to retailers in the long term, only benefits."

Perspective on changes:

Long term benefits of increased footpath space will allow for better walkability of pedestrians along the Golden Mile. Short term risks are minor and can be easily mitigated by appropriate temporary walking/accessibility solutions and mitigation strategies during the construction period.

6. Area character

Key risks of changes:

Increased footpath space by removing loading bays/parking and increased accessibility to the streetscape from repurposing the end of side streets poses short term risks during the construction period. However, as previously noted this can be mitigated through effective project management strategies.

Perspective on changes:

The changes will create more space along the Golden Mile to walk, sit, spend time, and access retailers and businesses. Naturally, this would slightly increase the area character of Manners Street and Courtenay Place, however because of their retail mix differences, Lambton Quay and Willis Street could see relatively more benefits from these changes, especially around the Cuba Street area, in terms of spaces people will want to sit and spend time in.

Relevance to retailers along the Golden Mile

Analysis on the current state of amenities along the Golden Mile, defined as Lambton Quay, Willis Street, Manners Street and Courtenay Place, brought some relevant findings forward. Proposed benefits were likely to be more pronounced along Manners Street and Courtenay Place, as they currently have a lower general level of existing amenity. Below, each section summarises the text above, in sections categorised by best to worst perspective of changes.

Walkability, pedestrian flow and area character

It was noted that changes to amenities such as walkability, pedestrian flow and area character, as long as they are well researched and designed, pose little to no effect on retailer profitability, and increases to customer accessibility along the corridor.

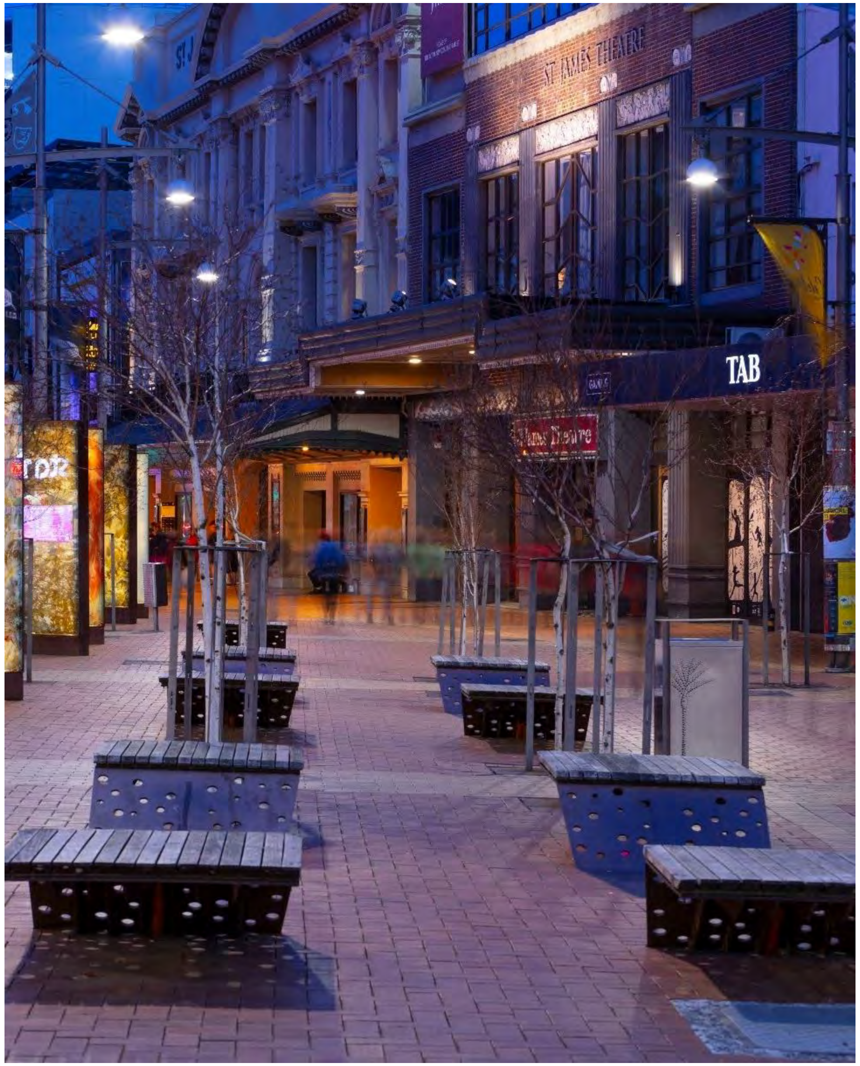
Parking

Research discovered that metered parking, including taxi parking was low to non-existent across all sections of the Golden mile, indicating that plans to reallocate parking would likely have little to no effect upon retailers and customer access. Any negative effect upon retailers was found to be offset by ample side-street parking.

Loading bays and bus stops

Some amenity changes pose more downside risk to retailers include changes to loading bays and bus stop layout. Customer accessibility to the precinct is largely by bus transport. Removing bus stops or reallocating spaces could cause short-term confusion, and restricting bus access to one lane prevents passing and causes some delays. Removing loading bays could decrease operational efficiency of retailers (especially cafes and restaurants) relying on daily or large deliveries of goods.

Figure 4: Courtenay Place, retrieved from Wellington City Council



Impacts

Retailers, through disruption and transformational change to Wellington's Golden Mile, can expect to experience positive and negative impacts from each of the three proposed options, compared to if they were to continue with the status quo. This section outlines likely positive and negative impacts and their effect on retailers under each scenario.

It should to be noted that, while this list arises from international literature and case study reviews, it is not exhaustive. Many other positive and negative effects could be felt by retailers along Wellington's Golden Mile as a result of transformational corridor changes. It is worth noting that the qualitative analysis of impact by option is indicative only. It can also be thought of simply as an indication of high-level expected outcomes of each option with respect to retailers.

The following impacts and the likely extent that they could be felt by retailers from each proposed option arose from international research and benchmarking against comparable city centres and retail precincts. Explanations present unbiased opinions and are supported by research from comparable case studies.

Increased foot traffic and pedestrian activity

All options present varying changes to the existing road transport corridor. Where greater changes exist, i.e. for Options Two and Three, we predict that a greater increase in foot traffic will occur. Associated increases in foot traffic and pedestrian activity enhances shop-front access, as footpaths may become wider and public transport modes more reliable. Bus transport will exclusively be able to access the city along specified parts of the Golden Mile. Retail stores, restaurants and entertainment precincts will likely enjoy greater economic return from increased pedestrian spend.

Studies of the results of improving the pedestrian environment in shopping areas have generally shown that lowering the speed of traffic passing through an area and providing amenities for pedestrians (wider footpaths, landscaping, streetscape improvements) pays dividends in terms of retail patronage and sales. For example, improvements to School Street in Lodi, California, coupled with economic incentives, have helped attract 60 new stores, lowering the vacancy rate to 6 percent from 18 percent and resulting in a 30% increase in sales tax revenues (mirroring increased sales) since the improvements were completed in 1997. In 1995, the City of West Palm Beach Florida made major investments in traffic calming and pedestrian realm improvements along Clematis Street, its traditional main street, including restoring the street to two-way movements. Improvements extended into the adjacent neighbourhoods, making them more pedestrian-friendly, encouraging residents to walk to Clematis Street. Property values have more than doubled along the street, with retail rents rising from an average of $6.00 to $30.00 per square ft. Of course, many factors may have contributed to these increases. The changes occurred contemporaneous with the development of City Place, a large mixed-use centre, itself a model of a walkable urban development that has attracted many new residents and visitors to the city.[39]

Increased foot path and recreational space

Enhanced recreational space is planned in all options for the Golden Mile. Recreational space will give opportunity for businesses to advertise their services without preventing traffic flow, hold shop- or store-front gatherings and deliver associated services such as kerbside dining experiences. Additionally, the Greater Wellington Regional Council will be able to position art installations or green spaces without disrupting pedestrian access to stores or restaurants. With parking transitioned to bus stops or public transport access, kerbs will be repurposed to provide economic services and access to customers. Loading bays shifted to side streets will encourage services to take place at alternative shop entrances and service providers to reduce retail trade disruptions.

[39] Robert Wood Johnson Foundation 2013 Business Performance in Walkable Shopping Areas. Accessed through: https://activelivingresearch.org/sites/activelivingresearch.org/files/BusinessPerformanceWalkableShoppingAreas_Nov2013.pdf

Streetscape enhancements have been discovered to add value to an area and are associated with higher rents and the attraction of new businesses. In addition, there is good evidence to show that catering for walking and cycling environments raises private property values by significant amounts, in addition to increasing rental price of retail properties.[40]

Key recreation and tourism attraction

Each of the planned options for the Golden Mile removes some access to the corridor for private vehicles and improves footpath area for walkers, bikers and scooters. The survey from Auckland Transport into the Economic Value of Walking in the Auckland City Centre concludes that slower movement throughout retail precincts leads to higher pedestrian spend. Matched with reduced congestion and less time delays[41] , the area could expect to improve economic contribution to the Wellington Metropolitan Area, and retailers could expect to improve revenue. The reduction of private vehicles and increase in footpath area earmarks the precinct as a retail and commercial hub of Wellington, attracting more recreation through added leisure facilities (seating and greenery) and shopping tourism activity.

Auckland Council also discovered, through its walkable city research that walking "facilitates personal and business networking" within business centres and attractive public spaces create a platform for business and social exchange and support the "spread of knowledge". These economic factors are likely to promote the area to retailers in pursuit of higher revenue and prime commercial leasing space.

[40] Heart Foundation Australia 2010 Good for Business, the benefits of making streets more walking and cycling friendly. Accessed through: https://activelivingresearch.org/sites/activelivingresearch.org/files/BusinessPerformanceWalkableShoppingAreas_Nov2013.pdf

[41] Auckland Council 2017 Business Case for Walking. Accessed through: https://infocouncil.aucklandcouncil.govt.nz/Open/2017/08/CEN_20170823_AGN_7016_AT_files/CEN_20170823_AGN_7016_AT_Attachment_55166_1.PDF

Improved public transport networks

Ensuring existing transport services are removed and public transport options encouraged will improve pedestrian access to the Golden Mile and its retail outcomes. The shopping precinct and entertainment precinct will become more accessible to visitors on public transport, who would resultantly spend more. Currently, 26% of the public access the Golden Mile by public transport, but only 4% get around the Golden Mile by public transport. Both statistics would increase if the public transport networks become more reliable and buses to and around the corridor become more reliable, delivering shoppers to retail stores along the corridor.

The 2020 Milford Bus Stop Upgrade by Auckland Transport in 2020 increased bus passengers to Milford Shopping Centre from 350 to 4000 per month as a result of the service changes. It was discovered that even if only 46% of passengers make a purchase in the shopping area on a visit and the average spend is relatively small ($20.03), the cumulative impact on spend is positive when compared to prior levels.

Enhanced retail and hospitality corridor

The Golden Mile of Wellington accommodates some 30% of the central area's total retail floorspace, within over 550 stores. The area brings together retail, restaurants, and entertainment precincts in high density to form economies of agglomeration. Cost savings from urban agglomeration bring more businesses closer to the area and increase foot traffic of the area by reducing costs to travel between associated services. If pedestrian access is encouraged through more walking space, the region can experience improvements to the hospitality corridor through economic spending increases. Auckland's Queen Street has directly experienced this effect, with one report focusing on the Economic Value of Walking in Auckland's City Centre showing that a doubling of pedestrians on Queen Street brought in 49% increase in retail spending and a 41% increase in café seats across the city.[42] In Wellington, it could be expected that the agglomeration effects of higher foot traffic will cause higher occupancy of leaseholders for retail space along the corridor.

[42] Auckland Council 2017 Business Case for Walking. Accessed through: https://infocouncil.aucklandcouncil.govt.nz/Open/2017/08/CEN_20170823_AGN_7016_AT_files/CEN_20170823_AGN_7016_AT_Attachment_55166_1.PDF

Designated space for cycling, scootering and other active modes of transport

Pedestrian connectivity is strongly linked with economic productivity. When people are motivated to slow down and look around shops, they are more likely to convert. Slower modes of transport such as cycling, scootering and walking, promoted through wider footpaths, encourages slower transport, and active engagement with retail shops and restaurants. Auckland Council's Business Case for Pedestrian Connectivity and Economic Productivity[43] proposes lifetime benefits of transforming Queen Street to a Light Rail or Pedestrian Mall, with 200% growth footfall has $15.2m in lifetime benefits. Given the obvious similarities between Auckland's Queen Street and Wellington's Golden Mile, benefits between the two areas directly correspond.

By reducing the number of cars pulling into and out of the transport corridor and removing parking, transport becomes safer for people on bikes and scooters and makes the city centre more accessible to multi-modal forms of transport. Removing private cars from the corridor allows access for more people and removes the congestion impact from private transport. In response, a designated area for cycling, scooters and walkers can increase economic returns of commercial areas along the corridor.

Removal of general traffic and parking

Of the 336 businesses recently surveyed in the Wellington Chamber of Commerce's survey, an overwhelming 90 per cent of businesses located on, and around, the Golden Mile believed the changes would negatively impact patronage, limit access or make no positive difference. Nearby car parks are critical for patronage, and businesses feel that decision-makers are making business worse in the city, not better. Wellingtonians are four times more likely to not make a trip to the city at all than they are to use alternative transport if car parks are unavailable. Carparks in the area are already seen as a stressed resource, with high turnover and low availability.

Retail New Zealand also provided a submission against the reduction of carparking on the Golden Mile. It is estimated that between 70-200 carparks will be lost, and this will negatively impact business patronage to an already inaccessible area to private vehicles. The submission suggested that alternative carparking options should be provided to the public before carparking is removed or repurposed.

A study undertaken in Toronto, Canada indicated that removing carparking in a downtown retail corridor has no negative effects on patronage and can even increase retail activity. They recommended pre- and post-surveys to provide valuable insights into local economic impacts of streetscape changes where sales data is limited.[44]

Removal of loading bays and taxi stands

Removing loading bay availability is seen as a step that will debilitate businesses' operations and other provisions must be made for deliveries to retail stores. Several submissions, including those from the Wellington Chamber of Commerce and Retail New Zealand indicated that loading bays were critical to the success of businesses along the corridor and should be increased, not decreased, in order to improve economic outcomes for businesses in Wellington City.

Loading bays provide spaces and increased accessibility options for retailers to receive their delivered goods. Relocating loading bays to side streets and removing general traffic could result in lower operational efficiency for businesses, as delivery drivers would have to walk further for drop offs, risk damage (weather circumstances, slippery surfaces for trolleys, theft from pedestrian congestion etc.) to items as distance from the loading bay to retailers increase.

The relocation of loading bays and removal of general traffic would see an impact on courier/delivery drivers as they would be most affected by this change. Longer distances to transport goods on foot from side streets on the Golden Mile bring additional risks to retailers surrounding the safety of their goods. However, seeing as relocations would be made to nearby side streets, risks from proposed changes could be low for retailers whereas increased time and effort for courier/delivery drivers would have a more significant impact.

[43] Auckland Council 2017 Business Case for Walking. Accessed through: https://infocouncil.aucklandcouncil.govt.nz/Open/2017/08/CEN_20170823_AGN_7016_AT_files/CEN_20170823_AGN_7016_AT_Attachment_55166_1.PDF

[44] Journal of the American Planning Association 2019 Measuring the Local Economic Impacts of Replacing On-Street Parking with Bike Lanes. Accessed through: https://www.tandfonline.com/doi/abs/10.1080/01944363.2019.1638816?journalCode=rjpa20

Closure of side streets

Side street closure is expected to reduce access to the area for delivery vehicles, taxis and non-local transit, causing traffic flow problems in the immediate vicinity of the corridor. The Automobile Association of New Zealand raises that side streets are critical to traffic flow, closing these off cuts traffic flow and reduces the number of carparks, leading to a reduced number of pedestrians able to access the area. They raise a solution, that turning circles must be provided and new carparks would need to be provided if side streets were to be closed.[45]

Reduction in equitable access for those with limited mobility

A distinct lack of solutions has been offered for those with restricted mobility and could be significantly improved upon. Patrons who frequent the area currently will be lost, and retailers will see a downturn in economic activity from those with restricted mobility. Opportunity in the area will be restricted to those who can access it. Consumer sentiment and submissions, particularly from the Wellington Chamber of Commerce present the difficulty those with limited mobility will face given any of the three proposed options are chosen.

It is expected that removal of private car access to the Golden Mile will make the corridor and retail spaces along it inaccessible to those with limited mobility. Currently, some patrons to the area are restricted to private car use only as their mobility restrictions make using public transport difficult. Reducing the number of carparks and access to private vehicles along the corridor will not make this easier.

[45] Let's Get Wellington Moving 2020 Engagement Summary Report. Accessed through: https://lgwm.nz/assets/Documents/Technical-Documents/Early-Interventions/Golden-Mile-engagement-report-June-August-2020.pdf

Construction period could result in reduced consumer activity

There is case study evidence that negative economic impacts can arise from construction, with delays likely to reduce patron activity in the area when construction takes place. In what has been a very difficult year for most small to medium enterprises, and as a result, this effect could be particularly pronounced.

In the case of the City Rail Link in Auckland, businesses along Albert Street experienced significant loss of revenue (up to 50% in some cases) and risked liquidation caused by construction delays. Resultantly, some compensation was provided to help businesses during the disruptive construction period. A hardship fund was set up by Phil Goff to assist Albert Street businesses if they became embattled, provided they met set eligibility criteria.[46]

Given lengthy construction timeframes, a similar fund could be prepared for Golden Mile retailers if the negative impacts from construction cause significant revenue losses. Additionally, a development response team could be set up to manage this fund and all construction impacts on retailers.

[46] McDonald Vague 2017 Rail Link project puts CBS businesses in peril. Accessed through: https://www.mvp.co.nz/articles/general/rail-link-project-puts-cbd-businesses-in-peril

Impacts summary

Qualitative economic impacts analysis intends to give an unbiased opinion of the most immediate positive and negative impacts on retailers from proposed options for traffic flow along Wellington's Golden Mile retail precinct. Any views are based on most recent research and local engagement.

Overall, positive impacts to retailers are expected to be highest in the case of Option Three, Transform. However, this option also presented the most concerning negative impacts to retailers. As is often the case with major transformational projects, retailers are expected to be negatively impacted by delays and significant changes to road layouts in the form of rental decreases, lower occupancy rates during the construction period and lower customer spending. This is offset by the greatest expected positive impact, given the road layout and associated public transport, walking, cycling and scootering transport solutions give rise to projected uplift in pedestrian numbers and per shopper spend. Overall, the greatest risk solution is expected to give way to greatest reward through improved consumer sentiment and access to walkers, cyclists and scooters along the corridor.

A purely *qualitative* analysis of net benefits *(average positive impacts minus average negative impacts)* of each option indicates that Option One and Two would result in a net cost to retailers along Wellington's Golden Mile. Alternatively, Option Three, transform, is the only option expected to result in a net benefit to retailers. Guided by case studies included in this report, net benefits would be felt in the form of increased sales, increased revenue and increased footfall to retailers along the Golden Mile. It is particularly expected that the widened footpath proposed in Option Three, together with allocated space for bikes and scooters would increase customer access to the Golden Mile with almost immediate effect.

The net benefits assessment has been qualitative in its nature; hence it is important to note the potential variation around this assessment. The case studies and intercept survey work indicate that in some cases the benefits are likely to be materially greater, while the small number of businesses that experience net negative impacts tend to be at the minor scale.

EY has not quantified any impacts on retailers and has instead obtained quantitative data to complement our findings. MRCagney's modelling looked at four scenarios; whereby all options, *bar* the Option 3 Pessimistic Scenario, showed *increases* in estimated change of retail spend.

Scenarios were tested based on assumptions from the 2020 Intercept Survey and different case studies. A set of core assumptions were developed and tested on each option, while a set of pessimistic to optimistic scenarios were also developed and tested on Option 3. It is crucial to note, the pessimistic scenario is highly unlikely to eventuate, and was developed to stress test the model for the purposes of the MCA process.

We note that modelling has only factored in changes in parking. Other impacts have not been monetised into retail spend values due to its complexity and is a limitation of this retail impact assessment. However, as stated, qualitative insight such as case study analysis has been used to evaluate and understand impacts that have already occurred in similar situations and environments.

Detailed analysis and further insight into the quantitative modelling described here is outlined in MRCagney's report; Golden Mile: Impacts of Parking on Retail.

Retail impact assessment

The following section presents insights on the expected outcomes of retail-specific measures for both landlords and tenants along Wellington's Golden Mile from the implementation of the proposed options.

Landlords

1. Greater lease demand and favourable lease terms

The flow on effects from positive impacts to retailers would lead to retail property in the area being more desirable. As expected, increased foot traffic, pedestrian activity and enhancements to the area will make space more attractive to retailers, hence driving greater interest and accordingly lease demand. For landlords, this could be played to their advantage by negotiating more favourable clauses such as longer lease terms, frequent rent reviews (within lease boundaries), inserting ratchet clauses etc.

As an example, the Wynyard Quarter in Auckland is going through one of the largest urban regenerations in New Zealand, evolving from an industrial port once closed to the public, to a community with a mix of residential, office and retail property.[47] The precinct has transformed with large corporates such as ASB, Air New Zealand, Apple, Microsoft, Fonterra and Datacom to name a few, setting up their head offices in the area. The addition of the Park Hyatt to the landscape this year and residential developments by Willis, Bond and Co further add to the vitality of the area. As such, considering the transformation of the precinct, Site 18 - a new mixed-use development project announced at the end of 2019, has almost 100 percent of the commercial development pipeline already pre-committed.[48] This signifies strong lease demand directly correlated to the flow on effects of regeneration in the Wynyard Quarter.

2. Lower vacancy rates

Greater interest from retailers due to increased vibrancy of the area from proposed improvements, can lead to greater lease demand and hence lower vacancy rates for landlords. Results from a study found shop vacancy rates increase as the level of traffic increases.[49] Hence, the removal of general traffic from the Golden Mile, in accordance with this study, could see lower vacancy rates (holding all other factors constant). Lower vacancies for landlords mean less rent abatements are needed to incentivise tenants or to account for vacancies in income forecasting, hence contributing to greater returns.

6.7% vacancy rate

Wellington CBD June 2020 Quarter

[47] Panuku 2020 Regenerating Wynyard Quarter. Accessed through: https://www.panuku.co.nz/wynyard-quarter/chapter/regenerating-wynyard-quarter

[48] Bayleys 2019 New commercial hub in Wynyard Quarter expected to attract early pre-tenant commitment. Accessed through: https://www.bayleys.co.nz/news/commercial/new-commercial-hub-in-wynyard-quarter-expected-to-attract-early-tenant-pre-commitment

[49] Sustrans 2003 Traffic restraint and retail vitality. Accessed through: https://activelivingresearch.org/sites/activelivingresearch.sdsc.edu/files/BusinessPerformanceWalkableShoppingAreas_Nov2013.pdf

3. Increased rent appreciation and property values

There is evidence that improvements to the public realm can increase retail rents.[50] One study in Hong Kong, which controlled for confounding variables, found a 17% increase in retail rents from pedestrianisation and also found shoppers' preferences for better streets could be indirectly quantified by the change of retail rent.[51]

> "There is evidence that public realm improvements can increase retail rents and property values"

There is also evidence that public realm improvements positively affect retail property prices.[52] For example, in Wellington an initiative involving new street paving and landscaping saw gains in rents, capital values, pedestrian counts and the presence of cafes. An economic assessment of property values suggested values were approximately double what they would otherwise have been without the public realm improvements.[53]

Figure 5: Courtenay Place, retrieved from Wellington City Council

[50] Living Streets 2018 The Pedestrian Pound: The business case for better streets and places. Accessed through: https://www.livingstreets.org.uk/media/3890/pedestrian-pound-2018.pdf
[51] Yiu, Chung Yim. 2011. "The Impact of a Pedestrianisation Scheme on Retail Rent-an Empirical Study in Hong Kong." Journal of Place Management and Development 4 (3): 1–1.
[52] Buchanan, P., and N. Gay. 2009. "Making a Case for Investment in the Public Realm." Proceedings of the ICE – Urban Design and Planning 162.
[53] Living Streets 2018 The Pedestrian Pound: The business case for better streets and places. Accessed through: https://www.livingstreets.org.uk/media/3890/pedestrian-pound-2018.pdf

Tenants

1. Increased competition for retail spaces and higher rents

Following on from the previous section, the positive impacts from the proposed improvements could lead to increased rent appreciation and greater lease demand. For retail tenants, this could lead to rent increases depending on their rent review structure, leading to greater fixed costs businesses. However, increased sales volumes are also a projected economic impact, which could offset higher rents.

Additionally, other retailers could be willing to pay higher rents creating competition for retail space on the Golden Mile. Higher rents are an indicator of better business opportunities on the presumption that if retailers are willing or able to pay more for rent, their revenues must be correspondingly higher or expected to be higher.[54]

2. Higher sales volumes and retail exposure from increased pedestrian traffic

Increased pedestrian traffic from the proposed improvements, specifically wider footpath space leading to better pedestrian flow and walkability, could lead to higher sales volumes for retailers. Similar changes to the Fort Street precinct in the Auckland CBD (creation of shared space, upgrades of streets and lanes) saw an increase of pedestrians by 50% in peak hours, 400% increase in hospitality spending and 47% increase in consumer spending.[55] For retailers, a good-quality public environment improves trading by attracting more people into an area. Well-planned improvements to public spaces within town centres can boost commercial trading by up to 40% and generate significant private sector investment.[56]

Additionally, investing in better streets and spaces for walking was found to provide a competitive return compared to other transport projects.[57] A study in New York found walking and cycling projects can increase retail sales by greater than 30% but pedestrian improvements at one junction increased local retail sales by 48%.[58] As another example in Piccadilly, Stoke-on-Trent, a £10 million investment to make the area more pedestrian-friendly increased pedestrian traffic by 30%. Changes such as widening footpaths, replacing existing footpath surfaces, installing trees and seating has encouraged large numbers of people back to the town centre and multiple new businesses, cafes and restaurants opening.

[54] Robert Wood Johnson Foundation 2013 Business Performance in Walkable Shopping Areas. Accessed through: https://activelivingresearch.org/sites/activelivingresearch.sdsc.edu/files/BusinessPerformanceWalkableShoppingAreas_Nov2013.pdf
[55] Auckland Design Manual n.d. Street Case Study: Fort Street Precinct. Accessed through: http://www.aucklanddesignmanual.co.nz/resources/case-studies/street_fort_street_precinct
[56] Living Streets 2018 The Pedestrian Pound: The business case for better streets and places. Accessed through: https://www.livingstreets.org.uk/media/3890/pedestrian-pound-2018.pdf
[57] Living Streets 2018 The Pedestrian Pound: The business case for better streets and places. Accessed through: https://www.livingstreets.org.uk/media/3890/pedestrian-pound-2018.pdf
[58] New York City Department of Transportation 2013 The Economic Benefit of Sustainable Streets. Accessed through: http://www.nyc.gov/html/dot/downloads/pdf/dot-economic-benefits-of-sustainable-streets.pdf

Appendices

Appendix A

Map loading bays and taxi stands along the Golden Mile

Appendix B

Intercept survey results and application to retailers

- The Golden Mile Intercept Survey aims to bring insight into customer travel and behaviour patterns in the Golden Mile. These insights are useful in understanding the impact on retailers from proposed changes to the Golden Mile, majors on customers being the removal of on-street parking and amenity improvements.
- The survey was carried out by WSP Research over a period of nine days, beginning on Saturday 28/11/20 and ending on Sunday 06/12/20. In total, 2,137 responses were captured during the whole survey period. Response rates were affected by Christmas events on the first weekend (higher rates) and poor weather on Monday and Tuesday (lower rates).
- Of the respondents who travelled to the Golden Mile, 44.2% originated from somewhere else in Wellington City, 32.5% within the Wellington City Centre, 23.3% from outside Wellington City.
- 69.6% of respondents used active modes/public transport, 22.3% drove a private vehicle, 2.9% were passengers in a private vehicle and 4% used Uber/Taxis. Proposed changes will improve public transport networks and provide better allowances for active modes of transport, along with better area amenity. This would highly likely lead to more customer attraction to the Golden Mile, flowing on to higher sales volumes for retailers, supporting retail tenant impacts identified in the Retail Impact Assessment of this report.
- Of the respondents who drove to the Golden Mile or were a passenger in a private vehicle, 79.1% did not use car parking, 12.8% used off-street parking and only 3.5% used on-street parking within the Golden Mile streets. Most respondents did not use carparking or used off-street parking, hence supporting multiple views that the removal of on street parking in the Golden Mile will have a minimal impact on customers and effectively retailers.
- The 3.5% of respondents who used on-street parking within the Golden Mile Streets were asked what they would have done, in the first instance, had they not found that car park. 74.3% would have kept looking for another on-street park and 16.2% would have parked in an off-street park. Of this sample of 74 respondents, 9.5% would have abandoned the outing entirely or travelled to a different shopping area.
- For respondents who would have abandoned the outing entirely or travelled to a different shopping area, it is unclear from the survey if they were aware of the locations of off-street parking, and if not, whether this was an influence in their response.
- 45.6% of respondents would visit the Golden Mile more frequently post improvements, thus having a flow on effect on retailers who would benefit from increased sales volumes and pedestrian traffic.

Appendix C

Loading bay weekday occupancy rates[59]

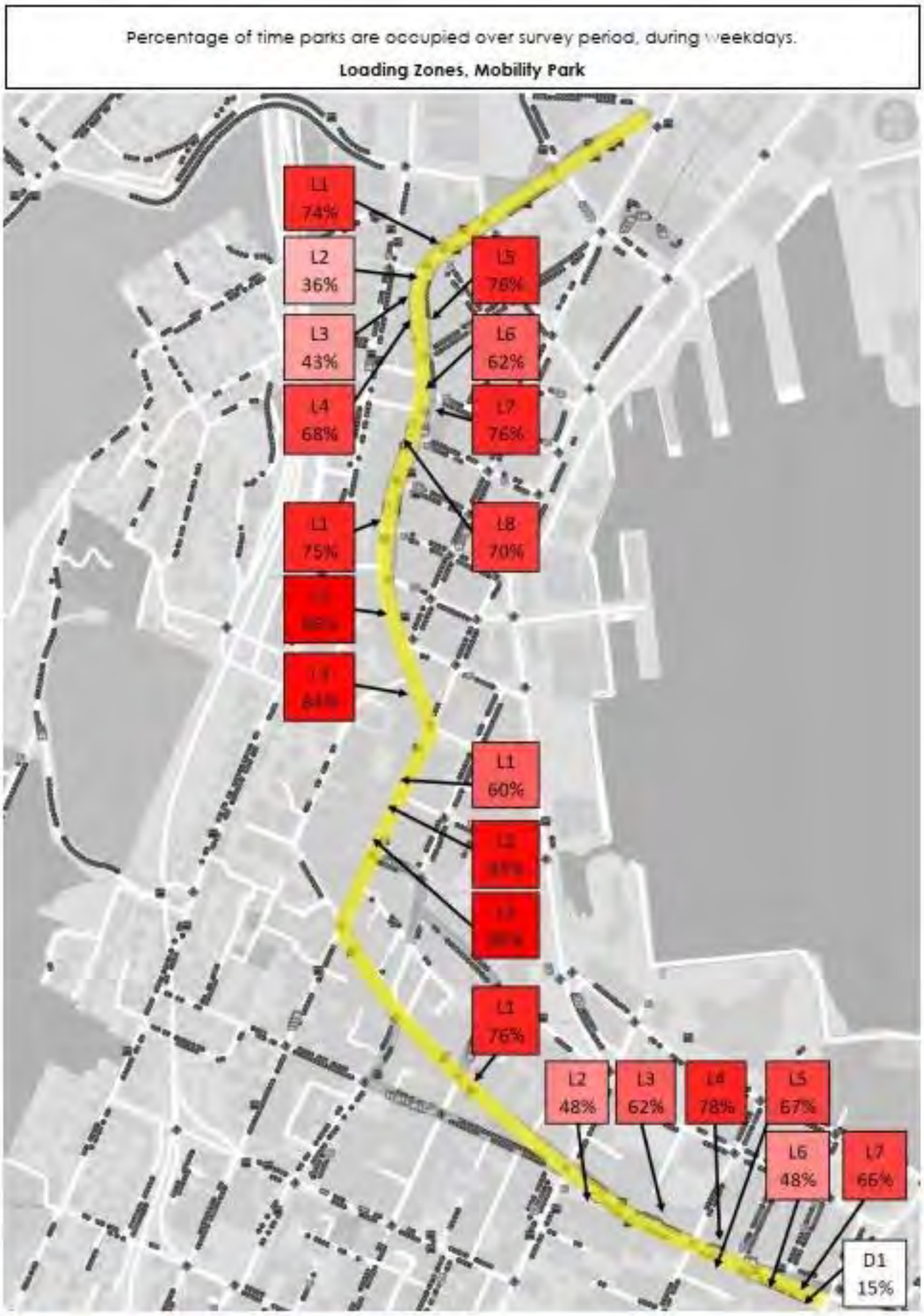


Figure 3-3: Loading zone and mobility (bottom right park only) utilisation heatmap for weekdays (percentage of "beats" with park occupied)

The highest percentage of time a park was occupied during weekdays was at L3, Zone 3 (86%).

[59] Stantec (2020) Golden Mile Surveys: Restricted Parking Occupancy & Bus Queue Behaviour.

Loading bay weekend occupancy rates[60]

Figure 3-6: Loading zone and mobility (bottom right park only) utilisation heatmap for weekends (percentage of "beats" with park occupied)

The highest percentage of time a park was occupied during weekends was at L3, Zone 2 (32%).

[60] Stantec (2020) Golden Mile Surveys: Restricted Parking Occupancy & Bus Queue Behaviour.

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Impacts on Parking on Retail Activity (and Golden Mile Retail Intercept Survey)

Golden Mile: Impacts of Parking on Retail Activity

Final Report

Prepared for: Waka Kotahi NZ Transport Agency

Prepared by: MRCagney (NZ) Ltd, Auckland, New Zealand

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Quality Assurance Register

Issue	Description	Prepared by	Reviewed by	Authorised by	Date
1	Draft	SC, FT	DG	DG	25 November 2020
2	Final Revision 1	FT, JP	DG	DG	15 December 2020
3	Final Revision 2	KC, JP	DG	DG	27 January 2021
4	Final Revision 3	CJ	DG	DG	23 April 2021
5	Final Revision 4	MM	DG	DG	20 May 2021
6	Final Revision 4.1	DG	DG	DG	28 May 2021
7	Final Revision 4.2	DG	DG	DG	4 June 2021

Contents

Figures

Tables

Executive Summary

The Golden Mile plays a vital role in the success of Wellington's transport system, regional economy and sense of place. Transecting central Wellington, it provides the core spine to the city's bus network and enables thousands of people to access employment, do business, shop, dine and to access other central city destinations each day. It has the highest pedestrian volumes in New Zealand. Due to its critical functions, the Golden Mile must perform at a high level, both as a transport asset that safely and efficiently moves people and goods, and as an important place for people that is pleasant, safe and attractive.

This technical memo summarises evidence in relation to the potential effect on the retail environment from changes relating to the Golden Mile as part of the Let's Get Wellington Moving programme. This work was largely initiated to explore the impacts of parking removal on the Golden Mile. It draws on desktop research and analysis and a 2020 Intercept Survey of visitors of the Golden Mile conducted by WSP (Appendix E).

It summarises various case studies, both from New Zealand and overseas, that give some indication of the typical access modes for people spending money in city centres; known relationships between access modes and spending patterns in city centres; and relationships between improved pedestrian environments and changes to footfall/retail spending.

Following this, spreadsheet analysis is undertaken to understand how parameters taken from these case studies and the 2020 Intercept Survey may apply within the context of the Golden Mile. Under the most extreme option for parking removal (short list option 3), around 1700 parking sessions (individual cars parking) per day are expected to be affected; this represents around 6% of total visitors to the Golden Mile.

The spreadsheet is then used to test some scenarios based on assumptions from the 2020 Intercept Survey and different case studies. The total estimated revenue from people parking in spaces that may be removed by the Golden Mile Improvements is around $6,300,000 (about 1%) annually of total revenue for retailers along the Golden Mile.

A set of core assumptions were developed and tested on each option, while a set of pessimistic to optimistic scenarios were also developed and tested on Option 3. The results of these are included in Table 1 and indicate that the net impact is most likely to be positive, although under some pessimistic (and probably unlikely) assumptions, the net impact could be slightly negative.

Table 1: Scenarios of effects of parking removal on retail spend

Golden Mile Option and Scenario	Net impact on annual retail spend	
Option 1 Core	*$2,600,000*	*0.51%*
Option 2 Core	*$2,100,000*	*0.42%*
Option 3 Core	*$770,000*	*0.15%*
Option 3 Pessimistic	-$21,000,000	-4.2%
Option 3 Mid-Range	$11,000,000	2.2%
Option 3 Optimistic	$48,000,000	9.3%

The findings under these core assumptions are likely to be understated as they assume no increase in new trips to the Golden Mile despite the public transport access and pedestrian realm improvements of the options. There are many other social benefits from these projects that are not monetised into retail spend values here and are considered and evaluated in other technical reports for the Golden Mile Single Stage Business Case.

1. Introduction

This technical memo summarises the evidence compiled and developed by MRCagney in relation to the potential effect on the retail environment from changes relating to the Golden Mile as part of the Let's Get Wellington Moving programme. This work was largely initiated to explore the impacts of parking removal on the Golden Mile.

This technical memo describes the findings of three tasks. These are:

- Literature and Case Study Review
- Base Case Pedestrian Value Assessment
- Net Impact Evaluation

The Net Impact Evaluation was initially developed with inputs from various case studies and was then updated with the findings from the 2020 Intercept Survey (Appendix E).

The literature review builds on the previous work done by WSP for the Golden Mile, dated 25 August 2020, and the subsequent information provided. The literature review provides more case studies and further relevant literature to help inform the data analysis, with a particular focus on the relationship between access modes and spending patterns.

The Base Case Pedestrian Value Assessment estimates the retail value of people on the Golden Mile, using pre-COVID-19 data for revenue and pedestrian numbers and the 2020 Intercept Survey (Appendix E).

The Net Impact Evaluation explores the potential effects of each short-listed option on total revenue collected by retailers along the Golden Mile, using inputs and discussions from subject matter experts involved in different parts of the MCA and review of relevant literature.

The purpose of these tasks is to help inform the MCA scoring of the changes to the retail environment, with the MCA scoring ultimately being completed by EY. The work relies on data that is currently available and makes some high-level assumptions to help quantify the potential changes to the retail environment. Following the MCA, this work may be updated with more detailed data, depending on subsequent steps.

2. Literature review

The literature review provides both local and international examples of the effect that changes to parking have on nearby retail environments. This has been commissioned as part of a wider study of the potential effects on Wellington retailers of changes to parking provision on the Golden Mile and of pedestrian and public transport improvements along the Golden Mile.

An initial literature review was undertaken by WSP in August 2020 (the WSP Memo) and the content of this initial review has been referred to or reproduced as part of the current review. The WSP Memo is attached to the current review in Appendix B.

This updated literature review has addressed three key questions:

1. What are the typical access modes for people that spend money in city centres?
2. What are some of the observed relationships between access modes and spending patterns at shops/services in city centres?
3. What are some of the known relationships between increased footfall and improved pedestrian environments and retail spending?

1.1 What are the typical access modes for people that spend money in city centres?

1.1.1 Waka Kotahi Research Report 530: Reallocation of Road Space

The WSP Memo finds several studies have investigated the proportion of shoppers arriving by various modes of transport, through self-report surveys, both internationally and locally, and discusses the findings of international surveys from Bristol, England and Graz, Austria. These surveys show that between 22 percent and 32 percent of shoppers arrived in the centres by car, but there was no reporting on whether the shoppers parked on-street in the immediate area of the shops or alternatively if they parked on-street further afield or off-street. These case studies are also included in Waka Kotahi Research Report 530[1], published in 2013. The report includes a comprehensive literature review and local case studies investigating various aspects of road space reallocation. Both the English and Austrian studies found that retailers overestimate the use of on and off-street parking by shoppers in the area and overestimate the impact of opportunistic trade from passing motorists (passing trade). However, local studies included in Research Report 530 indicate that Wellington retailers more accurately estimate the proportion of customers who use nearby car parks[2] than the English and Austrian examples.

One aspect of this research was an investigation of the economic impacts of transport and road space allocation on retail activity in central and arterial shopping areas. The report includes case studies from Auckland, Christchurch, and Wellington (in Wellington this includes Courtenay Place, The Terrace, and Riddiford Street). The case studies involved surveys of shoppers and retailers in shopping areas, with results reporting the mode transport shoppers used to get to the city and the mode of transport the shoppers used to get to the shops once they were in the city. The information on Courtenay Place is most relevant to the Golden Mile proposal, with the mode split for Courtenay Place being quite different to the mode split in other parts of the country, e.g., Takapuna in Auckland). The study results for Courtenay Place are summarised in the report in the following charts, which show Courtenay Place has a relatively high walk mode share and a

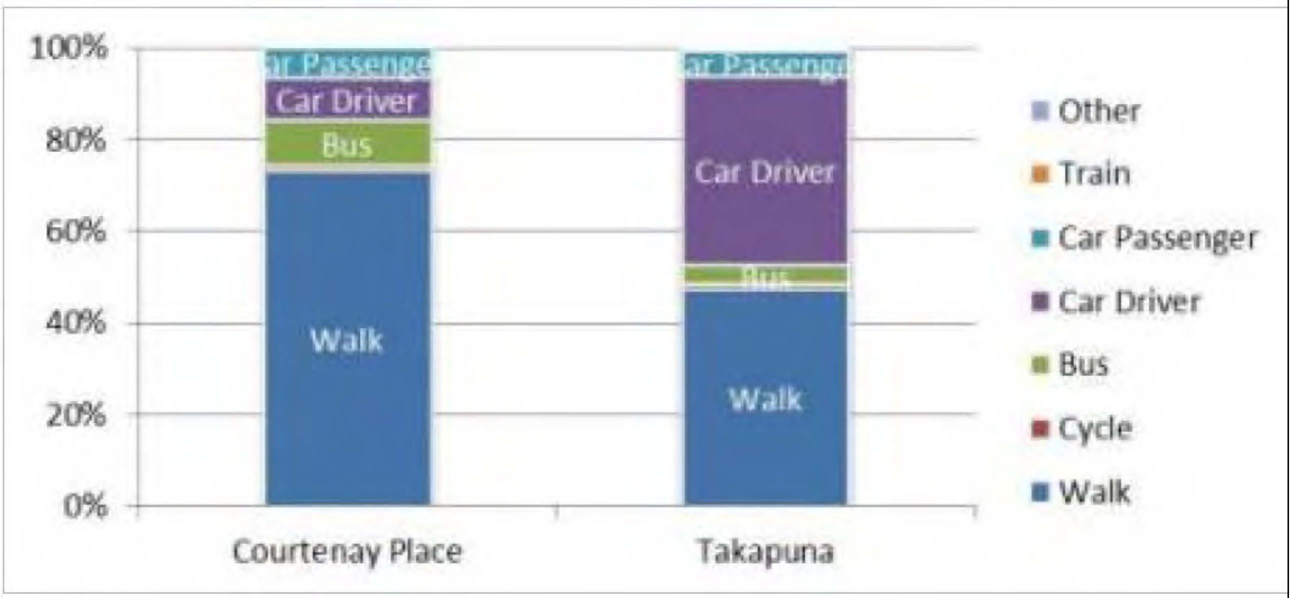
[1] Refer to NZTA Research Report 530, Reallocation of Road Space, T Fleming (Allatt), S Turner and L Tarjomi August 2013
[2] Refer to section 6.5 (Summary of data analysis) of NZTA Research Report 530

relatively low car mode share compared to Takapuna and has a relatively low bus and cycle mode share compared to Colombo Street.

Source: NZTA Research Report 530

Figure 2.1: Courtenay Place shoppers' main mode of travel to the city centre [3]

[3] Refer to Figure 6.15 of NZTA Research Report 530



Source: NZTA Research Report 530

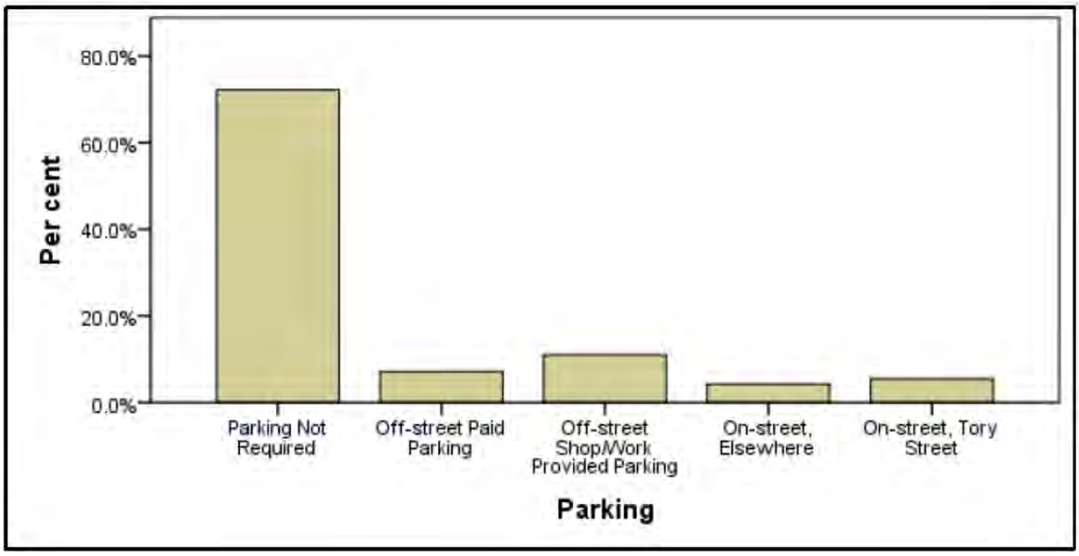
Figure 2.2: Courtenay Place shoppers' mode of travel to shop[4]

The Waka Kotahi Research Report also asked where people parked if their main mode of transport was 'car driver' to the Courtenay Place shops, and reports that of the 16 percent of shoppers who used a car as their main means of transport, around half parked outside the shops [on Courtenay Place][5]. This indicates that if car passengers are also accounted for, around 15 percent of the shoppers on Courtenay Place arrive by car and use on-street car parks in the immediate vicinity of the shops. It is noted that, for Courtenay Place, the proportion of shoppers who parked on-street outside the shops (15 percent) was relatively low compared to the proportion across all the surveyed Central[6] areas, which was 34 percent[7].

1.1.2 Tory Street Study

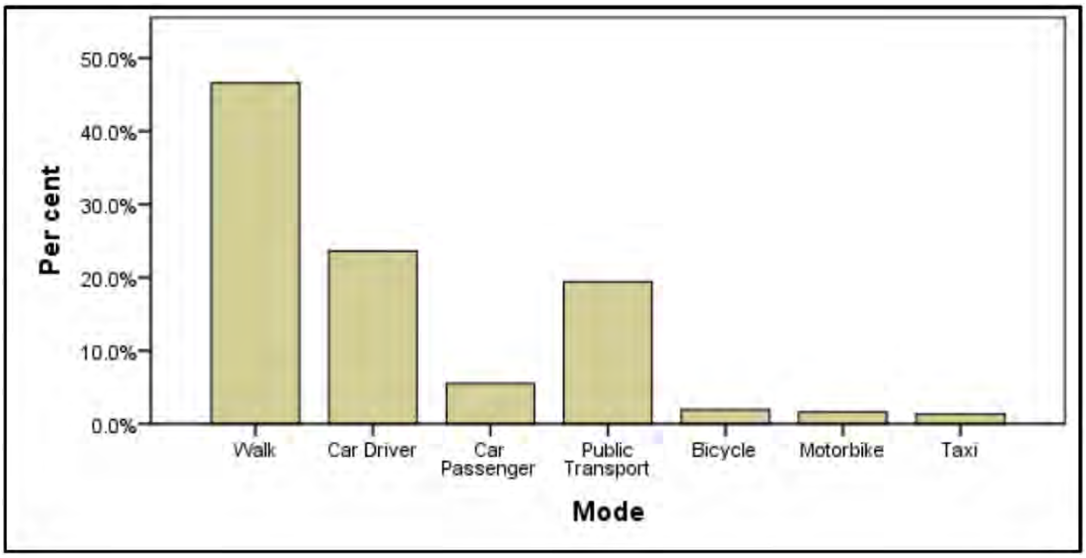
The WSP Report (Appendix B) outlines that the active and public transport mode share observed in the Courtenay Place case study is consistent with findings from other Wellington research. For example, research carried out by Beetham (2014), which includes data on shoppers' requirements for parking on arrival to the city and to Tory Street. The findings from Beetham (2014) are summarised in the following charts[8], which interestingly show a similar car mode share, at around 30 percent, to that observed in the Courtenay Place study in Waka Kotahi Research Report 530 discussed above and shows that of the people who arrived in the city by car, less than half parked on the street outside the shops.

[4] Refer to Figure 6.16 of NZTA Research Report 530
[5] Refer to Appendix C: New Zealand case studies – data summary by centre/site of NZTA Research Report 530
[6] The NZTA Research Report 530 classifies the study areas into either 'Central' or 'Arterial' types. The Central areas consist of Courtenay Place, Hurstmere Road, and Columbo Street.
[7] Refer to Figure 6.34 of NZTA Research Report 530
[8] Referred to Beetham, J (2014) Re-cycling the streets: exploring the allocation of public space for transport. Wellington: Victoria University of Wellington



Source: Beetham, 2014

Figure 2-1: Tory Street shoppers' parking requirement on arrival to city centre



Source: Beetham, 2014

Figure 2.4: Tory Street shoppers' mode of arrival to Tory Street

1.1.3 Portland, USA Study

A 2012 study from the United States city of Portland (Clifton et al.) investigated the mode split and spending patterns of customers to convenience stores, busy restaurants, and bars in various parts of the city. The study reported that the overall mode split of customers in the central city was made up of 34 percent private car, 43 percent walk, 9 percent cycle, and 14 percent public transport.[9] These proportions are generally comparable to those reported for Courtenay Place in Waka Kotahi Research Report 530 and Tory Street reported in Beetham

[9] Refer to article *Consumer Behavior and Travel Choices: A Focus on Cyclists and Pedestrians,* Clifton et al, submitted for presentation and publication to the 92nd Annual Meeting of the Transportation Research Board, January 2013, Washington, D.C.

(2014), although there is a higher cycle mode share and correspondingly lower transit / bus mode share reported in the Portland study.

1.1.4 Transport for London Town Centres Report

A more recent international study dealing with travel modes to main shopping streets is the Town Centres Report prepared for Transport for London.[10] This report has been prepared on a regular basis since 1999 and monitors the contribution made by bus users and other modes to the economic health and viability of town centres across London. The town centres covered by the study vary in terms of their characteristics so as to provide a range of economic mix, scale of retail activity, transport networks, road layout, traffic flow, parking provision etc, and are classified under London Plan town centre categories of International, Metropolitan, Major, and District. The Golden Mile has some generally comparable characteristics in terms of scale of retail activity, economic mix, and transport networks to some of the International, Metropolitan and Major town centres, e.g. Oxford / Regent Streets (International Centre) are central city locations proximate to office workers but are highly accessible by the Underground system (London's metro system), and Clapham Junction (Major Centre) has a relatively high density of retail activity and relies heavily on bus services rather than having Underground station access.

The average mode share across all town centres involved with the study was 35 percent bus, 27 percent walk, 16 percent private vehicle, 10 percent train, 7 percent Underground, and 2 percent cycle. The reporting shows the mode share at Clapham Junction was generally in line with the average for all town centres, the mode share at Oxford / Regent Streets was heavily weighted towards the Underground with only around 1 percent of shoppers arriving by car. Town centres like Bromley, a Metropolitan town centre on the outskirts of London, had a much higher private car mode share at around 36 percent (including passengers), but still had around 33 percent of shoppers arriving by bus, with only 1 percent walking. The study also shows that across all the town centres, between 2004 and 2015, there was a general reduction in car mode share, an increase in train and bicycle mode share, a slight increase in bus mode share, and a slight reduction in walking mode share. Of people who arrived in the centres by car, the study reports that around half parked in an off-street council or private non-accessory car park, 14 percent parked in accessory private parking (e.g. a shop's car park), 16 percent parked in off-street residential parking or other off-street private parking, 6 percent parked on-street on a side road, and 4 percent parked on-street on the main street. This means that around 10 percent of shoppers in the centres used on-street car parks in the immediate area of the shopping streets.

1.1.5 Melbourne, Australia – Malls vs Main Streets Study

A 2012 research report titled '*Convenience for the car-borne shopper: Are malls and shopping strips driving customers away?*'[11] investigates, in the context of Melbourne, Australia, the importance shoppers assign to car convenience and their perceptions of shopping malls and main street shopping areas (Melbourne's two predominant shopping formats) in relation to car convenience. The study compares the different shopping area formats in terms of their provision of parking. One of the issues this research identifies relates to environmental sustainability and the need to reduce car dependency within urban areas, coupled with the idea that suburban shopping malls, by providing more convenient car access and parking than main streets, undermine the economic success and potentially contribute to the decline of main street type shopping areas. Some of the conclusions of the research include that car access and parking is an important determinant of where the survey respondents chose to shop, which in turn influences their preference in terms of the shop format they visit more often. Malls are better at providing car access and parking in the format that consumers prefer, so the research finds that in this way, the mall format has an advantage compared to the main street

[10] Refer to *Town Centres: Final Report (2016)*, prepared by Accent for Transport for London
[11] Refer to Journal article *Convenience for the car-borne shopper: Are malls and shopping strips driving customers away?* Transportation Research Part A: Policy and Practice (March 2013), Reimers, Vaughan

format. The study's authors state that *"…planners must give careful consideration to the negative consequences that may stem from strategies designed to deter car-based shopping"*.

Some limitations are noted in the research, including the geographic context of the study, which was focused on suburban shopping areas of Melbourne rather than city centre shopping. Consequently, the report states that alternative modes of travel accounted for a small minority of trips in these areas and therefore the findings cannot reasonably be generalised to a European context [where alternative mode share is greater]. This suggests that the results cannot be generalised to the context of the Golden Mile where alternative mode split is much higher.

1.1.6 Dunedin George Street Study

A more recent New Zealand study comes from Dunedin, where the City Council commissioned Aitken Taylor to undertake a Public Life Survey on George Street, one of Dunedin's main shopping streets.[12] This study reported that of the survey participants, 29 percent walked to get to George Street, 15 percent took public transport, 42 percent used private vehicles, and 14 percent took other modes. Of the people who came by private vehicles, only 2 percent parked on George Street, while 23 percent parked in a parking building, 12 percent used a private car park, and 5 percent parked on-street 'elsewhere'. The survey also asked if the option to park on George Street influenced the participants decision to visit the city centre, and if the option was not available, whether they would still visit. Regarding influencing their decision, 68 percent of respondents indicated 'no' and 32 percent indicated 'yes', but of those who indicated 'yes', none had parked on George Street on the day of the survey. Eighty eight percent of respondents said they would still visit the city centre if the option to park on George Street was not available, and 12 percent said they would not. The study noted that of those people who said they would not still visit; none had parked on George Street on the day of the survey.

1.1.7 Summary

The above review indicates that it could be reasonable to infer the Courtenay Place survey results related to car mode share and parking location (reported on in Research Report 530) represent the mode share for shoppers on the Golden Mile. This assumption was used for the initial analysis and was then updated with the 2020 Intercept Survey findings.

The original assumptions relating to the data analysis section were:

- It is reasonable to assume that around 15 percent of the shoppers on Courtenay Place arrive by car and park remotely, making the final leg of their journey by alternative modes.
- It is reasonable to assume that around 15 percent of the shoppers on Courtenay Place arrive by car and use on-street car parks in the immediate vicinity of the shops, either on the Golden Mile or the nearby side streets.

1.2 What are some of the known relationships between access modes and spending patterns at shops/services in city centres?

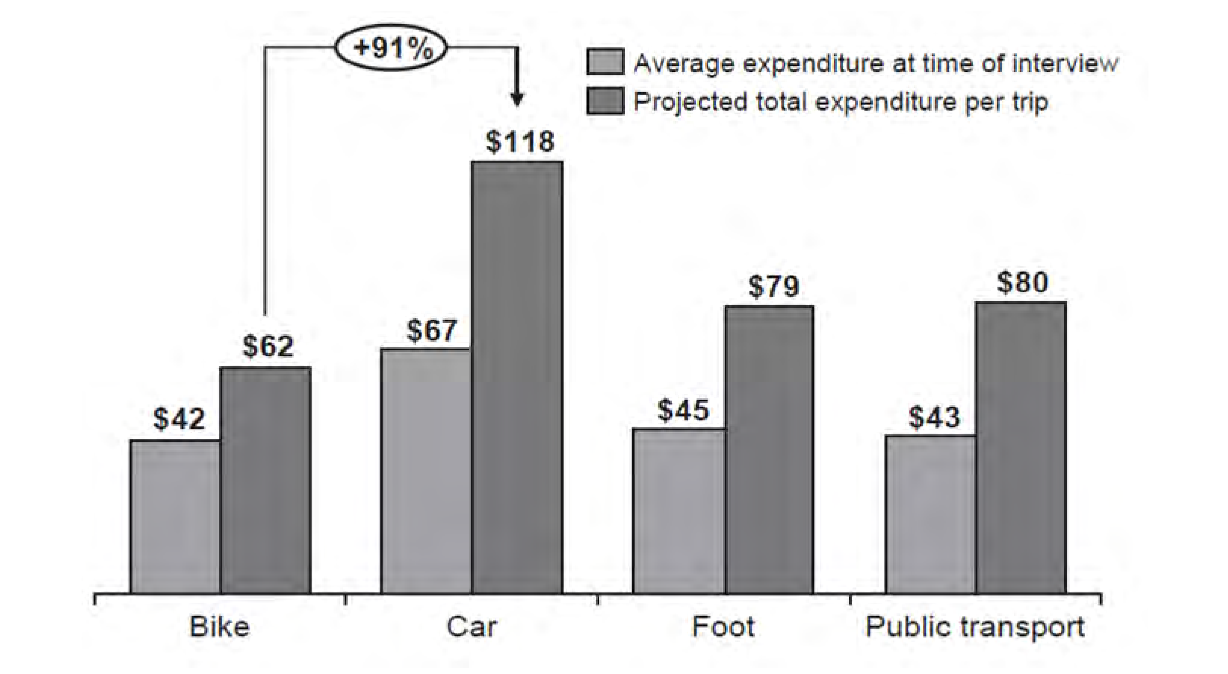
Several studies from the last 10 years have investigated the spending patterns of shoppers arriving by different modes at shopping main streets or city centre locations. These include a pedestrian intercept study of

[12] Refer to Dunedin City Council George Street Public Life Survey, Aitken Taylor, March 2020

shoppers at Lygon Street in Melbourne, Australia[13], a pedestrian intercept study in Portland, Oregon[14], shopper surveys undertaken across various shopping streets in New Zealand[15], and a pedestrian intercept survey undertaken across various town centres in London[16] including city centre high streets.

1.2.1 Lygon Street, Melbourne

Lygon Street is a busy traditional shopping street in the inner suburb of Carlton, immediately to the north of Melbourne's city centre. The Lygon Street study aimed to estimate the relative value of bicycle parking compared to car parking in terms of street space allocation. One of the metrics used in the estimate is the spend per trip by travel mode, and the report summarised this spending data in the following chart. This metric was then related back to how frequently people visited by different modes, with car drivers spending more per visit but visiting less frequently, and how much street space cyclists need to park their bikes compared to car drivers parking space requirements.

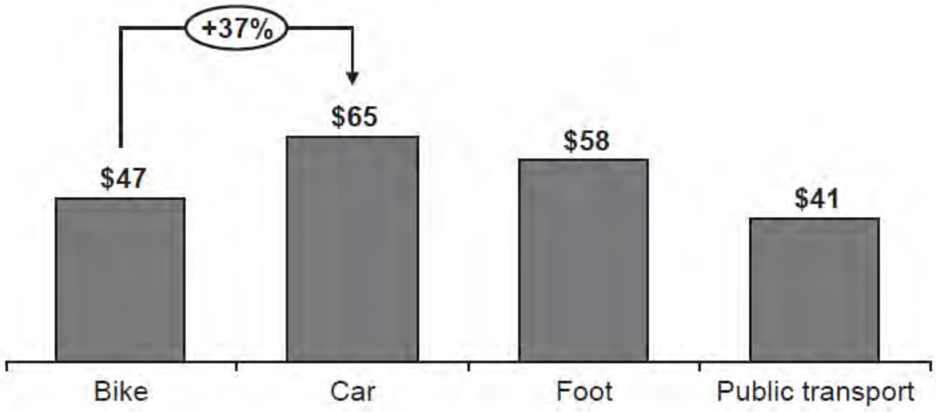


Source: Lee & March, 2010

Figure 2.5: Lygon Street study - Average spend and projected spend by mode[17]

People who arrived by car to Lygon Street tended to stay in the shops longer, so the duration of stay in the shops was also accounted for, and an assumed expenditure per mode per hour was calculated, as shown in the following chart.

[13] Refer to journal article Alison Lee & Alan March (2010) *Recognising the economic role of bikes: sharing parking in Lygon Street, Carlton,* Australian Planner, 47:2, 85-93, DOI: 10.1080/07293681003767785
[14] Refer to article *Consumer Behavior and Travel Choices: A Focus on Cyclists and Pedestrians,* Clifton et al, submitted for presentation and publication to the 92nd Annual Meeting of the Transportation Research Board, January 2013, Washington, D.C.
[15] Refer to Figure 6.15 of NZTA Research Report 530
[16] Refer to Town Centres: Final Report (2016), prepared by Accent for Transport for London
[17] Note that the authors of the study projected the total expenditure of respondents per trip by extrapolating their spend based on how long they intended to stay in the shopping centre and the amount they had spent per minute during their visit at the time they were interviewed.



Source: Lee & March, 2010

Figure 2-2: Lygon Street study - Expenditure per hour by mode

Ultimately the study found that whilst the streetscape was dominated by vehicle movement and parking, the space used for car parking in the street was less efficient at generating expenditure than bike parking when the space efficiency for each mode is considered. The reporting comments that:

"It may initially seem logical to conclude that if car users spend more, then public space should be dominated by car parking to attract more 'high spenders' to make the retail precinct successful and vibrant. However, the relative space efficiency of each mode needs to be considered"

The following table that shows the space efficiency calculation result from the report.

Mode	$ spent per hour	Parking space measurement	Hourly revenue generated per m^2*
Bike	$47	$1.5m^2$	$31
Car	$65	$13m^2$	$6

*Based on car occupancy of 1.2 people per car and bike occupancy of 1 person per bike.

Source: Lee & March, 2010

Figure 2-3: Lygon Street study - Comparison of average expenditure and space efficiency

Although the study results are not directly relevant to the Golden Mile project, the spending by mode information and the frequency of visit by mode information is generally consistent with the findings from other studies, i.e. although alternative mode users tend to spend less per visit, they visit more frequently than those who travel by car. The study also highlights that whilst car access to shopping areas is important for economic vitality, the space provided for car access needs to be balanced against the space efficiency afforded by alternative modes of transport, and too much space given over to parking can crowd out the potential economic benefits of providing for the access requirements of alternative mode users.

1.2.2 Portland, Oregon

The Portland study investigated the mode split and spending patterns of customers to convenience stores, busy restaurants, and bars in various parts of the city. The reporting states that Portland has a relatively high non-car mode share so presents a unique opportunity to observe the spending patterns across different travel modes. The study collected data on spend per visit by travel mode and frequency of visit by travel mode and used these data to estimate an expenditure per month by travel mode. This analysis is summarised in the report in the following table, which shows that even though active mode users may spend less per trip, they tend to visit the shops more frequently.

		Expenditure per trip	Trips per month	Expenditures per month	N
Convenience Store	Walk	$6.02	11.0	$64.81	96
	Bike	$7.95	9.1	$81.76	19
	Transit	$7.46	9.3	$60.37	26
	Auto	$7.61	8.3	$68.95	119
	Total	$7.03	9.5	$67.50	260
Bar	Walk	$22.30	2.6	$63.94	30
	Bike	$16.90	5.0	$81.90	20
	Transit	$19.00	5.0	$36.25	8
	Auto	$19.98	2.1	$40.78	41
	Total	$19.98	3.1	$55.74	99
Restaurant	Walk	$17.56	2.9	$32.01	64
	Bike	$10.97	7.5	$48.40	29
	Transit	$15.64	7.8	$49.39	14
	Auto	$19.52	2.5	$40.06	174
	Total	$18.00	3.5	$39.55	281

Source: Clifton et al., 2013

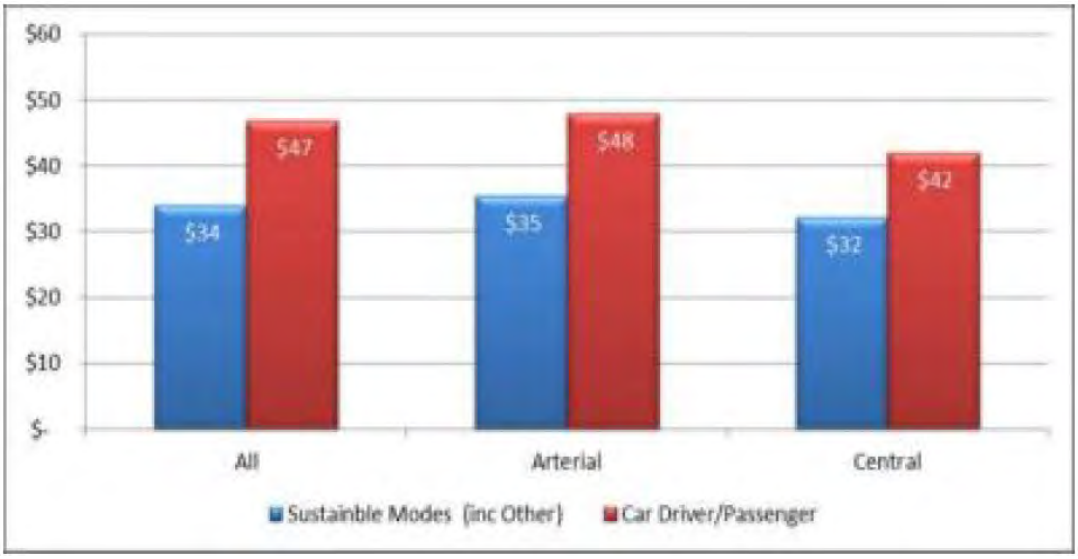
Figure 2-4: Portland study - Descriptive Consumer Expenditures and Frequency of Trips

Subsequently, the study applies additional analysis (modelling) that considers the various factors contributing to the amount customers spend and their mode choices, e.g. income, family circumstances etc, and provides commentary on the outcomes of the modelling. The conclusions of the study support the notion that customers who arrive by modes other than the car are competitive consumers, spending similar amounts or more, on average, than their counterparts using cars. The conclusions also outline the limitations of the study, which include the limited numbers and types of establishments included, noting that more work is needed, particularly for retail and supermarkets, where the requirement of carrying goods purchased can limit the purchases per visit by customers using non-car modes, but this may be offset by greater frequency of trips.

1.2.3 Waka Kotahi Research Report 530 – New Zealand Shopping Streets

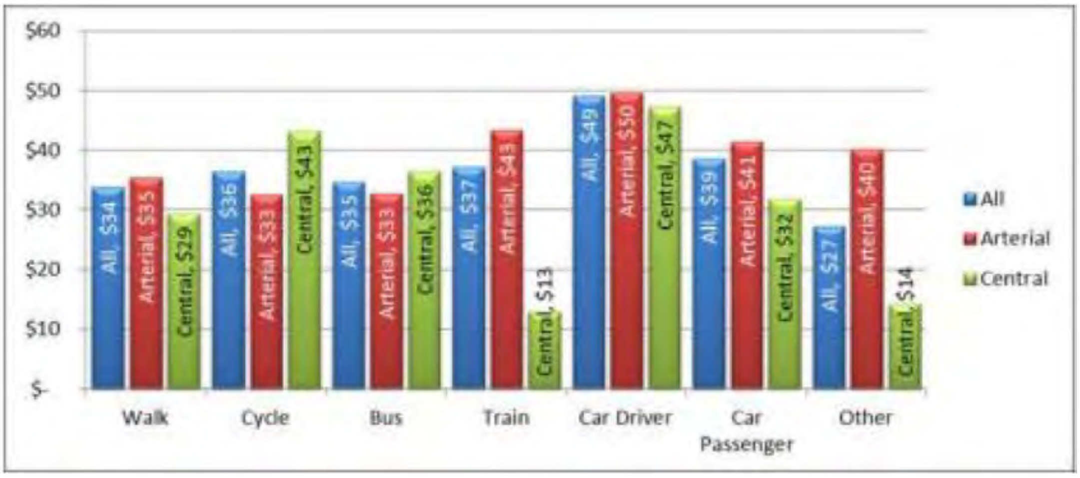
Waka Kotahi Research Report 530 includes data on the spend per trip for visitors to the New Zealand shopping areas and includes analysis to help understand the role of sustainable transport users (non-car) in the economic vitality of shopping areas[18]. The analysis includes the following charts, which separate data into arterial shopping areas (e.g. Dominion Road in Auckland) and central shopping areas (e.g. Courtenay Place in Wellington). The report comments that in aggregate the data shows that car drivers spend more per trip than people travelling by sustainable transport, but this difference is less evident in Central areas, and that sustainable transport users account for approximately 40 percent of the total revenue.

[18] Refer to NZTA Research Report 530, Reallocation of Road Space, T Fleming (Allatt), S Turner and L Tarjomi August 2013



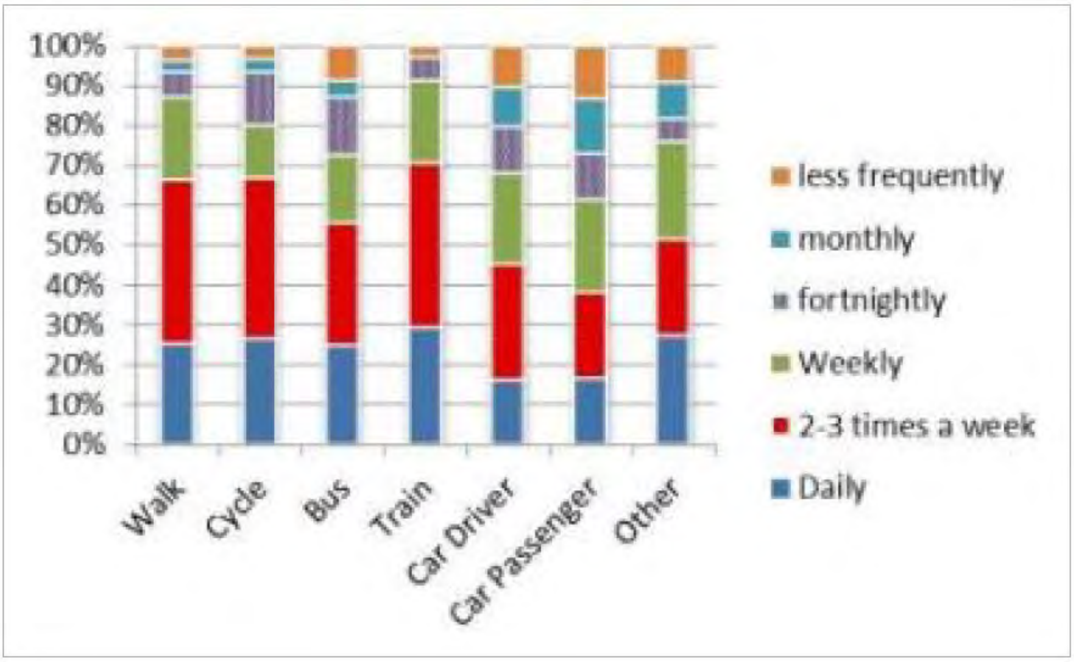
Source: NZTA Research Report 530

Figure 2-5: Research Report 530 - Shopper: trip spend (category median assumed) by travel mode



Source: NZTA Research Report 530

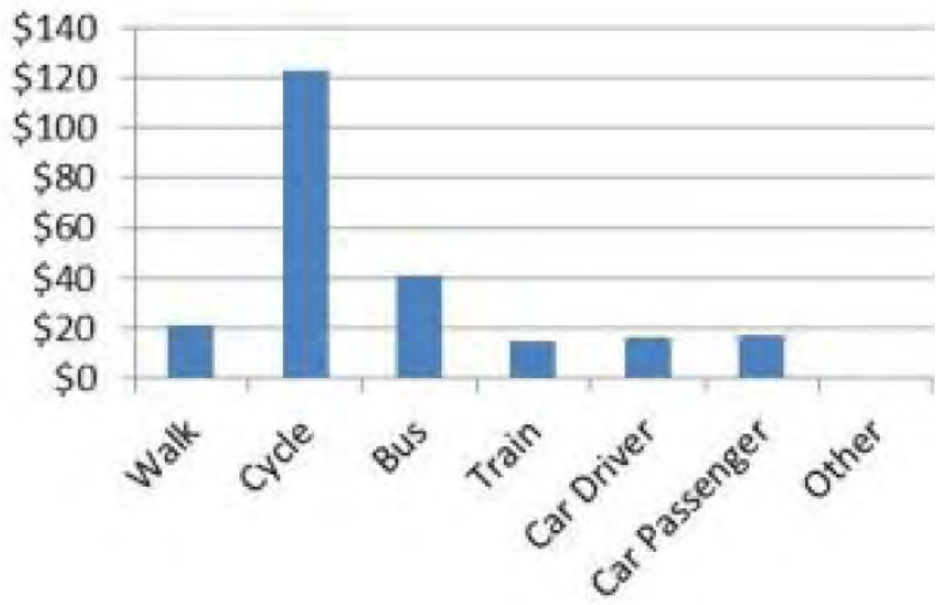
Figure 2-6: Shopper trip spend (category median assumed) by travel mode



Source: NZTA Research Report 530

Figure 2-7: Frequency of shopper trips by mode

In terms of the observations specific to Courtenay Place in Wellington, the location seemingly the most relevant to the Golden Mile, the report includes the following chart, which shows that the spend by alternative mode users is at least comparable to or more than that of car drivers or passengers.



Source: NZTA Research Report 530

Figure 2-8: Spend by various mode users on Courtenay Place (Wellington)

The report notes that the relatively high cycle mode user spend was based on a sample of only three cyclists and one of those cyclists had a large spend, and goes on to state that:

"Overall, when combining the walking and cycling mode shares with public transport the average spend was $29. This indicates that in comparison with car driver/passenger trips where the average spend was $17, sustainable transport mode users were likely to spend more."

1.2.4 Transport for London Town Centres Report

The London Town Centre study, which involved surveying in 22 town centres around London in 2015, outlines its findings regarding the spend per visit by mode and the average monthly spend by mode in the following tables. This data is consistent with other surveys discussed in this literature review, finding that public transport and active mode travel users tend to visit shopping areas more frequently and proportionally spend more in the shopping areas over time than private car users.

	Car %	Bus %	Train/Tube %	Bicycle %	Walked %	Taxi/ minicab/ other %
Nothing	2	1	2	1	1	2
Under £5	2	6	8	7	6	2
£5-£19.99	20	39	26	42	44	16
£20-£49.99	35	36	25	35	36	29
£50-£99.99	25	11	19	8	8	22
£100+	9	2	11	1	1	17
Mean	**£47**	**£30**	**£47**	**£25**	**£25**	**£62**
Mean 2014	*£43*	*£29*	*£41*	*£26*	*£26*	*£32*
Base[18]	**688**	**1,452**	**680**	**66**	**1,109**	**40**

Source: Town Centres: Final Report, 2016

Figure 2-9: Average spend by mode per visit 2015

	Car %	Bus %	Train/Tube %	Bicycle %	Walked %	Taxi/ minicab/ other %
Nothing	2	1	2	1	1	2
Under £5	1	1	4	2	0	2
£5-£19.99	4	3	6	3	1	2
£20-£49.99	6	7	13	8	3	11
£50-£99.99	11	12	16	13	8	11
£100+	68	72	52	69	84	60
Mean	£283	£284	£201	£259	£370	£332
Mean	*£261*	*£267*	*£227*	*£300*	*£371*	*£239*
Base[18]	688	1,451	680	66	1,109	40

Source: Town Centres: Final Report, 2016

Figure 2-10: Average total spend per month by mode 2015

	Car		Bus		Train/Tube		Bicycle		Walk		Taxi/mini-cab/ other	
	2015 %	2014 %	2015 %	2014 %	2015 %	2014 %	2015 %	2014 %	2015 %	2014 %	2015 %	2014 %
5 or more days a week	17	19	31	30	21	27	29	37	51	45	19	16
3 or 4 days a week	10	10	17	19	9	13	22	25	24	23	5	0
2 days a week	16	13	18	15	7	8	15	9	12	15	16	8
Once a week	24	24	19	18	16	13	19	16	9	10	23	22
Once a fortnight	13	10	6	7	10	7	8	7	2	2	4	25
About once a month	9	10	6	5	13	11	5	4	1	2	20	7
Less than once a month	9	13	3	4	17	14	1	1	1	3	4	14
First time	2	1	1	1	6	6	0		*	0	9	8
Monthly mean	**7.8**	**7.9**	**11.6**	**11.4**	**7.5**	**9.2**	**11.6**	**13.2**	**16.0**	**14.8**	**7.4**	**5.7**
Weighted base	**738**	**524**	**1,497**	**1,201**	**739**	**720**	**69**	**95**	**1,136**	**971**	**46**	**24**

* = less than 0.5%

Source: Town Centres: Final Report, 2016

Figure 2-11: Frequency of visit by mode of access: 2015 v 2014

1.2.5 Summary

The review of these various studies indicates that it would be reasonable to assume that in the Golden Mile context car users who park on-street in the immediate vicinity of the Golden Mile streets would likely spend more on average per trip than those who arrive by alternative modes, but an average alternative mode user will visit the shops more frequently and over time will spend more than an average car user. The review also indicates that an over-allocation of street space for car access and parking has the potential to crowd out more economically beneficial provision for alternative modes access to shopping areas, ultimately resulting in a less economically vibrant environment.

1.3 What are some of the known relationships between increased footfall and improved pedestrian environments and retail spending?

Numerous case studies have been documented to record the estimated effect of pedestrian improvements on local businesses. Generally, this stems from concerns by businesses adjacent to such projects that their revenue will be negatively affected by these changes that reallocate space from vehicles (typically in the form of parking) to pedestrian footpaths and other pedestrian amenity improvements.

Often, such examples are relatively localised, and relate to specific changes in a particular street, town or city. Whitehead et al. (2006) note that literature on the quantified impacts of pedestrian improvements on economic performance (which is at times measured by retail spending) is "underdeveloped" and what has been undertaken is not easily transferred to economic modelling due to the inherent differences in the retail and urban environment of any given local context.[19] This is also made difficult by the types of data available – the collection of local data appropriate to such analyses can be difficult, of limited quality or vary from location to location, making comparative analysis difficult. This provides some further impetus for performing a local study of potential effects on the environment being improved (in this case, the Golden Mile).

[19] Whitehead, T., Simmonds, D., & Preston, J. (2006). *The effect of urban quality improvements on economic activity. Journal of Environmental Management, 80(1), 1–12.* doi:10.1016/j.jenvman.2005.01.029

1.3.1 Analysis of multiple studies (Whitehead et al.)

That being said, Whitehead et al. find a number of studies that have analysed the effect of pedestrian improvements on economic benefits for retailers. In general the measures used to determine benefits to the retail environment are changes in footfall (or foot traffic), retail sales (or turnover) and the price of rent (with the implication being that higher rents for retailers signal economic improvements).[20] In many cases, only one of these factors is measured.

Within their own literature review, Whitehead et al. find that studies of pedestrianised areas see potential increases in footfall for retailers of between 20 and 40 percent; studies identifying changes in retail turnover from pedestrian improvement projects have an average increase of approximately 17 percent; and the average impact of a pedestrianisation scheme on retail rents is approximately a 22 percent increase. It should be noted that these figures come from a number of varied projects, so the average does not provide detail as to the size of each project.

Whitehead et al. also carried out their own modelling of the effects of pedestrianisation on various elements of economic activity. Their own modelling found a small but significant positive effect of urban improvements for businesses, employees and shoppers. For the most successful schemes, they find it is important to ensure mobility is as efficient as possible, so crowding effects do not exacerbate traffic congestion on streets, including on footpaths.[21] In the context of the Golden Mile, this is highly relevant as proposed pedestrian improvements and removal of car parking is to be complemented by public transport improvements.

Many examples exist of pedestrian improvement projects and measured results relating to retailers. These case studies, while not an extensive quantitative analysis in themselves, provide some context for what other areas, such as Wellington, might expect from similar changes.

1.3.2 Lygon Street – Melbourne

The same study referenced in section 1.2.1, looking at Lygon Street in Melbourne, Australia, found that the removal of a single car park would provide space for six bicycle parks. Based on an average spend per person of $AUD16 per hour, it was found that this one change could contribute $AUD96 per hour from the reallocated space, compared to the $AUD27 per hour that a single vehicle using the space would contribute.[22]

Another case study from Melbourne is Acland Street, St Kilda. The local traders association undertook its own market research about how the local shopping area could be made more vibrant. The research found that walkability was one of the driving factors behind the area's success and that more than half of local visitors walked to reach to shops. The same study found that local residents contributed nearly 86 percent of expenditure for local businesses, compared to 1.2 and 0.5 percent from interstate and international visitors respectively. The findings of the study led to the removal of nine car parking places, for widened footpaths and improved pedestrian amenity.[23]

1.3.3 New York City Department of Transportation

The New York City Department of Transportation has used its indicators of economic vitality, which include sales tax receipts, commercial vacancies and number of visitors, to evaluate street redesigns, including those

[20] Ibid.
[21] Ibid.
[22] Alison Lee & Alan March (2010) Recognising the economic role of bikes: sharing parking in Lygon Street, Carlton, Australian Planner, 47:2, 85-93, DOI: 10.1080/07293681003767785
[23] Smith P., 2004, Improving 'Walkability' in Acland Street, City of Port Phillip, Melbourne

that improve pedestrian facilities.[24] The department has several pedestrian improvement projects that have measured the benefit to retail. Measured benefits include reductions in commercial vacancies and increases in retail sales. The New York examples include:

- The expansion of walking facilities in Union Square North (Manhattan) saw commercial vacancies reduce by 49 percent. This is compared with a 5 percent increase in the wider borough.
- The conversion of an underused parking lot into a public park in Brooklyn saw nearby retail sales increase by 172 percent. In the wider borough, retail sales increased by 18 percent over the same time period.
- A Manhattan curb lane was converted into a public seating area. Adjacent businesses saw an increase in sales of 14 percent following this.

1.3.4 Lower Cuba Street

New Zealand has seen its own examples of the benefits of improved pedestrian facilities. Wellington's Lower Cuba Street was redeveloped in 2011 from a conventional street layout into a shared space where pedestrians have right of way. (Wellington City Council, nd). Thirty-three metered public car parks were reduced to 18, two mobility kerbside parks were reduced to one, four loading zone parks were reduced to two and three police kerbside car parks were reduced to one. Bicycle parking was provided with seating and landscape improvements, as well as pedestrian prioritisation through the area. A pre-implementation survey of people using the kerbside parking on Lower Cuba undertaken by WCC found that the kerbside parking on Lower Cuba Street generated, on average, one paying customer per day per business.[25] Retail transaction data showed that sales on Lower Cuba Street increased steadily once the project was completed, and as of the end of 2012, retail sales were higher than they were before the project began, and higher again relative to the rest of the CBD. The post-implementation analysis of the project found that "there is clear evidence of enhanced performance of the street from an economic perspective."[26]

1.3.5 Auckland Central

Auckland central has, over the last 10 years seen a number of its streets pedestrianised and many on-street parking spaces removed and replaced with pedestrian or shared spaces.

One such example was Fort Street, which had a revitalisation plan developed in 2008 that removed all on-street parking. The project was evaluated in 2012 and found to have been successful in attracting a greater number of people to the area, changing from a "thoroughfare" into a "destination".[27] A 2012 analysis found there had been a significant rise in hospitality spending compared with the previous year, and business-owners were favourable when assessing the changes. A full economic analysis was not undertaken as part of that review.

Other analysis has been carried out in a New Zealand context is around the effect of pedestrian connectivity improvements and economic productivity, with a particular focus on agglomeration effects.[28] The study finds that there is a positive and statistically significant association between improved walking job density and labour productivity in Auckland's central city. The estimate suggests a 10 percent increase in walking job density is associated with a 5.3 percent increase in economic productivity. The study finds that the most well-

[24] NYCDOT (2012), Measuring the Street: New Metrics for 21st Century Streets, New York City Department of Transportation (www.nyc.gov/html/dot); at www.nyc.gov/html/dot/downloads/pdf/2012-10-measuring-the-street.pdf.
[25] Robertson, J (2013) Lower Cuba Street upgrade outcomes evaluation. Prepared for Wellington City Council. Wellington.
[26] Ibid.
[27] Powell, F et al. (2015) The costs and benefits of inner city parking vis-à-vis network optimisation. Prepared for Waka Kotahi NZ Transport Agency. Wellington.
[28] Auckland Council (2017) The relationship between pedestrian connectivity and economic productivity in Auckland's city centre. Auckland.

connected pedestrian areas in Auckland are around retail businesses (i.e. Queen Street), but that these businesses are the least productive (compared to other office-based business). This is important for two reasons: firstly, it points to the fact that, despite relative productivity differences, the importance of pedestrian connectivity to the retail sector in particular is valued. Secondly, this study points out the importance of understanding the wider economic benefits beyond just retail business when considering potential benefits stemming from pedestrian improvements. Much of the Golden Mile's length includes streets that include office-based businesses.

1.3.6 Summary

Generally, the evidence found within this literature review indicates that the removal of car parking and the reallocation of this space for pedestrian improvement projects has had neither a negative effect on the retail spending at businesses, or the public/business perception of the area's success. Across more than one study, retail spending increases relating to pedestrian improvements projects have been found to sit between 14 and 17 percent, however larger improvements (for example the revitalisation of a large surface car park) have had larger retail spend increases, including up to 172 percent.

This indicates that both scale and type of improvement is important, in addition to the provision of access improvements, such as complementary public transport enhancements. These findings relate to assumptions for data analysis in the following ways:

- Retail spending increases tied to smaller-scale pedestrian improvements could be estimated between 14 and 17 percent.
- Daily footfall increases for retailers along areas of the Golden Mile that have pedestrian improvements could be estimated to be between 20 and 40 percent.
- These increases may be conservative for the Golden Mile project, as they included (in some instances) increased pedestrian or vehicle congestion. The Golden Mile project will include public transport improvements, which is expected to improve overall outcomes.
- Increases to retail spending as a result of pedestrian improvements could have an extreme upper bound of 172 percent, which was the increase in retail spending experienced by adjacent businesses when an underused parking lot was converted into a public park in Brooklyn, New York. As the Golden Mile is already used as a public transport and pedestrian thoroughfare, such a dramatic increase is not expected.

2 Base Case Pedestrian Value Assessment

This section outlines the methodology and results of the assessment of the effect of parking removal on the Golden Mile for retailers, incorporating the findings of the 2020 Intercept Survey. The analysis completed for this assessment is contained within a spreadsheet provided alongside this report.

The approach of estimating this effect involves four main steps:

1. Estimate the total number of visitors to the Golden Mile
2. Calculate the number of visitors and average spend by arrival mode
3. Estimate the number of affected trips by parking removal along the Golden Mile
4. Calculate the changes to visitor volumes and retail spend on the Golden Mile

This approach is shown in Figure 3-1 below, with more detail provided in the following sections.

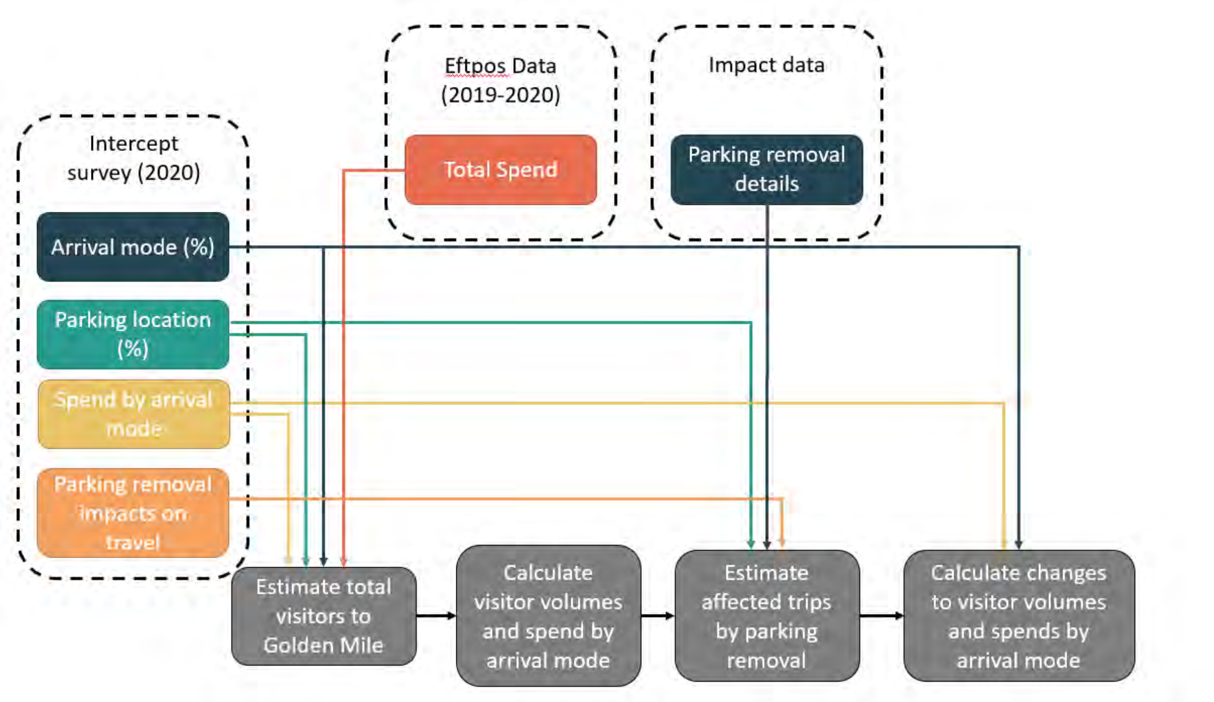


Figure 2-1: Model Workflow

Source: Study Team

2.1 Available Data

The main data sources for this analysis are outlined in Table 4-8 below.

Table 2-1: Available data for estimating revenue effects of Golden Mile improvements

Type of Data	**Sources**
Travel data Number of people arriving at the Golden Mile, by mode	• Arrival mode to the Golden Mile (Intercept Survey 2020)

Type of Data	**Sources**
Parking data Utilisation, turnover and location of car parking	• 2020 parking counts and turnover data on and around the Golden Mile (Wellington City Council) • Average Vehicle Occupancy (Wellington CBD Cordon Survey, 2019) • Parking location (Intercept Survey 2020)
Spending Data Value and type of retail spending on the Golden Mile	• EFTPOS NZ data for shops along the Golden Mile (2019 and 2020) by hour and Meshblock (Let's Get Welly Moving Dashboard, DotLovesData) • Average spend by mode (Intercept Survey 2020)
Parking removal details	• Proposed Golden Mile options as per the *Short List Assessment Report* (June 2020) • Behaviour if unable to find a park on the Golden Mile (Intercept Survey 2020)
Source: Study Team	

2.2 Methodology

The detailed methodology for estimating the impact of parking removal on retailers along the Golden Mile is described throughout this section. Eight key arrival modes are considered throughout the assessment:

- Drove a private vehicle,
- Passenger in a private vehicle,
- Walk/jog,
- Cycle/scoot,
- Bus,
- Train,
- Uber/taxi, and
- Other.

These modes are based upon the Intercept Survey results.

2.2.1 Estimate the total number of visitors to the Golden Mile

The total spend on the Golden Mile for a given day, S, can be expressed as

$$T = \sum_{m} s_m N_m P_m$$

where m is the mode of arrival, s_m is the average spend for an arrival mode, N_m is the number of people visiting the Golden Mile for an arrival mode, and P_m is the propensity to spend for an arrival mode.

The number of people arriving to the Golden Mile for a given mode can be expressed as $N_m = \alpha_m N$, where α_m is a proportion of the total number of visitors N.

Substituting this expression back into (1) and rearranging, we can express the total number of arrivals to the Golden Mile (across all modes) as:

$$N = \frac{S}{\sum_m s_m \alpha_m P_m}$$

Using the average spend, visitor proportion, and propensity to spend[29] data from the Intercept Survey[30], and the total spend estimates from EFTPOS transactions along the Golden Mile, we can estimate the total number of visitors to the Golden Mile.

2.2.2 Calculate the number of visitors and average spend by arrival mode

Using the estimated total number of visitors, the number of visitors by arrival mode can be calculated as $N_m = \alpha_m N$, and the total spend by arrival mode can be calculated as $S_m = \ s_m N_{mP_m}$. Table 3-2 shows the estimated number of visitors and total spend by arrival mode.

Table 2-2: Estimated number of visitors and total spend by mode for weekdays and weekends

Arrival Mode	Weekday		Weekend	
	Number of visitors N_m	**Total spend, S_m**	**Number of visitors N_m**	**Total spend, S_m**
Drove a private vehicle	4610	\$285,776	3978	\$388,445
Passenger in a private vehicle	705	\$47,733	723	\$71,301
Walk/jog	9774	\$429,189	7364	\$481,110
Cycle/scoot	1209	\$32,030	1118	\$54,493
Bus	8464	\$380,885	3288	\$201,455
Train	2670	\$170,247	822	\$48,078
Uber/taxi	1058	\$76,537	1216	\$105,146
Other	429	\$12,410	66	\$902
Total	**28919**	**\$1,434,808**	**18575**	**\$1,350,931**

2.2.3 Estimate the number of affected trips by parking removal along the Golden Mile

Using the parking removal scenarios from the Short List Assessment Report, we can calculate the number of car parks removed in each of the scenarios. We assume that in all scenarios 100% of the on-street parks on the Golden Mile are removed, and that the parking spaces on neighbouring streets are removed in alignment with the Short List Option Assessment.

Using parking sensor data, we can calculate the average number of parking sessions per day on the removed car parks. Multiplying the removed number of parking sessions by the average vehicle occupancy provides as estimate for the total number of visitors to the Golden Mile who either drove or were passengers in a private vehicle who would be affected by the proposed parking removal. This assumes that all car parking sessions on those streets are from visitors to the Golden Mile and estimates the net impact on retail spend accordingly, thus overstates the likely impact on retail spend as some of those people will not be visiting the Golden Mile.

[29] The propensity to spend data used in this methodology is the response rate to the question "How much money do you plan to spend at the Golden Mile today?". People who answered \$0 to the question were included in the average.
[30] The intercept survey was conducted between 28/11/2020 and 06/12/2020, which is a popular period for Christmas shopping. We exclude any survey respondent who said they are in the Golden Mile for "Christmas shopping and/or festivities".

2.2.4 Calculate the changes to visitor volumes and retail spend on the Golden Mile

2.2.4.1 Impact of reduced private vehicle traffic based on 2020 Intercept Survey data

The removal of parking will impact those who would otherwise have driven to the Golden Mile and parked in the spaces proposed for removal. The Intercept Survey (Appendix E) asked those who parked within the Golden Mile what they would have done if unable to find a park on the Golden Mile, and received the following responses:

- Park in an off-street car park: 16.2%,
- Find another on-street car park: 74.3%,
- Travel to another shopping area: 2.7%,
- Abandon the outing entirely: 6.8%.

Assuming that those who park off-street or find another on-street car park do not change the amount of money they spend, then the impact to Golden Mile retailers of parking removal, I_p, can be expressed as:

$$I_p = \sum_m \Delta N_m P_m s_m$$

where ΔN_m is the change in visitor volumes by mode, and m are the arrival modes "Drove a private vehicle" and "Passenger in a private vehicle".

2.2.4.2 Impact of increased footfall and changes to spending behaviour

The impact of prioritising pedestrians and public transport will likely increase the attractiveness of the Golden Mile and transform how visitors to the Golden Mile experience the space. Participants of the Intercept Survey were asked "How often would you visit the Golden Mile after the proposed improvements?". The options were:

- More frequently than I do now,
- About as frequently as I do now,
- Less frequently than I do now, and
- Not sure/don't know.

Assuming that those who visit less frequently and those who visit more frequently do so with the roughly the same incidence, then we can calculate the net visitors who would visit more frequently (as more people answered that they would visit more frequently than those that responded with less frequently). If we then assume how many additional trips per person would be taken, we can calculate the total increase in visits.

The model includes parameters to test the additional impacts of increases in footfall from new visitors and from changes to the average spend on retail spending along the Golden Mile.

2.3 Assumptions and Limitations

The methodology makes the following assumptions:

- Average vehicle occupancy reported in the Wellington CBD Cordon Survey (1.36) is representative of the Golden Mile.

- EFTPOS spend data collected is 40% of total spend as was found in historical trends of expenditure in the Greater Wellington Region.
- Improvements proposed for the Golden Mile do not affect the likelihood of spending by visitors.
- All those who say they would find another on-street park are able to find one.
- Post-improvements, those who visit less frequently and those who visit more frequently, do so with approximately the same incidence.
- Those who park spend the same, regardless of where they park.
- After parking spaces are removed, if the affected people change to other modes, they still spend the same as what is estimated based on their original/preferred mode.

3 Net Impact Evaluation

The Net Impact Evaluation is intended to use the results from the Base Case Pedestrian Value Assessment to provide details of the estimated net impact on retail revenue of parking removal along the Golden Mile. It applies a core test of the net impact based on findings and core assumptions from the Intercept Survey, while also testing various alternative assumptions from findings across the literature review and other sensitivities.

Note that the model assumes that visitors who drive or are passengers in private vehicles spend the same regardless of where they park. Some late data on spend by parking location was received from the Intercept Survey that could not be incorporated into the model due to timeframes. This data indicated that those who park on-street on the Golden Mile spend more than those who park off-street; therefore, the impact of removing those closer car parks will be understated in the model results.

A set of core scenario assumptions (described in Appendix A) were tested on all Golden Mile options to estimate the expected impact of parking removal from each option. The core assumptions are as follows, and the net impact findings are presented in Table 3:

- Redistribution of people that would have parked in spaces removed under the options is based on responses to the 2020 Intercept Survey question about what visitors would have done if they could not find a park.
- No increase in spend per visitor.
- No increased arrivals to Golden Mile despite the increased amenity and attractiveness under the options.
- People that 'would visit more frequently' would, on average, take one additional trip to the Golden Mile per four-weeks.

Table 3: Core net impact estimates

Scenario	Golden Mile Option	Net impact on retail spend		
		Per weekday	**Per weekend day**	**Annual**
Option 1 Core	Option 1	+$8,700 (+0.61%)	+$4,200 (+0.31%)	+$2,600,000 (+0.51%)
Option 2 Core	Option 2	+$7,400 (+0.51%)	+$2,700 (+0.20%)	+$2,100,000 (+0.42%)
Option 3 Core	Option 3	+$4,100 (+0.28%)	-$1,900 (-0.14%)	+$770,000 (+0.15%)

Each of these core net impact assessments estimates the net impact on annual retail spend of parking removal will be +0.15% to +0.51%. The negative impact of the parking removal is counterbalanced by the expected increase in trips to the Golden Mile, even at a modest assumption of an average one additional/fewer trip per four-weeks for people who would visit more/less frequently. For Option 3, the annual retail spend is estimated to increase from $513.6m currently to $514.4m under the option.

Several parameters are included in the spreadsheet to test inputs that are not based on local data. The standalone impacts of each of these assumptions are also tested on the 'Golden Mile Option 3 Core' and reported in the following bullet points:

1. Testing proportion of **parking trips that would no longer visit:** the redistribution to other modes of trips that would have parked in spaces that are removed under the options do not affect the final results as we assume those people will spend the same amount as they would have spent by their original mode. However, the assumption around how many trips would be removed entirely does affect the results, as that spend is now removed entirely. The core assumption (based on the Intercept Survey findings) is that 9.5% of affected people would no longer visit the Golden Mile.

  - o High impact, assume 20% of affected people no longer visit the Golden Mile (redistribution to other modes remains proportional based on the 2020 Intercept Survey): net annual impact on retail spending of -$6,200,000 (-1.2%).
  - o Low impact, assume 5% of affected people no longer visit the Golden Mile (redistribution to other modes remains proportional based on the 2020 Intercept Survey): net annual impact on retail spending of +$3,800,000 (+0.73%).

2. Testing **increased trips** to the Golden Mile: additional trips to the Golden Mile can be from existing visitors visiting more frequently (due to the realm/amenity improvements) or due to entirely new trips to the transformed space.
   - o Assume 5% increase in new trips to the Golden Mile: net annual impact of +$19,000,000 (+3.8%).
   - o Assume 20% increase in new trips to the Golden Mile (and zero additional trips for people visiting more frequently), to test the literature review finding in section 1.3.1: net annual impact of +$96,000,000 (+19%)
   - o Assume one additional (or fewer) trip per fortnight for people who reported in the 2020 Intercept Survey that they would visit more (or less) frequently: net annual impact of +$7,800,000 (+1.5%).
3. Testing increase in **spend per visitor**: these are included in sensitivity tests as there are no obvious thresholds to test based on the literature review or 2020 Intercept Survey.
   - o Assume visitors spend 2% less per trip: net annual impact of -$9,600,000 (-1.9%)
   - o Assume visitors spend 2% more per trip: net annual impact of +$11,000,000 (+2.2%)

These sensitivity tests have also been collated into several scenarios, to understand the expected impact of various possible outcomes. The detailed assumptions underlying each scenario are included in Appendix A and the results are summarised in Table 4.

Table 4: Scenarios of effects of parking removal on retail spend (based on numbered sensitivity tests above)

Scenario	Golden Mile Option	1 – Proportion of affected parking trips that no longer visit	2 - Increase in new trips to Golden Mile	2 – Frequency of additional trips to Golden Mile	3 – Change in spend per visitor	Net impact on annual retail spend	
Option 3 Core	*Option 3*	*9.5%*	*0%*	*1 every four-weeks*	*0%*	*$770,000*	*0.15%*
Option 3 Pessimistic	Option 3	20%	0%	1 every three-months	-2%	-$21,000,000	-4.2%
Option 3 Mid-Range	Option 3	9.5%	2%	1 every four-weeks	0%	$11,000,000	2.2%
Option 3 Optimistic	Option 3	5%	+5%	1 every two-weeks	+2%	$48,000,000	9.3%

4 Summary

This analysis has provided some insights into the potential effects on retailers that the proposed Golden Mile improvements may have. The analysis mostly draws on data from a 2020 Intercept Survey of visitors to the Golden Mile (Appendix E). The results of some scenario tests are described below while the assumptions are described in detail in Appendix A.

The core scenarios tested estimated a net annual impact on retail spend of +0.15% to +0.51% for the Golden Mile options, suggesting that the net impact is likely to be positive under all options (although the daily impact of option 3 on the weekends is expected to be slightly negative). The results are included in Table 5.

Table 5: Scenarios of effects of parking removal on retail spend (based on numbered sensitivity tests above)

Scenario	Golden Mile Option	1 – Proportion of affected parking trips that no longer visit	2 - Increase in new trips to Golden Mile	2 – Frequency of additional trips to Golden Mile	3 – Change in spend per visitor	Net impact on annual retail spend	
Option 1 Core	*Option 1*					*$2,600,000*	*0.51%*
Option 2 Core	*Option 2*	*9.5%*	*0%*	*1 every four-weeks*	*0%*	*$2,100,000*	*0.42%*
Option 3 Core	*Option 3*					*$770,000*	*0.15%*
Option 3 Pessimistic	Option 3	20%	0%	1 every three-months	-2%	-$21,000,000	-4.2%
Option 3 Mid-Range	Option 3	9.5%	+2%	1 every four-weeks	0%	$11,000,000	2.2%
Option 3 Optimistic	Option 3	5%	+5%	1 every two-weeks	+2%	$48,000,000	9.3%

The core scenarios are based on some core assumptions that are expected to understate the positive impact of the options, as they assume no increase in new trips to the Golden Mile, despite the public transport and pedestrian realm improvements. For Golden Mile Option 3 (the option with the highest removal of parking) the core and mid-range estimates for the net impact on retailers are estimated to be an increase of $0.8-11m (0.15-2.2%) annual spend. The 'optimistic' scenario estimates the annual increase in spend could be as much as $48m (a 9.3% increase), whilst the 'pessimistic' scenario indicates that the reduction in annual spend could be as much as -$21m (-4.2%).

The pessimistic scenario is expected to be unlikely as it assumes all of the following outcomes: 20% of people affected by parking removal would no longer visit the Golden Mile (compared to around 9.5% expected based on the 2020 Intercept Survey), all visitors would spend on average 2% *less* than they currently do, the improvements would attract *no* more people than the current environment, *and* people that indicated they would visit more frequently would only make one extra visit every three months..

The net impact on retail spending due to the options is therefore expected to most likely be a positive one, although it could be slightly negative. There are many other social benefits from these projects that are not monetised into retail spend values here and are considered and evaluated in other technical reports for the Golden Mile Single Stage Business Case.

Appendix A Scenario Description Table

The following table details the assumptions and results for each scenario tested. We expect the **Mid-Range** scenario and assumptions to be the most likely outcome. The scenarios tested are:

- **Core options**: draw on findings from the 2020 Intercept Survey. Assumes that respondents who would visit 'more frequently' after the improvements would make one extra trip every four weeks.
- **Mid-range**: we expect to be the most likely outcome. Aligns with the Core option, adding one assumption of increased attractiveness of the Golden Mile to new visitors following the project.
- **Pessimistic**: highly unlikely to eventuate and was developed to stress test the model for the purposes of the MCA process. Requires twice as many people to no longer visit the Golden Mile than indicated by the Intercept Survey, assumes a 2% reduction in average spend by all visitors (not just vehicle users) and assumes Golden Mile is not very attractive to existing or new users.
- **Optimistic**: assumes several positive changes to behaviour including most people that parked still find their way to the Golden Mile, all visitors to the Golden Mile spend an average of 2% more, and the Golden Mile is more attractive to existing and new users.

Table 6 Detailed assumptions and results of scenarios

<table>
<tr><th colspan="2">Variable</th><th>Option 1 Core</th><th>Option 2 Core</th><th>Option 3 Core</th><th>Option 3 Pessimistic</th><th>Option 3 Mid-Range</th><th>Option 3 Optimistic</th></tr>
<tr><td colspan="2">Parking scenario</td><td>Option 1</td><td>Option 2</td><td>Option 3</td><td colspan="3">Option 3</td></tr>
<tr><td rowspan="5">Shift for people that would have parked in removed spaces</td><td>Shift to off-street carparking</td><td colspan="3">16.2%</td><td>14.3%</td><td>16.2%</td><td>17%</td></tr>
<tr><td>Shift to public transport</td><td colspan="3">0%</td><td>0%</td><td>0%</td><td>0%</td></tr>
<tr><td>Shift to walking</td><td colspan="3">0%</td><td>0%</td><td>0%</td><td>0%</td></tr>
<tr><td>Search for another park</td><td colspan="3">74.3%</td><td>65.7%</td><td>74.3%</td><td>78%</td></tr>
<tr><td>No longer visit</td><td colspan="3">9.5%</td><td>20%</td><td>9.5%</td><td>5%</td></tr>
<tr><td colspan="2">Increase in spend per visitor (on weekends and weekdays)</td><td colspan="3">0%</td><td>-2%</td><td>0%</td><td>+2%</td></tr>
<tr><td colspan="2">Increased footfall from new visitors to the Golden Mile (on weekends and weekdays)</td><td colspan="3">0%</td><td>0%</td><td>+2%</td><td>+5%</td></tr>
<tr><td colspan="2">Additional trips per week for people that expect to visit 'more frequently'</td><td colspan="3">One extra trip every four weeks</td><td>One extra trip per three months</td><td>One extra trip every four weeks</td><td>One extra trip per fortnight</td></tr>
<tr><td rowspan="3">Estimated change in retail spend</td><td>Weekdays</td><td>$8,719 (0.61%)</td><td>$7,378 (0.51%)</td><td>$4,062 (0.28%)</td><td>-$49,703 (-3.46%)</td><td>$32,758 (2.28%)</td><td>$128,982 (8.99%)</td></tr>
<tr><td>Weekends</td><td>$4,189 (0.31%)</td><td>$2,737 (0.20%)</td><td>-$1,890 (-0.14%)</td><td>-$76,365 (-5.65%)</td><td>$25,128 (1.86%)</td><td>$133,250 (9.86%)</td></tr>
<tr><td>Annual</td><td>$2,638,887 (0.51%)</td><td>$2,136,029 (0.42%)</td><td>$768,437 (0.15%)</td><td>-$21,341,139 (-4.15%)</td><td>$11,041,229 (2.15%)</td><td>$47,590,695 (9.27%)</td></tr>
</table>

The pessimistic scenario is unlikely to eventuate and is also sensitive to assumptions: if we assume the change in spend per visitor is 0% instead of -2%, the annual net impact is -$11m, reduced from -$22m.

Appendix B WSP Literature Review

Memorandum

To	Roger Burra
Copy	
From	William Frith
Office	Petone
Date	25 August 2020
File/Ref	
Subject	Quick literature review-Golden mile parking removal-impact on businesses

Introduction

Let's Get Wellington Moving is a joint initiative between Wellington City Council, Greater Wellington Regional Council, and Waka Kotahi NZ Transport Agency. Its vision for Wellington is stated as[1]:

a great harbour city, accessible to all, with attractive places, shared streets, and efficient local and regional journeys

As part of the Let's Get Wellington Moving initiative the public are being consulted on three concepts to make the Golden mile a friendlier space for pedestrians and for people arriving via public transport modes. Where possible improvements will also be made for cyclists and e scooter users. At present it is the city's busiest pedestrian area with nearly 31, 000 walkers on a typical weekday[2].

To achieve this some space now occupied by metered parking may be redeployed to provide more space for pedestrians and cyclists. In parallel with the provision of this extra space investments are intended to be made to make the golden mile a state of the art, less crowded, more pleasantly walkable area.

Discussion

The initiative seeks to open public space along *the footpaths and side streets for people to walk, spend more time, and access businesses*[3].

The city centre is already generally considered walkable[4] but further improvement might be expected to increase discretionary visits such as shopping trips and make it more attractive for city workers to venture out in their lunch breaks. This will also increase retail turnover in the area as pedestrian traffic or "foot count" is a well establish metric used to measure an area's potential to be a successful shopping area.

[1] https://lgwm.nz/about/our-vision/
[2] https://lgwm.nz/our-plan/our-projects/golden-mile/
[3] https://lgwm.nz/our-plan/our-projects/golden-mile/
[4] eg https://blog.homes.co.nz/nzs-most-walkable-cities/

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The three concepts all propose to do this[5] by converting some curb side carparks to footpath and relocating loading zones and taxi parks to side streets, providing up between 30% and 75% more footpath space depending on the concept. There are 28,937 parking spaces in Wellington CBD. Of these 15,437 are for public use, 11,273 are off-street private parking spaces and 4,116 are council owned. Council owned parks consist of 3,278 on-street metered parks and 838 off-street parks. Speculating that the number removed is 100, if all these people were potential shoppers, at 1.6 people per car and say, 10 cars per space per day, then these spaces might at present contribute 5% of the present foot traffic.

If these 100 on-street car parks were removed, there are several possible options for what would happen to these trips. Either the trips would still occur to the Golden Mile, with the drivers choosing car parking elsewhere nearby (either using on- or off-street parking, of which there will still be a large number of spaces), by changing their travel mode, or by traveling less frequently (and either spending the same total amount or less). Alternatively, the people making these trips may change their destination to somewhere else, either some or all of the time. Therefore, in this hypothetical scenario, the impact on foot traffic might be somewhat less than 5%, which is likely to be offset by increased foot traffic from a successfully revitalised Golden Mile.

Questions may be asked as to what impact the loss of parking may have on trade on the Golden Mile. Such questions are hard to answer, any changes to parking will be part of the overall package, which is designed to improve the use of the area, with the attendant side benefit of improved trade for merchants. Foot traffic determines trader patronage, and foot traffic, is still the same whether the feet emerge from a bus, a car, or come as pedestrians, scooter riders, cyclists etc.

Unfortunately, mode of travel information for CBD shoppers is difficult to obtain. This is because modal split data is usually confined to commuters, who, for reasons of cost and time limits, are unlikely to use paying curb side parking. Most useful data comes from self-report surveys.

The proportion of shoppers using paid curb side parking

There is evidence locally overseas and locally, from self-report surveys, that paying curb side parkers are generally in the minority as CBD shoppers. However, caution should be used in applying outside information to Wellington as each CBD has its unique characteristics. Sustrans 2006 reports the following results (figure 1) on travel mode of shoppers in Bristol and shopkeepers' estimates. It was found that 22% of shoppers reported travel by car while shopkeeper estimates were 41%.

[5] https://lgwm.nz/assets/Documents/Technical-Documents/Golden-Mile/Golden-Mile-Short-List-Report-June-2020.pdf

Figure1: Travel mode of shoppers in Bristol and shopkeepers' estimates

Another similar survey in Graz, Austria saw shoppers reporting 32% car travel while shopkeepers reported 58% (Figure 2). These surveys of course do not specify where car drivers parked. Paying curb side parking would thus apply for an unknown proportion of the journeys.

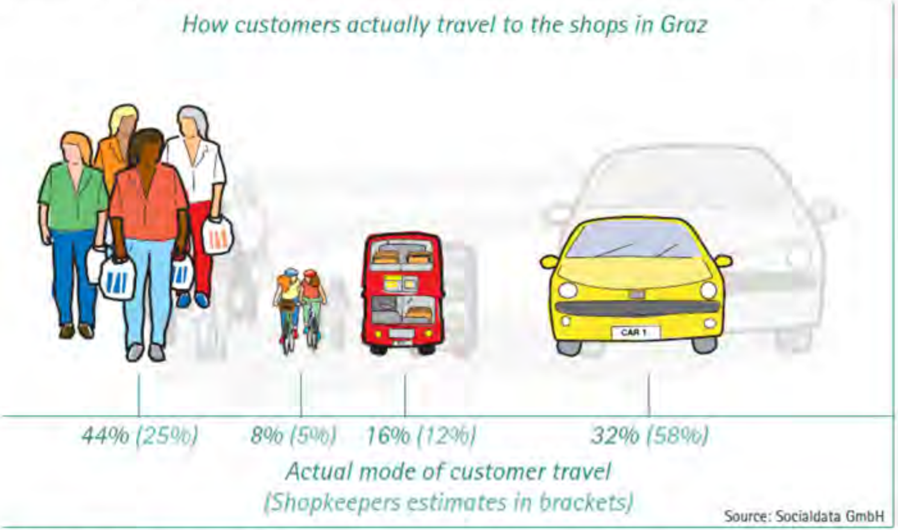

Figure 2: Travel mode of shoppers in Graz and shopkeepers' estimates

.A Wellington example comes from Beetham (2014) She illustrated this with the following bar chart (Figure 3) using data from an intercept survey of pedestrians on Tory St.

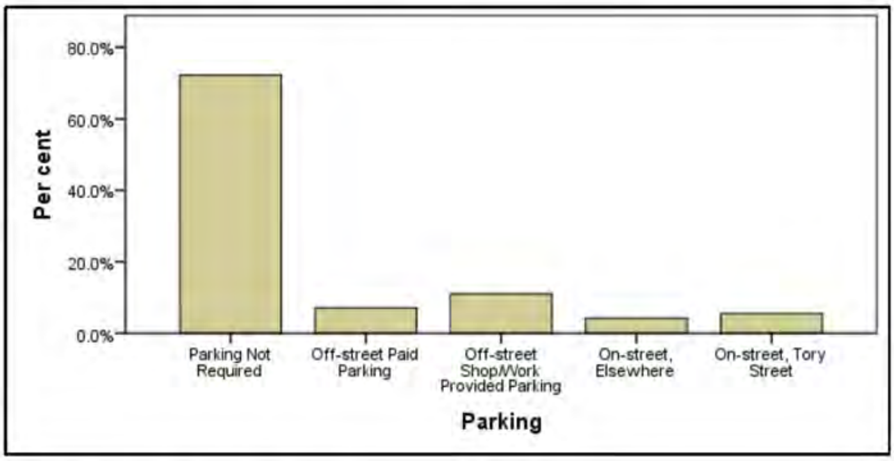

Figure 3: Parking by Tory St shoppers

It is apparent that only a very small percentage of those surveyed on Tory St required parking on Tory St.

The following chart (Figure 4) illustrates the modes by which respondents travelled to the city.

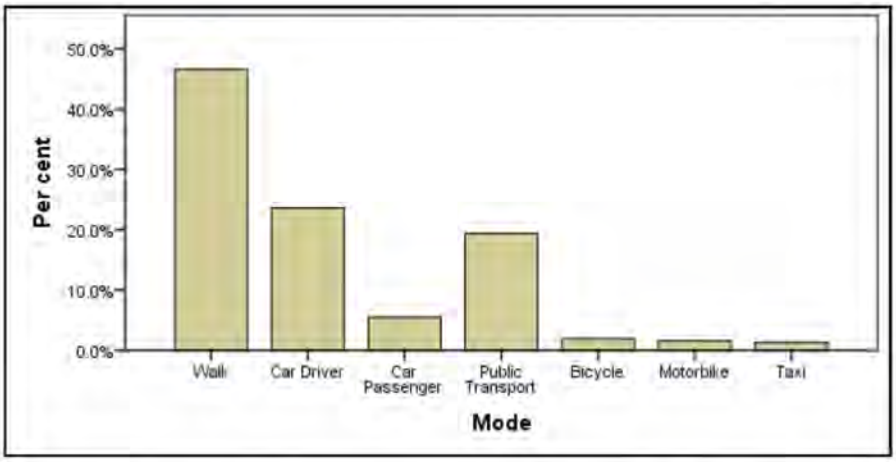

Figure 4: Modes by which Tory St shoppers travel to the city

It is apparent that active modes and public transport are in the majority.

She also looked at self-reported spend of the respondents. This is illustrated by the bar chart below (Figure 5). It is apparent that those requiring on street parking either on Tory St or elsewhere provided a small proportion of the total spend.

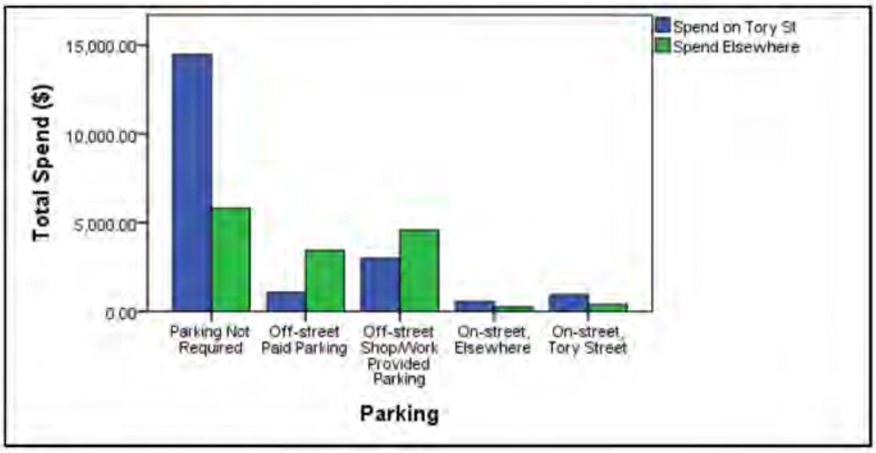

Figure 5: Spend of Tory St shoppers by parking type/ parking not required

Motor vehicle or public transport travel to a central city shop requires a leg to the central city followed by a leg to the shop. Fleming et al, 2013 present the following charts, based on self-report surveys for Courtenay place, Colombo St in Christchurch and Takapuna.

Figure 6 looks at travel to the CBD while Figure 7 looks at travel in the CBD to the shops. This will include travel from the alighting place for public transport and motor vehicle users and direct travel for CBD dwellers who might walk or scoot or bicycle direct to the shop.

The left-hand column of Figure 6 relates to the main mode of travel to the CBD of people who shopped in Courtney Place. It indicates that around a quarter of all Courtenay Place shoppers arrived in the CBD as car drivers or passengers. As all passengers travel with drivers, this means that fewer than a quarter of those arrivals required parking.

The left-hand column of Figure 7 looks at the modes by which shoppers arrived in Courtney Place, be it directly, or traveling by a secondary mode after arriving in the CBD by their main mode. It indicates that only around 15% of people whose final destination is Courtenay place arrive there in cars, with, as before, a lesser percentage requiring parking as some of the people are passengers. For a later, approximate calculation, it will be assumed that the proportion requiring parking is 10%.

As can be seen from the other charts for Colombo St Christchurch and Takapuna, the situation elsewhere in New Zealand cannot be taken as an indicator of the situation in Courtenay place.

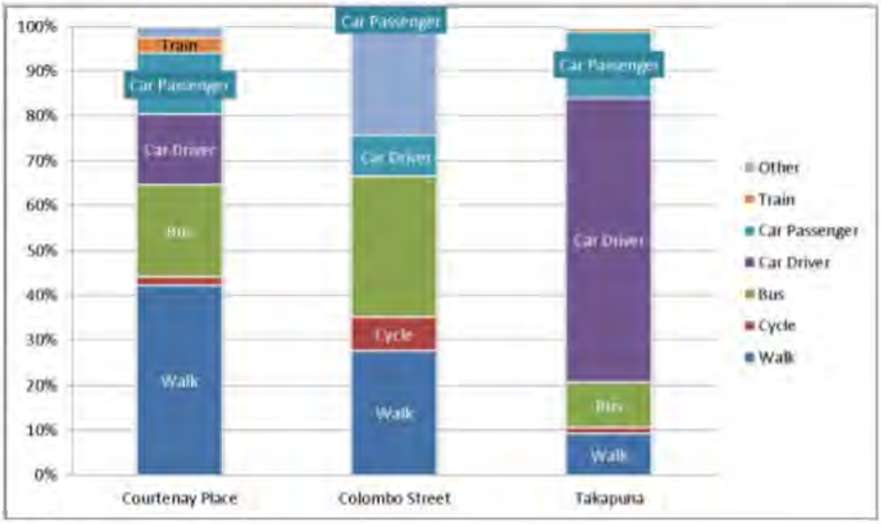

Figure 6: Courtenay Place shoppers' main mode of travel to CBD

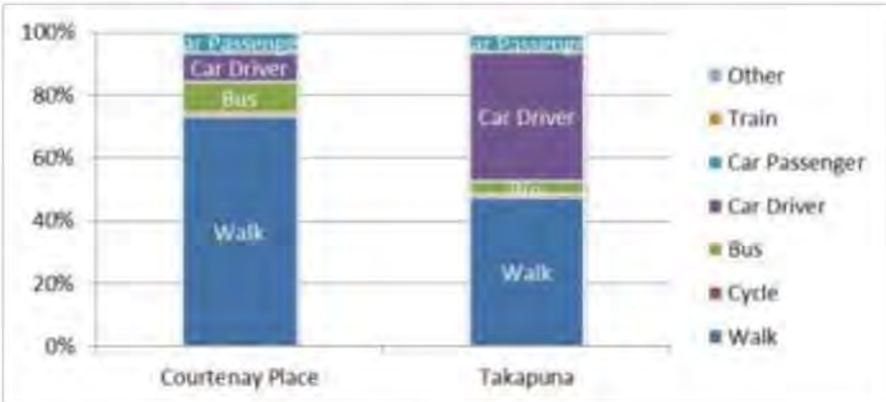

Figure 7: Final leg of Courtenay Place shoppers' travel to shops.

5

Further comment from the literature

According to Powell et al (2015) business owners generally expect a loss of parking to cause a reduction in trade, as customers can no longer park outside their building. Fleming et al (2013) found the importance of kerbside parking is often overstated. They found that pedestrians and cyclists contribute a higher economic spend than their modal share would indicate and are important for the economic vitality of local shopping areas. While business owners value kerbside parking highly, shoppers were more concerned with high-quality pedestrian spaces and urban environments and do not usually expect to park immediately outside a specific shopping destination. In fact, most have multiple shopping destinations within the total area which is seen as a destination in itself.

Further, the retail and hospitality industries have been shown to benefit most from kerbside parking reallocation, especially when an improved urban environment is built in its place (Carmine and Williamson 2012; Transport for London 2011). Reallocation of kerbside parking to PT or cycle infrastructure will bring new users into the space; these visitors have been shown to spend less per trip, but more in the long term as they visit more frequently (Lee 2008; Transport for London 2011).

If space reallocated from on-street parking is designed well, to make it attractive to people and to provide for and promote alternative modes, retail trade and vitality can increase (Fleming, *et al.*, 2013; New York City Department of Transportation, 2013). In short, several studies have shown that the assumption that reducing parking will be bad for business is supported by very little evidence, and in many cases, the opposite effect may occur.

Conclusion

The metered parking space removals from the Golden Mile being considered in association with "Get Wellington Moving" concepts are only a small proportion of total parking supply and of themselves likely to have only a marginal impact on businesses. In the event of an impact, this should be outweighed by improvements in foot traffic, from people arriving by a variety of modes, brought about by improved attractiveness of the area to the public at large. These improvements should be greater for the concepts which provide greater amenity to pedestrians and remove more (but still a relatively few) metered carparks.

Figure 8 for Courtenay Place shoppers relates to where drivers park, given they drive. This indicates that half of the shoppers who drive to Courtenay place park "in front of shops". If we assume, that around 10% of shopping arrivals at Courtenay place require parking, then half of that or 5% of arrivals will require on street parking "in front of shops". This is similar to the percentage that Beetham (2014) found for Tory St shoppers.

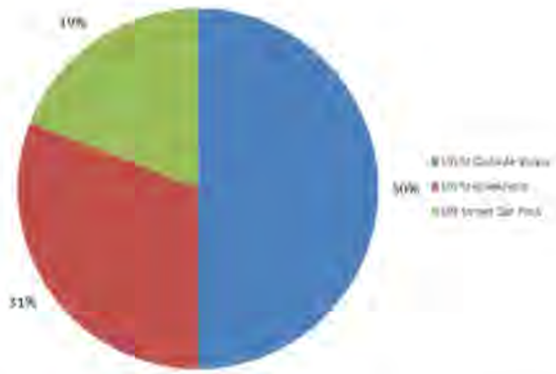

Figure 8: Where Courtenay Place shoppers' cars are parked while shopping

No useful data are available for Auckland from Fleming et al 2013, as none of the shopping areas they considered were CBD shopping areas. Unfortunately, Fleming et al, 2014 contains no information on the contribution of cars to the final leg of the Colombo St shopping trips.

Three New Zealand case studies

Lower Cuba Street was redeveloped in 2011 from a conventional street layout into a shared space where pedestrians have right of way. (Wellington City Council, nd). Thirty-three metered public car parks were reduced to 18 and 2 mobility kerbside parks were reduced to 1. Bicycle parking was provided with seating and landscape improvement. A pre-reallocation survey of people using the kerbside parking on Lower Cuba undertaken by WCC (Wellington City Council, nd), found that the kerbside parking on Lower Cuba Street generated, on average, one paying customer per day per business. Retail transaction data showed that sales on Lower Cuba Street increased steadily once the project was completed, and as of the end of 2012, retail sales were higher than they were before the project began, and higher again relative to the rest of the CBD (Robertson 2013).

Wellington also has a great historical example of the successful Cuba Mall following the removal of tram lines and closure to traffic in 1969.
In Auckland, several streets have been pedestrianised with positive impacts on the neighbourhood. Some of these have been so successful that retailers in other areas of Auckland have asked for similar treatments in a bid to improve business vitality (Powell et al, 2015).

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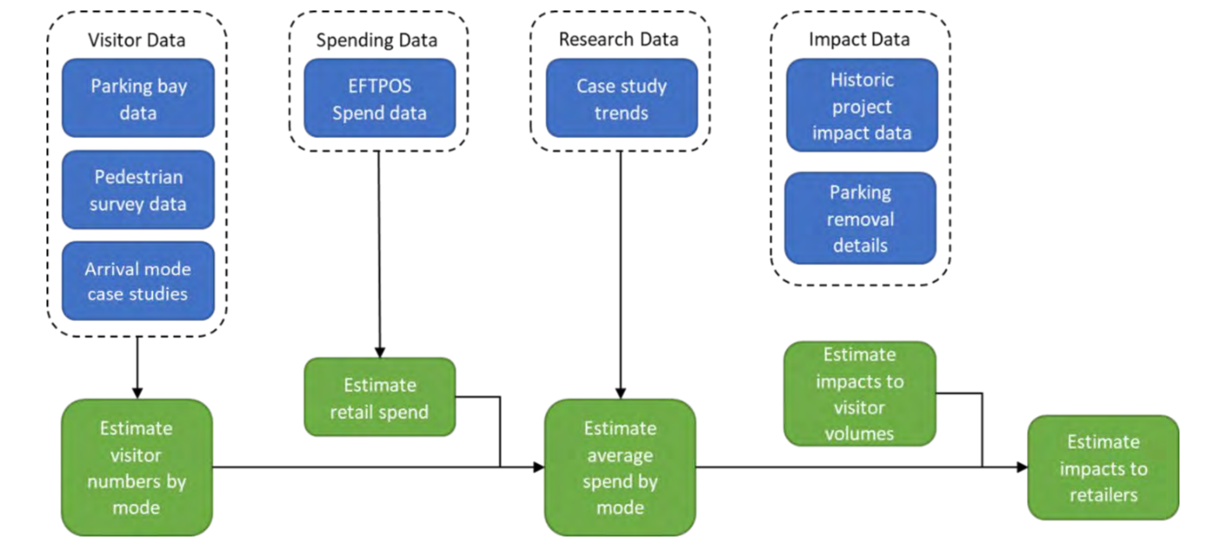
Appendix C Preliminary (Original) Base Case Pedestrian Value Assessment (Pre-Intercept Survey)

This section outlines the methodology and results of the preliminary assessment of the effect of parking removal on the Golden Mile for retailers. This assessment was conducted prior to the Intercept Survey in order to have a preliminary understanding of these impacts for the Short List Options MCA workshop. The full content of this section from the preliminary report is included for completeness, so some of it duplicates with the body of this report that covers the updated approach and findings.

The approach of estimating this effect involves five main steps:

1. Estimate the number of visitors to the Golden Mile, by arrival mode
2. Estimate the total spend by visitors to the Golden Mile
3. Estimate the average spend of a visitor to the Golden Mile by arrival mode
4. Estimate the adjusted visitor volumes, taking account of:
    4.1. Redistribution to other arrival modes (or removal of trips entirely) of the people that would have otherwise parked in the spaces being removed
    4.2. Changes to other arrival modes based on amenity/attractiveness improvements of the options
5. Calculate the net impact on retail spending based on the new arrival modes

This approach is shown in Figure 5-1 below, with more detail provided in the following sections.



Source: Study Team

Figure 4-1: Model workflow

C.1 Available Data

The main data sources for this analysis are outlined in Table 4-8 below.

Table 4-7: Available data for estimating revenue effects of Golden Mile improvements

Type of Data	Sources
Travel data Number of people arriving at the Golden Mile, by mode	• Average and Peak Hour pedestrian volumes along the Golden Mile (Stantec, 2019) • Pedestrian volumes (Golden Mile Case for Change, June 2019) • Case studies (Section 2 above)
Parking data Utilisation, turnover and location of car parking	• 2020 parking counts and turnover data on and around the Golden Mile (Wellington City Council) • Average Vehicle Occupancy (Wellington CBD Cordon Survey, 2019)
Spending Data Value and type of retail spending on the Golden Mile	• EFTPOS NZ data for shops along the Golden Mile (2019 and 2020) by hour and Meshblock (Let's Get Welly Moving Dashboard, DotLovesData) • Case studies (Section 2 above)
Historic project impact data Similar projects and research in Wellington and abroad	• Case studies (Section 2 above)
Parking removal details	• Proposed Golden Mile options as per the *Short List Assessment Report* (June 2020)
Source: Study Team	

C.2 Methodology

The detailed methodology for estimating the impact of parking removal on retailers along the Golden Mile is described throughout this section. Five key arrival modes are considered throughout the assessment:

- **On-street Golden Mile parking visitors** – visitors to the Golden Mile who park on Lambton Quay or Courtenay Place
- **On-street 'elsewhere' parking visitors** – visitors to the Golden Mile who park on-street within walking distance (approximately 300m) of the Golden Mile
- **Off-street parking visitors** – visitors to the Golden Mile who park in any kind of off-street car park
- **Public transport visitors** – visitors who disembark their public transport journey on the Golden Mile
- **Walking visitors** – visitors who arrive to the Golden Mile on foot. This may include people who caught the train, or those who drove to the city centre but parked further away than the on-street 'elsewhere' parking visitors.

C.2.1 Estimate visitor numbers by arrival mode

Several data sources are used to estimate the number of visitors to the Golden Mile by their arrival mode, as outlined in the steps below.

C.2.1.1 Estimate total visitors to the Golden Mile

To estimate the total visitors to the Golden Mile, two data sources are used:

- Pedestrian counts from the Stantec annual Wellington cordon count survey (2019). These counts took place at 22 sites along the Golden Mile between 12pm and 2pm in March 2019.
- Pedestrian counts the Golden Mile Case for Change (June 2019).

Neither count provides a complete record of the total visitors to the Golden Mile on both weekdays and weekends. We use the Case for Change pedestrian counts for weekdays and estimate the weekend counts by scaling the weekday counts down. The weekday counts are scaled down using ratio of weekend to weekday pedestrian volumes of counts from the Stantec annual Wellington cordon count survey.
The pedestrian counts in the Case for Change have one figure for each section of the Golden Mile: Lambton Quat, Willis Street, Manners Street, and Courtenay place. We use the sum of these counts as our total visitor volume.

C.2.1.2 Estimate on-street Golden Mile parking visitors

Using 2018-2020 parking sensor data from Wellington City Council, the number of vehicles that park on the Golden Mile is collected. This is separated into weekend and weekday parking sessions, and the median number of parking sessions per day across all car parks along the Golden Mile is calculated.
The total number of parking sessions on the Golden Mile is then multiplied by the average vehicle occupancy from the 2019 Wellington CBD Cordon Survey to estimate the number of people who travel to the Golden Mile and use an on-street car park.

C.2.1.3 On-street 'elsewhere' parking visitors

As with the on-street Golden Mile parking visitors, we use parking sensor data on car parks within 300m of the Golden Mile to collect the number of parking sessions close to the Golden Mile and estimate the number of visitors to the area using the average vehicle occupancy rate. As not all people parking in this area will visit the Golden Mile, we can remove a portion of these visitors as a parameter. By default, we assume 50% of people parking on-street 'elsewhere' will visit the Golden Mile and 50% will not; this portion is an estimate, and a range of potential values were tested, ranging from 1% to 100%, with negligible effects.

C.2.1.4 Off-street parking visitors

The ratio of the number of people who parked in off-street car parks to visit Tory Street (based on that case study) to the number that parked directly on Tory Street is used to estimate the number of visitors to the Golden Mile who park in off-street car parks.

C.2.1.5 Walking visitors

The number of people arriving at the Golden Mile by walking is estimated to be the remainder of the foot traffic on the Golden Mile after the counts from all other arrival modes are removed from the total visitor estimate described in Section C.2.1.1.

Table 4-8: Golden Mile visitors by arrival mode

Visitor Type	Weekday	Weekend
On-street (GM) parking visitors	1,934	1,892
On-street (elsewhere) parking visitors	11,638	9,425
Off-street parking visitors	8,703	8,513
Public transport visitors	11,959	2,990
Walking visitors	52,166	43,445
Total	**1,934**	**1,892**

C.2.2 Estimate retail spend

EFTPOS spend along the Golden Mile was collected from EFTPOS NZ and Dot Loves Data[31], for the year 2019 and 2020. Given historical expenditure trends in the Greater Wellington region, this EFTPOS spend is estimated to be 40% of the total retail expenditure in the area. The total daily retail expenditure for the Golden Mile is estimated to average (across 2019 and 2020) $1,434,807.50 per day on weekdays, and $1,350,931.25 on average per day on weekend days.

C.2.3 Estimate average spend by mode

The total spend, T, can be expressed as a follows:

$$T = \sum_i N_i L_i S_i \qquad (1)$$

where N_i is the number of visitors to the Golden Mile by arrival mode i, L_i is the likelihood of spending by arrival mode i, and S_i is the average spend per shopper by arrival mode i.
S_i can be expressed as the product:

$$S_i = R_i M \qquad (2),$$

where R_i is the relative spend of mode i compared with the lowest spend by mode, and M is the average spend of the lowest spending mode.

The likelihood of spend L_i, and the relative spend by mode R_i are inferred from the Tory Street case study, such that the original equation can be rearranged to estimate M, as follows:

$$M = \frac{T}{\sum_i N_i L_i S_i} \qquad (3)$$

Substituting this value for M back into (2), S_i, the average spend per shopper by arrival mode is estimated.

Table 4-9: Average spend per person by arrival mode

Visitor Type	Average Spend
On-street (GM) parking visitors	$31.05
On-street (elsewhere) parking visitors	$22.58
Off-street parking visitors	$39.52
Public transport visitors	$33.87
Walking visitors	$33.87
Source: Study Team	

C.2.4 Estimate adjusted visitor volumes

The adjusted visitor volume on the Golden Mile depends on the extent of parking removal and the impact of the option improvements on public transport patronage and pedestrian footfall. The two components of adjusted visitor volumes are described below.

[31] Dot Loves Data is a data science company based in Wellington. They created a 'Let's Get Wellington Moving' dashboard which includes retail spend data for Wellington.

C.2.4.1 Redistribution of people who would otherwise have parked

The removal of parking will impact those who would otherwise have driven to the Golden Mile and parked in the spaces proposed for removal. Some assumptions are made about the redistribution of those people to the following groups:

- Park in an off-street car park
- Arrive by public transport
- Walk to the Golden Mile
- No longer visit the Golden Mile

C.2.4.2 Induced demand from Golden Mile improvements

The impact of prioritising pedestrians and public transport will likely transform how visitors to the Golden Mile experience the space and increase the attractiveness of the Golden Mile for people travelling by those modes. Some sensitivity tests are included to test the impact of changes in footfall on retail spending along the Golden Mile.

C.2.5 Estimate impacts to retailers

Given the spend by mode, S_i, calculated in step 3, and the updated visitor volumes, N_i^1(from adjustments described in step 4), the updated total spend, T_1, can be expressed as:

$$T_1 = N_i^1 L_i S_i \qquad (4)$$

assuming that L_i and S_i remain constant.

C.3 Assumptions and Limitations

The methodology makes the following assumptions:

- Most people spend their time on only one section of the Golden Mile (Lambton Quay, Manners Street, Willis Street, or Courtenay Place).
- Average vehicle occupancy reported in the Wellington CBD Cordon Survey (1.36) is representative of the Golden Mile.
- EFTPOS spend data collected is 40% of total spend as was found in historical trends of expenditure in the Greater Wellington Region.
- Likelihood of spending and relative spend by arrival mode found in the Tory Street Case Study is approximately the same as for the Golden Mile.
- Improvements proposed for the Golden Mile do not affect the likelihood of spending or amount spent by visitors.
- The ratio of people visiting the Golden Mile by parking directly on-street compared to parking on-street 'elsewhere' or off-street is the same as the ratio found in the Tory Street case study.

Appendix D Preliminary (Original) Net Impact Evaluation (Pre-Intercept Survey)

This Appendix presents the results from the preliminary net impact evaluation that was conducted prior to the Intercept Survey to collect specific data from the Golden Mile. These results are included for completeness of this work, but the updated Net Impact Evaluation should be used for future work and discussions.

The Net Impact Evaluation is intended to use the results from the Base Case Pedestrian Value Assessment to provide details of the estimated net impact on retail revenue of parking removal along the Golden Mile. It applies some assumptions relating to the redistribution to other modes of visitors who would otherwise have driven and parked in the spaces being removed, and assumptions about the potential increase in visitors by other modes due to the improved amenity of the Golden Mile.

As no modelling is available to estimate the redistribution of visitors that would otherwise have parked on the Golden Mile or the increase in arrival by other modes, some high-level assumptions and scenarios are tested to understand the potential net impact of the Golden Mile improvements.

Some insights drawn from various case study scenarios and tests of the spreadsheet are noted in the sections below. For each of these tests, the parking scenario that removes the greatest volume of parking has been used (Bus Emphasis and Pedestrian Priority). In these tests, 1120 on-street (elsewhere) parking sessions (cars) are removed per weekday, and 986 per weekend day.

- **Estimating spend from people parking in spaces that may be removed:** scenarios of alternative relative spends by mode have been tested, compared to the base assumption which is based on the Tory Street Case Study. These scenarios are described below:
  - The base assumption, using the spending data from the Tory Street Case Study (on-street elsewhere visitors spend the least; on-street Golden Mile visitors spend 37.5% more; off-street visitors spend 75% more; public transport and walking visitors spend 50% more), estimates the annual revenue generated from car parks that may be removed by the Golden Mile options is $21m, which is 4.1% of the current total annual revenue.
  - If the relative spend by mode reflected the values reported in Waka Kotahi’s Research Report 530 for central areas (people that arrive by car or walking spend 43% more than people arriving by public transport, on average), the estimated spend from people using the car parks expected to be removed would be $25m, or 4.8% of current annual retail revenue.
  - If the relative spend by mode reflected that of the Lygon Street, Melbourne case study (people arriving by car spend 56% more and by foot spend 5% more than people arriving by public transport), the estimated spend from people using the car parks expected to be closed would be $31m, or 6.0% of the current annual revenue.
  - If the relative spend by mode reflected the values from the London Town Centre study (people arriving by car spend 72% more than those that arriving by walking, and those arriving by bus spend 20% more than walkers), the estimated spend from people using the car parks expected to be removed would be $33m, or 6.4% of the current annual revenue.
  - **Summary**: the annual revenue from people currently parking in spaces that may be removed is estimated to be around $21-33m, which is 4-6% of the total spend on the Golden Mile.
- **Testing redistribution to other modes** of people that would otherwise have parked in spaces that may be removed: using the Tory Street Case Study as a base for the relative spend by mode, some scenarios of the redistribution of people that would have otherwise parked in spaces being removed have been tested and found that:

  - If those people redistribute proportionately across the other current weekday arrival modes (that is, 12% park off-street, 16% take public transport and 72% walk), the net impact on annual retail spend is -$240,000, which is -0.05% of the current annual spend.
  - If they redistribute proportionately across the other current *weekend* arrival modes (that is 16% park off-street, 5% take public transport and 79% walk), the net impact on annual retail spend is +$1m, or +0.19% of annual spend.
  - If we assume 20% of those trips that would otherwise have used the on-street parking no longer come to the Golden Mile, and the others split proportionately based on the other current weekday arrival modes (that is 20% no longer come to the Golden Mile, 21% shift to other parking, 29% shift to public transport and 30% shift to walking), the net impact on annual retail spend is -$3.0m; a 0.58% reduction in annual spend.
  - **Summary**: using the Tory Street Case Study for relative spend by mode, and scenario testing the above redistribution of people who would otherwise have parked in spaces that may be removed, the net impact on retail revenue could be around -$3.0m to +$1m, which is -0.58% to + 0.19% of current annual revenue. This doesn't include additional revenue that would be generated from increased visitors due to the improved amenity and attractiveness of the Golden Mile.
- **Testing other impacts** due to amenity improvements of the Golden Mile: using the Tory Street Case Study as a base for relative spend by mode and the most conservative assumption for the redistribution of people to other modes (assuming all visitors who previously parked in removed spaces no longer visit).
  - The Whitehead et al. study found that across Germany and the UK, projects developing pedestrianised areas could realise an increased retail footfall of 20 to 40 percent. The lowest bound of this estimate has been tested in this case, applying the increase in footfall to both pedestrian and public transport visitors.
  - If a 20% increase in pedestrian and public transport numbers is applied to the assumptions stated above, the net impact on retail revenue would be +$47m (+9.2%).
  - A more conservative estimate in terms of increased pedestrian visitors and public transport arrival was also tested. If a 10% increase in pedestrian and public transport numbers is applied to the previous assumptions, the net impact on retail revenue would be +$13m (+2.6%).
- **Collating the sensitivity tests into scenarios**: the following points collate the above sensitivity tests into a set of scenarios to understand the cumulative impact of these assumptions.
  - **Pessimistic scenario:** sensitivity testing all the most negative/pessimistic assumptions:
    - Relative spend by mode from the London Town Centre study, meaning that visitors who would otherwise have parked spend more relative to other visitors (compared to other case studies).
    - Assume all people who would have driven and parked in spaces being removed no longer visit the Golden Mile at all.
    - Assume no increase in visitors to the Golden Mile by bus or walking, despite the amenity improvements.
    - The net impact of these pessimistic assumptions is a net annual revenue change of -$33m, or -6.4%.
  - **Mid-range scenario:** sensitivity testing a 'middle ground' assumption from the various case studies:
    - Relative spend by mode from Waka Kotahi's Research Report 530.
    - Assume the people that would have parked in spaces that are now removed redistribute to other modes, with 20% no longer visiting the Golden Mile, and the remaining 80% being split proportionately based on the current weekday mode split.
    - Assume a 5% increase in walking and public transport visitors to the Golden Mile.

    - The net impact of these mid-range assumptions is a net annual revenue change of +$6.5m, an increase of 1.3%.
- **Optimistic scenario:** sensitivity testing all the most positive/optimistic assumptions:
    - The Tory Street Case Study assumptions about relative spend by mode.
    - Assume all visitors to the Golden Mile that would have parked in spaces proposed for removal still visit and split proportionately based on the current weekend mode split.
    - Assume a 20% increase in walking and public transport visitors to the Golden Mile.
    - The net impact of these optimistic assumptions is a net annual revenue increase of $70m (13%).

Appendix E Golden Mile Intercept Survey Results

Golden Mile Intercept Survey Results

To	Let's Get Wellington Moving
From	Daniel Cooper, Jean Beetham, Sheryl Tank, Vivienne Ivory
Office	WSP Research
Date	December 2020
Subject	Golden Mile Intercept Survey Results

1 Survey deployment and data analysis

The Golden Mile Intercept Survey was carried out over a period of nine days, beginning on Saturday 28/11/20 and ending on Sunday 06/12/20.

During this time surveyors were out on the Golden Mile between the hours of 8 AM to 8 PM Monday to Friday, 9 AM to 8 PM on Saturdays, and 10 AM to 8 PM on Sundays. There were two teams of two surveyors rostered on each day (a total of four surveyors per day). The first team started in the morning and finished at 4 PM, and the second team started at 12 PM and finished at 8 PM.

The Golden Mile was split into eight zones to ensure full coverage. Each surveying team was assigned two zones for each shift, one for the first half and one for the second half. The surveyors were encouraged to split up when undertaking surveying work, except during the evenings when they were encouraged to work together as a safety precaution.

The survey itself was done using iPads and the offline SurveyMonkey Anywhere app. The participants were self-selecting — surveyors were advised to approach people on the street and ask whether they would like to take a short survey about the Golden Mile. If a person expressed interest but did not wish to complete the survey in-person, they were given a card which included a link to complete the survey online.

In total, 2,137 responses were captured during the survey period. Five of these responses were removed from analysis as they were incomplete, only containing data for the first question. As the first two questions were mandatory these responses were considered invalid. This left a remaining total of 2,133 responses for analysis (2,127 captured in-person and 6 captured online).

1.1 Intercept survey parameters

The survey method was designed to capture responses from as many participants as possible along the Golden Mile to provide a snapshot of current activity and perceptions. However, the method does have constraints to take into consideration:

- As the survey was designed to be taken in-person on the street, it had to be quick to complete. This meant that some information was not able to be captured, for example, specific parking and spend locations. Priorities were agreed by the LGWM project team
- Some parts of the Golden Mile are active during times outside the survey capture period. For example, Courtenay Place has many bars and restaurants which are active after 8 PM.

- It is likely that the vast majority of participants only completed the survey once. This means the results may underestimate the impact of frequent visitors, such as those who work on the Golden Mile.
- Most of the questions had a limited range of options to allow for speedy data collection, but the questions on time and money spent were open-ended. This means the data for these questions may be prone to errors, either on the part of the surveyor (entering data incorrectly) or the participant (providing a false or misleading response). In line with best statistical practice, outliers have been excluded from the analysis reported below. This is discussed in further detail in the relevant sections.

2 Survey statistics

The following section provides an overview of when the survey responses were collected.

Figure 1 shows a breakdown of the number of responses received per day. The six online responses have been excluded as the specific day the participant was intercepted is unknown. Response rates were affected by Christmas events on the first weekend (higher rates relative to the second weekend) and poor weather on Monday and Tuesday (lower rates relative to other weekdays).

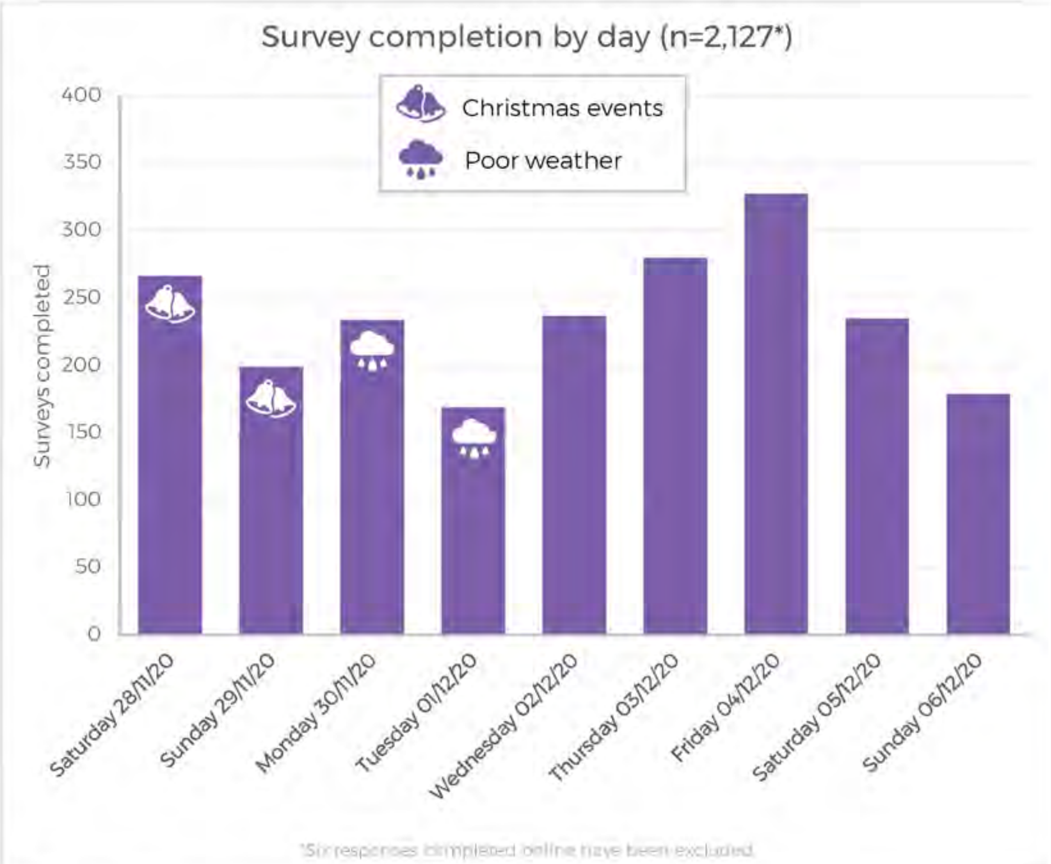


Figure 1. Survey completion by day (n=2,127)

Figure 2 shows a breakdown of the times the weekday responses were obtained, and Figure 3 shows a breakdown of the times the weekend responses were obtained. The six online responses have again been excluded.

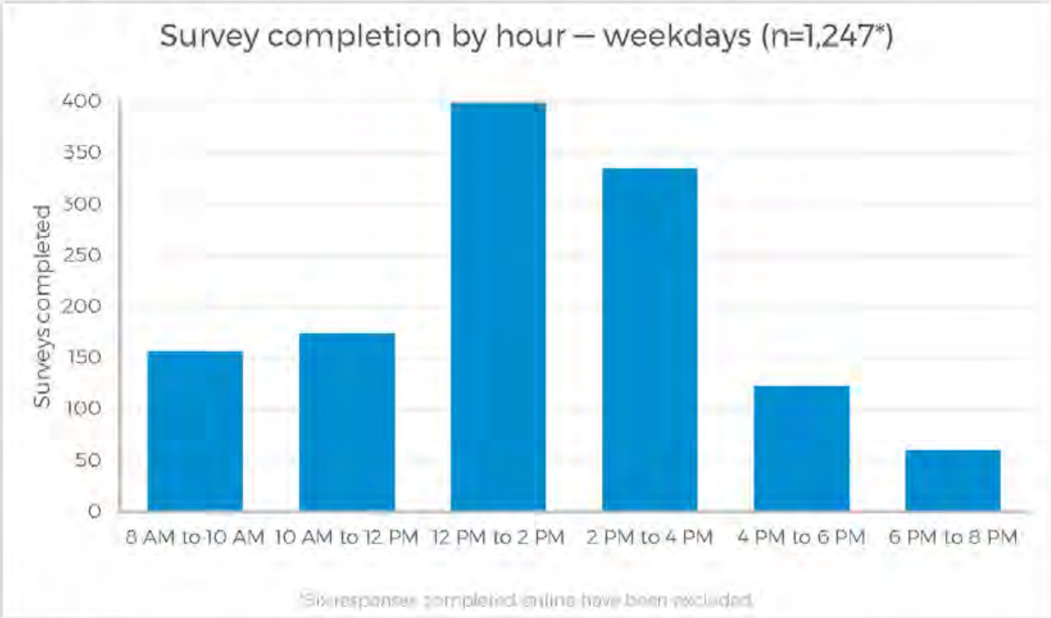


Figure 2. Survey completion by hour – weekdays (n=1,247)

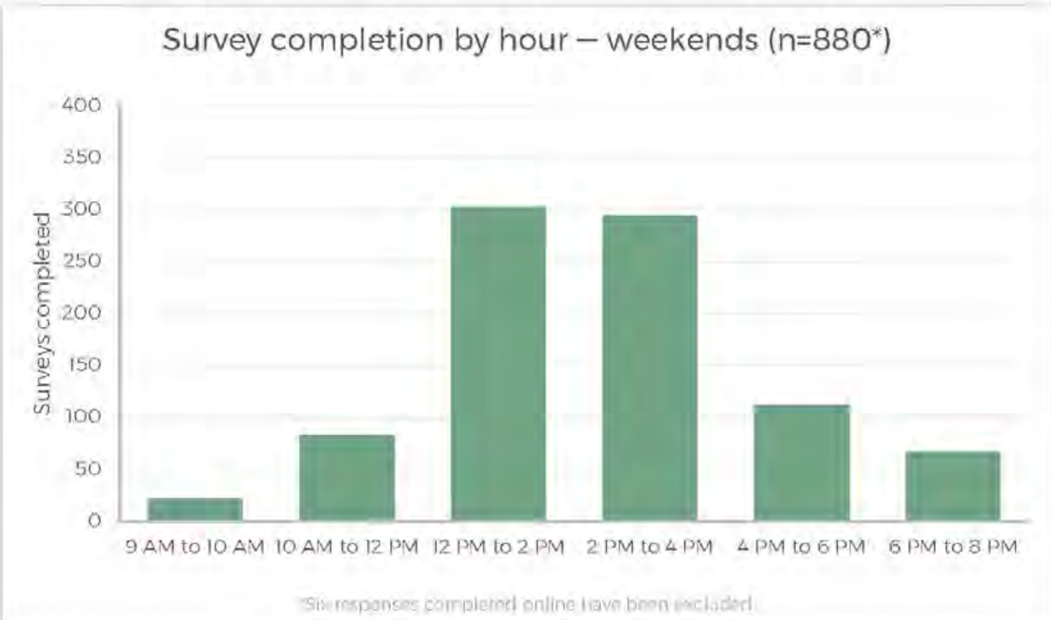


Figure 3. Survey completion by hour – weekends (n=880)

3 Survey results

The following section describes how participants responded in the following order:

- The origin of trips to the Golden Mile
- Mode of travel and parking behaviours
- The purpose of the trip
- Estimates of time and dollar spend in relation to the trip
- Typical frequency of travel to the Golden Mile, and
- A trip frequency response to potential changes to the Golden Mile

Participants were first asked the question *"Where did you travel from today?"* and were provided with four options: 'from within the Wellington City Centre', 'from somewhere else in Wellington City', 'from outside Wellington City', and 'don't know / not sure'. To aid their answer, surveyors showed participants a map of the Wellington City Centre (Appendix 1). The Wellington City Centre includes the suburbs of Aro Valley, Highbury, Kelburn, Mount Cook, Mount Victoria, Oriental Bay, Pipitea, Te Aro, Thorndon, and Wellington Central.

Figure 4 shows where participants travelled from on the day they were intercepted.

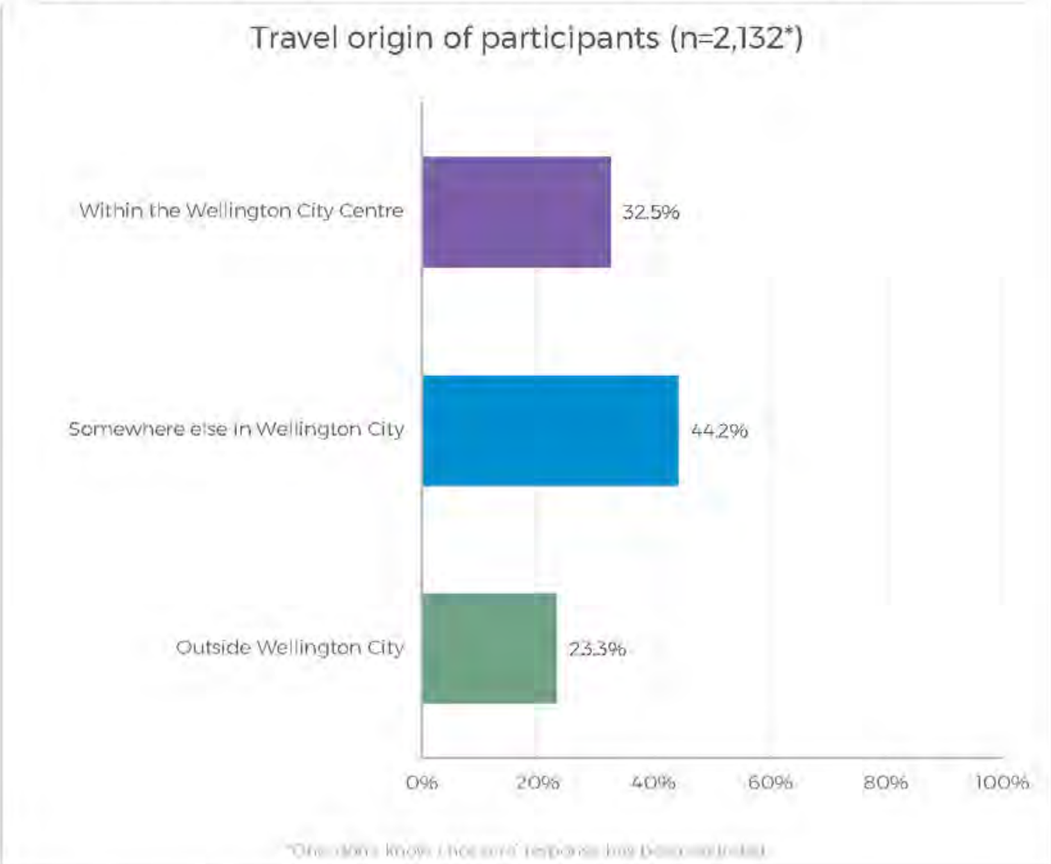


Figure 4. Travel origin of participants (n=2,132)

Participants were then asked to identify how they travelled into the Wellington City Centre (or within the City Centre if that was their travel origin), shown in Figure 5.

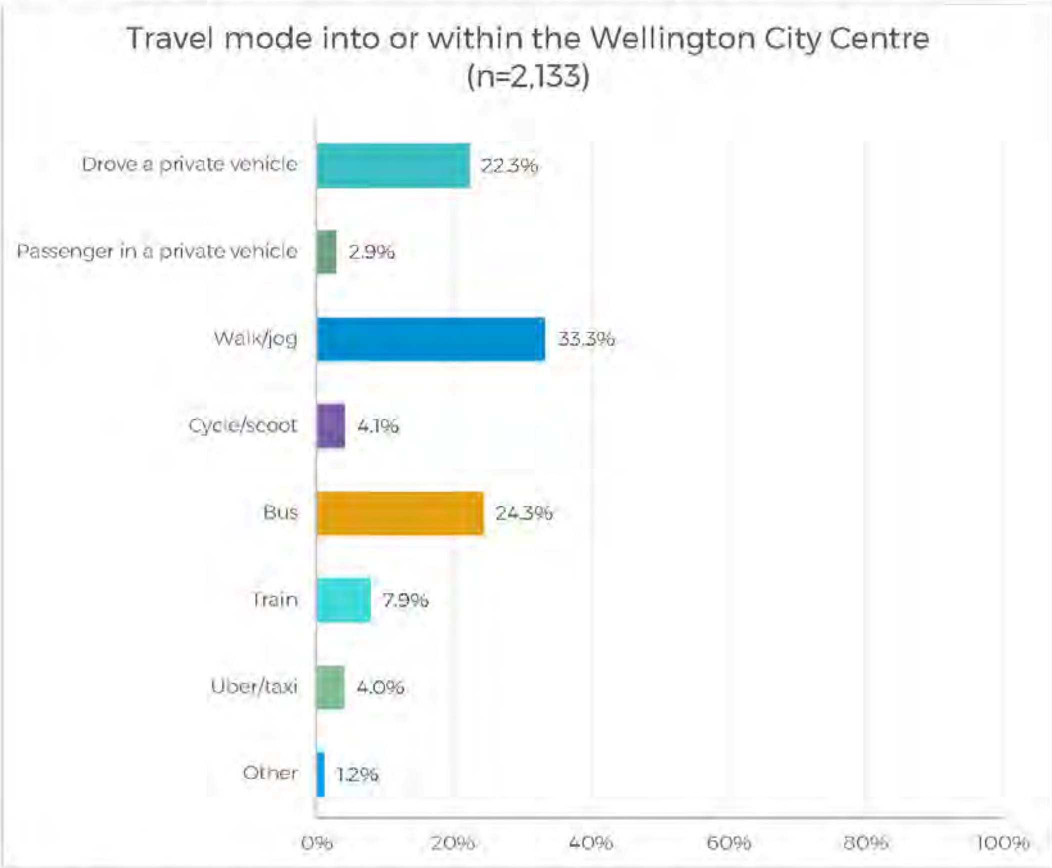


Figure 5. Travel mode into or within the Wellington City Centre (n=2,133)

Figure 6 combines both the travel mode and travel origin data to provide a breakdown of travel mode by travel origin.

Those who travelled within the Wellington City Centre were more likely to walk/jog, while those who travelled from somewhere else in Wellington City or from outside Wellington City were more likely to drive or catch public transport.

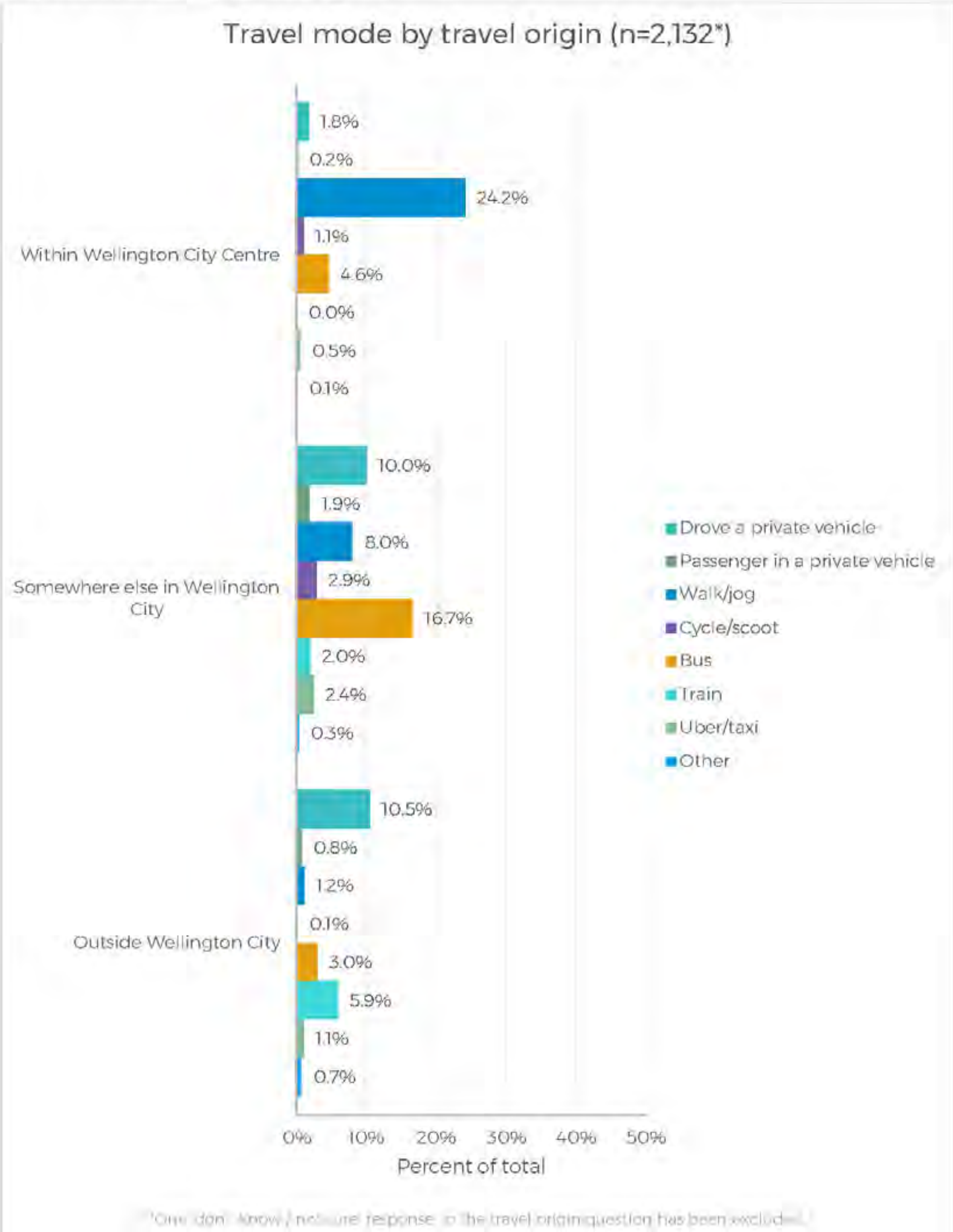


Figure 6. Travel mode by travel origin (n=2,132)

Those who responded that they either drove a private vehicle or were a passenger in a private vehicle were then asked whether their trip involved the use of car parking, and if so, where they parked. Those who parked on-street were then asked to identify whether they parked their car in the Golden Mile Streets, an area defined as the boundary of the Golden Mile plus the side streets that may be impacted by potential parking changes. The exact boundary of the Golden Mile Streets can be seen in Appendix 2.

Figure 7 shows the responses to the parking questions. Note that the 'no parking used' category includes both participants who used a private vehicle but did not park (presumably because they were dropped off) as well as participants who identified a mode of transport that does not require car parking.

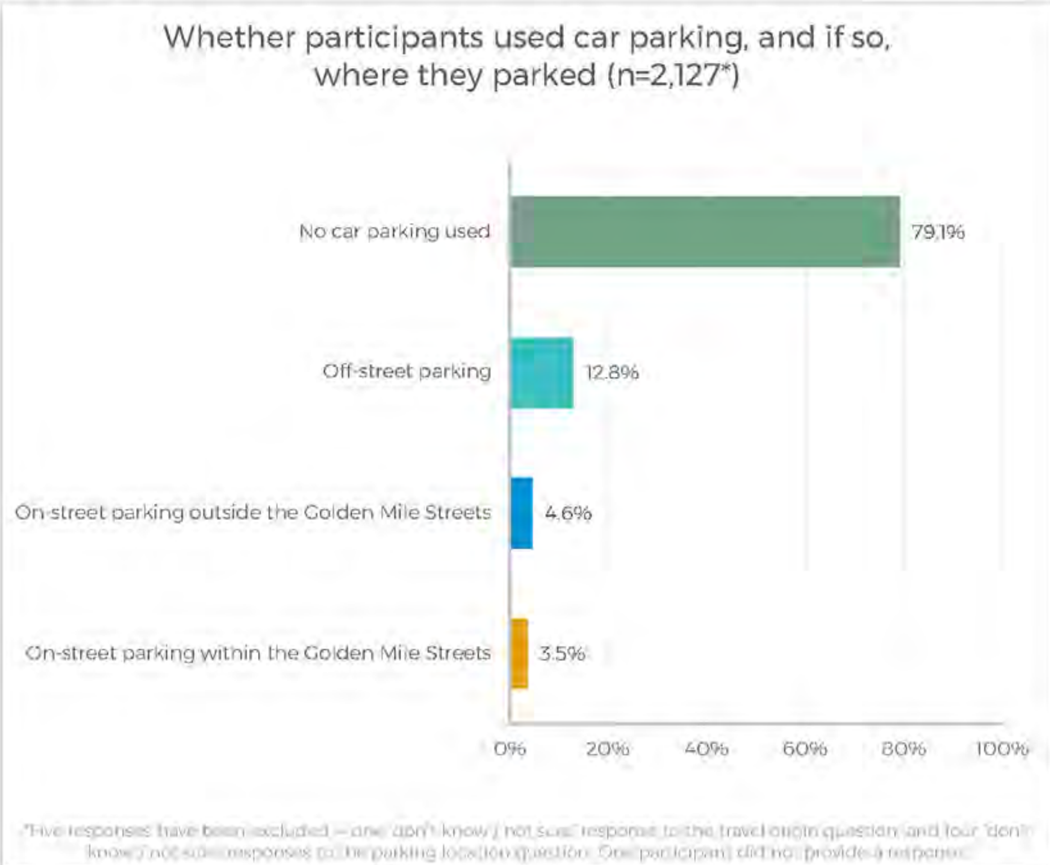


Figure 7. Whether participants used car parking, and if so, where they parked (n=2,127)

The 3.5% of participants who used on-street parking within the Golden Mile Streets were asked what they would have done, in the first instance, had they not found that park. This is shown in Figure 8.

The majority of this group would have looked for another park either on-street or off-street (90.5%), while only 9.5% would have abandoned the outing entirely or travelled to a different shopping area.

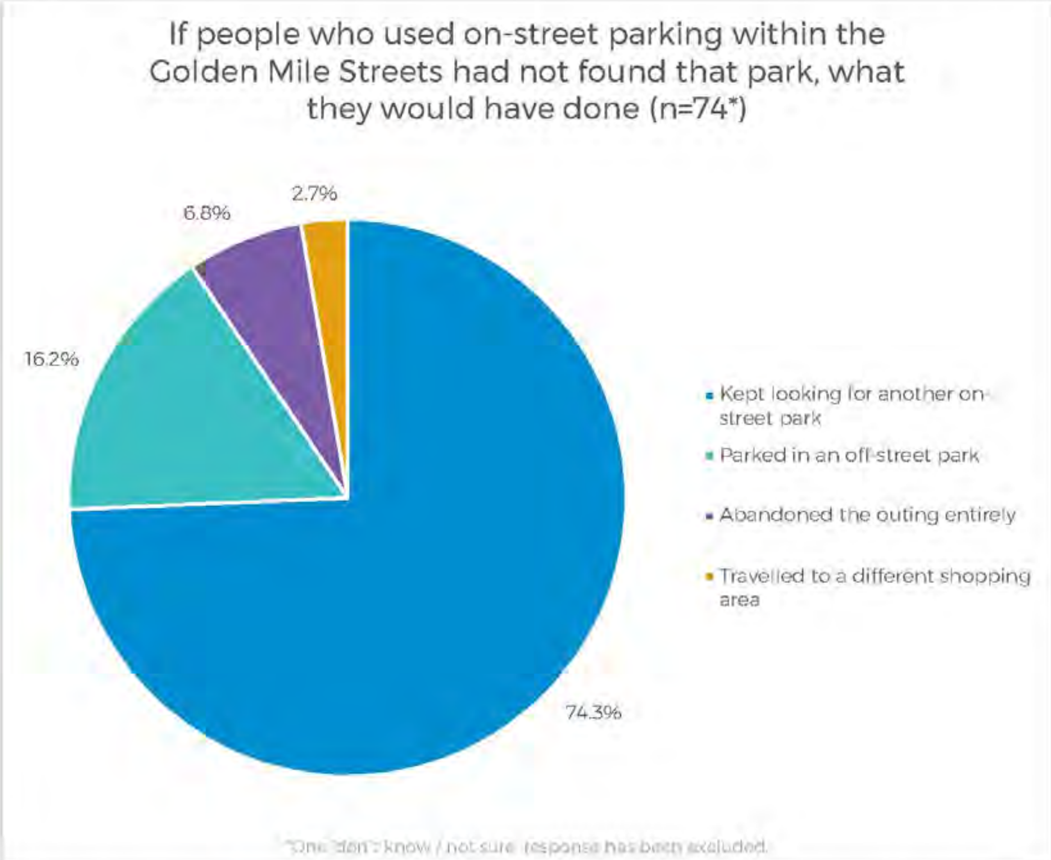


Figure 8. If people who used on-street parking within the Golden Mile Streets had not found that park, what they would have done (n=74)

The parking responses have been combined with the travel origin responses to provide a breakdown of parking used by travel origin in Figure 9, showing that parking is more likely to be used by people who travelled further.

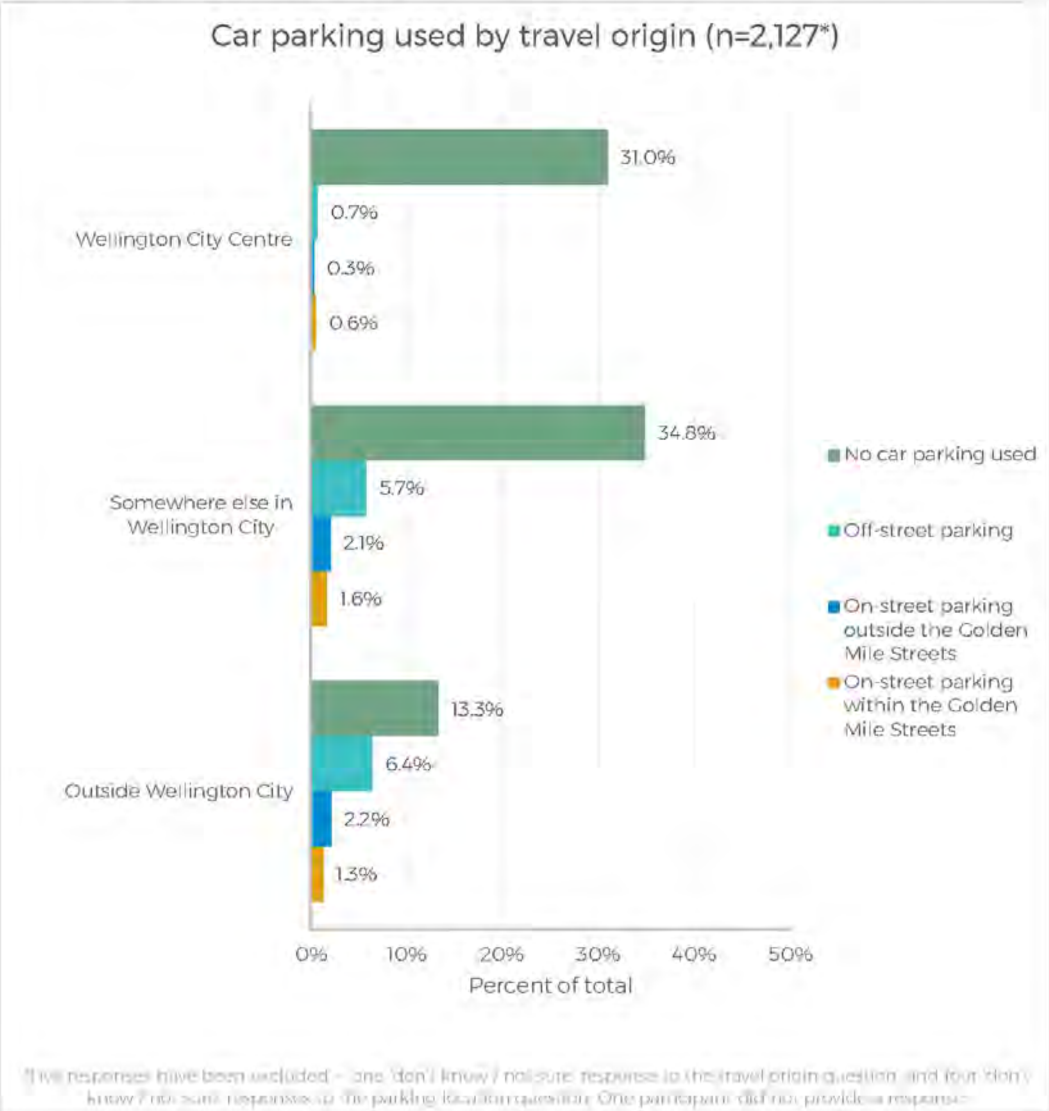


Figure 9. Car parking used by travel origin (n=2,127)

All participants were asked a multiple-choice question: *'What are the purpose(s) of your outing in the Golden Mile Area today?'*. Surveyors were instructed to show the Golden Mile Area as the Golden Mile Streets (shown on the map in Appendix 2) and the immediately adjoining streets. Figure 10 shows these responses.

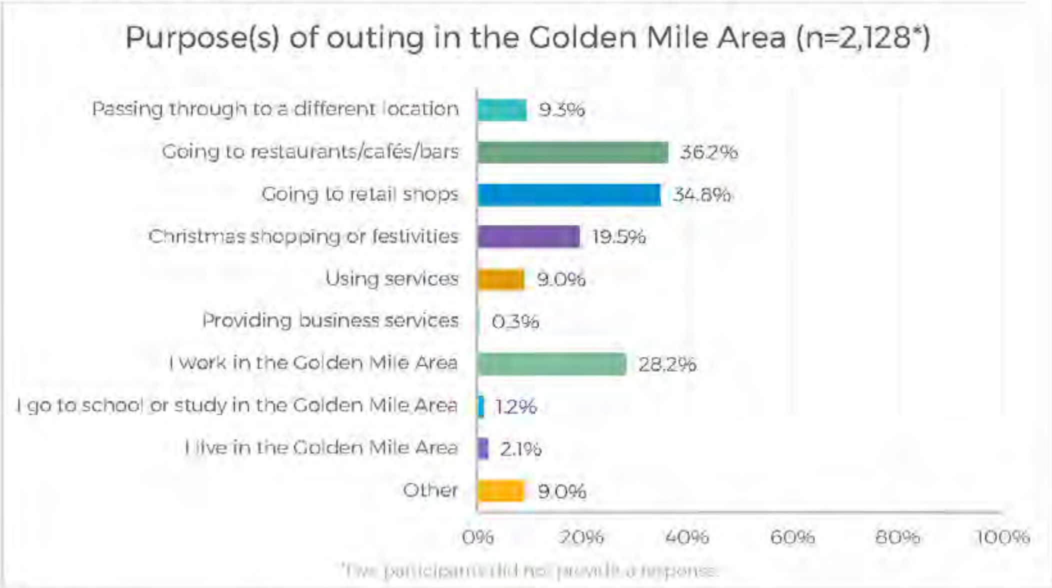


Figure 10. Purpose(s) of outing in the Golden Mile Area (n=2,128)

Figure 11 shows the outing purpose(s) of the group of participants who used on-street parking within the Golden Mile Streets. This group differs from the overall sample in that they are more likely to visit retail shops; and less likely to work, study, and live in the Golden Mile Area.

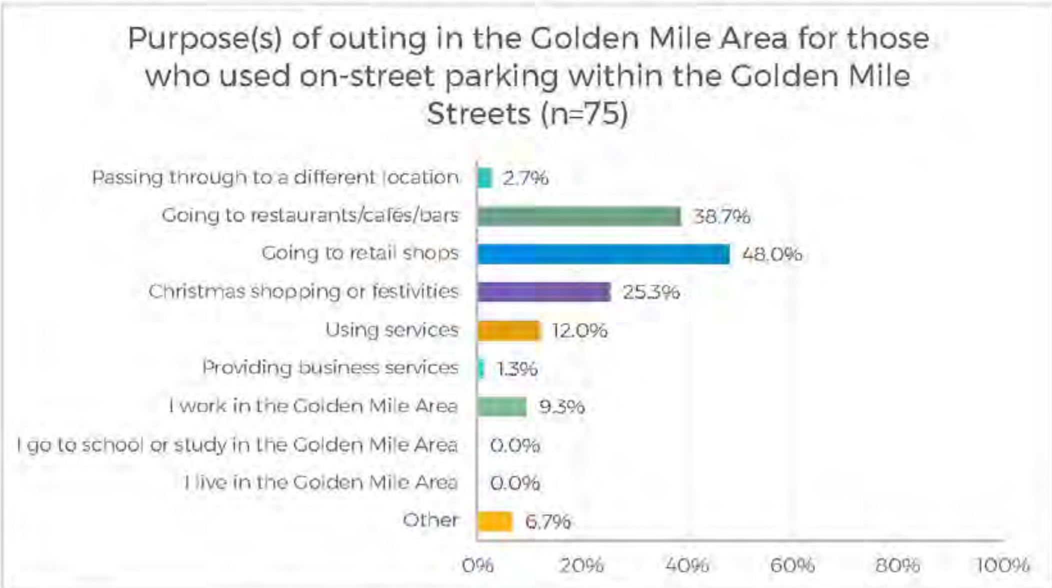


Figure 11. Purpose(s) of outing in the Golden Mile Area for those who used on-street parking within the Golden Mile Streets (n=75)

Participants were then asked to give an estimate of how long they were planning to spend in the Golden Mile Area in total on their outing. Some of the responses received were outliers, with the longest response being 1,215 hours. It is possible that some respondents were staying on the Golden Mile, or lived and worked on the Golden Mile, and responded from that perspective.

In order to represent the average length of time the majority of participants were spending in the Golden Mile Area responses longer than 12 hours were removed from analysis (n=68). With these removed, the average time spent was calculated at **3.83 hours** (n=2,024).

The time spent responses have been combined with the parking data in Figure 12, showing the average time spent by parking used, and Figure 13, showing the total time spent by parking used.

Those who used on-street parking within the Golden Mile Streets on average spent just over an hour less in the Golden Mile Area than those who did not use any parking. This may be because those who use on-street parking within the Golden Mile Streets are less likely to work, live, and study in the Golden Mile Area (all activities that take extended amounts of time) compared to retail shopping and other shorter activities which make up the vast majority of their outings. In addition, most on-street parking is limited to 2 hours, making it less likely that this group will spend extended amounts of time in the Golden Mile Area.

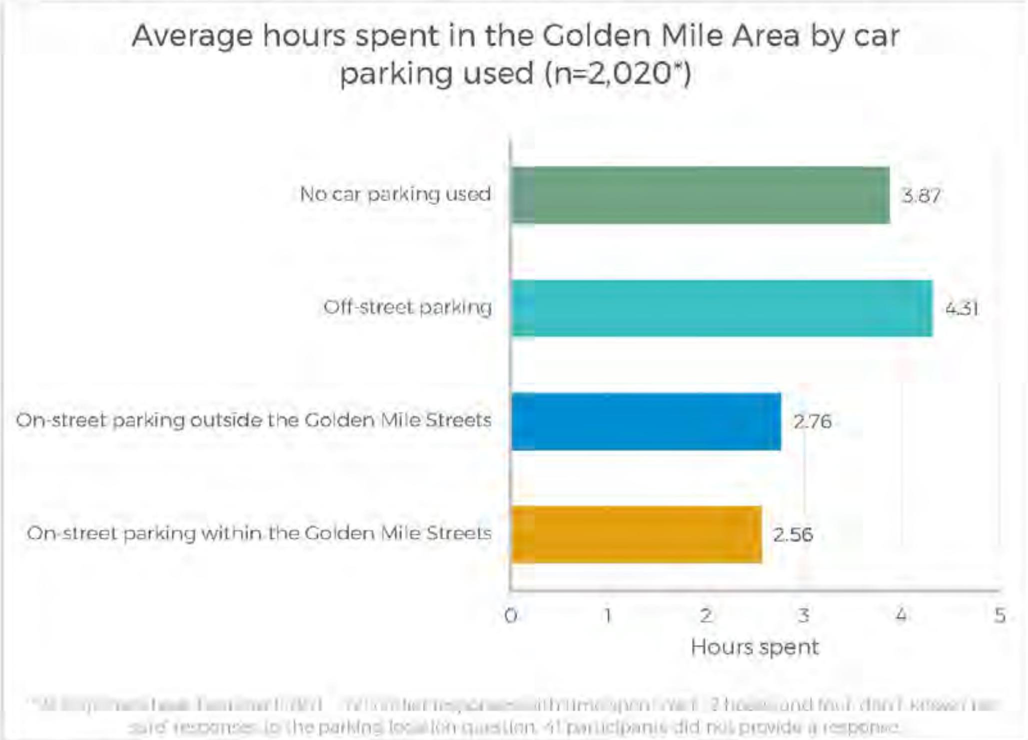


Figure 12. Average hours spent in the Golden Mile Area by car parking used (n=2,020)

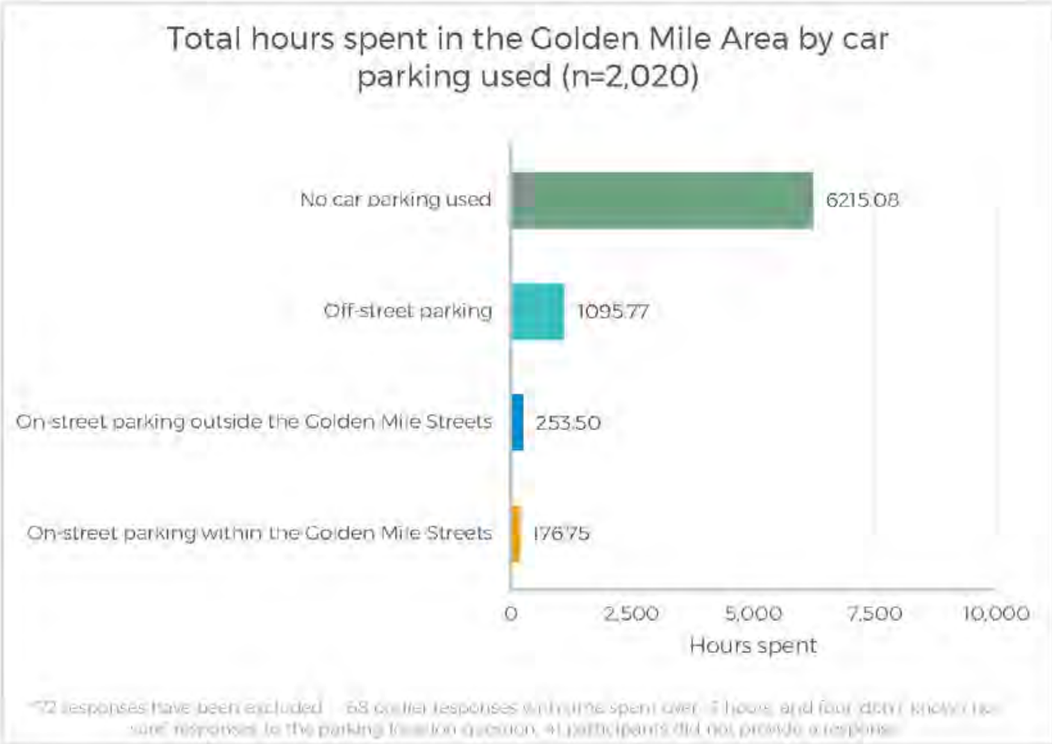


Figure 13. Total hours spent in the Golden Mile Area by car parking used (n=2,020)

Participants were also asked to give an estimate of how much money they planned to spend in the Golden Mile Area on their outing. There were four responses over $5,000 which were deemed to be outliers (based on a scatterplot assessment) as they were significantly higher than the rest. These have been removed from analysis. The average spend of the remaining sample was calculated at **$69.23** (n=1,952).

The money spent responses have been combined with the parking data in Figure 14, showing the average money spent by parking used, and Figure 15, showing the total money spent by parking used.

Those who used on-street parking within the Golden Mile Streets on average spent more money than those who parked elsewhere and those who did not use any parking. As with the difference in time spent, part of the reason for this may be because those who use on-street parking within the Golden Mile Streets are more likely to be in the Golden Mile Area for retail shopping than the sample as a whole, and less likely to be carrying out activities which do not generate as much spend. It may also be reasonable to assume that much of this group might have already decided on a purchase prior to their trip given the two-hour time limit on on-street parking.

Another observation is that while the Golden Mile Streets on-street parking group does have a higher average spend, they are a relatively small proportion of the total sample meaning their total spend is far smaller than those who use no car parking and those who use off-street parking, as shown in Figure 15. In addition, as previously shown in Figure 8, the vast majority of this group would have looked for another park if they had not found one on the Golden Mile Streets. Only 7 participants from this group (0.3% of the total sample) would have abandoned their outing entirely or travelled to a different shopping area.

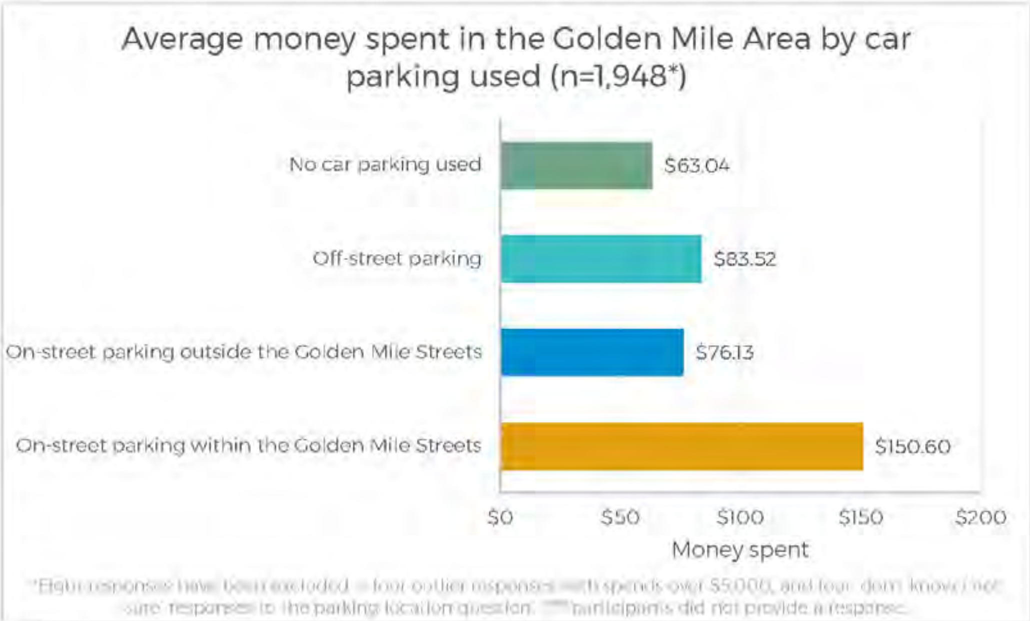


Figure 14. Average money spent in the Golden Mile Area by car parking used (n=1,948)

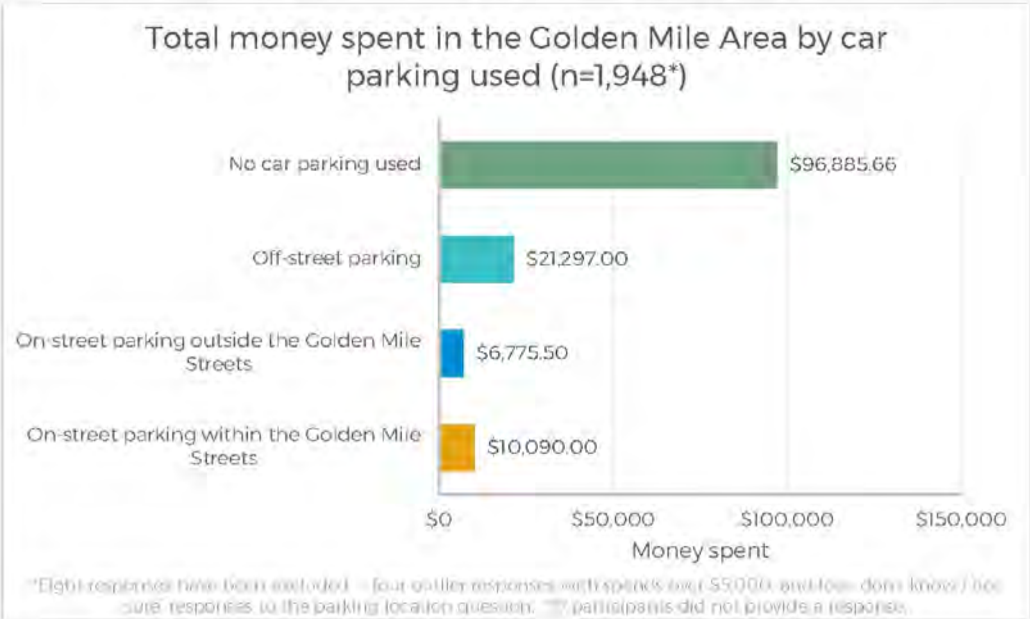


Figure 15. Total money spent in the Golden Mile Area by car parking used (n=1,948)

As the survey was run in the lead up to Christmas, one of the options for outing purpose was 'Christmas shopping or festivities'. Figure 16 shows the average spend for those that selected this option compared to everyone else who answered the spend question.

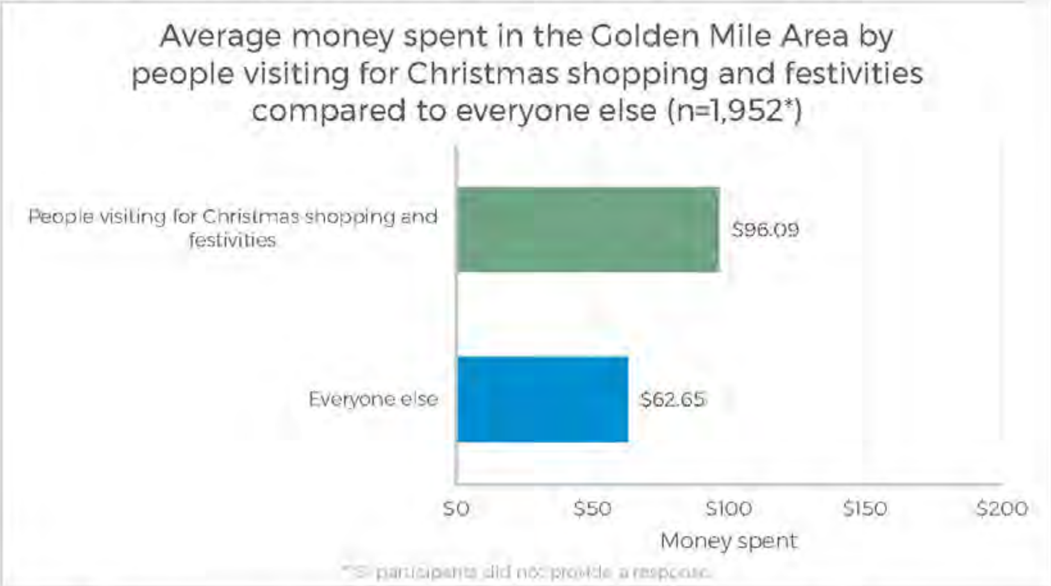


Figure 16. Average money spent in the Golden Mile Area by people visiting for Christmas shopping and festivities compared to everyone else (n=1,952)

Participants were asked to estimate their typical visit frequency. Figure 17 shows the typical frequencies for the whole sample, and Figure 18 shows the typical frequencies for the group that used on-street parking within the Golden Mile Streets. Both groups visit frequently, though the Golden Mile Streets parkers are slightly more likely to visit less frequently.

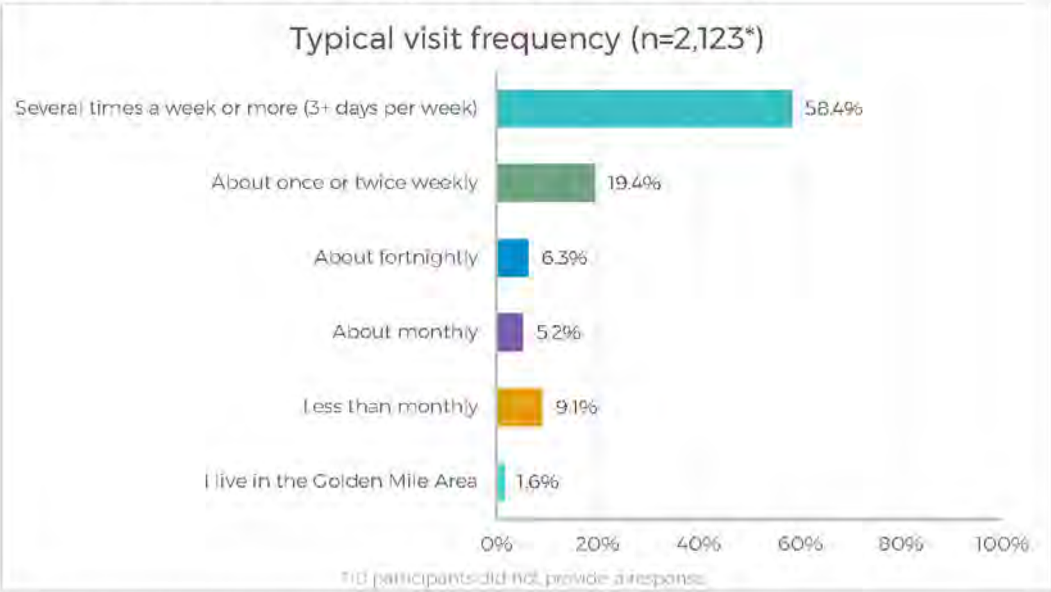


Figure 17. Typical visit frequency (n=2,123)

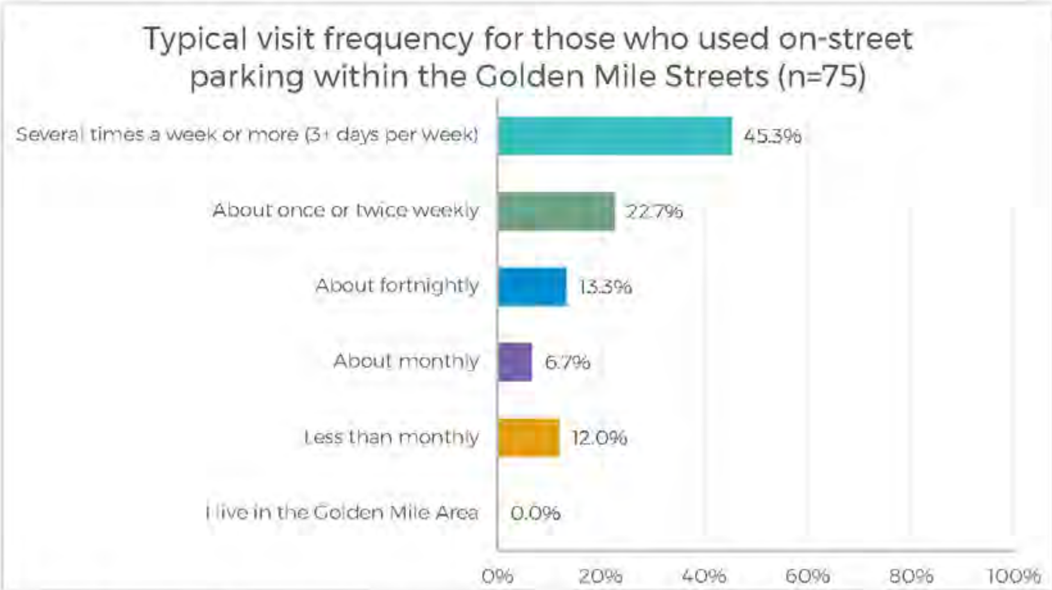


Figure 18. Typical visit frequency for those who used on-street parking within the Golden Mile Streets (n=75)

Figure 19 compares typical visit frequency with car parking used.

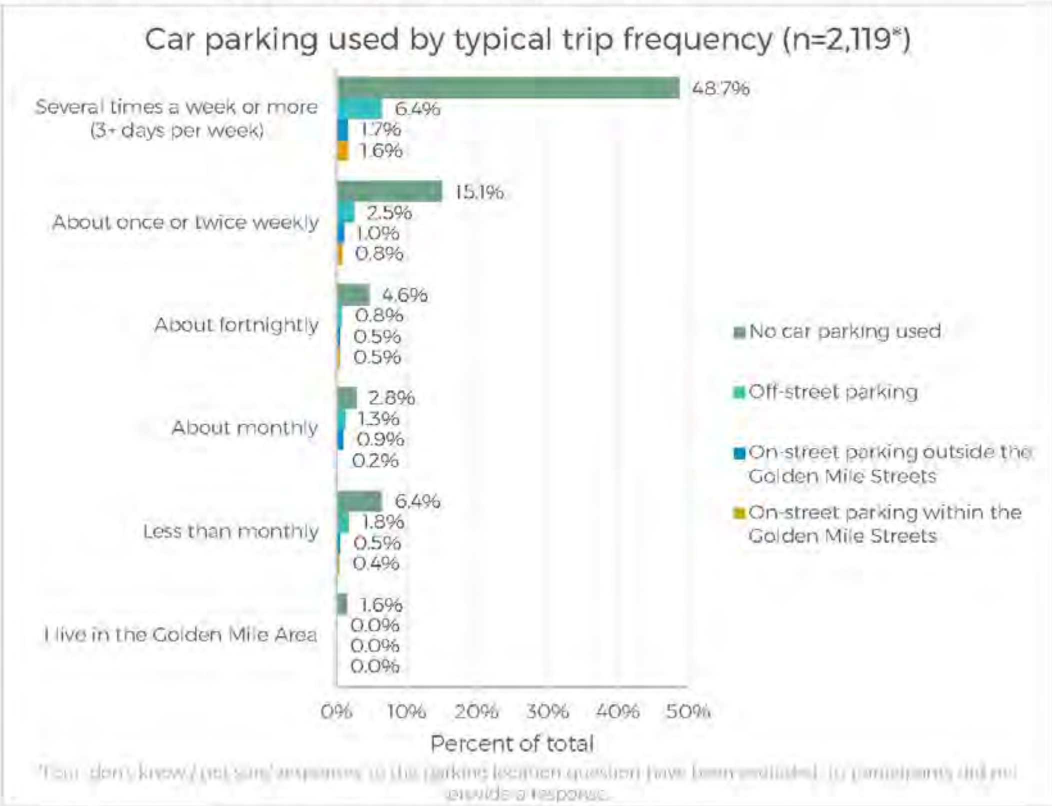


Figure 19. Car parking used by typical trip frequency (n=2,119)

Figure 20 shows the average money spent in the Golden Mile Area by visit frequency, and Figure 21 shows the total money spent in the Golden Mile Area by visit frequency. Although those who visit more frequently spend less money on average, their total spend outweighs the total spend of the group who visit less frequently. In addition, as it is likely that the vast majority of participants only completed the survey once, the total spend figure may underestimate the overall contribution of those who frequently visit the Golden Mile such as those who work nearby.

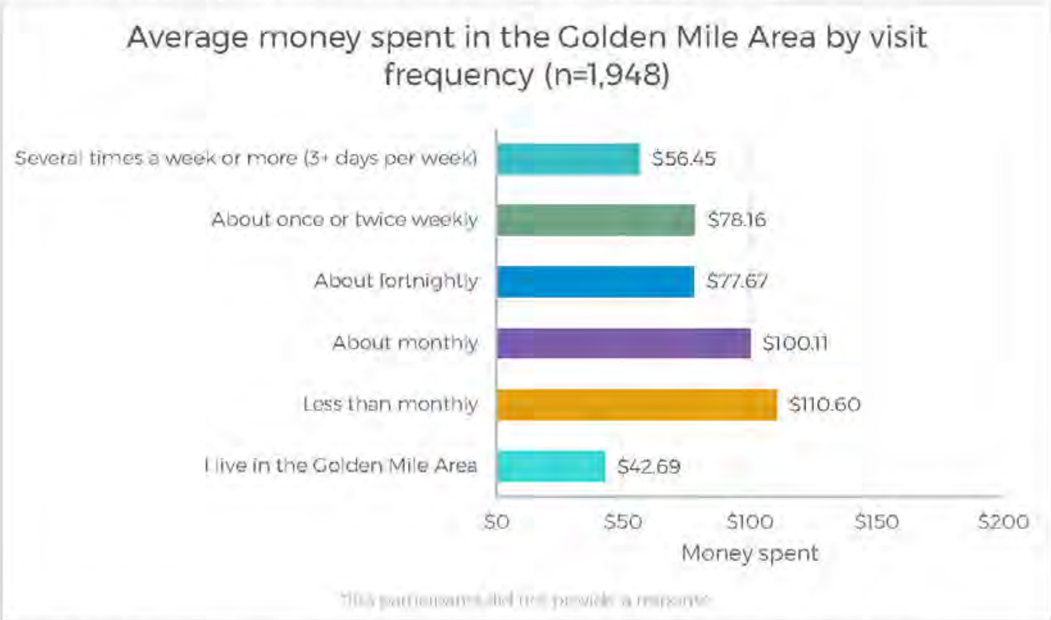


Figure 20. Average money spent in the Golden Mile Area by visit frequency (n=1,948)

Figure 21. Total money spent in the Golden Mile Area by visit frequency (n=1,948)

The last question asked for a response to the general characteristics of the three Golden Mile change options proposed by Let's Get Wellington Moving: *'If the Golden Mile had more space for people to walk and enjoy, improved public transport, and less space for parked cars, how frequently do you think you would visit?'*

Figure 22 shows the responses for the whole sample, and Figure 23 shows the responses for those who used on-street parking within the Golden Mile Streets. Both groups had a relatively even split between the percentage of people who would either visit about as frequently as they already do, or more frequently. Only 5.7% of the total sample, and 18.3% of the Golden Mile Streets parkers, would visit less frequently, indicating that reductions in the frequency of visits by some would be outweighed by an increased frequency by others.

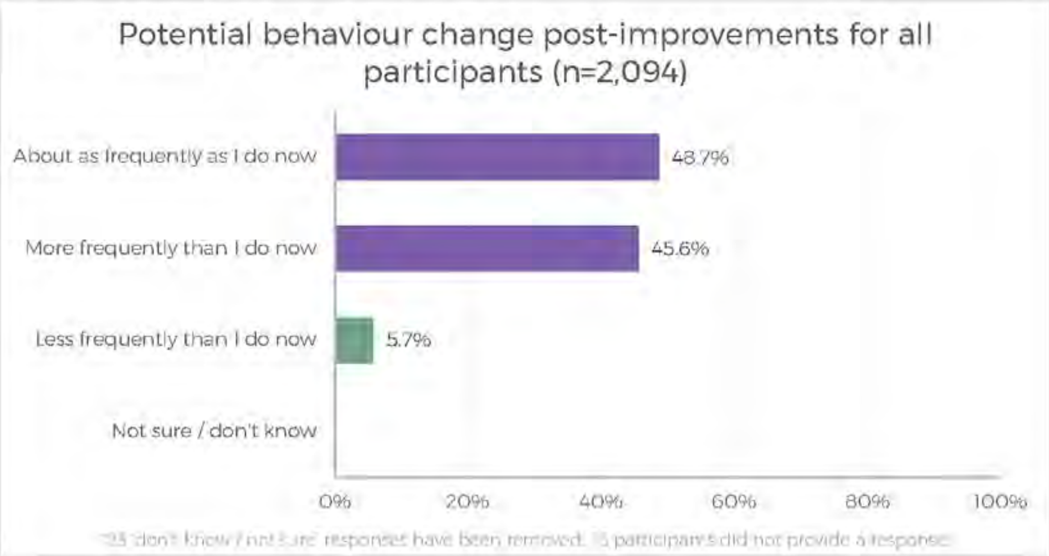


Figure 22. Potential behaviour change post-improvements for all participants (n=2,094)

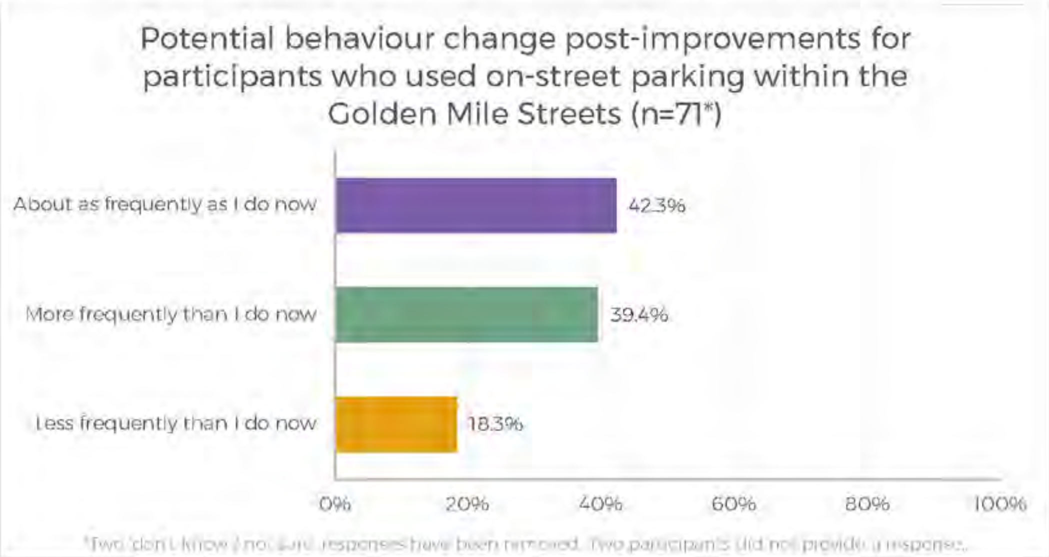
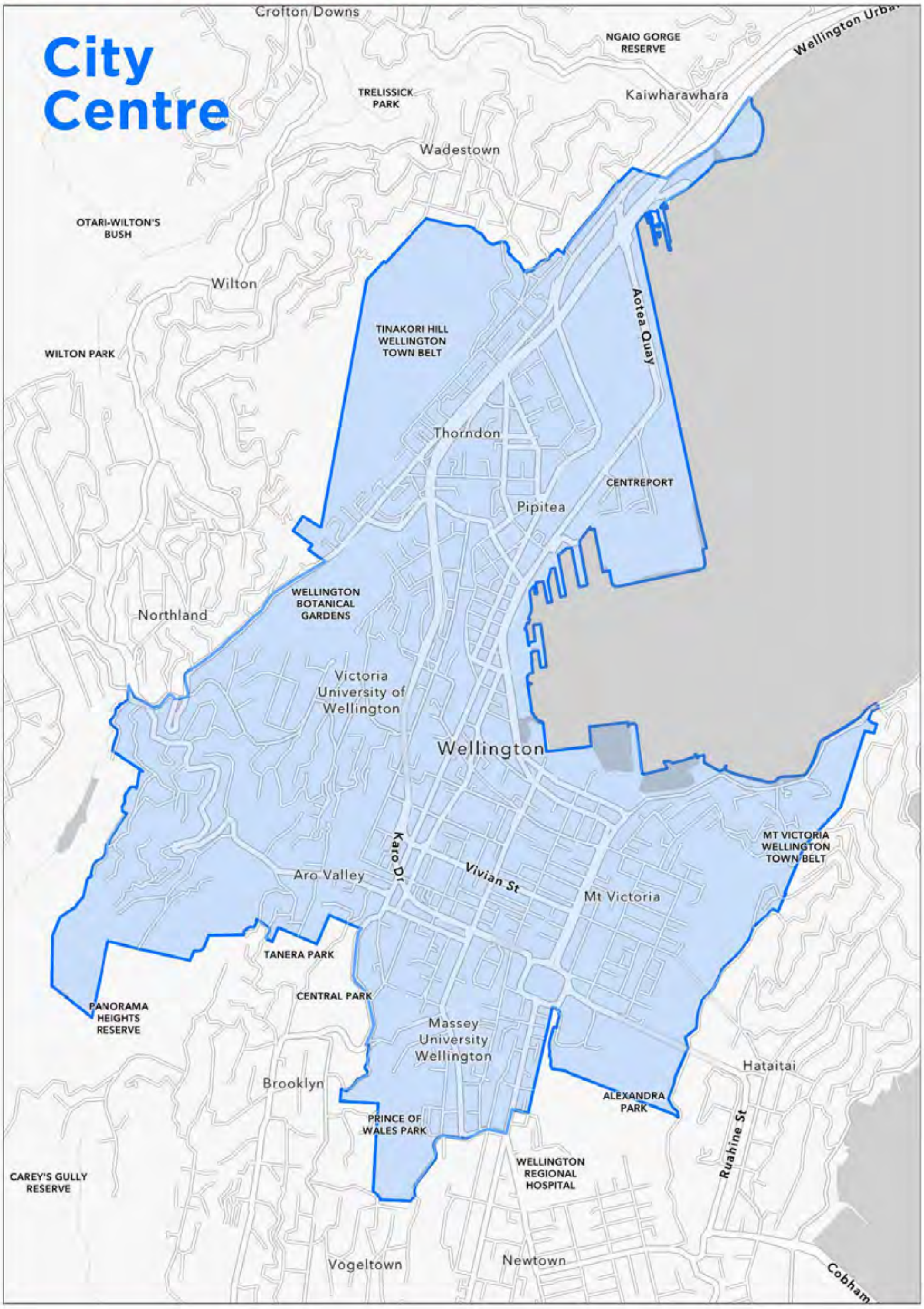


Figure 23. Potential behaviour change post-improvements for participants who used on-street parking within the Golden Mile Streets (n=71)

Appendix 1. Map of Wellington City Centre



Appendix 2. Map of Golden Mile Streets

Page 19

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Cycling Level of Service Report

Memorandum

To	Selwyn Blackmore/ Let's Get Wellington Moving
From	David Huang
Office	Wellington
Date	7 December 2020
File/Ref	5-c3880.03
Subject	Golden Mile Options Evaluation - Cycling Level of Service

1 Introduction

The following memorandum describes the method used and the outcomes of the 'Cycling Level of Service' criterion assessment of the 3 options as part of the LGWM Golden Mile project MCA. The memo provides a tabulated assessment including a score and notes for each of the 3 options being assessed.

2 Assessment Criteria and Method

As part of the cycling level of service assessment for the LGWM Golden Mile MCA, the following assessment criteria have been considered:

(a) Effect on cycling level of service
(b) Effect on perceived safety and comfort of cycling on the Golden Mile
(c) Increase active transport mode share
(d) Increase number of cycling trips
(e) Improved access and utilisation of public transport via active modes
(f) Increase jobs and education opportunities accessible by short cycle trips for people with lower levels of transport choice

Following discussions with the Golden Mile project team, as well as the LGWM subject matter experts (SME), it was decided that items (c) to (f) would not be included as part of the assessment as they would not be significant differentiators for the assessment of different options at Golden Mile and using a cycling level of service assessment approach would be the most appropriate as it is quantitative and widely accepted.

Subsequently, discussions were held at the TAG meeting on 2 November and the meeting with LGWM SMEs on 9 November to confirm the methodology to be used for assessing the cycling level of service. The two main methodologies considered were the Trafitec Danish Roadway Segment Cycling LOS 2007 (a.k.a. the Danish method) and the method outlined in NZ Transport Agency research report 660 'Factors affecting cycling levels of service'. The recommendation from the members of the TAG and LGWM SMEs was to use the Danish method for the Golden Mile option assessment as it is also used by the LGWM City Streets programme. This approach will help maintain consistency across different programmes.

As part of developing the Danish method, the research found that the most important predictors of cyclists' satisfaction were the type and width of the facility, the size of buffer from the facility to traffic in the nearest lane and the distance from pedestrians. Cyclists were increasingly dissatisfied with rising volumes of traffic on the adjacent road segment and pedestrians in the space, higher numbers of parked vehicles along the route, bus stops interrupting the route and greater vehicle speeds.

Using the criteria outlined in the Danish method, the current layout (base model) on Golden Mile and the three short-listed options were assessed and assigned with the most appropriate cycling level of service scores. The entire Golden Mile was divided into four main sections for this assessment. They were Lambton Quay, Willis Street, Manners Street and Courtenay Place.

It was found during the assessment that 'Average Speed' had a significant influence on the performance rating using the Danish method. When it was assumed that all streets along Golden Mile would have an average operating speed of 30 km/h, for consistency with the generic speed limit in the wellington CBD, the level of service ratings for most sections achieved a 'Good'. When the average speeds were set over 40km/h, almost all ratings became "Poor'. Cycling level of service ratings showed meaningful differentiation when the average speed was set between 35-37 km/h.

There were other factors taken into account which were not part of the Danish method but were included in the evaluation such as position of bus stops (i.e. in-lane or indented bus bays), cycle access (e.g. cycle access on Manners Street between Taranaki Street and Lower Cuba Street). loading bays and taxi stands, and intersection treatments (including closing side streets).

Based on their relative improvement or deterioration in level of service compared to the base model, the three short-listed options were scored on a seven-point scale of -3 to 3.

3 Key Assumptions

The following key assumptions underpinned the cycling level of service evaluation of the short-listed options:

- For Option 1, some side streets are closed, which helps reduce the general traffic volume along the Golden Mile and turning movements at some intersections. The ability for cyclists to filter through will be allowed to ensure cycle connectivity.
- For Option 2, cyclists will be able to continue to ride on parts of Lambton Quay and Courtenay Place, side street closures help reduce the general traffic volume along the Golden Mile and turning movements at some intersections. Cyclists will be able to filter through side streets. Removal of general traffic will benefit cyclists.
- For Option 3, there is an opportunity to provide a protected cycle facility, side street closures improve the ability for cyclists to filter through and the removal of general traffic will benefit cyclists.
- It has been assumed that northbound cycle movements would continue to be permitted along Willis Street between Boulcott Street and Willeston Street across all three short-listed options. However, the short section of westbound lane on Manners Street between Taranaki Street and Lower Cuba Street would no longer accommodate cycle movements.

4 Assessment Results

A summary of the cycling level of service assessments for Lambton Quay, Willis Street, Manners Street and Courtenay Place are set out below in Tables 1, 2, 3 and 4 respectively.

4.1 Lambton Quay Options

Table 1: Lambton Quay Options

	Base Model	Option 1	Option 2	Option 3
Assessment Comments	Heavily used by northbound cyclists as there is no parallel northbound route on Featherston St and cycling LoS is poor along the quays.	Minor improvements as some side streets movements by motorised vehicles are being restricted. Removal of loading bays and taxi stands also provide improvement.	Minor improvements as the general traffic is being removed from this section of GM. Although cyclists will still mix with motorised vehicles (i.e. buses), the reduced volume of motorised vehicles will result in a slight improvement of cycling level of service.	Significant improvements for people on bikes as there is opportunity for seperated cycle facility to be provided.
Ratings		Slight Positive	Slight Positive	Large Positive
Scoring	0	1	1	3

4.2 Willis Street Options

Table 2: Willis Street Options

	Base Model	Option 1	Option 2	Option 3
Assessment Comments	No cycle provision for southbound cyclists. Northbound cyclists mix with general traffic in a low speed environment.	Still no cycle provision for southbound cyclists. Northbound cyclists continue to use general traffic lane.	Still no cycle provision for southbound cyclists. Northbound cyclists to use bus lane.	Still no cycle provision for southbound cyclists. Northbound cyclists continue to use general traffic lane. Removal of indented bus stops and marking of in-lane bus stops means people on bikes have limited space to pass stationary buses.
Ratings		Neutral	Neutral	Slight Negative
Scoring	0	0	0	-1

4.3 Manners Street Options

Table 3: Manners Street Options

	Base Model	Options 1, 2 & 3
Assessment Comments	No cycle provision apart from a short section between Taranaki St and Lower Cuba St.	No cycle provision on the entire Manners St. The short section of cycle provision between Taranaki St and Lower Cuba St is being removed.
Ratings		Slight Negative

Scoring	0	-1

4.4 Courtenay Place Options

Table 4: Courtenay Place Options

	Base Model	Option 1	Option 2	Option 3
Assessment Comments	No cycle facility but low speed environment means most commuter cyclists are able to use Courtenay Place without major barrier.	No dedicated cycle facility but improved cycle experience due to the removal of car parking, loading zones and taxi stands.	No dedicated cycle facility but improved cycle experience due to the removal of general traffic, car parking, loading zones and taxi stands.	Provision of protected cycle facility significantly improve the cycling level of service on Courtenay Place.
Ratings		Slight Positive	Slight Positive	Large Positive
Scoring	0	1	1	3

4.5 Summary of Results

Table 5: Summary of Scores

Lambton Quay			Willis Street			Manners Street	Courtenay Place		
Option 1	Option 2	Option 3	Option 1	Option 2	Option 3	All Options	Option 1	Option 2	Option 3
1	1	3	0	0	-1	-1	1	1	3

4.6 Loading Bays and Taxi Stands

If it is assumed that retaining either loading bays or taxi stands on the Golden Mile means that these vehicle types would be permitted to enter or exit the Golden Mile at Taranaki Street, Boulcott / Willis or Williston Streets then this will influence the design of these intersections.

For most sections along Golden Mile, the retention of loading bays and taxi stands will have a negative impact on the cycling level of service however the effect will not be significant enough to change the evaluated scores.

As there is an opportunity to provide a protected cycle facility (e.g. protected two-way cycleway) as part of Option 3, the level of service for people on bikes will be compromised if the service vehicles will be required to travel or manoeuvre on a short section of the cycleway at some sections of Lambton Quay and Courtenay Place.

4.7 Through Movements on Tory Street at Intersection with Courtenay Place

Allowing through movements by general traffic will have minimal impact on the cycling level of service at this location. Intersection treatments may be required but the improved cycling level of service along Courtenay Place can be maintained.


L
Sustainability Report
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0800 801 700

Memorandum

To	Selwyn Blackmore
Copy	Roger Burra
From	Rowan Dixon
Office	Auckland
Date	2 December 2020
File/Ref	5-c3880.03 - 00575
Subject	Sustainability Assessment of Golden Mile Options

The purpose of this memo is to summarise the Sustainability Assessment of the three Golden Mile Options.

The sustainability criteria to be assessed were collaboratively developed with Wellington City Council and drew on readily available sustainability policy, strategy and guidance; including but not limited to the below:

Wellington City Council

- Te Atakura – First to Zero
- Our Natural Capital – Wellington's Biodiversity Strategy & Action Plan
- Wellington Region Waste Management and Minimisation Plan

Greater Wellington Regional Council

- Supporting regional sustainability
- Sustainable homes
- Greater Wellington is committed to climate action
- Corporate Carbon Neutrality Action Plan

Waka Kotahi

- Toitū Te Taiao: Our Sustainability Action Plan
- Arataki: To Tātou Mahere Mō Te Pūnaha Waka Whenua / Our Plan For The Land Transport System

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Sustainability Criteria

Table 1: Assessment criteria

Criteria	Justification
Lower VKT in transport system	Indicated reduced used of private motor vehicles and internal combustion engines and reduced emissions, pollution and resource use
Extent and appeal of cycling	Indicates increased probability of mode shift for city center residents away from vehicle use and reduced emissions, pollution and resource use
Mode shift away from PMV	Direct measure of mode shift away from vehicle use and reduced emissions, pollution and resource use
Large scale physical works	Indicates reduced emissions, pollution, energy, waste generation and resource use (construction phase focus)
High opportunity for green infrastructure and vegetated street	Indicates increased probability of vegetated street scape, biodiversity improvements, improved water quality outcomes, and shaded cool places to retreat to on hot days
Sufficient area for pedestrian and active modes priority	Indicates increased probability of mode shift away from vehicle use and reduced emissions, pollution and resource use and potential increased greenspace and its benefits
Low Public Transport travel times	Indicates increased probability of mode shift away from vehicle use and reduced emissions, pollution and resource use
High opportunity for Tactical Urbanism	Indicates increased probability and multiplying factor for increased mode shift away from vehicle use and reduced emissions, pollution and resource use and increased greenspace and its benefits

Note that these criteria excluded flooding, inundation, and sea level rise climate risks as WCC consider that concurrent water related design works and expected streetscape redesign of the Golden Mile in the next 20-30 years will respond suitably to these stressors.

Input data

The following data was used to inform the collaborative scoring of the sustainability criteria with Wellington City Council.

- Golden Mile Short List Options Report (June 2020), Golden Mile Single Stage Business Case, Contract No. 1851 https://lgwm.nz/assets/Documents/Technical-Documents/Golden-Mile/Golden-Mile-Short-List-Report-June-2020.pdf
- Golden Mile: Engagement summary Report (June – August 2020) https://lgwm.nz/assets/Documents/Technical-Documents/Early-Interventions/Golden-Mile-engagement-report-June-August-2020.pdf
- Vehicle Kilometres Travelled (VKT) modelling results were unavailable, so the below information points were used to inform VKT criteria:
    - Current options ban traffic from the length of the Golden Mile which would mean people that continue to drive would need to drive further.
    - Expect 9% reduction in car trips which might result from a reduction in road capacity across all options.
    - It's not clear to what extent the 9% reduction offsets the increase from persistent driver driving further
- Cost and quantity estimates for key global quantities "SL Estimates DRAFT – V2 for BM.pdf"
- Conversations with members of Future Group's urban design and landscape architecture team.

Scoring system

Waka Kotahi's 7 point scoring system (below) was used to assess the sustainability criteria across the Golden Mile options.

Table 2: Scoring system

Score	Scoring Description	Definition
3	Large Positive	Major positive impacts resulting in substantial and long-term improvements or enhancements of the existing environment.
2	Medium Positive	Moderate positive impact, possibly of short-, medium- or long-term duration. Positive outcome may be in terms of new opportunities and outcomes of enhancement or improvement.
1	Slight Positive	Minimal positive impact, possibly only lasting over the short term. May be confined to a limited area.
0	Neutral	Neutral - no discernible or predicted positive or negative impact
-1	Slight Negative	Minimal negative impact, possibly only lasting over the short term, and definitely able to be managed or mitigated. May be confined to a small area.
-2	Medium Negative	Moderate negative impact. Impacts may be short, medium or long term and are highly likely to respond to management actions.

-3	Large Negative	Impacts with serious, long-term and possibly irreversible effect leading to serious damage, degradation or deterioration of the physical, economic, cultural or social environment. Required major rescope of concept, design, location and justification or requires major commitment to extensive management strategies to mitigate the effect.

Assessment outcome

The final sustainability assessment scores for each option is shown in Table 3 below. These scores were arrived at based on an on-balance assessment of the scores in the Assessment Matrix (Table 4 below) and in close collaboration with Wellington City Council. From this it was felt that option 3 offered major positive impacts from substantial enhancements and progress toward sustainable and low-carbon cities and neighbourhoods. It is possible that option 2 could offer greater than minimal benefits, but the information available at this stage did not convince the assessment that these benefits were moderate or that they led to new sustainability and low-carbon, low-traffic opportunities and outcomes that were compelling in the context of the climate and biodiversity emergency.

Table 3: Assessment outcome

	Lambton Quay			Willis St			Manners Mall	Courtenay Place		
Option	One	Two	Three	One	Two	Three	All	One	Two	Three
Score	1	1	3	1	1	3	0	1	1	3

Assessment matrix

Table 4: Assessment matrix

	Lambton Quay			Willis St			Manners Mall	Courtenay Place			Notes
Option	One	Two	Three	One	Two	Three	All	One	Two	Three	
Lower VKT in transport system	0	1	1	0	1	1	0	0	1	1	Assume VKT reduction and increase across options are approximately neutral Assume PMV street closures in options 2 & 3 reduce VKT slightly more and option 1.
Extent and appeal of cycling	1	1	3	1	1	3	0	1	1	3	Based on cycle lanes remaining in carriage way for options 1 and 2, but separated in option 3
Mode shift away from PMV	-	-	-	-	-	-	-	-	-	-	No material difference was detected in modelling
Large scale physical works	-1	-1	-1	-1	-1	-1	0	-1	-1	-1	Assuming that extent and staging of works in all options allow for Tactical Urbanism interventions to reduce the scale and delay the timing (and emissions) of works. Recognise that emissions can be managed and mitigated for much of the proposed work as there are low-carbon materials and construction methods available. However, this may influence costs.
High opportunity for green	1	1	3	1	1	3	0	1	1	3	Minimal improvement in option 1

	Lambton Quay			Willis St			Manners Mall	Courtenay Place			Notes
infrastructure and vegetated street											Increased improvement in option 2 with more space, but not much more. Significant improvement in and opportunity in option 3 for Water Sensitive Design and Green Infrastructure. Including the opportunity to integrate works with upgrade stormwater network and enhanced Water Sensitive Design and resilience.
Sufficient area for pedestrian priority	1	2	3	1	2	3	0	1	2	3	Minimal change in option 1 Slightly greater area in option 2, and likely to offer new opportunities and outcomes Significant benefit in option 3 and opportunity to reduce intensity of people and escape heat, and into the shaded breeze in centre of the street.
Low PT travel times	-	-	-	-	-	-	-	-	-	-	Not scored. Didn't feel confident with the information available. Considered the risk of double counting too high; given items existing weighting in the IOs and MCA.
High opportunity for Tactical Urbanism	1	2	3	1	2	3	0	1	2	3	Assuming space allocation and works provide for flexibility in use and priority. Minimal change and opportunity in option 1

	Lambton Quay			Willis St			Manners Mall	Courtenay Place			Notes
											Present in option 2 but limited focus on side streets and unlikely to expand from there. Present in option 3 and verily likely to expand as its scale facilitates a strategic and fundamental change

Fit with LGWM Programme Report

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Delivery, Operations and Maintenance Report

Memorandum

To	Selwyn Blackmore
Copy	Roger Burra
From	Sam Thornton
Office	Wellington
Date	14 January 2021
File/Ref	5-C3880.03
Subject	LGWM: Golden Mile MCA – delivery, maintenance and operations, timeframe for delivery and costs (DRAFT)

This memo outlines the process and assumptions used to derive the MCA scores for the delivery, maintenance and operations, timeframe for delivery and costs.

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1 Process

The process for this assessment has been in line with the *Golden Mile: Shortlist Option Evaluation Scope V2, 25 June 2020*.

The assessments are primarily qualitative based on engineering judgement.

1.1 TAG input

The assessments have been discussed with subject matter experts within the technical advisory group (TAG) as laid out in the table below.

Assessment criteria	Future group MCA Assessor	LGWM TAG Member
Delivery	Sam Thornton	Stephen Harte
Operations and Maintenance[1]	Sam Thornton	Kylie Hook (WCC)
Timeframe for Delivery	Sam Thornton	Eddie Anand (LGWM)
Costs	Sam Thornton	Eddie Anand (LGWM)

1.2 Sub criteria

The scope documented above suggested the possible assessment considerations:

Assessment criteria	Assessment considerations
Delivery	• expected duration of delivery • effect on pedestrians during delivery • effect on bus operations during delivery • effect on retail – during construction • effect on access to and servicing[2] of private building (i.e. deliveries, removals, building maintenance) – during construction
Operations and Maintenance	• effect on public operational costs (maintenance, refuse collection, street cleansing, landscape maintenance) • effect on ability to accommodate utilities and services repairs and renewals • effect on ability to re-route bus services due to major planned and unplanned events • effect on ability for buses to pass a broken-down vehicle • effect on ability to accommodate marches and events • effect on the flexibility of future corridor use (movement and place)[3] • effect on emergency services response times / effectiveness • qualitative assessment of effect on operational cost
Timeframe for Delivery	• ability to demonstrate tangible improvements (outputs) within the 2018-21 / 2021-24 period • ability to demonstrate tangible improvements (benefits) within the 2018-21 / 2021-24 period
Costs	• n/a

[1] GWRC were contacted but did not take the opportunity to provide input
[2] consider no. and location of loading bays
[3] i.e. degree to which constraints on long-term corridor re-configuration are minimised

The following sub-criteria have been identified (based on above).

Assessment criteria	Sub-criteria
Delivery	• Pedestrian impacts during construction • Bus impacts during construction • Retail impacts during construction • Building servicing impacts during construction • Traffic impacts during construction
Operations and Maintenance	• Maintenance costs • Maintenance access • Utilities access • Bus ability to pass broken down vehicle • Bus diversion routes • Public events • Emergency services
Timeframe for Delivery	• n/a
Costs	• n/a

1.3 Scoring

Scoring is based on a seven-point scale as shown below. Generally, the scoring for the delivery and maintenance and operations criteria re negative.

Score	Scoring Description
+3	Large Positive
+2	Medium Positive
+1	Slight Positive
0	Neutral
-1	Slight Negative
-2	Medium Negative
-3	Large Negative

1.4 Staging

Staging has not been explicitly addressed due to the complexities of considering multiple permutations for different sections of the corridor. Once the preferred option is identified, it will be possible to work out the most appropriate way for it to be implemented gradually (if desired). All options can be staged if needed.

2 Options

Three core options have been considered for each of the four project areas as outline below (with sub-options to Option 3 in some locations).

Section	Option
Lambton Quay	Do Minimum
	Option 1
	Option 2
	Option 3
Willis Street	Do Minimum
	Option 1
	Option 2
	Option 3
	Option 3C
Manners Street	Do Minimum
	Option 1
	Option 2
	Option 3
Courtenay Place	Do Minimum
	Option 1
	Option 2
	Option 3
	Option 3A
	Option 3B

The options are based on Appendix E pf the following document
https://lgwm.nz/assets/Documents/Technical-Documents/Golden-Mile/Golden-Mile-Short-List-Report-June-2020.pdf

3 Delivery Criteria

3.1 Key assumptions

The following construction time-frames have been assumed:

Section	Option 1	Option 2	Option 3
Lambton Quay	6-9 months	9-15 months	12-18 months
Willis Street	< 3 months	< 3 months	3-6 months
Manners Street	< 3 months	< 3 months	3-6 months
Courtenay Place	3-6 months	3-6 months	6-12 months

These timeframes are based on assuming the work is not staged, and could be shorter or longer depending on several factors:

- Available resources; (both at an industry level and from the Contractor, e.g. number of crews);
- Available working hours (restrictions around bus / business and noise disruption);
- Wider network and programme coordination;
- Desire for trials or proof of concept; and
- Level of project staging needed.

Impacts on utilities have not been considered in detail. In general, it is expected that the impacts on existing utilities will be minimal except in areas where new drainage provision is required (strip drains, sumps and lateral connectors). Limited areas of new road pavement are expected and therefore significant levels of excavation are not expected. There is currently insufficient detail to determine the potential impact of the options on specific utilities.

3.2 Raw scores and specific assumptions

Section	Option	Pedestrian impacts during construction	Bus impacts during construction	Retail impacts during construction	Building servicing impacts during construction	Traffic impacts during construction
Lambton Quay	Do Minimum	0	0	0	0	0
	Option 1	-1	-1	-2	-2	-2
		Minor footpath works along entire length (footpath narrowed), more significant changes at side roads	Lane closures to construct footpath works (reducing capacity) and temporary bus stops while stops being upgraded / relocated	Footpaths narrowed along entire length (staged), no significant hoardings expected	Loading zones relocated to side roads as part of enabling works, narrow footpaths restrict use of large trolleys etc	No through traffic
	Option 2	-1	-1	-2	-2	-1
		Same as Option 1	Same as Option 1	Same as Option 1	Same as Option 1	Changes to ban through traffic undertaken as part of enabling works
	Option 3	-2	-2	-3	-2	-1
		Major footpath works along entire length (footpath narrowed and some diversions)	One lane in each direction (reducing capacity) and temporary bus stops while stops being upgraded / relocated	Footpaths narrowed and hoardings screening businesses along entire length (staged)	Same as Option 1	Same as Option 2
Willis Street	Do Minimum	0	0	0	0	0
	Option 1	-1	-1	-1	-1	-3

Section	Option	Pedestrian impacts during construction	Bus impacts during construction	Retail impacts during construction	Building servicing impacts during construction	Traffic impacts during construction
		Minor footpath works in isolated locations (footpath narrowed), Minor diversion required at end of Mercer	Narrow lanes during footpath / new bus stop works	Isolated footpath narrowing, no significant hoardings expected	Loading zones relocated to side roads as part of enabling works, narrow footpaths restrict use of large trolleys etc	No through traffic
	Option 2	-1	-1	-1	-1	-1
		Same as Option 1	Same as Option 1	Same as Option 1	Same as Option 1	Changes to ban through traffic undertaken as part of enabling works
	Option 3	-2	-2	-2	-1	-1
		Major footpath works along entire length (one-side) (footpath narrowed)	Narrow lanes during footpath works, temporary bus stop required while stop being upgraded	Footpaths narrowed along entire length (staged), no significant hoardings expected	Same as Option 1	Same as Option 2
	Option 3C	-2	-2	-2	-1	-1
		Same as Option 3	Same as Option 3	Same as Option 3	Same as Option 3	Same as Option 3
Manners Street	Do Minimum	0	0	0	0	0
	Option 1	-1	-2	-1	-1	-1
		Minor footpath works in isolated location (footpath narrowed), Minor diversion required at end of Cuba	Narrow lanes during footpath works, temporary bus stop required while stop being upgraded	Isolated footpath narrowing, no significant hoardings expected	Loading zones relocated to side roads as part of enabling works, narrow footpaths	No through traffic

Section	Option	Pedestrian impacts during construction	Bus impacts during construction	Retail impacts during construction	Building servicing impacts during construction	Traffic impacts during construction
					restrict use of large trolleys etc	
	Option 2	-1	-2	-1	-1	-1
		Same as Option 1	Same as Option 1	Same as Option 1	Same as Option 1	Changes to ban through traffic undertaken as part of enabling works
	Option 3	-1	-2	-1	-1	-1
		Same as Option 1	Same as Option 1	Same as Option 1	Same as Option 1	Same as Option 2
Courtenay Place	Do Minimum	0	0	0	0	0
	Option 1	-1	-1	-1	-1	-2
		Minor footpath works along entire length (footpath narrowed), more significant changes at end of Allen and Blair, in CP plaza and opposite CP plaza (diversions)	Lane closures to construct footpath works (reducing capacity) and temporary bus stops while stops being upgraded / relocated	Footpaths narrowed along entire length (staged), hoardings around more significant changes at end of Allen and Blair, in CP plaza and opposite CP plaza screening businesses	Loading zones relocated to side roads as part of enabling works, narrow footpaths restrict use of large trolleys etc	Courtenay Place banned to through traffic
	Option 2	-1	-1	-1	-1	-2
		Same as Option 1	Same as Option 1	Same as Option 1	Same as Option 1	Changes to ban through traffic undertaken as part of enabling works
	Option 3	-2	-2	-3	-1	-1

Section	Option	Pedestrian impacts during construction	Bus impacts during construction	Retail impacts during construction	Building servicing impacts during construction	Traffic impacts during construction
		Major footpath works along entire length (footpath narrowed and some diversions)	One lane in each direction (reducing capacity) and temporary bus stops while stops being upgraded / relocated	Footpaths narrowed and hoardings screening businesses along entire length (staged)	Same as Option 1	Same as Option 2
	Option 3A	-2	-2	-3	-1	-1
		Same as Option 3	Same as Option 3	Same as Option 3	Same as Option 3	Same as Option 3
	Option 3B	-2	-2	-3	-1	-1
		Same as Option 3	Same as Option 3	Same as Option 3	Same as Option 3	Same as Option 3

3.3 Weighting scenarios

The following weighting scenarios have been considered.

Weighting scenario	Pedestrian impacts during construction	Bus impacts during construction	Retail impacts during construction	Building servicing impacts during construction	Traffic impacts during construction
Average	20%	20%	20%	20%	20%
Sustainable Transport Focus	30%	30%	13%	13%	13%
Business Impact Focus	13%	13%	30%	30%	13%

3.4 Weighted scores and overall score

The following shows the raw scores, the weighted scores and the overall score.

Section	Option	Raw Scores					Weighting scenarios			Overall Rating
		Pedestrian impacts during construction	Bus impacts during construction	Retail impacts during construction	Building servicing impacts during construction	Traffic impacts during construction	Average	Sustainable Transport Focus	Business Impact Focus	
Lambton Quay	Do Minimum	0	0	0	0	0	0	0	0	0
	Option 1	-1	-1	-2	-2	-2	-1.6	-1.4	-1.7	-1
	Option 2	-1	-1	-2	-2	-1	-1.4	-1.3	-1.6	-1
	Option 3	-2	-2	-3	-2	-1	-2.0	-2.0	-2.2	-2
Willis Street	Do Minimum	0	0	0	0	0	0	0	0	0
	Option 1	-1	-1	-1	-1	-3	-1.4	-1.3	-1.3	-1
	Option 2	-1	-1	-1	-1	-1	-1.0	-1.0	-1.0	-1
	Option 3	-2	-2	-2	-1	-1	-1.6	-1.7	-1.6	-2
	Option 3C	-2	-2	-2	-1	-1	-1.6	-1.7	-1.6	-2
Manners Street	Do Minimum	0	0	0	0	0	0	0	0	0
	Option 1	-1	-2	-1	-1	-1	-1.2	-1.3	-1.1	-1
	Option 2	-1	-2	-1	-1	-1	-1.2	-1.3	-1.1	-1
	Option 3	-1	-2	-1	-1	-1	-1.2	-1.3	-1.1	-1
Courtenay Place	Do Minimum	0	0	0	0	0	0	0	0	0
	Option 1	-1	-1	-1	-1	-2	-1.2	-1.1	-1.1	-1

Section	Option	Raw Scores					Weighting scenarios			Overall Rating
		Pedestrian impacts during construction	Bus impacts during construction	Retail impacts during construction	Building servicing impacts during construction	Traffic impacts during construction	Average	Sustainable Transport Focus	Business Impact Focus	
	Option 2	-1	-1	-1	-1	-1	-1.0	-1.0	-1.0	-1
	Option 3	-2	-2	-3	-1	-1	-1.8	-1.9	-1.9	-2
	Option 3A	-2	-2	-3	-1	-1	-1.8	-1.9	-1.9	-2
	Option 3B						-1.8	-1.9	-1.9	-2

3.5 Comments

The following aspects have been commented on below.

Aspect	Comment
Loading bay retention	Reduces construction impacts for Options 1 and 2 if remain in same location – construction effort for Option 3 would remain the same – no change in score expected
Loading bay and taxi bay retention	Reduces construction impacts for Options 1 and 2 if remain in same location – construction effort for Option 3 would remain the same – no change in score expected
Tory Street through movement	Potential minor reduction in construction impacts if cul-de-sac treatments not required (Option 3) – no change in score expected

4 Operations and Maintenance Criteria

4.1 Key assumptions

The following key assumptions are noted.

<table>
<tr><th>Section</th><th>Bus diversion routes</th><th>Public events</th><th>Emergency services</th></tr>
<tr><td>Lambton Quay</td><td rowspan="3">Current diversion route is between Taranaki and Whitmore via the Quays.

If closure excludes Lambton Quay then northbound buses can use Willeston Street.</td><td>LQ used for parades (Parliament to Civic Square), protests (Civic Square to Parliament) and Very Welly Christmas.</td><td rowspan="4">Don't travel wrong way down one-way streets</td></tr>
<tr><td>Willis Street</td><td>WS used for parades (Parliament to Civic Square), protests (Civic Square to Parliament) and Very Welly Christmas.</td></tr>
<tr><td>Manners Street</td><td>n/a</td></tr>
<tr><td>Courtenay Place</td><td>Northbound Bus diversion is between Wakefield and Whitmore via the Quays.

Alternate diversion route is between Willis / Victoria and the Basin Reserve (via SH1, Taranaki and Ghuznee)</td><td>CP used for Chinese New Year and Pride marches.</td></tr>
</table>

Another general assumption is that footpath areas are costlier to maintain than road carriageway and footpaths (paved) also have a shorter asset life. Alternative footpath area surfacing could have an impact on the scoring, however, current costings do not allow for a full route replacement.

4.2 Raw scores and specific assumptions

For the maintenance scores the full range of scores (0 to -3) has been used to differentiate between the options. However, the options that score that -3 are not necessarily significantly negative.

Section	Option	Maintenance costs	Maintenance access	Utilities access	Bus ability to pass broken down vehicle	Bus diversion routes	Public events	Emergency services
Lambton Quay	Do Minimum	0	0	0	0	0	0	0
	Option 1	-1	-1	0	0	0	0	-1
		Small increase in footpath area	Reduced access to some side streets	As per do min	As per do min	As per do min	As per do min	Reduced access to side streets
	Option 2	-2	-2	0	0	0	0	-1
		Moderate increase in footpath area	Reduced access to all side streets	As per do min	As per do min	As per do min	As per do min	Reduced access to side streets
	Option 3	-3	-3	-2	-2	0	0	-2
		Significant increase in footpath area	Reduced access to side streets and reduced carriageway on Lambton Quay for maintenance vehicles	Reduced carriageway space for plant and equipment, increased areas of footpath which result in increased reinstatement costs	Reduced ability due to reduction to one lane	As per do min	As per do min	Reduced access to side streets and reduced carriageway on Lambton Quay for emergency vehicles
Willis Street	Do Minimum	0	0	0	0	0	0	0
	Option 1	-1	-1	0	0	0	0	-1
		Small increase in footpath area	Reduced access to side streets	As per do min	As per do min	As per do min	As per do min	Reduced access to Mercer Street

Section	Option	Maintenance costs	Maintenance access	Utilities access	Bus ability to pass broken down vehicle	Bus diversion routes	Public events	Emergency services
	Option 2	-1	-1	0	0	0	0	-1
		Small increase in footpath area	Reduced access to side streets	As per do min	As per do min	As per do min	As per do min	Reduced access to Mercer Street
	Option 3	-1	-2	-1	-1	0	0	-2
		Small increase in footpath area	Reduced access to side streets and reduced carriageway on Willis Street for maintenance vehicles	Reduced carriageway space for plant and equipment, increased areas of footpath which result in increased reinstatement costs	Reduced ability at south end of Willis Street where third lane removed	As per do min	As per do min	Reduced access to Mercer Street and reduced carriageway on Willis Street for emergency vehicles
	Option 3C	-1	-2	-1	-1	0	0	-2
		Small increase in footpath area	Reduced access to side streets, separated cycle facility have increased maintenance requirements	Same as Option 2	Reduced ability at south end of Willis Street where third lane removed	Same as Option 3	Same as Option 3	Same as Option 3
Manners Street	Do Minimum	0	0	0	0	0	0	0
	Option 1	-1	-1	0	-1	0	0	-1
		Small increase in footpath area	Reduced access to Cuba Street	As per do min	Reduced ability where right turn into Cuba Street removed	As per do min	As per do min	Reduced access to Cuba Street
	Option 2	-1	-1	0	-1	0	0	-1

Section	Option	Maintenance costs	Maintenance access	Utilities access	Bus ability to pass broken down vehicle	Bus diversion routes	Public events	Emergency services
		Small increase in footpath area	Reduced access to Cuba Street	As per do min	Reduced ability where right turn into Cuba Street removed	As per do min	As per do min	Reduced access to Cuba Street
	Option 3	-1	-1	0	-1	0	0	-1
		Small increase in footpath area	Reduced access to Cuba Street	As per do min	Reduced ability where right turn into Cuba Street removed	As per do min	As per do min	Reduced access to Cuba Street
Courtenay Place	Do Minimum	0	0	0	0	0	0	0
	Option 1	-1	-1	0	0	0	0	-1
		Small increase in footpath area	Reduced access to some side streets	As per do min	As per do min	As per do min	As per do min	Reduced access to side streets
	Option 2	-2	-2	0	0	0	0	-1
		Moderate increase in footpath area	Reduced access to all side streets	As per do min	As per do min	As per do min	As per do min	Reduced access to side streets
	Option 3	-3	-3	-2	-2	0	0	-2
		Significant increase in footpath area	Reduced access to side streets and reduced carriageway on Courtenay Place for maintenance vehicles	Reduced carriageway space for plant and equipment, increased areas of footpath which result in increased reinstatement costs	Reduced ability due to reduction to one lane	As per do min	As per do min	Reduced access to side streets and reduced carriageway on Courtenay Place for emergency vehicles
	Option 3A	-3	-3	-2	-2	0	0	-2

Section	Option	Maintenance costs	Maintenance access	Utilities access	Bus ability to pass broken down vehicle	Bus diversion routes	Public events	Emergency services
		Significant increase in footpath area	Same as Option 3	Same as Option 3	Reduced ability due to reduction to one lane	Same as Option 3	Same as Option 3	Same as Option 3
	Option 3B	-3	-3	-2	-2	0	0	-2
		Significant increase in footpath area	Same as Option 3	Same as Option 3	Reduced ability due to reduction to one lane	Same as Option 3	Same as Option 3	Same as Option 3

4.3 Weighting scenarios

The following weighting scenarios have been considered.

Weighting scenario	Maintenance costs	Maintenance access	Utilities access	Bus ability to pass broken down vehicle	Bus diversion routes	Public events	Emergency services
Average	14%	14%	14%	14%	14%	14%	14%
Bus operations focus	0%	0%	0%	50%	50%	0%	0%
Maintenance focus	25%	25%	25%	6%	6%	6%	6%
Public event focus	6%	6%	6%	6%	35%	35%	6%
Emergency focus	8%	8%	8%	8%	8%	8%	50%

4.4 Weighted scores and overall score

The following shows the raw scores, the weighted scores and the overall score. For the overall rating the full range of scores (0 to -3) has been used to differentiate between the options. However, the options that score that -3 are not necessarily significantly negative.

Section	Option	Raw Scores							Weighting scenarios					Overall Rating
		Maintenance costs	Maintenance access	Utilities access	Bus ability to pass broken	Bus diversion routes	Public events	Emergency services	Average	Bus focus	Maintenance focus	Public event focus	Emergency focus	
Lambton Quay	Do Minimum	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Option 1	-1	-1	0	0	0	0	-1	-0.4	0.0	-0.6	-0.2	-0.7	-1

Section	Option	Raw Scores							Weighting scenarios					Overall Rating
		Maintenance costs	Maintenance access	Utilities access	Bus ability to pass broken	Bus diversion routes	Public events	Emergency services	Average	Bus focus	Maintenance focus	Public event focus	Emergency focus	
	Option 2	-2	-1	0	0	0	0	-1	-0.7	0.0	-1.1	-0.3	-0.8	-2
	Option 3	-3	-2	-2	-2	0	0	-2	-1.7	-1.0	-2.3	-0.7	-1.8	-3
Willis Street	Do Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0
	Option 1	-1	-1	0	0	0	0	-1	-0.4	0.0	-0.6	-0.2	-0.7	-1
	Option 2	-1	-1	0	0	0	0	-1	-0.4	0.0	-0.6	-0.2	-0.7	-1
	Option 3	-1	-2	-1	-1	0	0	-2	-1.0	-0.5	-1.2	-0.4	-1.4	-2
	Option 3C	-1	-2	-1	-1	0	0	-2	-1.0	-0.5	-1.2	-0.4	-1.4	-2
Manners Street	Do Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0
	Option 1	-1	-1	0	-1	0	0	-1	-0.6	-0.5	-0.6	-0.2	-0.8	-1
	Option 2	-1	-1	0	-1	0	0	-1	-0.6	-0.5	-0.6	-0.2	-0.8	-1
	Option 3	-1	-1	0	-1	0	0	-1	-0.6	-0.5	-0.6	-0.2	-0.8	-1
	Do Minimum	0	0	0	0	0	0	0	0	0	0	0	0	0

Section	Option	Raw Scores							Weighting scenarios					Overall Rating
		Maintenance costs	Maintenance access	Utilities access	Bus ability to pass broken	Bus diversion routes	Public events	Emergency services	Average	Bus focus	Maintenance focus	Public event focus	Emergency focus	
Courtenay Place	Option 1	-1	-1	0	0	0	0	-1	-0.4	0.0	-0.6	-0.2	-0.7	-1
	Option 2	-2	-1	0	0	0	0	-1	-0.7	0.0	-1.1	-0.3	-0.8	-2
	Option 3	-3	-2	-2	-2	0	0	-2	-1.7	-1.0	-2.3	-0.7	-1.8	-3
	Option 3A	-3	-2	-2	-2	0	0	-2	-1.7	-1.0	-2.3	-0.7	-1.8	-3
	Option 3B	-3	-2	-2	-2	0	0	-2	-1.7	-1.0	-2.3	-0.7	-1.8	-3

4.5 Comments

The following aspects have been commented on below.

Aspect	Comment
Loading bay retention	Minor improvement for maintenance access (as provides a parking location – no change in score expected). Enforcement challenges with access.
Loading bay and taxi bay retention	Minor improvement for maintenance access (as provides a parking location – no change in score expected). Enforcement challenges with access.

Tory Street through movement	Minor improvement for number of sub-aspects (as provides improved access – no change in score expected).

5 Timeframe for delivery criteria

The time-frame for delivery of the Golden Mile improvements will be subject to coordination and sequencing with wider the LGWM programme. Factors that might influence these timeframes include (but are not limited too):

- Engagement on other parts of the programme;
- Available funding;
- Programme aspects required to ease the impact of the construction activities on the Golden Mile (for example a second bus spine).

In isolation from the wider programme, it is expected that there will be little to differentiate between the options from a time-frame perspective which is reflected in the scores below.

5.1 Key assumptions

The following key assumptions are noted:

- SSBC complete July 2021;
- Detailed design complete / construction begins July 2022;
- Construction complete by July 2024; and
- Construction time-frames are not a significant differentiator between options

5.2 Overall score

The following shows the overall score.

Section	Option	Overall Rating	Comment
Lambton Quay	Do Minimum	0	Complete within desired time-period No significant differentiators between options
	Option 1	+2	
	Option 2	+2	
	Option 3	+2	
Willis Street	Do Minimum	0	
	Option 1	+2	
	Option 2	+2	
	Option 3	+2	
	Option 3C	+2	
Manners Street	Do Minimum	0	
	Option 1	+2	
	Option 2	+2	
	Option 3	+2	
Courtenay Place	Do Minimum	0	
	Option 1	+2	
	Option 2	+2	
	Option 3	+2	
	Option 3A	+2	
	Option 3B	+2	

5.3 Comments

The following aspects have been commented on below.

Aspect	Comment
Loading bay retention	No change in score expected.
Loading bay and taxi bay retention	No change in score expected.
Tory Street through movement	No change in score expected.

6 Costs

The costs and methodology are summarised in the Short List Options – Indicative Cost Estimate (21 May 2020) which is appended to the short list options report.

6.1 Key assumptions

Following costs have been excluded:

- Operational and maintenance costs
- Costs associated with wider network improvements to address traffic redistribution
- Quantities based on sketches provided in cost memo.

6.2 Cost summary

Scores have not been provided for the costs, the cost ranges are summarised below.

6.3 Comments

The following aspects have been commented on below.

Aspect	Comment
Loading bay retention	Potential minor cost savings for Option 1 and 2 if remain in same location
Loading bay and taxi bay retention	Potential minor cost savings for Option 1 and 2 if remain in same location
Tory Street through movement	Cost saving if cul-de-sac treatments not required


Economics Report

Economic Assessment for Short List Multi-Criteria Analysis

Report

Prepared for: Let's Get Wellington Moving, Golden Mile Single Stage Business Case

Prepared by: MRCagney (NZ) Ltd, Auckland, New Zealand

Document Information

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Quality Assurance Register

Issue	Description	Prepared by	Reviewed by	Authorised by	Date
1	Draft Report for discussion	DG		DG	4 Dec 2020
2	Final Report for MCA	DG	CJ	DG	26 Jan 2021

Contents

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Glossary

Term	Meaning
ADT	Average Daily Traffic count
HCV	Heavy Commercial Vehicle
MBCM	Monetised Benefits and Costs Manual (Waka Kotahi, 2020)
MRT	Mass Rapid Transit project, part of Let's Get Wellington Moving programme
WAU	Wellington Analytics Unit
WPTM	Wellington Public Transport Model

Executive Summary

This report describes the methodology and initial results of the economic assessment of each of the short list options for the Golden Mile. The streams of benefits assessed include road user benefits, public transport benefits and pedestrian benefits. Standard assumptions from the Monetised Benefits and Costs Manual (MBCM) are applied, including a 4% discount rate, 40-year evaluation period, 2019 values of time, and an evaluation year of 2021.

Due to the stage of this assessment, being an initial economic assessment for the short list MCA, with uncertain data and inputs, there are a number of limitations in the analysis at this stage. Some key caveats around the current results of the economic assessment are:

- Costs have only been estimated to a high level, and do not include any maintenance or renewal costs.
- Heavy commercial vehicle (HCV) impacts are not currently estimated.
- Benefits and disbenefits in the offpeak (i.e. evening) and weekends are not currently estimated.
- Mode shift due to the interventions is only estimated at a high level for the road user impacts.
- Public transport travel times do not include congestion impacts from vehicles or other buses, nor do they include variability in dwell times at stops.
- Pedestrian benefits are estimated with interim guidance from Waka Kotahi, and as such some sensitivity tests are included that have a material effect on the scale of pedestrian benefits estimated.

With that in mind, a range of results based on some core assumptions and sensitivity tests are presented here, noting that the final economic assessment is likely to differ from this.

Table 1: Present value of economic costs and benefits

Benefits and costs	**Option 1 ($millions)**	**Option 2 ($millions)**	**Option 3 ($millions)**
Construction costs (present value)	**$14 - $20**	**$19 - $29**	**$47 - $72**
Car travel time impact	-$6.2 - $4.8	-$79 - $37	-$79 - $37
Public transport travel time benefit	$18 - $24	$26 - $34	$23 - $30
Public transport reliability benefit	$4.7 - $6.1	$9.1 - $12	$9.1 - $12
Pedestrian realm benefits	$11 - $17	$81 - $128	$122 - $407
Pedestrian travel time benefits	$3.1 - $4.9	$5.8 - $9.4	$13 - $20
Total benefit	**$31 – $57**	**$42 - $219**	**$87 - $505**
Benefit-cost ratio	**1.6 – 4.2**	**1.5 – 12**	**1.2 - 11**

The car travel time impact and pedestrian realm benefits each have a significant range of estimated benefits. The reasons for these are:

- Car travel time impacts: for each option a range is reported from a strong disbenefit to a more moderate positive benefit. These are from two different sets of AIMSUN models:
    i. Fixed Demand Model: the initial AIMSUN models had fixed demand assumptions across all options (i.e. despite the reduction in vehicle capacity of the city centre, the vehicle demand was constant and no reduction in vehicle trips was assumed). This is a 'worst case' estimate of traffic impacts, as it assumes no travel behaviour response to the interventions.
    ii. Elasticity Model: an elasticity was applied to the results from the Fixed Demand Model to estimate the potential reduction in origin-destination trips that would result from the reduced vehicle capacity in the city centre. These new trip demands were run through AIMSUN to get these results. This can be considered an 'upper limit' of expected traffic impacts, as the elasticity approach should be applied iteratively to converge on a set of likely demands.
- Pedestrian realm benefits: the cause of the range in uncertainty around the magnitude of these benefits is caused by several factors, mainly:
    - Whether or not the footpath widening benefit is included
    - Whether the 'willingness to pay' values from the interim guidance or from the supplementary New Zealand Survey are used
    - Whether the average value of time is derived from the proportional trip purposes in the interim guidance or in the MBCM.

Ideally for the preferred option economics, the AIMSUN elasticity approach should be iterated further, the pedestrian realm benefit assumptions should be refined and agreed, and other impacts that have been excluded due to uncertainty of their inputs should be further explored to be included (this includes refining pedestrian demand estimates and investigating heavy commercial vehicle impacts in AIMSUN).

1 Introduction

The purpose of this report is to describe the methodology and results for the initial economic assessment for the short list MCA for the Let's Get Wellington Moving (LGWM) Golden Mile Single Stage Business Case (SSBC). There are a number of uncertainties in the inputs to this assessment that are being reviewed and are expected to be refined and updated for the final report.

This assessment will provide initial estimates of benefits and costs for each of the short list options, including a range of sensitivity tests to assist with decision making on the short list options. For this MCA assessment, some assumptions are made that are not expected to differentiate between the options, but that will affect the final economic assessment of the preferred option. These assumptions will be refined and updated for that final more detailed economic assessment.

The three options being assessed are described in detail in the *Short List Assessment Report* and are:

- Option 1, Reduced Traffic: retains traffic along the Golden Mile, albeit reduced compared to the current conditions.
- Option 2, Bus Emphasis: removes traffic from the Golden Mile, prioritising space for bus movements.
- Option 3, Bus + Pedestrian Emphasis: removes traffic from the Golden Mile, providing some space for buses but prioritising space for pedestrians.

2 Economic data and inputs

Each of the options provides different treatments for the pedestrian environment, public transport conditions, and traffic configurations. General economic inputs and assumptions are detailed below, whilst specific data or assumptions for each benefit are detailed in the relevant methodology section later.

- Evaluation period of 40 years and discount rate of 4%.[1]
- Evaluation year is the year ended June 2021.
- Benefit values for 2019 are used:[2]
- Current demands are sourced differently for each mode and is described in the methodology sections.
    - Public transport and pedestrian demands are fixed across all options (i.e. no mode shift towards these modes is assumed, despite the improvements in the options).
    - Vehicle demands are tested with a range, from 'fixed demand' assuming no mode shift, to an elasticity-adjusted demand that estimates mode shift away from vehicles based on the estimated increase in travel times in the 'fixed demand' modelling. A detailed file note on this is available upon request.
    - Growth in demands for each mode from 2016 to 2036 are collected from WTSM models as per the *Golden Mile – Do Minimum Scenario Description*.
- Annualisation factors differ by mode and are described in the methodology sections.

[1] These are the default assumptions in the MBCM. The LGWM Mass Rapid Transit (MRT) project is like to be operational about 10 years after Golden Mile and may reduce some public transport demand for Golden Mile. However, the Golden Mile improvements are included in the do minimum scenario for MRT, so the impacts MRT has should be captured by that business case.
[2] The latest update factors for the MBCM values at the time of writing were for 2019.

3 Costs

Cost estimates for each option were developed for the short list report[3] and are the latest available cost estimates. Costs for physical works, professional services and client managed costs are included. No costs have been estimated for maintenance, operations or renewal; however, these would not be expected to be a differentiator in the economics. Table 2 shows the lower and upper bounds of estimated costs for each of the options.

Table 2: Range of cost estimates for each option

Option	Lower cost estimate	Upper cost estimate
Option 1	$15,000,000	$22,000,000
Option 2	$21,000,000	$32,000,000
Option 3	$52,000,000	$79,000,000

Construction duration for each option is estimated to range from 6-18 months depending on the option and street section being considered. As per the assumptions in the costing workstream, it is assumed that construction occurs over 2-years (August 2022 – July 2024), with benefits first being realised in the July 2025 financial year.

[3] Cost estimates and related assumptions were provided by WSP.

4 Benefits

This section describes the transport benefits that have been estimated for each short list option; these are summarised in Table 3.

Table 3: Summary of benefits estimated

Impact	Description
Road user travel time impact	The road user travel time impact relates to the value of changes in vehicle travel times for car users. A range of benefits is estimated that considers some possible mode shift impacts.
Public transport travel time benefits	The public transport travel time benefit estimates the value of travel time savings to public transport users along the Golden Mile.
Public transport reliability benefits	The public transport reliability benefit estimates the value of improved reliability for public transport users along the Golden Mile due largely to signal timing changes. Note that this does not include travel time variability caused by vehicle or bus congestion or dwell times.
Pedestrian travel time benefits	Travel time benefits for pedestrians come from removing signalised crossings of side streets ***along*** the corridor. Impacts of changes to signal timings where all side streets are kept opened is not measured. Signalised crossings (e.g. mid-block crossings) ***across*** the corridor are not measured due to uncertain demands for crossing across the corridor at signalised crossings.
Pedestrian realm benefits	Improvements to the pedestrian environment, such as adding street trees and plantings, also provide benefits to pedestrians and attract more pedestrians than streets without such features.

4.1 Road user impacts

Road user benefits were previously estimated using AIMSUN model results for the indicative economic assessment. The AIMSUN models have since been refined to better reflect the short list options and were rerun to better understand the road user impacts of the short list options. Only two AIMSUN models were run, as the short list options 2 and 3 are operationally the same for private vehicles on the road network.

4.1.1 Data and assumptions

Inputs for the road user impacts include:

- Vehicle demands and travel times from AIMSUN modelling:
  - The spatial extent of the model covers the whole city centre.
  - Impacts on private vehicles are included, but on HCVs are excluded as the model results for HCVs did not seem realistic based on the expected impacts.[4]

[4] This should be investigated by WAU for inclusion in the preferred option economics.

- o The two-hour period extract from AIMSUN for the city centre is factored up by 1.6[5] to reflect the 4-hour 'model period', from which annualisation factors are applied.
- o The model results are *not* factored up to include offpeak or weekend impacts, for consistency with the other benefit streams currently assessed (and while weekend factors are being refined).

- Two 'edge' scenarios have been assessed: the first assumes no mode shift away from vehicle travel despite private vehicle restrictions in the options, while the second tests one iteration of a demand-elasticity approach to estimate the mode shift away from vehicles due to the vehicle restrictions in the options. A more detailed file note on this approach is available upon request.
- Annualisation factors have been inherited from WAU to ensure consistency with other projects in Wellington and are described in Appendix A.
- Values of time have been inherited from WAU and updated to 2019 dollars to ensure consistency with other transport projects in Wellington.

Table 4: Value of time for different purposes (italicised values are not currently assessed)

Period	Value of time (2019$/hour)
AM	$18.85
IP	$19.53
PM	$22.67
Offpeak	*$14.52*
Weekend	*$19.65*
HCV (1)	*$36.01*

Notes:

(1) Value of time for HCV vehicles is constant for all periods/times of the day

4.1.2 Methodology

Two rounds of AIMSUN modelling were completed, and the road user impacts for each of these rounds was estimated to provide a range for the expected road user impacts. The two modelled rounds were:

1. Fixed demand model: this tested the network changes of the options with the same demand as the do minimum. No mode shift due to changes in travel time were estimated.
2. Elasticity model: this applied an elasticity approach to the travel time difference between option 2 and the do minimum to estimate a potential reduction in trips resulting from the implementation of the option.

The methodology for computing the road user travel time impacts of the options was as follows, for each of the model rounds (the fixed demand model and the elasticity model):

1. For each option, modelled period and vehicle type (car only at this stage):
   1.1. Collect total trips and total vehicle-seconds travelled from AIMSUN outputs.[6]

[5] The factor of 1.6 was estimated based on AIMSUN outputs for the full 4-hour model periods for the full region.
[6] For the fixed demand model, 2-hour model extracts were collected and multiplied by 1.6 to reflect the full 4-hour period. For the elasticity model, 4-hour model extracts are used directly.

1.2. Compute the 'travel time benefit' (including the rule of half) between the option and do minimum scenarios, using:

$$B = \frac{1}{2}(n_{DM} + n_{OPT})(t_{DM} - t_{OPT})$$

where B is the travel time benefit (seconds), n_{DM} is the number of trips in the do minimum scenario, n_{OPT} is the number of trips in the option scenario, and t_{DM} and t_{OPT} are the average time per trip (seconds) for the do minimum and option scenarios respectively.

1.3. Convert from vehicle-seconds to vehicle-hours saved.

2. Estimate daily travel time differences for each period (AM, IP, PM) using the 'model to daily' scale factors in Table 16.
3. Compute the value of the travel time impacts by applying the values of time from Table 4 to the travel time differences from step 2.
4. Compute the annual value of the travel time impacts by applying the 'daily to annual' factors from Table 16 and summing the benefit for each model period and vehicle type.

The results from each of the rounds of modelling are used to provide the range of expected road user impacts from the options.

4.1.3 Road user impacts

The annual road user travel time impact for each option in 2025 is estimated to be:

- -\$360,000 to \$280,000 per year for option 1
- -\$4,700,000 to \$2,200,000 per year for both options 2 and 3

This is then projected into future years with a discount rate of 4%, resulting in present value estimates of:

- -\$6.2m to \$4.8m for option 1
- -\$79m to \$37m for both options 2 and 3

4.2 Public transport benefits

The previous indicative economic assessment used MRCagney's runtime model to inform the public transport user benefits. This model has been used again with refinements to the corridor definitions and updates to some inputs to provide further certainty on the estimated benefits. Some inputs will still need to be updated in the economic assessment of the preferred option.

4.2.1 Data and assumptions

The primary data inputs and assumptions for the public transport benefit assessment are recorded below:

- Public transport demands:
  - WAU provided us with WPTM results and a methodology to adjust these from the model average to a March weekday. The resulting, 2018 estimated public transport demands are included as Table 17.
  - Growth in public transport demand to the city centre is estimated to average 1.6% per year from 2016 levels (from 28,000 in 2016 to 37,000 in 2036) as recorded in the *Golden Mile - Do*

Minimum Scenario Description. Therefore, the base benefit estimate is estimated to grow at 1.6% per year throughout the evaluation period for the present value calculations.

- Annualisation factor: 245, as per WAU's annualisation assumptions for number of working days per year.
  - This effectively ignores weekends and evenings (as patronage data is only input for morning, afternoon and inter-peak periods).
  - It is expected that this assumption will be updated for the preferred option economics; it was not refined here as this assumption is not expected to differentiate between the options.
- Public transport travel times: MRCagney has a public transport runtime (Monte Carlo) model that was originally developed to estimate indicative travel times for proposed rapid transit corridors and was requested for this assessment. It is a physics-based model with the following features, assumptions and considerations:
  - **Elements** of Golden Mile modelled:
    - **Road links** segmented by traffic signals, intersections and bus stops. Inputs relating to lengths of each link and assumptions about maximum realistic speed are included for each road link.
    - **Intersections**/traffic signals are coded with signal timing assumptions from the LinSig model developed for the Golden Mile (cycle time and green time for relevant movement) and with maximum realistic speed for the bus movement through the intersection, if the vehicle has a green signal upon arrival.
    - **Bus stops** are coded with an average dwell time for the period represented by the model, provided by WAU and based on observed data, as described in Appendix B.
  - **Computing travel times** for each 'element' with a physics-based model incorporates the following features:
    - Acceleration from stops or intersections and deceleration to stops or intersections.
    - Travelling at the maximum reasonable speed between the acceleration and deceleration phases.
    - Stopping at bus stops for a given dwell time.
    - Random arrival times at intersections, whereby sometimes the vehicle would get a green light and not have to stop (or decelerate) and other times it would get a red light and have to stop for the remaining time in the cycle length.
  - **Key assumptions** include:
    - Acceleration and deceleration rates of buses (assumed to be a linear rate of $1.2 m/s^2$)[7]
    - Signal timing assumptions provided by WSP, from the LinSig model (and used without significant changes in the AIMSUN models).
    - Dwell time assumptions provided by WAU, based on observed data.
    - Corridor descriptions for each option, including the corridor layout and maximum speeds at different elements defined by MRCagney.
  - **Limitations** of the model include:
    - Bus on bus delays and congestions are not modelled, as the runtime estimates are based on a single bus's journey through the corridor and is not a simulation model of buses arriving and interacting with/affecting other buses.

[7] $1.2 m/s^2$ is a reasonable assumption for acceleration/deceleration of buses when local data is not available (Transit Capacity and Quality of Service Manual—2nd Edition, page 4-46)

  - Congestion effects from general traffic is not modelled. It can be approximated by adjusting acceleration/deceleration rates and/or top speeds, although this has not yet been done.
  - Impacts of private vehicles parking or accessing loading zones is not included. It can be approximated by including 'dummy' stations or intersections to reflect the likely conditions or effects of such conflicts but this has not yet been done.
- Value of time: $12.28 per person per hour (for trip purposes in *Impact on Urban Amenity in Pedestrian Environments*, Table 15, Waka Kotahi Economic Evaluation Manual Table A12.3)

4.2.2 Travel time benefit

The total public transport travel time benefit was estimated from the model results using the formulas described next. First, the total passenger-hours travelled for each option is estimated using:

$$T_{s,p,o} = d_{s,p} t_{s,p,o},$$

where $T_{s,p,o}$ is the total passenger-hours travelled in the segment s, period p and option o; $d_{s,p}$ is the public transport demand for segment s and period p; and $t_{s,p,o}$ is the estimated travel time for segment s in period p and option o from the runtime model.

Then, the annual travel time savings benefit in each option is estimated using:

$$B = av \sum_{s,p} \left(T_{s,p,b} - T_{s,p,o}\right),$$

where B is the annual benefit value; a is an annualisation factor of 250; v is the average value of time; the sum is over all segments (Lambton Quay, Willis Street, Manners Street, Courtenay Place) and periods; $T_{s,p,o}$ is as defined above, and $T_{s,p,b}$ is the passenger-hours travelled in segment s in period p in the base/do minimum model run.

4.2.3 Reliability benefit

Signal timings are the only source of variability included for a given 'corridor definition' in the public transport runtime model. Where signal timings are adjusted (primarily due to flow-on effects of changes to restrictions on permitted general traffic movements), this affects the likelihood of arriving to a red light, and the length of delay at those signals. In reality, there will also be variability in dwell times, and delays at various points along the corridor are likely to be correlated; for the SSBC short list assessment these effects have not been considered, but they should be investigated in the future.

This variability is estimated from the public transport runtime model, from which the 50th and 90th percentile travel time estimates are used to reflect the variability of travel. This methodology is developed on the basis that passengers in general should always allow for public transport travel times to be at least as slow as the 50th percentile travel time. However, in most cases, people need to allow for around the 90th percentile travel times to avoid being late too often. The 90th percentile value assumes people are 'willing' to be late 10% of the time (or once in every ten trips). The reliability benefit is estimated by the following formulas:

$$V_{s,p,o} = P90_{s,p,o} - P50_{s,p,o},$$

where $V_{s,p,o}$ is the variability in travel time for segment s, period p in option o; and $\mathrm{P90}_{s,p,o}$ (and $\mathrm{P50}_{s,p,o}$) are the 90th (and 50th) percentile travel time estimates for segment s, period p in option o. This travel time variability is then valued according to:

$$B = av \sum_{s,p}(V_{s,p,b} - V_{s,p,o}) ,$$

where B is the annual benefit value; a is an annualisation factor of 250; v is the average value of time; the sum is over all segments (Lambton Quay, Willis Street, Manners Street, Courtenay Place) and periods; $V_{s,p,o}$ is as defined above, and $V_{s,p,b}$ is the variability in travel time for segment s, period p and the base option.

4.2.4 Public transport impacts

Figure 1 shows the 'all-day' travel time estimates for buses along the Golden Mile that have resulted from the runtime model. These have been used to estimate the public transport travel time benefits for the short list options. Table 5 shows the median to upper limit of travel time that is expected based on the runtime model.

Table 5: Range of median to upper limit travel times in the PM peak (minutes (range in brackets))

Option	Northbound		Southbound	
Case for change	*17.0 – 19.0*	*(2)*	*15.0 – 17.0*	*(2)*
Base	14.3 – 15.7	(1.4)	13.4 – 14.7	(1.3)
Option 1	13.2 – 14.5	(1.3)	12.8 – 13.9	(1.1)
Option 2	12.8 – 14.3	(1.5)	11.9 – 12.9	(1.0)
Option 3	12.6 – 13.6	(1.0)	11.9 – 13.1	(1.2)

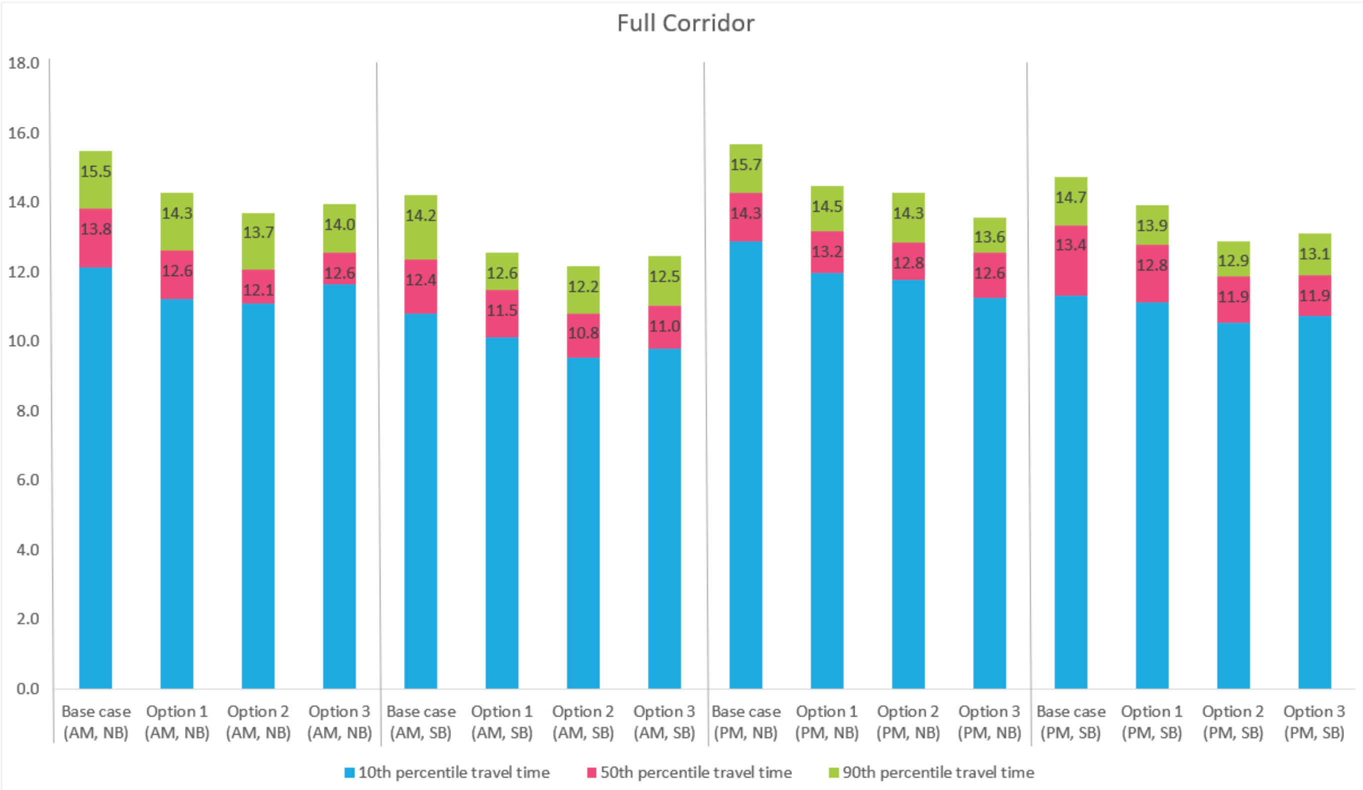

Figure 1: Public transport travel time estimates along Golden Mile

The estimated public transport benefits (from travel time savings and reliability improvements) are included in Table 6 and Table 7.

Table 6: Annual public transport benefit, 2025 (first benefit year)

	Option 1	Option 2	Option 3
Travel time benefit	$900,000	$1,300,000	$1,100,000
Reliability benefit	$230,000	$450,000	$450,000

Table 7: Present value of public transport benefits

	Option 1	Option 2	Option 3
Travel time benefit	$18,000,000	$26,000,000	$23,000,000
Reliability benefit	$4,700,000	$9,100,000	$9,100,000

4.3 Pedestrian benefits

The short list options include varying levels of improvements to the pedestrian environment along the Golden Mile including closing some side streets onto the Golden Mile, widening footpaths and reducing adjacent traffic volumes. Benefits related to these improvements are described in the following subsections.

4.3.1 Data

- Signal timing assumptions:
  - Signal cycle times from the LinSig model developed for the Golden Mile.
  - Length of green phase for pedestrian crossings is assumed to be 12 seconds. [8]
- Value of pedestrian realm improvements (willingness to pay): Waka Kotahi's interim guidance for *Impact on Urban Amenity in Pedestrian Environments*.
- Pedestrian demands are collected from the *Active Modes Visualisation Tool* for Wellington City Centre.
- Annualisation factor: 245, as per WAU's annualisation assumptions for number of working days per year.
  - This effectively ignores weekends and evenings (as the pedestrian demand period only covers 06:30-09:30, 11:00-2:00, 15:30-18:30).
  - It is expected that this assumption will be updated for the preferred option economics; it was not refined here as this assumption is not expected to differentiate between the options.
- Growth in demand for pedestrians entering the city centre is assumed in the *Do Minimum Scenario Definition* to average 1.3% per year; this is assumed to be appropriate for the Golden Mile as well.
- Value of time: $12.28 per person per hour (for trip purposes in *Impact on Urban Amenity in Pedestrian Environments*, Table 15, Waka Kotahi Economic Evaluation Manual Table A12.3)

4.3.2 Travel time benefit: closing side street crossings

The short list options include closures of some side roads which currently have signalised pedestrian crossings across them. Those crossings introduce a delay for pedestrians travelling *along* the corridor[9]. The benefit of removing or reducing that delay can be measured using conventional transport benefit methods.

Delay per person

To estimate the current average delay per person using these signalised crossings, the assumed signal cycle times and pedestrian green phases have been collected. The cycle time assumptions, and which 'side of the road' is affected by that signal is described in Table 8. The average delay per intersection is estimated according to:

$$Delay = P(stop) * T(stop) = \frac{C-G}{C} * \frac{C-G}{2} = \frac{(C-G)^2}{2C},$$

Where:

- $Delay$ is the average pedestrian delay at the intersection

[8] This is consistent with assumptions made in the *Active Mode Visualisation Tool* used for other projects, and is recommended in: *Pedestrian planning and design guide*, NZ Transport Agency, Wellington, ISBN 978-0-478-35228-3, Oct. 2009, pp. 15.13.
[9] Delays associated with moving *across* the corridor (Golden Mile) itself are not estimated at this stage, in part due to limited data on how many pedestrians cross the road and in part due to uncertainties around how many pedestrians are willing to cross where there are no signals.

- $P(stop) = \frac{C-G}{C}$ is the probability of arriving at the intersection during a red signal and therefore having to stop
- $T(stop) = \frac{C-G}{2}$ is the average wait time for a pedestrian that arrives at some point during a red phase
- C is the intersection cycle time
- G is the green time for the pedestrian phase

Demands

Pedestrian demands for Wellington City Centre from the *Active Mode Visualisation Tool* have been collected for the Golden Mile on either side of the relevant side streets. The following assumptions have then been applied to those demands to estimate the number of people crossing each intersection:

- Assume the demand for crossing the side street matches the lower demand from the two links on either side of that side street.
  - For example, the AM peak hour has 270 people on Lambton Quay north of Stout Street and 565 people south of Stout Street. For the Stout Street crossing, the lower number of 270 people is assumed to be the demand for crossing the street.
- The peak hour demands for the AM, IP and PM periods are scaled up to a 9-hour day by multiplying each period's peak hour demand by 3 (i.e. 3*AM + 3*IP + 3*PM); this is the assumption in the *Active Mode Visualisation Tool*.
- The 9-hour daily demands are then annualised with a factor of 250.

Table 8: Pedestrian crossing demands and delays for side streets being closed

Intersection description				Demand	Average delay (seconds)				Total daily delay for all people (hours)			
Street	**Section**	**Side of street**	**Period**	**Total crossing**	**Base**	**Option 1**	**Option 2**	**Option 3**	**Base**	**Option 1**	**Option 2**	**Option 3**
Stout St	Lambton Quay	East	AM	270	18.4	18.4	0.0	0.0	4.1	4.1	0.0	0.0
Stout St	Lambton Quay	East	IP	375	18.4	18.4	0.0	0.0	5.7	5.7	0.0	0.0
Stout St	Lambton Quay	East	PM	320	20.3	20.3	0.0	0.0	5.4	5.4	0.0	0.0
Brandon St	Lambton Quay	East	AM	440	26.8	26.8	0.0	0.0	9.8	9.8	0.0	0.0
Brandon St	Lambton Quay	East	IP	460	23.8	23.8	0.0	0.0	9.1	9.1	0.0	0.0
Brandon St	Lambton Quay	East	PM	710	27.3	27.3	0.0	0.0	16.1	16.1	0.0	0.0
Mercer St	Willis Street	East	AM	515	33.2	0.0	0.0	0.0	14.3	0.0	0.0	0.0
Mercer St	Willis Street	East	IP	630	29.3	0.0	0.0	0.0	15.4	0.0	0.0	0.0
Mercer St	Willis Street	East	PM	875	34.2	0.0	0.0	0.0	25.0	0.0	0.0	0.0
Tory St	Courtenay Place	North	AM	300	50.2	50.2	50.2	0.0	12.5	12.5	12.5	0.0
Tory St	Courtenay Place	North	IP	400	47.2	47.2	47.2	0.0	15.7	15.7	15.7	0.0
Tory St	Courtenay Place	North	PM	480	67.1	67.1	67.1	0.0	26.8	26.8	26.8	0.0
Tory St	Courtenay Place	South	AM	265	50.2	50.2	50.2	0.0	11.1	11.1	11.1	0.0
Tory St	Courtenay Place	South	IP	525	47.2	47.2	47.2	0.0	20.6	20.6	20.6	0.0
Tory St	Courtenay Place	South	PM	475	67.1	67.1	67.1	0.0	26.6	26.6	26.6	0.0

4.3.3 Pedestrian realm benefit

Pedestrians are often willing to walk out of their way to travel through a more amenable environment; this additional willingness enables the benefit of pedestrian realm improvements to be valued. The process for valuing such improvements is described in Waka Kotahi's *Impact on Urban Amenity in Pedestrian Environments* technical paper. This interim guidance is applied as described in the following subsections.

The Golden Mile short list options include several features which can be valued through this interim guidance. These are discussed in more detail in the following sub-sections and include:

- Seating: people are willing to walk 1% further if there is seating available.
- Street trees or plantings: people are willing to walk up to 20% further for a route that includes trees or plantings on or adjacent to the footpath.
    - This is separated into two components: a willingness to pay of 11% for street trees and of 9% for 'plantings' (e.g. human-scale planter boxes) based on findings from the *Draft Valuing Improved Pedestrian Facilities: Stated Choice Survey Design and Analysis.*
- Adjacent traffic volume reduction: people are willing to walk 5% further per 1000 fewer vehicles (AADT) on the route.
- Widened footpaths in crowded conditions: people are willing to walk 14% further per extra metre of footpath width (capped at 56% further), to walk on a wider footpath if that means the footpath is no longer 'crowded'.
    - Current data suggests the Golden Mile does not meet the suggested threshold for 'crowded' in the interim guidance. The appropriateness of this threshold in this context and the effective footpath width will be refined to ensure this benefit can be captured, if relevant.

As noted in the bullet points above, the interim guidance provides willingness-to-pay values, as a ratio of walking time; this is the additional proportion of time people are willing to walk for a route that offers a more amenable environment. The total pedestrian realm benefit is then estimated by:

$$Benefits = v * D_{base} * WTP_o * T,$$

where v is the average value of time; D_{base} is the average demand (number of pedestrians) using the facility; WTP_o is the additional willingness to pay ratio in the option relative to the base (this is the sum of the individual willingness to pay ratios for each additional street feature in the option); and T is the time spent walking along the facility being improved. The appropriate willingness to pay values depend on the level of interventions; this is discussed as appropriate in the following sub-sections.

For each section of the Golden Mile (Lambton Quay, Willis Street, Manners Street, Courtenay Place), the average demand for the section is used, and each person is assumed to walk along the Golden Mile for an average of 5 minutes (around 375 metres, which is about the length of three street 'blocks'[10] on the Golden Mile). This is sensitivity tested between 2-10 minutes.

Seating

There are currently limited opportunities for seating along all sections of the Golden Mile. Public benches are almost entirely limited to bus stop seating. Each of the options provides the potential to offer further seating

[10] 'Blocks' along the Golden Mile (distance between side streets) ranges from around 60-130 metres.

opportunities for people moving through the corridor, separate to those offered for public transport users waiting for a bus.

As existing seating is limited to bus stop seats that are located based on bus stops and (depending on the time of day and bus schedules) may not always provide seating opportunities to pedestrians, the additional seating opportunities in the options is considered appropriate to be measured as a benefit, counting the full value of this benefit (effectively from a route with 'no' seating opportunities to one with 'full' seating opportunities).

The seating benefit is applied to:

- The full length of all sections, in all short list options

Street trees or plantings

There is currently a low presence of street trees along the Golden Mile – in places, there is planting in the road median, while trees adjacent to the footpaths are only occasionally present and do not exist at the 'human-scale'. Street trees are particularly absent on Courtenay Place and Lambton Quay and are somewhat present on Willis Street and Manners Street. Furthermore, there is a clear absence of low planters, which are valued by people separately to how street trees are valued.

The *New Zealand Valuing Walking Survey*[11] is intended to provide New Zealand-specific values for the interim guidance. This survey found that that people in New Zealand are willing to walk 91% further for a route with street trees and plantings and 52% further for a route that contains only street trees relative to a route with neither of these features. These values are significantly higher than the base values in the interim guidance, so are used only for sensitivity testing at this stage, and to inform the relative benefit split between street trees and plantings.

The street trees and planting benefit is applied to:

- Base: assume street trees already exist on Willis Street and Manners Street
- Option 1: no change from base
- Option 2: no change from base
- Option 3: street trees and plantings on all sections of Golden Mile (i.e. street tree benefit applied to Lambton Quay and Courtenay Place and benefit of 'plantings' applied to all sections)

Reduction in adjacent traffic volumes

The Golden Mile currently supports somewhat high traffic volumes (up to 15,000 average daily traffic volumes (ADT)). Interventions under options 2 and 3 involve significant traffic restrictions all along the Golden Mile. The do minimum and option ADTs were estimated using a combination of AIMSUN outputs and traffic counts (collected from Mobile Road) as described in Appendix C.

The willingness to pay value of 5% per 1000 fewer daily vehicles is then applied to the estimated reduction in ADT to compute the estimated pedestrian realm benefit of the traffic removal.

[11] Part of the *Interim Guidance on Valuing Improved Pedestrian Facilities.*

Widened footpaths in crowded conditions

Wider footpaths provide significant value to pedestrians in areas with high pedestrian volumes, such as along the Golden Mile. The average available footpath width along the Golden Mile ranges from 3.5-4.5 metres. However, the presence of 'street clutter' (such as rubbish bins, seats, etc.) and edge zones at building frontages and kerbsides reduce the width available to pedestrians, in many places by 1-1.5 metres, leaving an average effective footpath width of just 2-3.5 metres.

Crowded footpaths are slower and more difficult for pedestrians to move along. Based on the current footpath conditions and demands, none of the sections meet the proposed threshold for a 'crowded' footpath (of 33 people per minute per metre of footpath width), as shown in Table 9.

Table 9: Calculation of footpath crowding

Measure	Lambton Quay	Willis Street	Manners Street	Courtenay Place
Maximum peak-hour weekday demand (people)[12]	5,037	3,320	2,966	1,122
Average effective footpath width (metres)	3-3.5	2-2.5	2.5-3	2.5-3
Peak hour demand per minute per metre	24-28	22-28	16-20	6-7
2036 peak hour demand per minute per metre[13]	30-35	28-35	21-25	8-9

This suggests that, in general, the corridor does not meet the threshold of a 'crowded' footpath as suggested by the interim guidance; it is noted that Lambton Quay is expected to reach that threshold within the next 20 years. However, other factors can lead to a 'crowded' footpath, such as people lingering/spending time in that environment, or more localised 'street clutter' (including the presence/location of bus stops) that create bottlenecks along the footpath. These other factors are still being investigated.

As a sensitivity test at this stage, where footpath widening is included in an option, the benefit of widening that footpath by 1 metre for that stretch is estimated; this reflects that a widening of 1 metre is likely to move most sections of the corridors to an 'uncrowded' level, where additional metres of width may not be valued as much. Whilst this will not capture the full potential benefit of footpath widening, it will provide a reasonable benchmark for the potential benefit that could be captured with further analysis.

For the purposes of this test, the following assumptions are made about the length of each section (per side of road, e.g. if 500m is widened on both sides of the road, that would be 1000m of widening) that is widened in each option:

[12] Maximum peak-hour demand on a single side of the road for the counts along each section, from the March Monitoring counts, *NOT* the *Active Mode Visualisation Tool.*

[13] Estimated by scaling up the current demands by the increase in active modes demand from the PBC modelling of 2016 to the 2036 active trips in the do minimum scenario.

- Option 1: Lambton Quay has 40m of widening, Manners Street has 20m of widening, Courtenay Place has 25m of widening
- Option 2: Lambton Quay has 439m of widening, Manners Street has 20m of widening, Courtenay Place has 270m of widening
- Option 3: Lambton Quay has 540m of widening, Willis Street has 150m of widening, Manners Street has 20m of widening, Courtenay Place has 725m of widening

4.3.4 Pedestrian impacts

The core estimated pedestrian benefits (from travel time savings and urban realm improvements) are included in Table 10 and Table 11 (sensitivity tests of these are included in Section 5.1.

Table 10: Annual pedestrian benefit, 2025 (first benefit year)

	Option 1	Option 2	Option 3
Pedestrian realm benefit: seating, street trees, plantings, reduced traffic	$620,000	$4,600,000	$6,900,000
Travel time benefit	$150,000	$290,000	$630,000

Table 11: Present value of pedestrian benefits

	Option 1	Option 2	Option 3
Pedestrian realm benefit: seating, street trees, plantings, reduced traffic	$12,000,000	$90,000,000	$140,000,000
Travel time benefit	$3,100,000	$5,800,000	$13,000,000

5 Preliminary results

Table 12 presents the range of expected benefits using the 4% discount rate, 40-year evaluation period, and excluding offpeak and weekend impacts.

Table 12: Economic assessment summary

Benefit	Option 1 ($m)	Option 2 ($m)	Option 3 ($m)
Construction costs	**$14 - $20**	**$19 - $29**	**$47 - $72**
Car travel time impact	-$6.2 - $4.8	-$79 - $37	-$79 - $37
Public transport travel time benefit	$18 - $24	$26 - $34	$23 - $30
Public transport reliability benefit	$4.7 - $6.1	$9.1 - $12	$9.1 - $12
Pedestrian realm benefits	$11 - $17	$81 - $128	$122 - $407
Pedestrian travel time benefits	$3.0 - $4.8	$5.6 - $9.1	$12 - $19
Total benefit	**$31 – $57**	**$42 - $219**	**$87 - $505**
Benefit-cost ratio	**1.5 – 4.2**	**1.5 – 12**	**1.2 - 11**

The car travel time impact and pedestrian realm benefits each have a significant range of estimated benefits. The reasons for these are:

- Car travel time impacts: for each option a range is reported from a strong disbenefit to a more moderate positive benefit. These are from two different sets of AIMSUN models:
  - iii. Fixed Demand Model: the initial AIMSUN models had fixed demand assumptions across all options (i.e. despite the reduction in vehicle capacity of the city centre, the vehicle demand was constant and no reduction in vehicle trips was assumed). This is a 'worst case' estimate of traffic impacts, as it assumes no travel behaviour response to the interventions.
  - iv. Elasticity Model: an elasticity was applied to the results from the Fixed Demand Model to estimate the potential reduction in origin-destination trips that would result from the reduced vehicle capacity in the city centre. These new trip demands were run through AIMSUN to get these results. This can be considered an 'upper limit' of expected traffic impacts, as the elasticity approach should be applied iteratively to converge on a set of likely demands.
- Pedestrian realm benefits: the cause of the range in uncertainty around the magnitude of these benefits is caused by several factors, mainly:
  - o Whether or not the footpath widening benefit is included
  - o Whether the 'willingness to pay' values from the interim guidance or from the supplementary New Zealand Survey are used
  - o Whether the average value of time is derived from the proportional trip purposes in the interim guidance or in the MBCM.

It is important to note that these results will continue to change as the preferred option is selected and refined, with more details and more precise modelling available.

It is also noted that whilst these results are based on the current data and models available and understanding of options, as the options are developed further, they may include some provisions to mitigate disbenefits or further improve benefits. Therefore, it will be important to update the economic assessment as the options are developed further, and it is expected that further assessments will be conducted.

5.1 Sensitivity tests

Table 12 presents a summary of the estimated benefits and costs under each category, to show the range of expected economic outputs for each option. This section of sensitivity tests first presents a 'base' economic assessment summary, describing the costs and benefits from a 'core' set of assumptions, and then presents two groups of scenario tests (one that increases the benefits and one that decreases them).

The base assumptions reported on in Table 13 are:

- Construction costs: assume the high cost estimate
- Car travel time impact: use the fixed demand model benefits, exclude offpeak traffic impacts (consistent with other modes)
- All public transport and pedestrian benefits: average value of time per person is $12.28 (estimated using split of trip purposes in *Impact on Urban Amenity in Pedestrian Environments*, Table 15, Waka Kotahi Economic Evaluation Manual Table A12.3)
- Pedestrian realm benefit:
    - Assume average walking speed of 4.5km/h
    - Exclude footpath widening benefit
    - Use pedestrian realm willingness to pay values from the interim guidance
- Pedestrian travel time benefit: assume pedestrian crossing phase at signalised side streets is 12 seconds

Table 13: Base assumptions, economic summary

Benefit	Option 1 ($m)	Option 2 ($m)	Option 3 ($m)
Construction costs	**$20**	**$29**	**$72**
Car travel time impact	$2.4	-$72	-$72
Public transport travel time benefit	$18	$26	$23
Public transport reliability benefit	$4.7	$9.1	$9.1
Pedestrian realm benefits	$12	$90	$136
Pedestrian travel time benefits	$3.0	$5.6	$12
Total benefit	**$41**	**$58**	**$107**
Base benefit-cost ratio	**2.0**	**2.0**	**1.5**

Table 14 presents the change in the total project benefit as assumptions are *cumulatively* stacked towards a *higher* total benefit. Table 15 then presents the converse scenario, whereby assumptions are cumulatively adjusted to reduce the total benefit.

Table 14: Total present value benefit: cumulative impact of stacking assumptions that INCREASE the benefit

Benefit	Option 1 ($m)	Option 2 ($m)	Option 3 ($m)
Base assumptions	*$41*	*$58*	*$107*
Assume pedestrian crossing phase is 6 seconds	$41	$59	$109
Include footpath widening benefit	$42	$66	$122
Use pedestrian willingness to pay for trees/plants values from the NZ survey values in the draft report	$42	$66	$284
Base value of time for pedestrians/public transport on split of trip purpose for cars (from MBCM Table 15, 'urban other', 'weekday' = $16.12)	$55	$110	$395
Use demand elasticity model for road user benefits for option 2 and 3	-	$215	$500
Include offpeak traffic impacts for option 1	$57	$219	$504

Table 15: Total present value benefit: cumulative impact of stacking assumptions that DECREASE the benefit

Benefit	Option 1 ($m)	Option 2 ($m)	Option 3 ($m)
Base assumptions	*$41*	*$58*	*$107*
Average walking speed of 5km/h	$39	$49	$94
Use demand elasticity model for road user benefits for option 1.	$33	-	-
Include offpeak traffic impacts	$31	$42	$87

5.2 Impacts of Mass Rapid Transit

The Golden Mile project is one of several projects likely to affect Wellington's transport in the future. The Mass Rapid Transit (MRT) project is one particular project that will be very close to the Golden Mile and is likely to affect the way people use the Golden Mile. The nature of the effect is uncertain as the preferred MRT option is not yet known; however, there is significant interest in understanding the implications of the nearby MRT project on the economics for the Golden Mile.

It is worth noting that this Golden Mile project is part of the base case for MRT, so any effects of MRT on the performance of the Golden Mile interventions should be captured by the assessment of the MRT project. However, to acknowledge the impact that MRT may have on Golden Mile, it is noted that around 30-35% of the present value benefits for Golden Mile are estimated to accrue in the first 10 operational years, before MRT is expected to have an effect. Sensitivity tests of greater and lower benefits for Golden Mile after the first 10-year period will be included in a subsequent version of this report, to better understand the possible impacts of MRT.

5.3 Caveats and next steps

As has been mentioned throughout this report, there are numerous caveats, limitations and uncertain data that mean these results should be reviewed with caution. The purpose of these results is to give an indication of the possible relative benefits of each of the short list options for the MCA process.

- Costs:
  - Construction costs have not been updated since the initial estimates made for the Short List Assessment Report.
  - No other costs are included, such as maintenance or renewal costs.
- Modes not modelled:
  - HCV impacts are currently excluded as the AIMSUN results for this mode were much larger than expected. It is possible that there will a material disbenefit added to the economic assessment. This should be investigated for inclusion in the final economic assessment phase.
- Periods not modelled:
  - Benefits for pedestrians and public transport users in the offpeak (e.g. evening) period have not yet been estimated. To align with the lack of data available for these modes, offpeak impacts for traffic are not included in the core results.
  - Weekend impacts for all modes are currently excluded.
- Mode shift only estimated at a high level for road user benefit:
  - A demand elasticity model was run that tested the impact of potential mode shift away from private vehicles, although this was only considered in the context of the road user benefit. A detailed file note on this is available upon request.
  - Demands for other modes are fixed across all options (i.e. mode shift effects of the options are not considered).
- Public transport travel times:
  - Congestion impacts from vehicles and other buses are currently not modelled. It is unknown if or when these impacts might be included in public transport travel time estimates.
  - Dwell times are currently fixed, as the average dwell time for the relevant period. It is unknown if or when variable dwell times might be included in public transport travel time estimates.
  - Delays caused by private vehicles parking or accessing loading zones is not included. Effects from parking or loading zones will not be included in public transport travel time estimates, as decisions about these features are likely to be made when the preferred short list option is refined.

- Pedestrian benefits:
    - Pedestrian demands from the *Active Modes Visualisation Tool* are, in some places, significantly different to pedestrian counts from the annual March Monitoring counts. Investigations into the cause of these differences are underway. At this stage, the core assumption uses the demands from the *Active Modes Visualisation Tool*; however, if March Monitoring counts are more accurate, the pedestrian benefits are expected to increase significantly.
    - Value of pedestrian realm improvements:
        - The willingness to pay values from the interim guidance on *Impact on Urban Amenity in Pedestrian Environments* are currently used. However, the subsequent work on *Draft Valuing Improved Pedestrian Facilities: Stated Choice Survey Design and Analysis* found that much higher values for street trees and planting may be appropriate in the New Zealand context.
        - Currently the benefits of seating and street trees and plants are assumed to be an 'all or nothing' improvement, rather than, for example, considering an area to improve from a '25%' quality/number of street trees to a '100%' quality/number of street trees. It is unknown if or when this additional level of detail might be incorporated in the economic assessment.
    - The Golden Mile has been assessed as being 'not crowded' based on the threshold proposed in the interim guidance. It has been acknowledged that that threshold may not be appropriate in the New Zealand context. Anecdotally, parts of the Golden Mile do appear to be crowded, so further work needs to be done to identify what scale of benefit can be captured from footpath widening improvements. It is unknown if or when this additional analysis will be done.
    - The duration of the pedestrian green phase has not yet been confirmed and is currently assumed to be 12 seconds. It is expected that this will be updated in a later version of this report.

6 Initial conclusions

Whilst firm conclusions about the net present value and benefit-cost ratio of each option are not possible given the number of caveats and limitations at this stage in the assessment of options, there are still some meaningful conclusions that can be drawn from this work. In particular, these include:

- Pedestrian benefits are likely to be a substantial portion of the total benefits for the projects, largely due to the *Impact on Urban Amenity in Pedestrian Environments* benefits than can be estimated with the latest interim guidance from Waka Kotahi.
- The range of road user impacts are estimated to be -$6.2m to $4.8m for option 1 and -$79m to $37m for options 2 and 3. The demand elasticity models in AIMSUN should be iterated on to converge on a level of demand to narrow the expected range for this benefit. The actual impact is likely to lie somewhere close to the middle of the two 'extremes' for each option.

Appendix A Annualisation factors

Road user impact annualisation

Annualisation factors for vehicle benefits were provided by WAU to ensure consistency with other projects in Wellington. Table 16 describes the annualisation factors applied, where:

- **Benefit period** refers to the period for which benefits are being calculated.
- **Hours** refers to the hours in that benefit period.
- **Model period** identifies which modelled period is used for the base demand values for that benefit period (note, each model period has a duration of 4 hours).
- **Factor: model to daily** defines the factor to scale the modelled benefits to the expected benefits for the benefit period.
- **Factor: daily to annual** identifies the number of days per year that the daily benefit applies, and is used to factor the daily benefits to annual.

Table 16: Factors for scaling AIMSUN results to daily and annual (periods currently not evaluated are shaded and italicised)

Benefit period	Hours	Model period	Factor: model to daily	Factor: daily to annual
AM	4	AM	1	250
IP	5	IP	1.27	250
PM	4	PM	1	250
Off Peak	*11*	*IP*	*0.84*	*250*
Weekend/ Public holiday	*24*	*IP*	*4.21*	*115*
HCV_AM	*4*	*AM*	*1*	*250*
HCV_IP	*5*	*IP*	*1.25*	*250*
HCV_PM	*4*	*PM*	*1*	*250*
HCV_Off Peak	*11*	*IP*	*0.42*	*250*
HCV_Weekend	*24*	*IP*	*1.6*	*115*

Effectively, this equates to annualisation calculations, if all benefit periods are evaluated, of (where AM, IP, PM each represent the benefit calculated for that respective model period):

- Annual vehicle impacts: 250*AM + 250*PM +1011.65*IP[14]
- Annual HCV impacts: 250*AM + 250*PM + 601.5*IP

[14] The IP factor is defined by: (IP factor + offpeak factor) * number of weekdays + weekend factor * number of weekend days. E.g. for vehicles, (1.27+0.84)*250+4.21*115 = 1011.65.

Appendix B Public transport demands and dwell times

This appendix describes the public transport demand and dwell time estimates for computing the public transport benefit.

Public transport demands

WPTM plots were reviewed to approximate the average public transport demand along each section of the Golden Mile. According to advice from WAU, the estimated demands were factored up by 25% to adjust from 2013 modelled to estimated 2018 demands.

The resulting demands are shown in Table 17.

Table 17: Public transport demands (2018 estimated demands for two-hour periods)

Segment	AM	IP	PM
North/westbound			
Courtenay Place	5,600	1,500	3,900
Manners Street	7,400	2,200	5,800
Willis Street	8,200	1,100	6,000
Lambton Quay	2,900	1,000	3,700
South/eastbound			
Lambton Quay	5,500	1,300	1,800
Willis Street	8,100	2,300	6,300
Manners Street	7,200	2,100	5,500
Courtenay Place	5,600	1,500	4,100

Public transport dwell times

Existing dwell times at stops along the Golden Mile were provided to MRCagney based on analysis of Snapper data. These dwell times were adjusted in options with stop closure by apportioning the dwell time of the stop being closed to the two adjacent stops, based on distance to each of those stops. For example, if a stop being closed had a dwell time of 60 seconds, and had a stop 100m away in one direction and 200m in the other, the dwell time for the stop 100m away would increase by 40 seconds, and for the stop 200m away would increase by 20 seconds.

The resulting dwell times for stops that were input into the public transport runtime model are defined, for each period, in Table 18, Table 19 and Table 20.

Table 18: Daily average dwell time

Direction	Stop	Do minimum dwell (s)	Option 1 dwell (s)	Option 2/3 dwell (s)
Northbound	Courtenay Place - Stop A	21.7	21.7	28.9
	Courtenay Place at St James Theatre	14.3	*Courtenay-Taranaki stop* 14.3	-
	Manners Street at Cuba Street - Stop A	21.4	30.5	37.7
	Manners Street at Willis Street	18.3	-	-
	Willis Street at Grand Arcade	22.1	31.3	31.3
	Lambton Quay at Cable Car Lane	19.7	33.2	33.2
	Lambton Central - Stop A	17.9	-	-
	Lambton Quay North - Stop A	34.0	38.4	38.4
Southbound	Lambton Quay North - Stop D	18.5	18.5	18.5
	Lambton Central - Stop B	29.0	49.3	49.3
	Lambton Quay at Hunter Street	16.9	-	-
	Willis Street at Willbank Court	25.4	*Willis at Bond stop* 32.2	*Willis at Bond stop* 32.2
	Manners Street at Cuba Street - Stop B	24.6	24.6	32.4
	Courtenay Place at Courtenay Central	15.6	*Courtenay-Taranaki stop* 15.6	-
	Courtenay Place - Stop C	18.6	18.6	26.4

Table 19: AM peak dwell time

Direction	Stop	Do minimum dwell (s)	Option 1 dwell (s)	Option 2/3 dwell (s)
Northbound	Courtenay Place - Stop A	24.3	24.3	31.3
	Courtenay Place at St James Theatre	14.1	*Courtenay-Taranaki stop* 14.1	-
	Manners Street at Cuba Street - Stop A	19.8	28.3	35.4
	Manners Street at Willis Street	17.2	30.2	-
	Willis Street at Grand Arcade	21.6	-	30.2
	Lambton Quay at Cable Car Lane	23.8	40.5	40.5
	Lambton Central - Stop A	22.3	37.6	-
	Lambton Quay North - Stop A	32.0	-	37.6
Southbound	Lambton Quay North - Stop D	20.1	20.1	20.1
	Lambton Central - Stop B	27.1	49.0	49.0
	Lambton Quay at Hunter Street	18.3	32.7	-
	Willis Street at Willbank Court	25.4	-	*Willis at Bond stop* 32.7
	Manners Street at Cuba Street - Stop B	18.9	*Willis at Bond stop* 18.9	26.3
	Courtenay Place at Courtenay Central	14.8	14.8	-
	Courtenay Place - Stop C	14.0	14.0	21.4

Table 20: PM peak dwell time

Direction	Stop	Do minimum dwell (s)	Option 1 dwell (s)	Option 2/3 dwell (s)
Northbound	Courtenay Place - Stop A	20.9	20.9	28.3
	Courtenay Place at St James Theatre	14.9	*Courtenay-Taranaki stop* 14.9	-
	Manners Street at Cuba Street - Stop A	24.0	36.2	43.7
	Manners Street at Willis Street	24.4	49.1	-
	Willis Street at Grand Arcade	36.9	-	49.1
	Lambton Quay at Cable Car Lane	28.0	45.4	45.4
	Lambton Central - Stop A	23.2	49.1	-
	Lambton Quay North - Stop A	43.3	-	49.1
Southbound	Lambton Quay North - Stop D	23.8	23.8	23.8
	Lambton Central - Stop B	37.9	65.5	65.5
	Lambton Quay at Hunter Street	23.0	48.5	-
	Willis Street at Willbank Court	39.3	-	*Willis at Bond stop* 48.5
	Manners Street at Cuba Street - Stop B	31.0	*Willis at Bond stop* 31.0	40.3
	Courtenay Place at Courtenay Central	18.5	18.5	-
	Courtenay Place - Stop C	21.0	21.0	30.3

Appendix C Estimating average daily traffic (ADT) flow for pedestrian realm improvement

The modelled traffic flows from AIMSUN were used to understand the estimated change in traffic volumes along the Golden Mile in each option, to inform the pedestrian realm benefit of reductions in adjacent traffic volumes. The methodology for estimating ADT reduction is as follows:

1. Collect AIMSUN vehicle flows for 1-hour periods
2. Scale values from step (1) to reflect estimated 4-hour vehicle flows. Scale factors estimated from full AIMSUN outputs for 4-hour periods:
   2.1. 8am-9am flows scaled by 2.82 to reflect 6am-10am model period
   2.2. 12pm-1pm flows scaled by 3.68 to reflect 10am-2pm model period
   2.3. 5pm-6pm flows scaled by 3.46 to reflect 3pm-7pm model period
3. Estimate modelled ADT using the factors for interpeak and offpeak, described in Appendix A.

Step 1: Collect approximate AIMSUN traffic flows

The approximate traffic flows collected from AIMSUN for each model period are shown in Table 21, Table 22 and Table 23.

Table 21: AM traffic flows (8am-9am, AIMSUN)

Segment	Do Minimum	Option 1	Option 2
North/westbound			
Courtenay Place	350	350	40
Manners Street	45	60	45
Willis Street	400	50	55
Lambton Quay	250	220	60
South/eastbound			
Lambton Quay	350	350	50
Willis Street	50	50	50
Manners Street	50	45	40
Courtenay Place	200	180	40

Table 22: IP traffic flows (12pm-1pm, AIMSUN)

Segment	Do Minimum	Option 1	Option 2
North/westbound			
Courtenay Place	400	390	20
Manners Street	40	40	20
Willis Street	350	40	25
Lambton Quay	350	350	25
South/eastbound			
Lambton Quay	250	350	30
Willis Street	35	40	30
Manners Street	30	35	20
Courtenay Place	400	330	15

Table 23: PM traffic flows (5pm-6pm, AIMSUN)

Segment	Do Minimum	Option 1	Option 2
North/westbound			
Courtenay Place	400	420	50
Manners Street	60	70	55
Willis Street	350	70	70
Lambton Quay	450	400	75
South/eastbound			
Lambton Quay	300	380	60
Willis Street	65	65	70
Manners Street	55	55	60
Courtenay Place	350	350	50

Step 3: Estimated ADT from factored AIMSUN flows

Table 24 shows the estimated ADT from the AIMSUN traffic flows and scale factors for each section of the Golden Mile.

Table 24: Approximate ADT for sections of Golden Mile

Segment	Do Minimum	Option 1	Option 2
Courtenay Place	10,400	9,700	800
Manners Street	1,200	1,300	900
Willis Street	5,700	1,400	1,200
Lambton Quay	8,900	9,700	1,200

Estimated ADT removed

Table 24 shows the estimated ADT removed under each option. The pedestrian realm improvement applies a benefit/willingness to pay value based on 1000's of daily vehicles removed.

Table 25: Approximate daily traffic reduction in each option, for each section of the Golden Mile

Segment	Do Minimum	Option 1	Option 2
Courtenay Place	0	600	9,500
Manners Street	0	-100	300
Willis Street	0	4,300	4,500
Lambton Quay	0	-800	7,700

Appendix D References

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Waka Kotahi (March 2020). *Impact on Urban Amenity in Pedestrian Environments*.

P

Numerical Rankings for the Weighting Assessment

Weighting Scenarios

Description*	Investment Objective Weightings	Focus on improving the public realm	Focus on people movement	Focus on Safety	Program fit and delivery focus	Economic Focus	Social Focus	Workshop Weighting
	Default weighting scenario - weighting based on LGWM priorities and investment objectives	This scenario places increased emphasis on the on improved public realm, by increasing the weighting applied to place and pedestrians.	The scenario places emphasis on interventions that move people through the corridor, with increased weighting applied to bus travel time and pedestrian capacity.	This scenario applies increased importance on safety outcomes and reduces overall weighting applied to investment objectives, while increasing the weighting applied to pedestrian and general safety.	This scenario assumes increased emphasis on broader program fit and the ability to quickly deliver outcomes. It reduces overall weightings for investment objectives and applies increased weighing to program fit and delivery	This scenario assumes a priority is placed on achieving maximum economic return.	This scenario addresses the relative social support and business impacts. It reduces overall weightings for investment objectives and applies increased weighting to social and business impacts.	Weighting determined by workshop MCA Assessors
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Bus Travel Time and Reliability	25%	15%	35%	10%	20%	20%	20%	21%
Bus Passenger Boarding and Alighting Comfort and Convenience	25%	15%	10%	10%	20%	20%	20%	21%
Pedestrian Safety	20%	20%	10%	60%	20%	20%	20%	21%
Pedestrian Capacity	20%	20%	35%	10%	20%	20%	20%	18%
Improve Place quality	10%	30%	10%	10%	20%	20%	20%	19%
Investment Objectives Total Weighting	**60%**	**60%**	**60%**	**40%**	**20%**	**60%**	**20%**	**80%**
Social	17%	17%	17%	10%	10%	17%	25%	19%
Retailer Impacts	17%	17%	17%	10%	10%	17%	25%	20%
Cycling Level of Service	17%	17%	17%	10%	10%	17%	10%	16%
General (Road) Safety	17%	17%	17%	50%	10%	17%	10%	19%
Sustainability	17%	17%	17%	10%	10%	17%	10%	16%
Fit with LGWM Programme	17%	17%	17%	10%	50%	17%	10%	10%
Effects Objectives Total Weighting	**20%**	**20%**	**20%**	**40%**	**40%**	**20%**	**60%**	**10%**
Delivery	33%	33%	33%	33%	40%	33%	33%	40%
Operations and Maintenance	33%	33%	33%	33%	20%	33%	33%	55%
Timeframe for Delivery	33%	33%	33%	33%	40%	33%	33%	5%
DM&O Total Weighting	**20%**	**20%**	**20%**	**20%**	**40%**	**20%**	**20%**	**10%**

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