Council has received requests for additional information from some community members.

This page provides clarification in relation to how options have been referenced in Council reports compared to the technical document.

Clarifications are as follows:

Project Impact Assessment / Council Report - 18 October 2023

Extracts of the information provided within the Project Impact Assessment were included in the Council Project Report of 18 October 2023.

The report outlined four options for Councillor consideration, these were listed as Option 1, Option 2, Option 3, and Option 4.

The attached Project Impact Assessment document assesses 5x options and includes an 'Option 3A'.

Community Engagement Options

Community Engagement was undertaken on the following options contained within the Safe Systems Analysis:

- **Option 1:** Safety improvements including a kerbside protected bike lanes
  (Option A in the community engagement)
- **Option 3A:** Safety improvements including on-road buffered bike lanes
  (Option B in the community engagement, Option 3 in the 18.10.23 Council report)

Option 3 in Council Report

In the 18.10.23 Council report, Option 3A is referred to as Option 3.

The change was for simplicity within the Council report.

The original design for Option 3 was superseded by Option 3A.

The only difference between the options was the retention of existing parking offsets (and associated sightlines) in Option 3A which allowed additional parking to be retained.

SMEC
Member of the Surbana Jurong Group

Inkerman Street Safe Travel Corridor

We're redefining exceptional

Through our specialist expertise, we're challenging boundaries to deliver advanced infrastructure solutions.

1. Background

Project Context

Introduction

The City of Port Phillip (CoPP) is seeking to improve the safety, amenity, and accessibility of the Inkerman Safe Travel Corridor by developing concept design options for the corridor between Hotham Street and St Kilda Road. The aim of the project is to deliver safety outcomes, attract a broader cycling demographic, and minimise amenity loss on the corridor for the community of Port Phillip and beyond.

The Inkerman Safe Travel Corridor extends along Inkerman Road/Street between Fitzroy Street and Orrong Road. The corridor is shared with the City of Glen Eira (Glen Eira) between Hotham Street and Orrong Road, this section of corridor is beyond the scope of this project. The study area for this project is the section on Inkerman Street between Hotham Street and St Kilda Road in the CoPP.

The corridor has been identified as a priority as it has the greatest potential to reduce pedestrian, bike rider and driver crashes. It also has the potential to attract new bike riders, shifting the mode share of the municipality. Strategically it will also create a continuous bicycle corridor that connects to the Melbourne Central Business District (CBD) and the Victorian Government's St Kilda Road Bike Lanes project. The project provides an opportunity for innovation that, if successful, can be replicated in other similar projects.

Project Scope

SMEC was engaged by City of Port Phillip in October 2021 to undertake a Safe Travel Corridor Study for the Inkerman Street corridor.

The purpose of this report is to appraise the five cross section options short listed by Council to enable the community to visualise the benefits and trade-offs of the options including any potential mitigation options. Each option is assessed against a set of criteria by means of a Multi Criteria Analysis to determine a preferred option.

Photo: Herald Sun

Methodology

Objectives and Method

The objective of this report is to provide an independent impact identification and assessment of the design options generated for the road scenarios previously along the Inkerman Road Safe Travel Corridor. In order to achieve this, the following has been included:

- Site visits and meetings with City of Port Philip
- Review of crash history data, traffic data and civil services
- A review of the relevant standards
- Defining the key features of each road option being appraised
- Establishing defined criteria used to measure effects
- Multi-criteria assessment

The project was broken into three phases for delivery:

Phase 1: Including Phase 1A, 1B and 1C – Planning, Analysis and Consultation

Phase 2: Detailed Design

Phase 3: Documentation

References

Move, Connect, Live 2018-28 Integrated Transport Strategy

St Kilda Road South Precinct Plan (updated 2015)

Strategic Context

Strategic Cycling Corridors (SCC)

The Strategic Cycling Corridors (SCC) are an important transport route for cycling and are a subset of the Principal Bicycle Network (PBN). The SCC plays an important part in supporting cycling trips for a number of trips, including for work, education, trips to public transport, shops and schools, and link up important destinations.

One Key SCC Strategy actions include:

- Prioritise investment in the strategic cycling corridors with the current and potential highest levels of demand.
- Investing in high quality infrastructure for strategic cycling corridors to make cycling on them an attractive mode of transport for people of all ages, especially interested but concerned people.

SCC's can be combined on or off road and are designed to provide a safe, lower-stress cycling experience. SCC's are intended to cater to riders of all ages and abilities.

Inkerman Street corridor (shown in orange above) is a key connection in the Strategic Cycling Corridor providing direct connection to St Kilda Road Cycle Corridor.

There are three main SCC typologies:

- Shared (bicycle) street for low speed, low volume streets (not appropriate).
- Cycleway - protected bicycle lanes within the road reserves for the exclusive use of bicycle traffic.
- Bicycle path - protected from motor vehicles.

A Key Connection

5 key principles underpinning the SCC network

Destination focused: supports continuous cycling routes linking up significant destinations across suburbs and municipalities

Safe: encourages greater cycling for transport through the provision of safer, lower stress cycle environments.

Direct: provides cyclists with better travel time routes, often this is the shortest and most direct route.

Connected: SCCs are supported and strengthened by municipal and local cycling links that provide for end-to-end cycling trips.

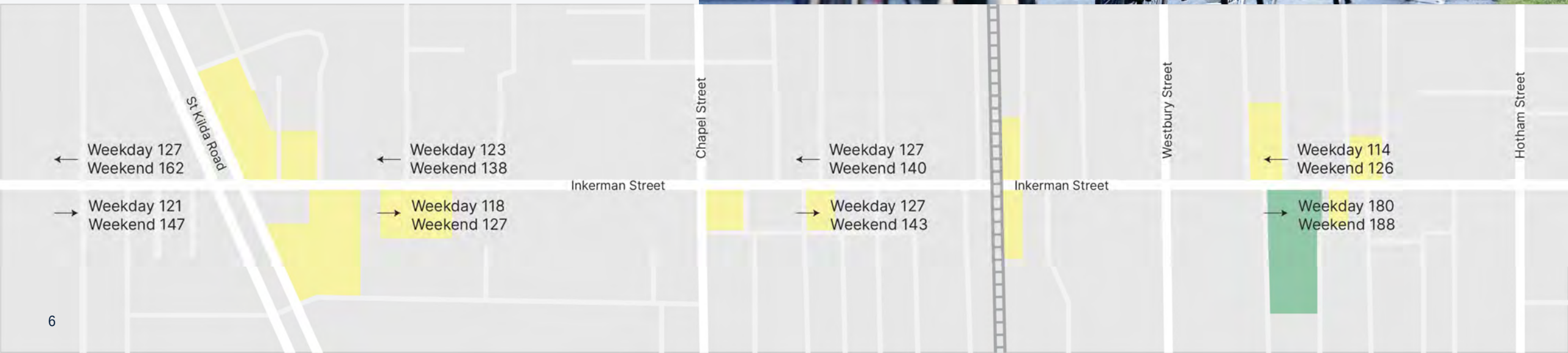
Integrated: SCCs are integrated with broader transport network and are located on transport routes where cycling is a priority.

Existing Conditions

Number of people on bikes

The number of people riding bikes on Inkerman Street were counted along the corridor on November 25, 28, 30 and December 4, 2021. The counts were undertaken with cameras and include on-road bicycle riders only.


Photo: Herald Sun



Existing Conditions

Inkerman Street

Inkerman Street is a Council owned and managed local road that runs east-west. It provides a single traffic lane per direction of travel with a mix of wide painted and constructed median islands. The existing width between kerbs is from 14.4 to 14.8m.

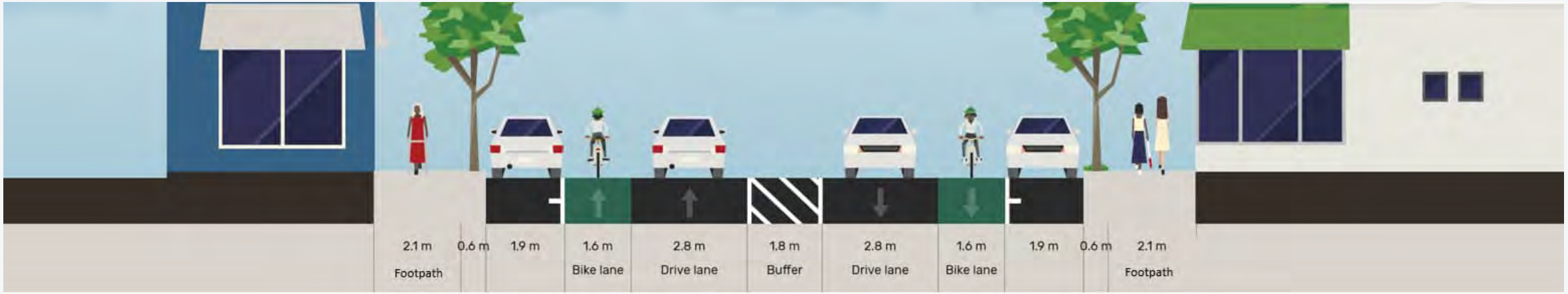
There are 4 signalised intersections and numerous uncontrolled intersecting side streets.

Kerb side parking is supplied along the corridor. Painted on-street bicycle lanes are also provided between the parked cars and moving cars. Footpaths are constructed on both sides of the road allowing for pedestrian movements along the corridor.

Between St Kilda Road and Chapel Street, Inkerman Street has a mix of residential and commercial frontages and provides access to many local roads. This section has a large supermarket and a large residential presence including a twelve-storey community housing tower.

Between Chapel Street and Hotham Street, Inkerman Street has a mix of residential and commercial frontages. The commercial frontages in this extent are smaller but more numerous than the extent west of Chapel Street. This section also provides access to some small recreational areas either directly or through the nearby network, provides access to many local roads, and has some sections of unrestricted parking.

Existing Cross Section



2. Upgrade Options

Future Cross Sections for Consideration

Design Considerations

Bicycle lanes

Continuous bicycle lanes are proposed between St Kilda Road and Hotham Street. Bicycle lane widths are measured to the face of kerb / kerb invert with the assumption that the channel surface can be safely traversed by riders (e.g. channel surface is smooth and does not have excessive cross slope).

Separation / Buffers

Separation buffers between the bicycle lane and traffic lane / parked cars are proposed to provide protection for riders and a place to load and unload where parking exists. Physical buffers are provided with consideration of crossover locations, vehicle turn paths and on-street parking. Painted buffers are adopted where vehicles must cross the buffers to access a side road, driveway or parking bay.

Parking

The parking dimensions currently adopt 5.5m (end) to 6.0 m (mid) lengths for all parking spaces. Spaces will provide a 3 m offset to driveways per initial Council direction for Options 1 to 3, with Options 3a to 4 retaining existing offset.

Sight Distance

Under existing conditions, Safe intersection sight distance is impaired from the side roads due to the proximity of on-street parking to intersections. The concept design options provide a constant 10 m offset from unsignalised intersections and 20 m offset from signalised intersections to proposed parking. This is in accordance with Victorian Road Rules.

Swept Paths

Vehicle swept path checks were undertaken at various intersections to determine the design vehicles reflecting existing conditions. A 0.5 m clearance envelope was applied to design vehicle swept paths.

Pedestrian Crossings

Raised Pedestrian Crossings (Wombat Crossings) are proposed on Inkerman Street at three locations:

- Approximately 17m east of Marriott Street;
- Between Young Street and Blenheim Street;
- Approximately 15m west of Leslie Street.

For 4 of the 5 Options. The design of the pedestrian crossings is to be in accordance with AS1742.10.

Drainage

It will be necessary to provide gaps in the raised separation buffers and the locations will need to consider the road crown and crossfall grades.

Traffic Performance

To provide bike lanes that continue to each intersection, the number of traffic lanes on the approach and departure sides of some intersections have been reduced. The Department of Transport (now DTP) will need to be satisfied that any impact on traffic is acceptable.

Traffic Signals and Lighting

The design of traffic signal timing will be done using relevant design specifications at the detailed design phase.

Utilities

Feature survey information identifies service lid locations. Where a concept option impacts upon a service lid location this has been highlighted. Detailed utility impacts are proposed for later phases of the project.

Public Transport

Public transport facilities are generally not within the scope of this project. Public transport routes run north-south along:

- St Kilda Road,
- Chapel Street, and
- Hotham Street.

Community Bus Route 1 operates along the Inkerman Street from Westbury Street to Orrong Road and Marriott Street to Chapel Street. Existing bus shelters are to be retained in the current position. Bus stops/flag are to be positioned as close to possible to the existing location as the concept option will allow.

Pavement

Existing pavement will be retained where possible. Where median islands are removed new pavement will be provided. The pavement profile needs to be determined.

Public Lighting

Lighting upgrades for project length are proposed with specific focus on the proposed mid-block pedestrian crossings.

Vehicle Speed

The existing 50km/h limit is proposed to be lowered to 40km/h.

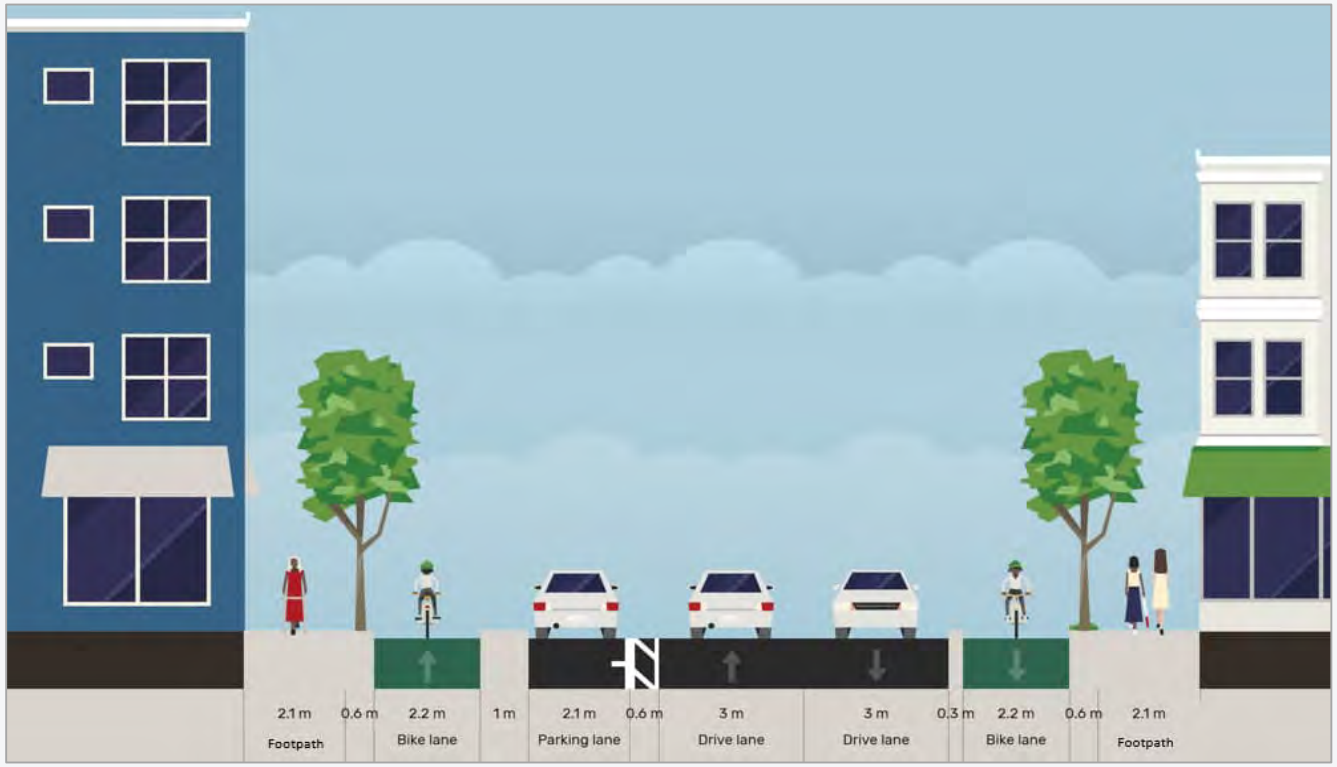
Future Cross Sections for Consideration

Option 1

The proposed typical arrangement of Option 1 along Inkerman Street comprises:

- 2.2 m protected bicycle lanes on north and south sides adjacent to existing kerb. This meets the desirable width recommended by CoPP and Austroads, and allows for overtaking, and use by cargo bikes
- Physical separation buffers between bicycle lanes / parking / traffic lane where practicable
- 2.1 m wide parking adjacent to bicycle lane buffer on north or south side (on side where parking can be maximised)
- 2 x 3.0 m traffic lanes.

At intersections requiring an additional right turn lane, an additional travel lane can be added.



Future Cross Sections for Consideration

Option 2

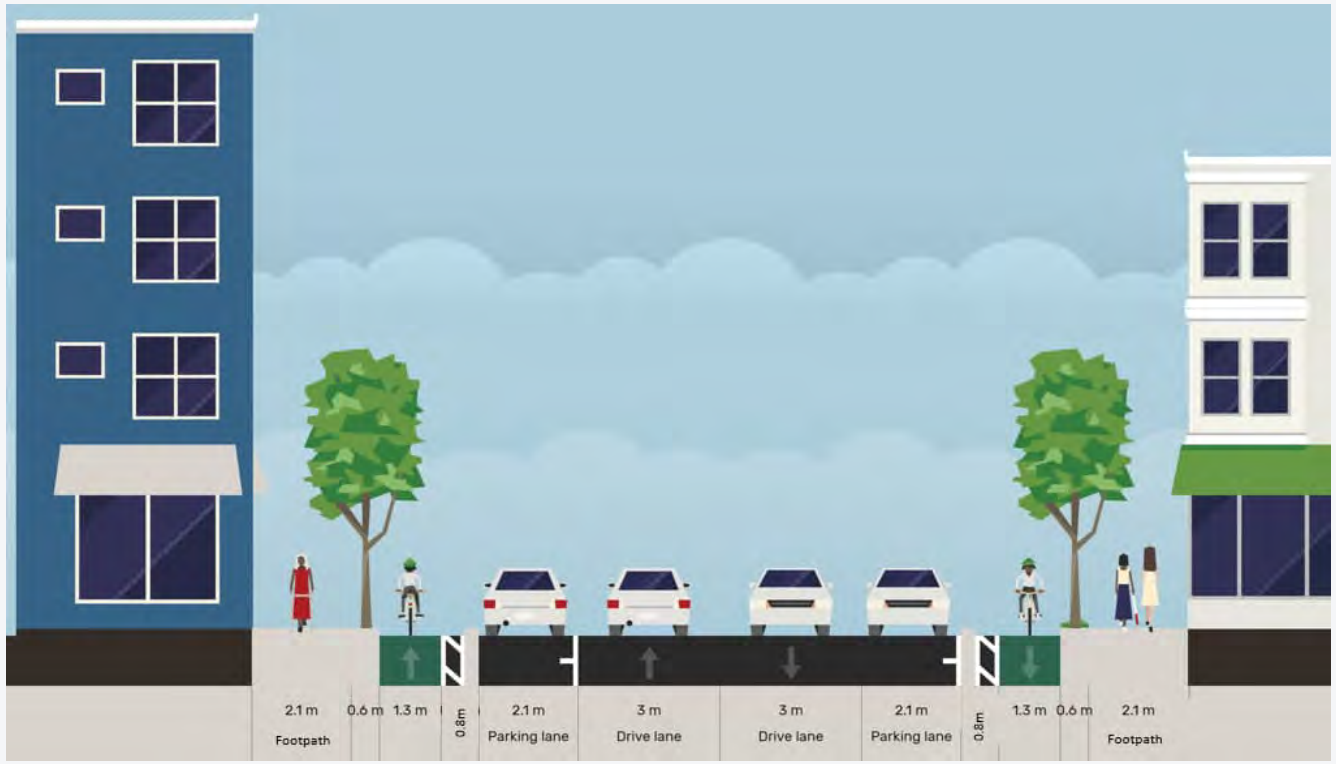
The proposed typical arrangement of Option 2 comprises:

- 1.3 m protected bicycle lanes on north and south sides adjacent to existing kerb. This meets the min. width required by CoPP, but does not allow for overtaking or use by cargo bikes
- Physical Separation buffers between bicycle lanes / parking where practicable
- 2.1 m wide parking adjacent to bicycle lane buffer on north and south sides
- Central 2 x 3.0 m traffic lanes.

At intersections requiring an additional right turn lane, an additional travel lane can be added.

Option 2 adopts a 1.3 m protected bicycle lane width. Physical separation buffers are currently proposed to provide prominent delineation between the bicycle rider and parked vehicles. A 300mm kerb is proposed adjacent to the parking lane to physically exclude vehicles from the bicycle lane. A 500mm painted buffer is to highlight a likely 'dooring' area

However, this arrangement with narrow bicycle lanes may limit bicycle rider maneuverability and cause bottlenecks. AGRD Part 3 Section 4.9.5 specifies that a 2.0 m minimum width is to be provided for protected lanes to allow for overtaking. This desirable minimum width cannot be practicably achieved – widening the cross section would impact a significant amount of verge side utilities, poles and trees.



Future Cross Sections for Consideration

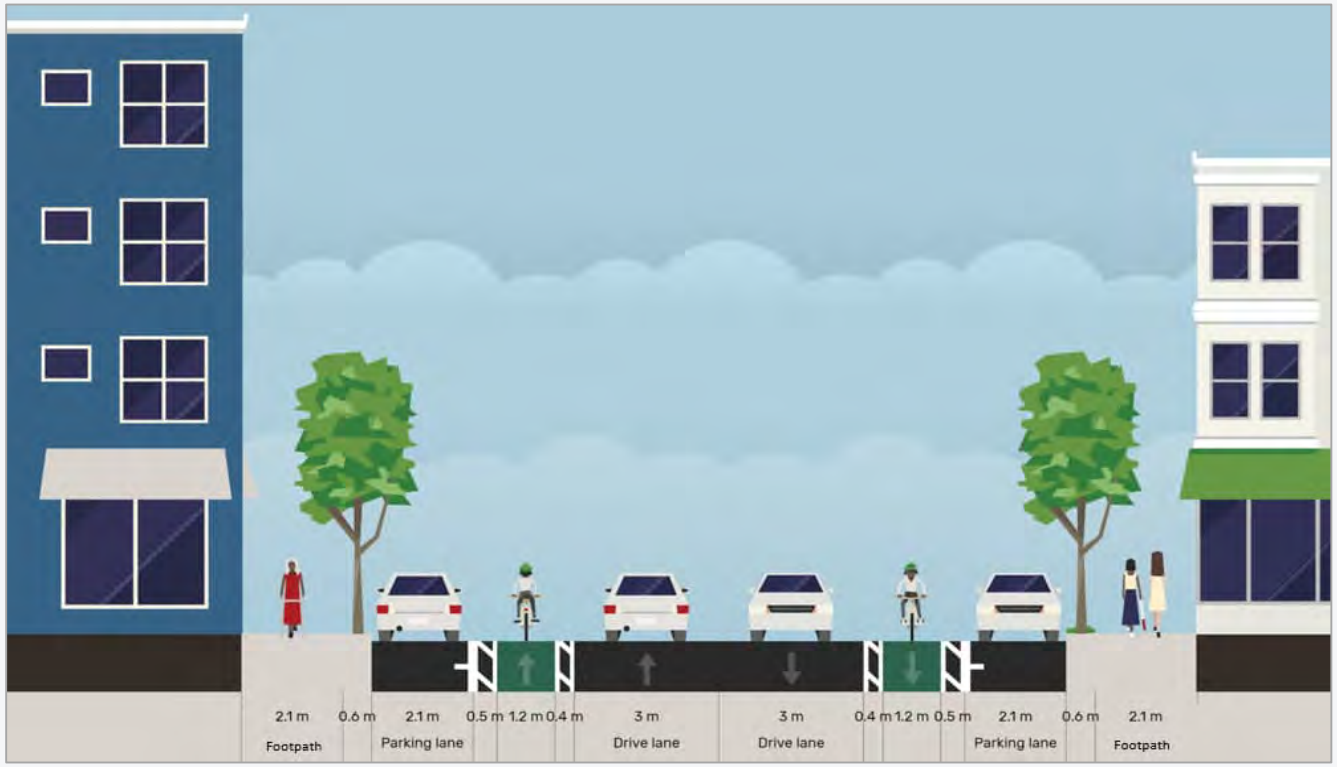
Option 3

The proposed typical arrangement of Option 3 comprises:

- 2.1 m wide parking on north and south sides adjacent to existing kerb
- Painted buffers between parking / bicycle lanes (0.5 m) and bicycle lanes / traffic lanes (0.4 m)
- 1.2 m bicycle lanes on north and south sides adjacent to painted parking buffer
- Central 2 x 3.0 m traffic lanes

At intersections requiring an additional right turn lane, an additional travel lane can be added.

Option 3 adopts the absolute minimum bicycle lane width permitted by Council and narrow painted buffers. The absence of physical buffers does not limit bicycle rider's maneuverability. Bicycle riders will be able to traverse the painted buffers, potentially crossing into the adjacent traffic lane, to overtake another. This movement would increase the exposure of bicycle riders to cars as the narrow buffers already offer little separation to adjacent traffic and parking lanes. Bottlenecking may still persist as an issue where there are inexperienced bicycle riders lacking the confidence to undertake this movement.



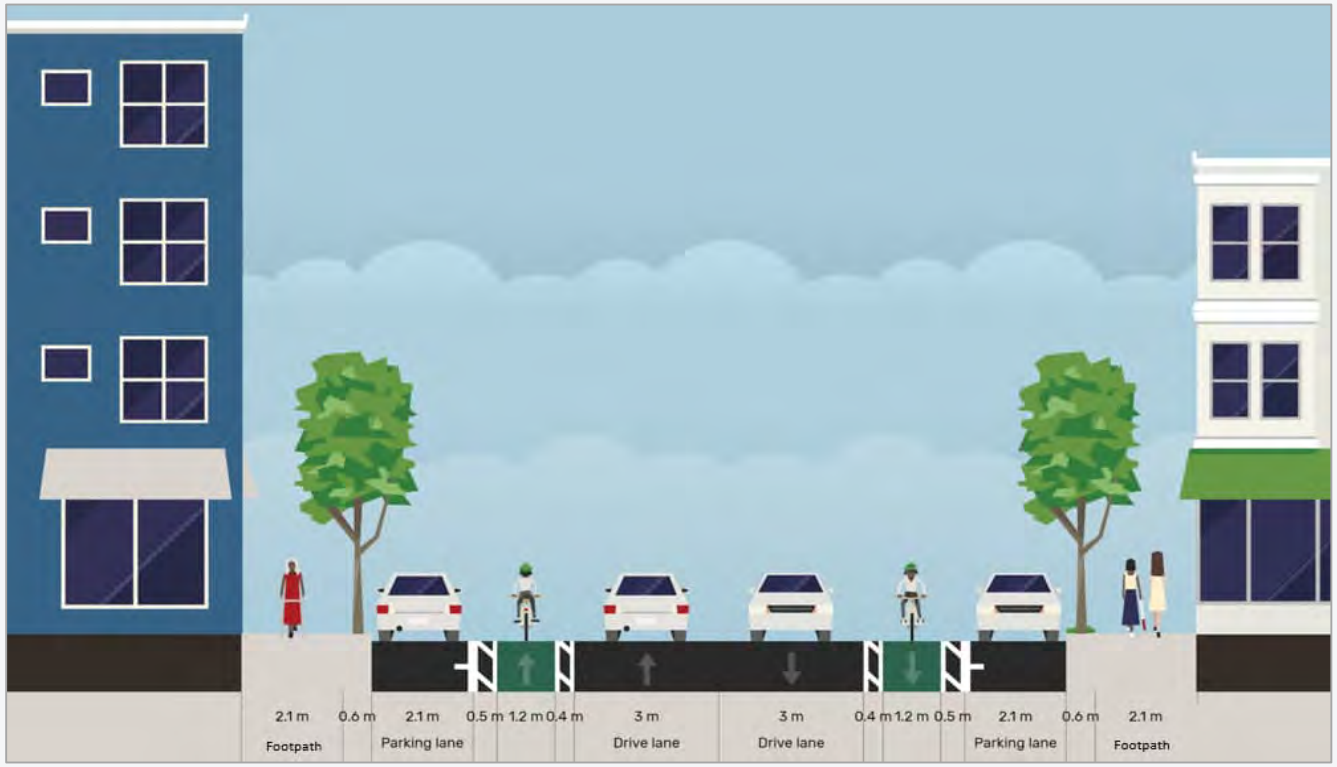
Future Cross Sections for Consideration

Option 3A

The proposed typical arrangement of Option 3A is the same as Option 3, and comprises:

- 2.1 m wide parking on north and south sides adjacent to existing kerb
- Painted buffers between parking / bicycle lanes (0.5 m) and bicycle lanes / traffic lanes (0.4 m)
- 1.2 m bicycle lanes on north and south sides adjacent to painted parking buffer
- Central 2 x 3.0 m traffic lanes
- Retains existing parking offsets to driveways
- Reduced impact to parking near signalised intersections

At intersections requiring an additional right turn lane, an additional travel lane can be added.



Future Cross Sections for Consideration

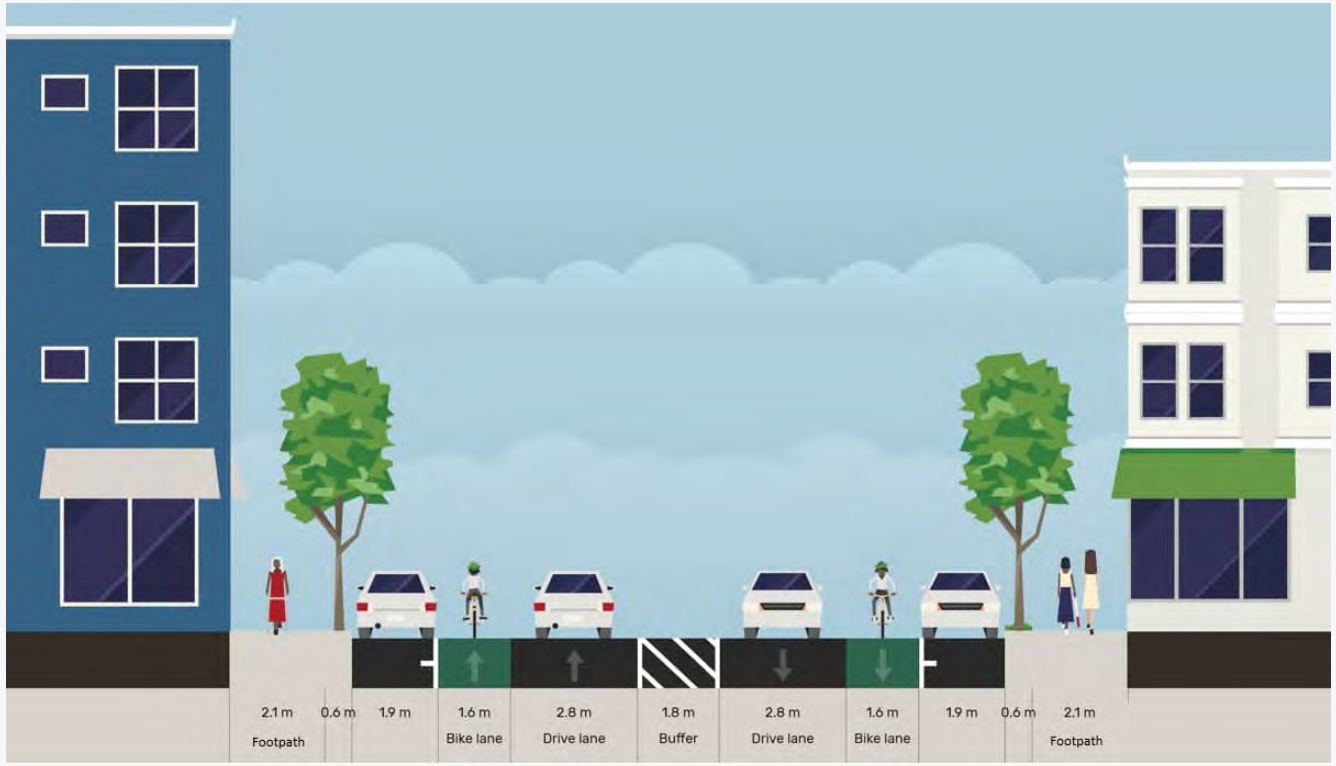
Option 4

Option 4 retains the typical arrangement of the existing conditions, which comprises of:

- 1.9 m wide parking on north and south sides adjacent to existing kerb
- 1.6 m bicycle lanes on north and south sides adjacent to vehicle parking
- 2 x 2.8 m traffic lanes
- Central 1.8 m buffer between the traffic lanes, providing painted separation and intermittent physical separation

Option 4 differs from the existing conditions by providing the following upgrades:

- 3 x mid-block road humps along Inkerman Street (east of Marriot Street; between Young Street and Blenheim Street; and East of Malakoff Street)
- Hold lines at some side streets moved up to the bicycle lanes along Inkerman Street
- Raised threshold treatments and crossing points on Nelson Street and Raglan Street



3. Basis of Assessment

- Movement and Place Framework
- Speed Environment
- Side Road Treatment
- Parking Impacts
- Intersection Performance
- Access and Maintenance
- Crash History
- Safe System Framework

Movement and Place Framework

The Inkerman Safe Travel Corridor between Hotham Street and St Kilda Road is characterised by low volume and free flowing vehicle traffic with few large trucks. The corridor segments are enclosed by residential buildings, clusters of commercial activity, and visually interesting features found in the variety of architectural styles and build forms. The study area features activity centres, and heritage and community buildings that act as landmarks for CoPP, with some providing key services for the entire region.

The current performance of the corridor within the study area meets or exceeds minimum targets for travel speed, interchange accessibility, user experience, and the environment. However, it is does not meet the aspirational and functional requirements set out in the Movement and Place framework for movement by bicycle riders and pedestrians, place safety and comfort, and road safety.

Theme	Indicator	Minimum LoS Score	Existing LoS Score	Gap
Movement	Cyclist stress	B	D	Lack of protected bicycle lanes and moderately high traffic speeds.
	Interchange accessibility	C	C	Opportunity to improve interchange facilities by providing more street furniture, shelter and wayfinding.
	Pedestrian delay	B	D	Lack of designated mid-block crossing opportunities.
	Travel Speed	D	A	Opportunity to increase safety and comfort for all road users with a reduction in traffic speed
Place	Safety and comfort	C	C	Limited use of street furniture and outdoor amenities.
	User Experience	C	C	Lack of wayfinding to promote the cycling corridor. Poor tree canopy cover for trees on public land.
Road Safety	Crash history	A	C	Moderately high traffic speeds and lack of active transport-friendly corridor treatments.
Environment	General Environment	C	C	Opportunity to increase tree canopy cover and to increase number of people walking and bike riding.

Speed Environment

The posted and design speeds for the corridor is proposed to reduce from 50km/h to 40km/h for all options. This will create a similar speed environment to the central city areas, which has led to a reduction in crashes each year without significantly affecting vehicle travel speeds.

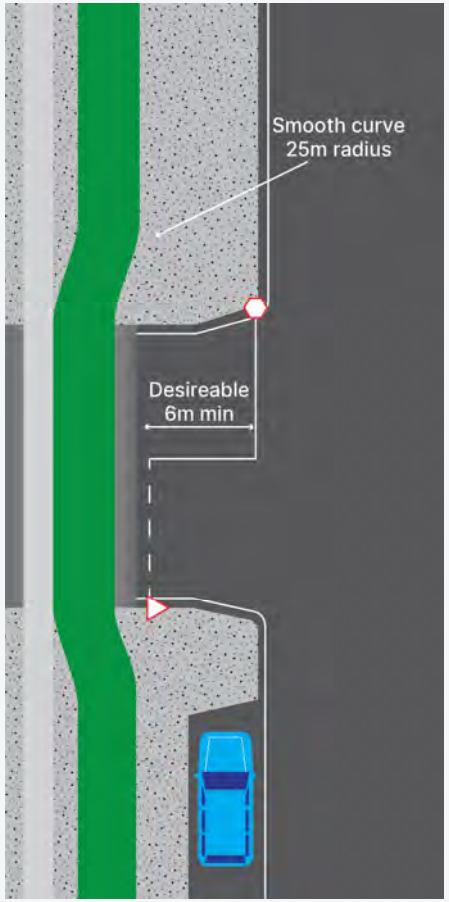
A change to the speed limit can be supported under the VicRoads guidelines, which states a 40km/h limit may be applied to local urban streets which are identified as bicycle priority routes in a plan adopted by a council.

There is evidence that reducing speed limits on roads shared by different types of road users, leads to significant improvements to safety for all users, as well as improving the attractiveness of the road to users other than vehicles.

The default design speed for bike riders is 30 km/h and limits how much curvature there is in bicycle lanes especially at side streets.

Design Input	Value	Reference	Notes
Posted Speed Limit	40 km/h	CoPP	Proposed change by CoPP. Current posted speed limit is 50km/h.
Design Speed (Vehicles)	40 km/h	n/a	Equal to proposed posted speed limit
Design Speed (Rider)	30 km/h	ARGD Part 3	Default design speed
Reaction Time	2.0 seconds	ARGD Part 3 Table 5.2	Urban environment, alert drivers
Safe Intersection Sight Distance	73m	ARGD Part 4 Table 3.2	Measured 5.0m (3.0m min) back from conflict point. Not adjusted for grade.

Side Road Treatments

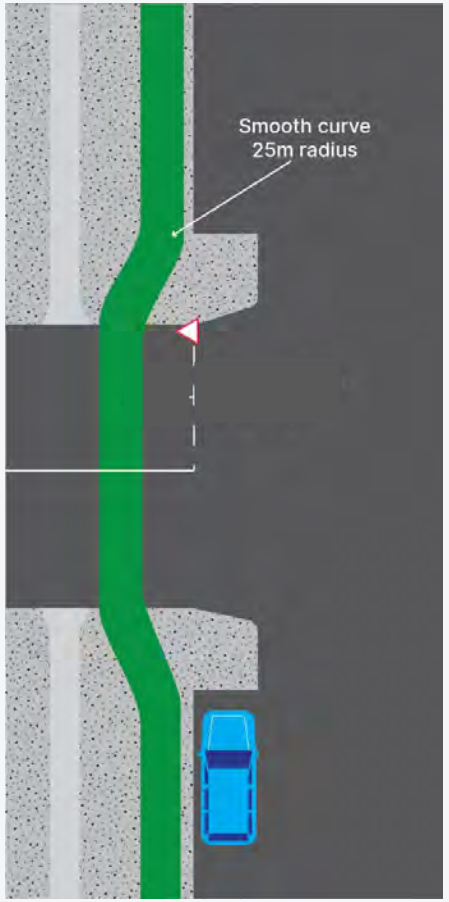


Raised Treatment

Bicycle path and footpath are located on platform across the carriageway to provide a level crossing point.

It is desirable to allow 6m minimum from the stop bar at the intersection to ensure cars are not queuing on the platform.

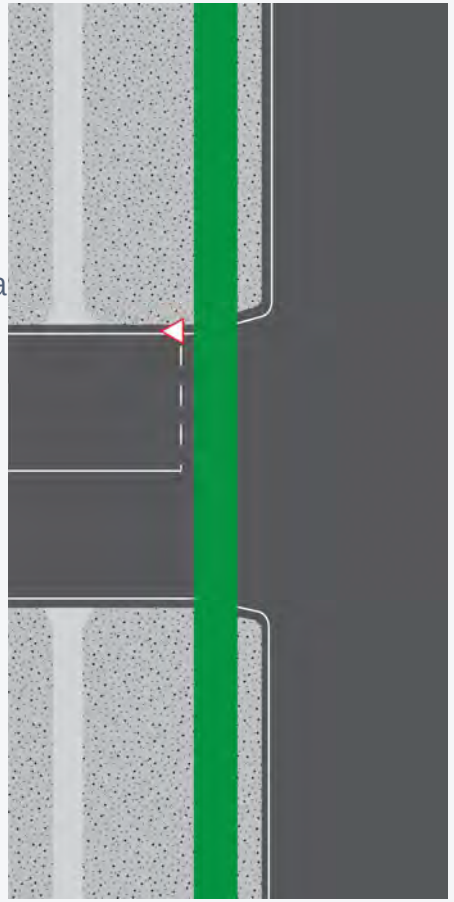
The curve radius of the bicycle lane should be a minimum of 25m.



Bent-In Treatment

Bicycle lane curves to cross the road in front of the side street control bar.

The curve radius of the bicycle lane should be a minimum of 25m.



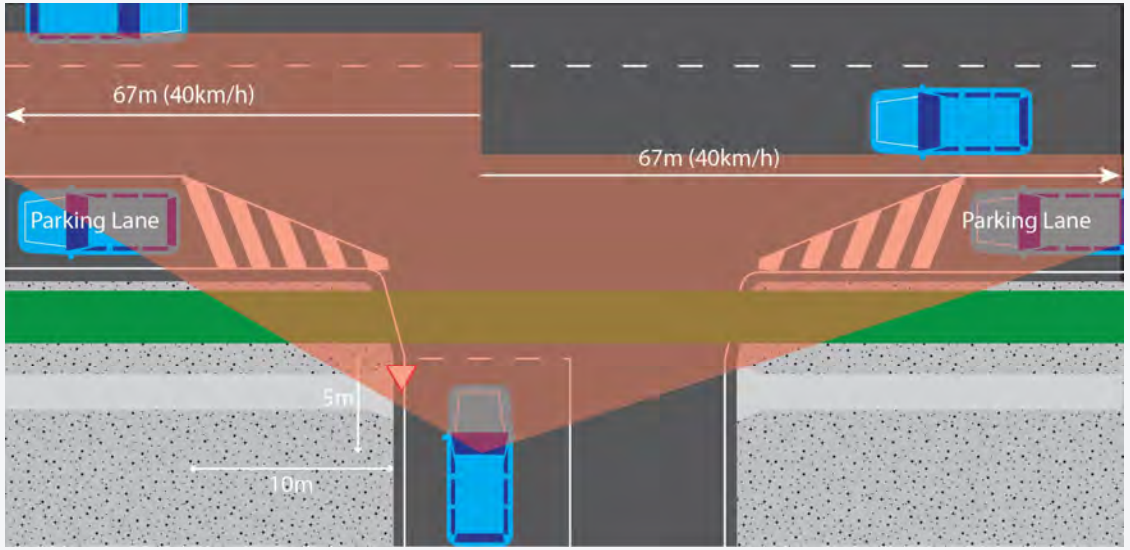
Straight Treatment

Bicycle lane crosses in front of the side street control bar, in a straight line of travel.

Option does not allow for on-street parking near the intersection.

Side Road Treatments – Sight Distances

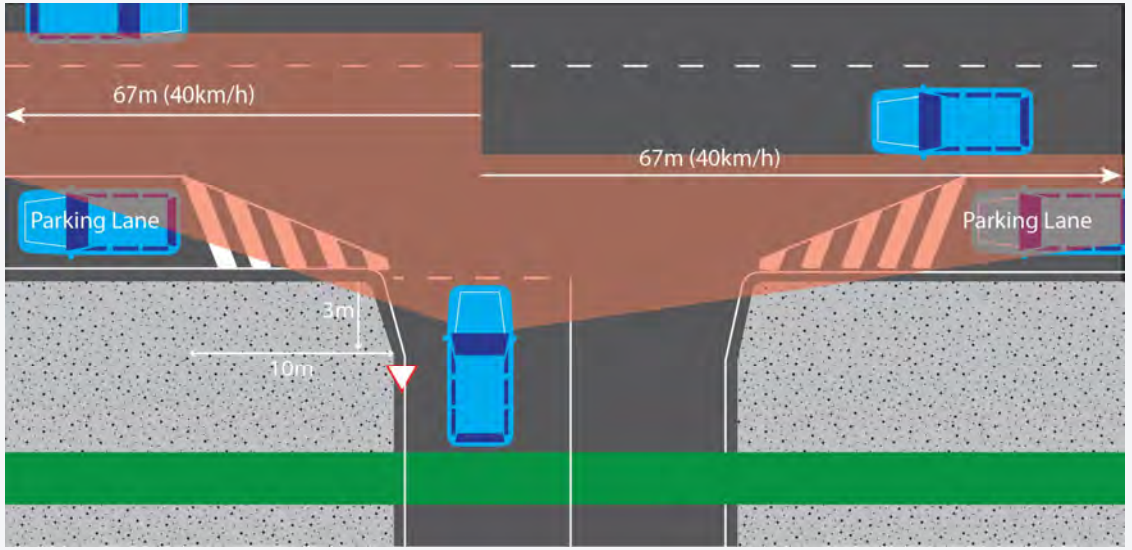
In – Line (straight and bent-in treatments)



In-line (Straight and Bent-In typologies)

Assumes that parking will continue to exist inside the sight distance triangle, and visibility of oncoming traffic over bonnets and between parked vehicles will continue to be relied upon. Similar to driveways, under an 'in-line' arrangement, there is risk of drivers propping across the bicycle lane when waiting for a gap to exit the side road.

Offset – (raised treatment)



Offset (Raised typologies)

When bicycle lanes are offset into the side road, this increase the ability of vehicles to prop clear of the bicycle lance before entering Inkerman Street.

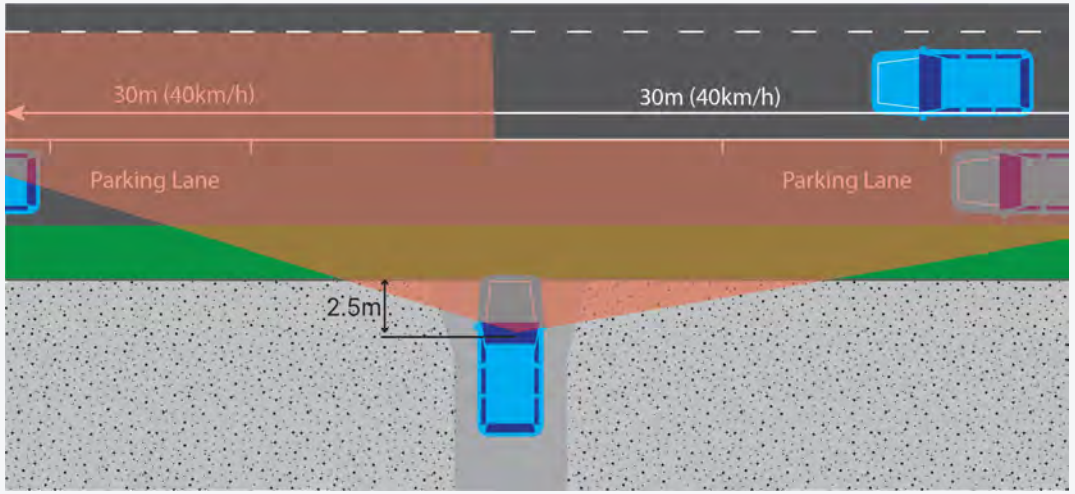
Compared to the 'Straight' and 'Bent-in' options, sight distance to oncoming traffic is improved, as well as providing space for vehicles to stop clear of the bicycle lane. This is also an improvement compared with the existing conditions.

Parking Changes at Driveways

Driveway sight distance principles

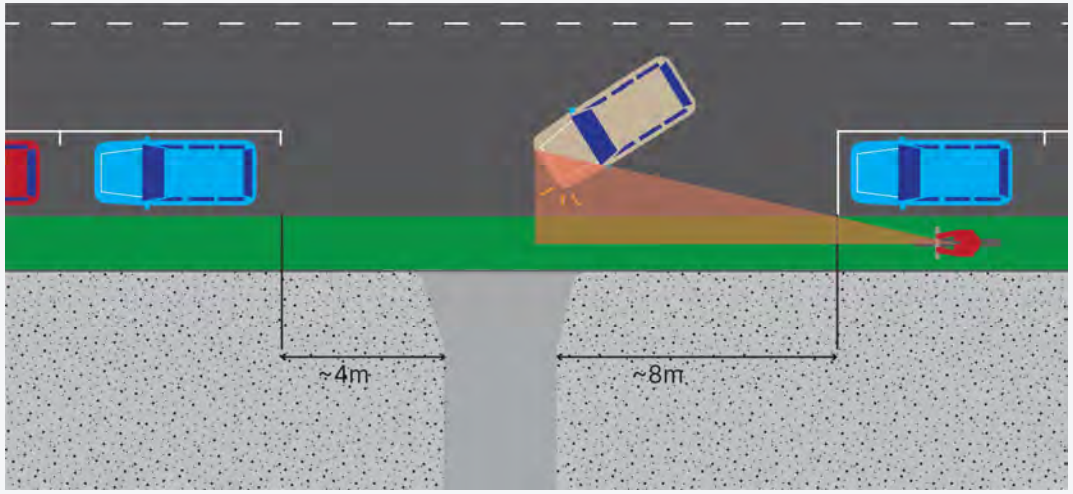
The Australian Standards specify that at driveways, a sight distance of 30m should be provided in either direction for exiting vehicles. This typically only applies to fixed and permanent obstructions. Currently, parking is permitted in close proximity to driveway entries for most local streets, and this visibility is assumed to be achieved over bonnets, between cars, and through windows and it is not proposed to restrict parking on this basis.

There is a risk that 'flipping' the order of parking and bicycles creates new hazards. For example, that drivers prop across the bike lane when exiting, to sight oncoming traffic, or that entering vehicles do not sight oncoming cyclists. The safety of these interactions may be dependent on both the width of the separator and offset distance between the edge of driveway and parked cars.



Adopted Basis of Assessment (Options 1 to 3)

The basis of assessing parking impact is that there will be one less parking space between each consecutive driveway. This would increase the offset from around 1m to around 4m, accommodating vehicle swept paths to/from driveways. It should be noted that this distance is less than would be required to judge a 2.5 second gap in cyclists travelling at 30km/h, and has been adopted to balance safety for all road users and minimize loss of parking. As such, it is assumed that if a cyclist has not been sighted in advance by the driver on approach (based on gaps in parking); that the rider is travelling more slowly or is able to modulate their speed to avoid a collision. The familiarity of residential access along Inkerman Road may aid better driver awareness..

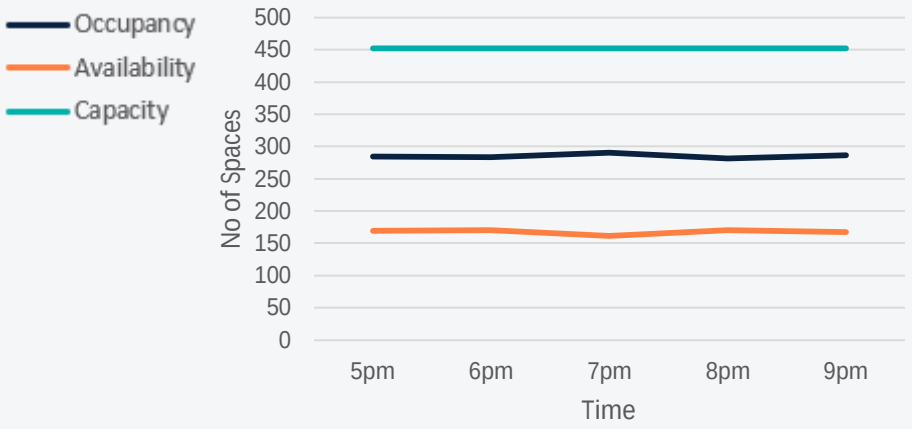


Parking – Existing Conditions

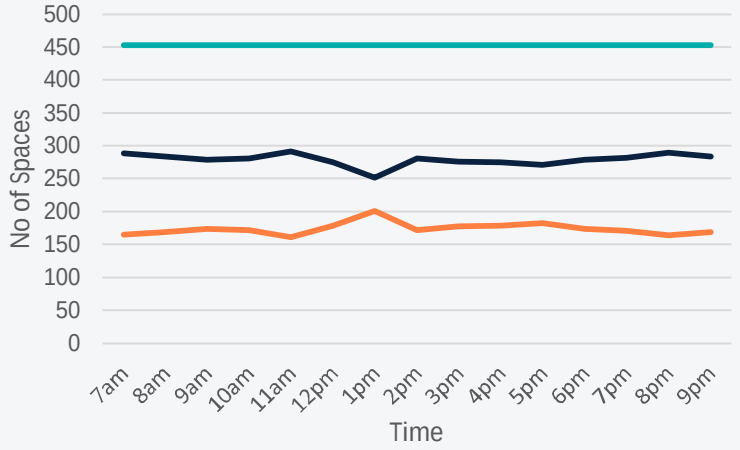
On-street parking surveys were undertaken on 18, 19, and 22 February 2022.

The surveys identified parking supply and occupancy rates for Friday, Saturday (weekend peak) and Tuesday (mid week peak) conditions.

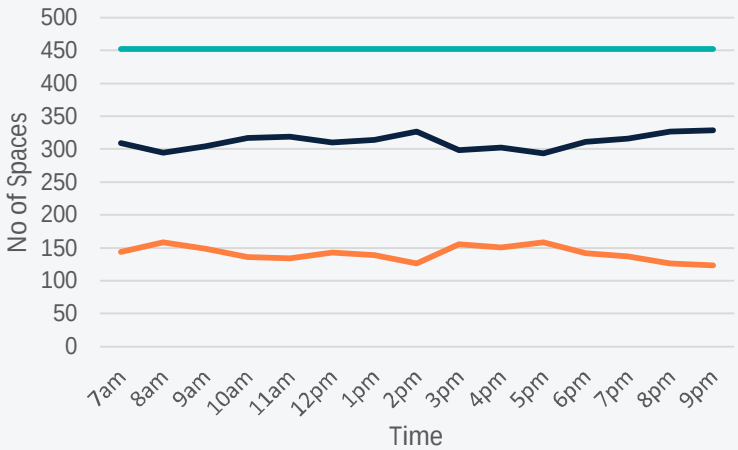
There are 453 spaces located less than 3min walk (100m) from the project area, with 180 spaces on Inkerman Street along the project extent (St Kilda Road to Hotham Street).



Friday Side Road Parking Occupancy Rates



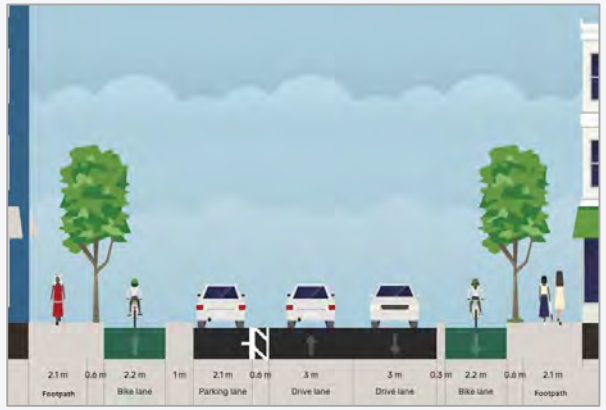
Saturday Side Road Parking Occupancy Rates



Tuesday Side Road Parking Occupancy Rates

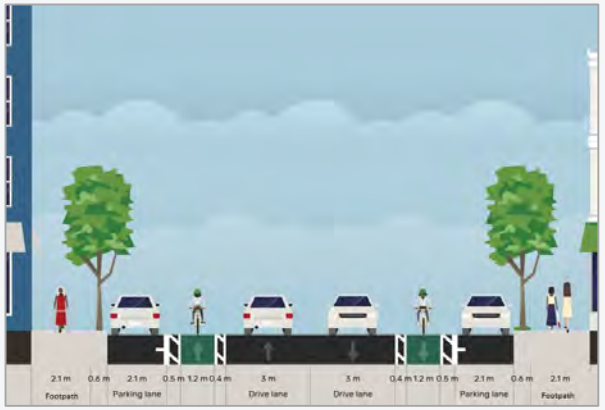
Parking Changes

Type	Existing Spaces	Option 1	Option 2	Option 3	Option 3A	Option 4
Inkerman Street (St Kilda Road to Hotham Street)	180	62	107	116	160	180
Surrounding Area - located less than 3min walk (100m)	453	453	453	453	453	453
Total	633	515	560	569	613	633

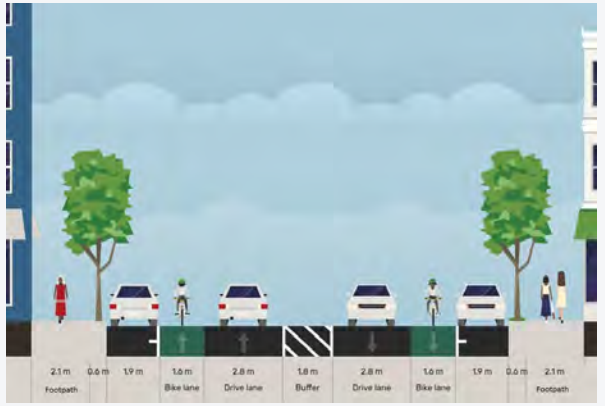


Option 1

Option 2



Option 3 & Option 3A



Option 4

Parking Impacts

Parking impacts have been assessed for the three distinct sections of Inkerman Street. The existing Inkerman Street and side road parking demand for each peak period has been assessed for each option.

Section 1: St Kilda Rd to Chapel St

Type	Spaces	Average Occupancy				Maximum Occupancy			
		Friday	Saturday	Tuesday	Combined	Friday	Saturday	Tuesday	Average
Concept Option 1	124	93%	95%	>100%	96%	99%	>100%	>100%	>100%
Concept Option 2	144	80%	82%	86%	83%	85%	93%	93%	93%
Concept Option 3	150	78%	80%	84%	81%	83%	91%	95%	90%
Concept Option 3a	164	70%	72%	76%	73%	75%	82%	87%	81%
Concept Option 4	172	67%	69%	72%	69%	72%	78%	83%	78%

Section 2: Chapel St to Westbury St

Type	Spaces	Average Occupancy				Maximum Occupancy			
		Friday	Saturday	Tuesday	Combined	Friday	Saturday	Tuesday	Average
Concept Option 1	258	66%	70%	78%	72%	68%	77%	89%	78%
Concept Option 2	277	62%	65%	73%	67%	63%	72%	83%	73%
Concept Option 3	281	61%	64%	72%	66%	62%	71%	81%	72%
Concept Option 3a	295	58%	61%	68%	63%	59%	67%	78%	68%
Concept Option 4	301	57%	60%	67%	62%	58%	66%	76%	67%

Section 3: Westbury St to Hotham St

Type	Spaces	Average Occupancy				Maximum Occupancy			
		Friday	Saturday	Tuesday	Combined	Friday	Saturday	Tuesday	Average
Concept Option 1	133	76%	72%	84%	78%	80%	83%	93%	85%
Concept Option 2	139	73%	69%	81%	75%	76%	79%	89%	82%
Concept Option 3	138	73%	69%	81%	75%	77%	80%	90%	82%
Concept Option 3a	154	65%	62%	73%	67%	69%	71%	81%	74%
Concept Option 4	160	63%	60%	70%	65%	66%	69%	78%	71%

Section 1: St Kilda Rd to Chapel St

Section 2: Chapel St to Westbury St

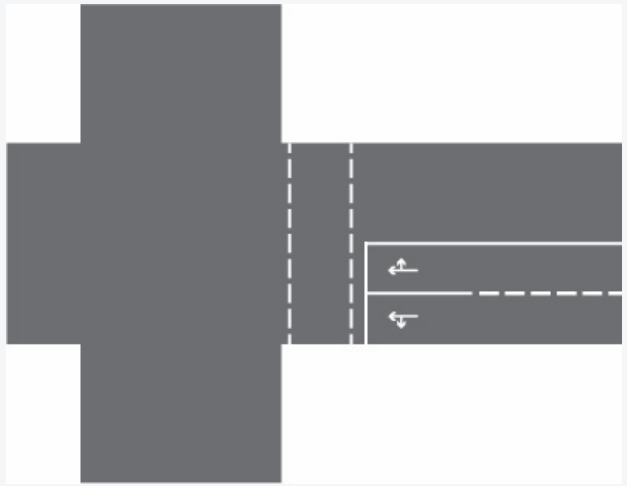
Section 3: Westbury St to Hotham St

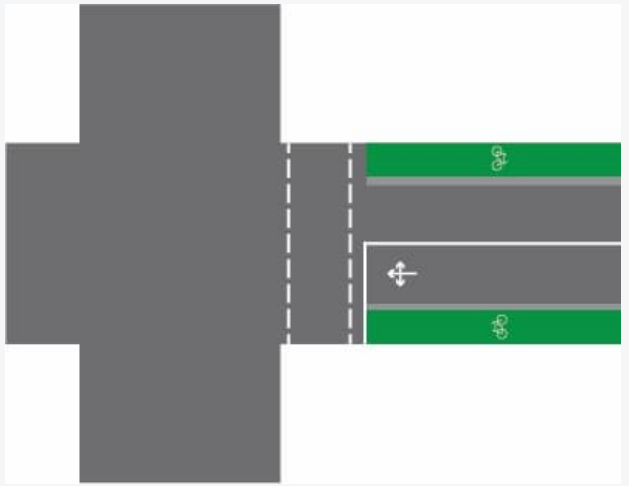
Intersections – Signals

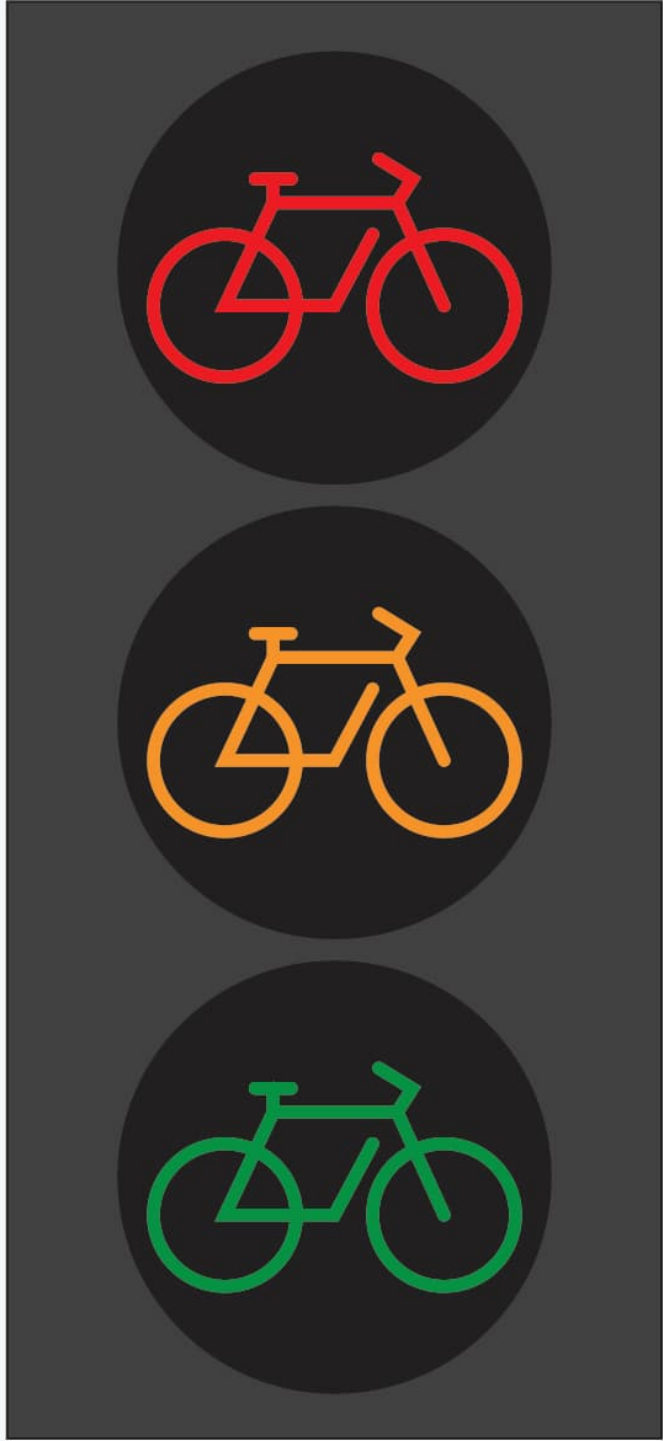
To provide improved safety at signalized intersections with separated cycling facilities, the addition of cycling lanterns should be installed. The provision of cycle lanterns allows for green time to be allocated to bicycle riders to reduce conflicts with left-turning vehicles, by providing a head start on the bicycle rider's movement. Council's preferred position is to provide a head start for pedestrian and bicycle rider's movements at signalised intersections along the corridor.

Including cycle lanterns at signals legitimises bicycle rider movements and priority over left-turning vehicles when both signals are green outlined in Road Rule 62(1)(b) with signal programming at intersections ultimately decided by the Department of Transport (VicRoads).

In order to prioritise bicycle rider movements safely at signalised intersections where dedicated left-turning lanes have been provided with an unfiltered left turn, it may be required to combine lanes to create enough physical separation between bicycle riders and conflicting car movements.







Intersection Performance

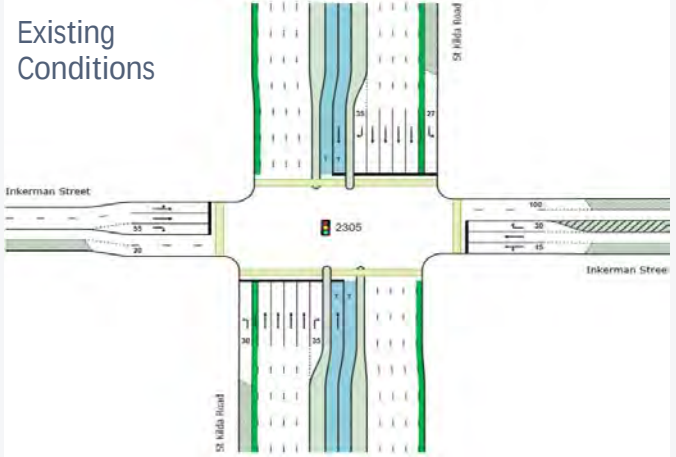
Demand = the number of vehicles arriving during the peak hour that pass the stop line.

DoS = Degree of Saturation is the ratio of demand to lane capacity. Where DoS exceeds 1, that lane is operating above capacity and likely to be experiencing long queue/delays. Values greater than 0.9 are considered above practical capacity.

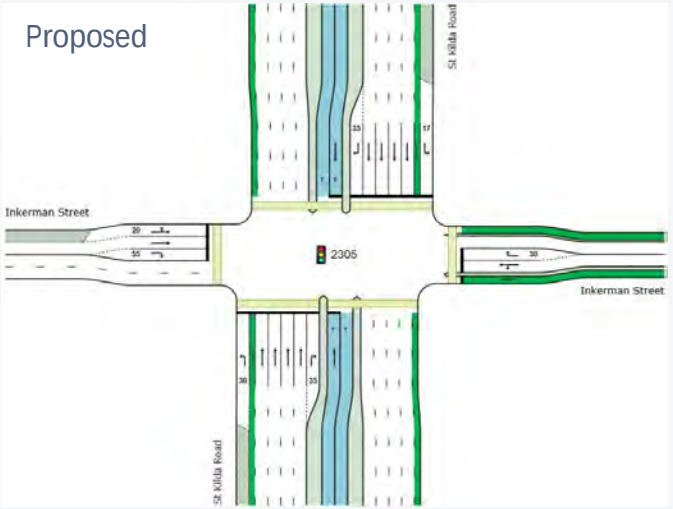
LOS = Level of Service is a measure of average delay per vehicle against DoT modelling guideline values.

Inkerman Street and St Kilda Road

Existing Conditions



Proposed



Approach	Scenario	Demand	DoS	LOS
South	Existing	3079 (2406)	0.978 (0.765)	F (D)
	Option	3079 (2406)	1.041 (0.945)	F (F)
East	Existing	450 (400)	0.682 (0.710)	E (D)
	Option	450 (400)	1.037 (0.891)	F (E)
North	Existing	1423 (2516)	0.600 (0.795)	D (D)
	Option	1423 (2516)	0.600 (0.945)	D (F)
West	Existing	559 (516)	0.988 (0.666)	F (E)
	Option	559 (516)	1.061 (0.809)	F (E)

AM VALUE / (PM VALUE)

	Existing		Option	
	AM	PM	AM	PM
Average Delay (sec)	73	48	123	79
Maximum Queue Lengths (m)	475	243	634	339
Average Travel Speed (km/hr)	20	26	14	19

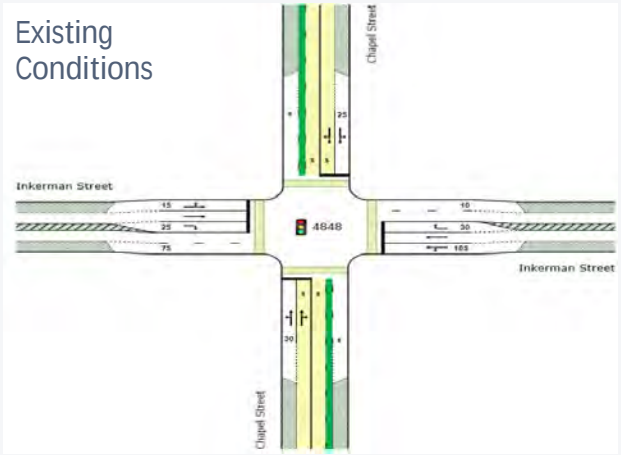
Existing = current intersection layout

Option = Options 1, 2 & 3 provide similar intersection footprints. Intersection modelling revealed each option resulted in the same performance. Results for one option only are presented

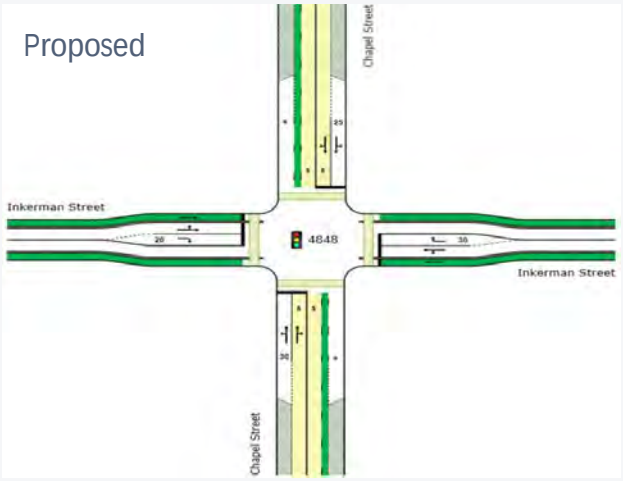
Intersection Performance

Inkerman Street and Chapel Street

Existing Conditions

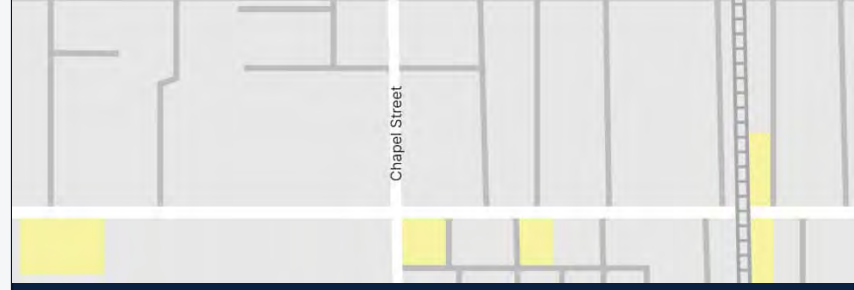


Proposed



Approach	Scenario	Demand	DoS	LOS
South	Existing	478 (479)	0.545 (0.668)	B (B)
	Option	478 (479)	0.776 (0.839)	C (C)
East	Existing	571 (565)	0.554 (0.648)	C (C)
	Option	571 (565)	0.794 (0.790)	C (C)
North	Existing	452 (527)	0.501 (0.678)	B (B)
	Option	452 (527)	0.672 (0.841)	C (C)
West	Existing	379 (597)	0.456 (0.614)	C (C)
	Option	379 (597)	0.499 (0.839)	B (C)

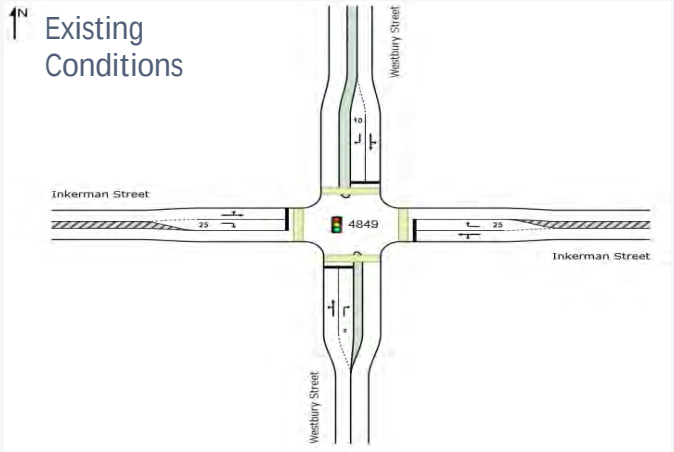
AM VALUE / (PM VALUE)

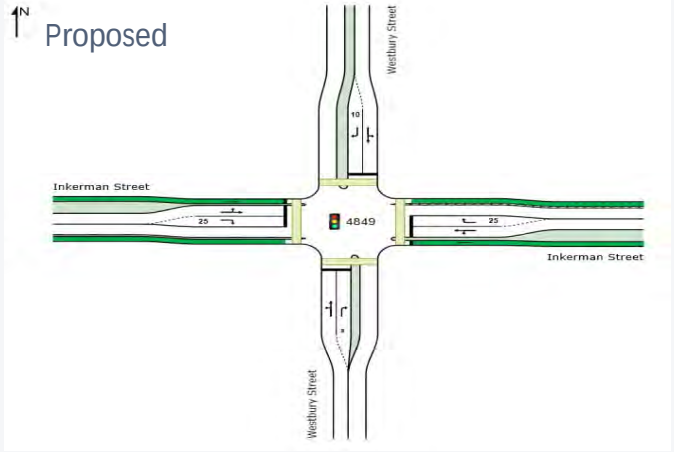


	Existing		Option	
	AM	PM	AM	PM
Average Delay (sec)	18	21	23	26
Maximum Queue Lengths (m)	70	83	110	113
Average Travel Speed (km/hr)	38	36	37	35

Intersection Performance

Inkerman Street and Westbury Street





Approach	Scenario	Demand	DoS	LOS
South	Existing	80 (129)	0.366 (0.421)	C (C)
	Option	80 (129)	0.363 (0.396)	C (C)
East	Existing	601 (540)	0.414 (0.388)	A (A)
	Option	601 (540)	0.474 (0.444)	A (A)
North	Existing	118 (149)	0.413 (0.422)	D (C)
	Option	118 (149)	0.435 (0.393)	D (C)
West	Existing	432 (598)	0.299 (0.442)	A (A)
	Option	432 (598)	0.325 (0.499)	A (A)

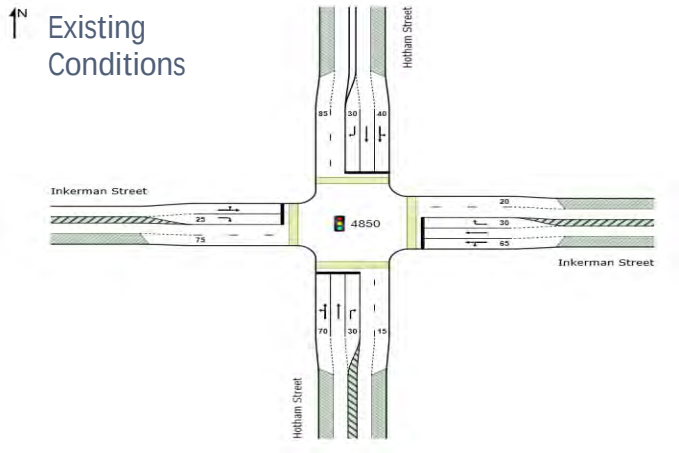
AM VALUE / (PM VALUE)

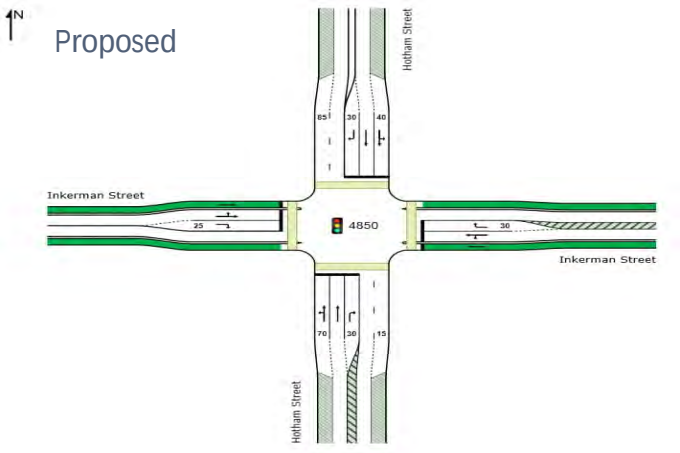
	Existing		Option	
	AM	PM	AM	PM
Average Delay (sec)	10	11	11	13
Maximum Queue Lengths (m)	53	60	61	74
Average Travel Speed (km/hr)	40	40	40	40

Speed limit at intersection

Intersection Performance

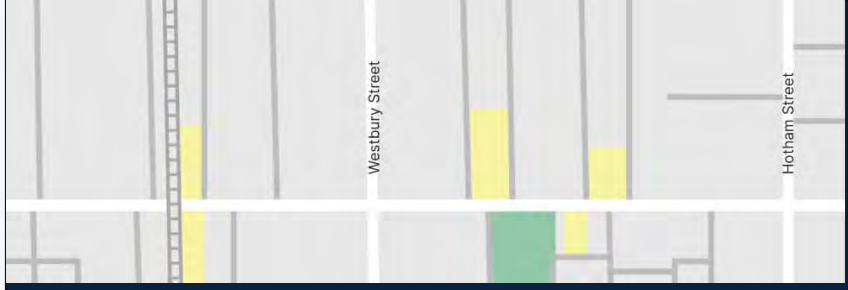
Inkerman Street and Hotham Street





Approach	Scenario	Demand	DoS	LOS
South	Existing	1078 (657)	0.770 (0.681)	C (C)
	Option	1078 (657)	0.929 (0.710)	D (C)
East	Existing	722 (474)	0.670 (0.435)	C (B)
	Option	722 (474)	0.932 (0.551)	D (C)
North	Existing	804 (936)	0.696 (0.591)	C (C)
	Option	804 (936)	0.818 (0.623)	C (C)
West	Existing	535 (583)	0.782 (0.685)	C (C)
	Option	535 (583)	0.661 (0.700)	C (C)

AM VALUE / (PM VALUE)



	Existing		Option	
	AM	PM	AM	PM
Average Delay (sec)	24	23	37	24
Maximum Queue Lengths (m)	157	116	255	119
Average Travel Speed (km/hr)	37	31	38	37

Access and Maintenance

Emergency Services

It is critical that emergency vehicles can travel freely along the corridor and are able to access all properties and areas in an efficient manner.

Each of the options do not impede emergency vehicle access along the corridor or the ability to complete a U-Turn.

Accessible Parking

Australian Standards set requirements for dimensions and access to and from accessible parking spaces. When considering parking adjacent bicycle, accessible parking spaces can be reinstated by

- breaks in the raised separator alongside the accessible parking space; and
- providing a pram ramp from the bicycle lane onto the footpath that is designed in accordance with Australian Standards.

Users of accessible parking spaces can then access their properties via the footpath as per existing conditions. It is noted that existing accessible parking provision on Inkerman Road is limited to areas adjacent commercial land uses and is located in side streets where possible.

Waste Collection & Street Cleaning

Current waste collection vehicles use a side-reach arm to collect bins from the edge of the carriageway, between parked vehicles.

With the introduction of protected bicycle lanes under Options 1 & 2, this method will become a safety hazard for bicycle riders.

CoPP is considering collection times to occur outside the traditional bike rider commuter peak.

Street cleaning operations will largely remain the same under Option 3. Options 1 & 2 excluding narrow protected bicycle lanes where a smaller cleaning vehicle may be required.

Crash History

Crash history data showing the locations of crashes between 2016 and 2021 along the corridor is shown on the image below.

Crashes have been categorised to show collision type:

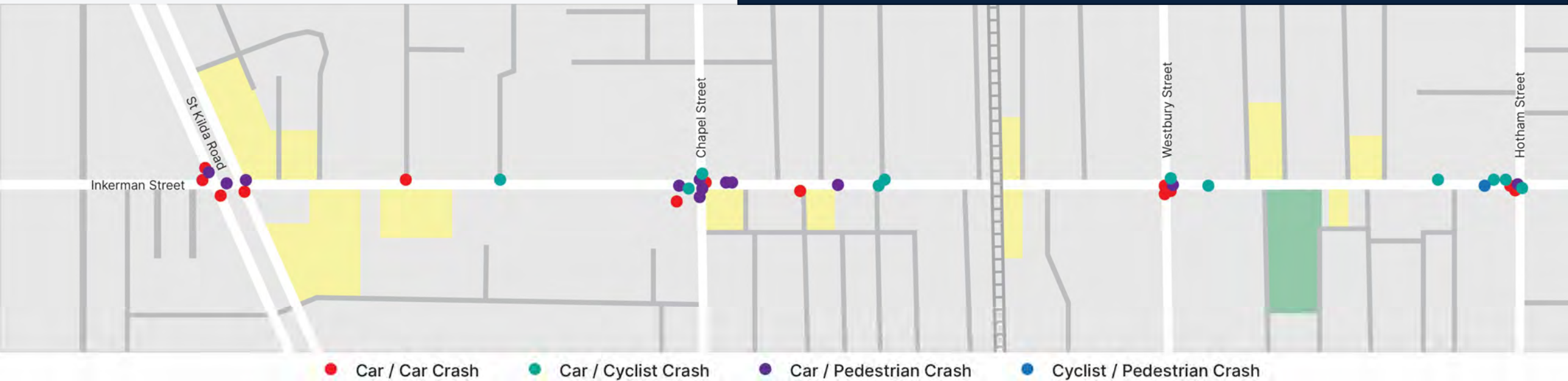
- Cars and other cars
- Cars and Bicycle Rider
- Cars and Pedestrians
- Bicycle Rider and Pedestrians

38
Total crashes along corridor in last 5 years

11
Involving a car and bicycle riders

12
Involving a car and pedestrian

1
Involving a bicycle riders and pedestrian

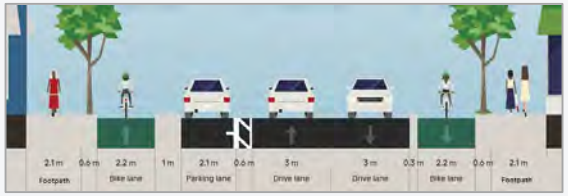


Safe Systems Assessment

The Safe System approach is a road safety philosophy that requires roads to be designed and managed so that crash-related death and serious injury are minimised.

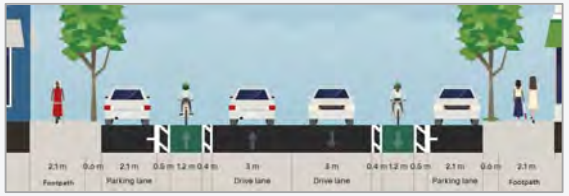
The project options were scored against the existing conditions to compare alignment with Safe System Principles. Each element comprises of an exposure, likelihood and severity score which results in a product score. Scoring is based on guidance provided in VicRoads Safe System Assessment Guidelines (2019). The lower the overall score, the better aligned the item is to Safe System Principles. The aim of the Safe System scoring is to reduce the total score towards zero.

Project Option 1 shows the greatest alignment with Safe System Principles and likelihood to achieve the Victorian Road Safety Strategy goal of reducing lives lost on Victoria's roads by half before 2030.



Option 1
(Kerbside bicycle lanes with parking on one side)

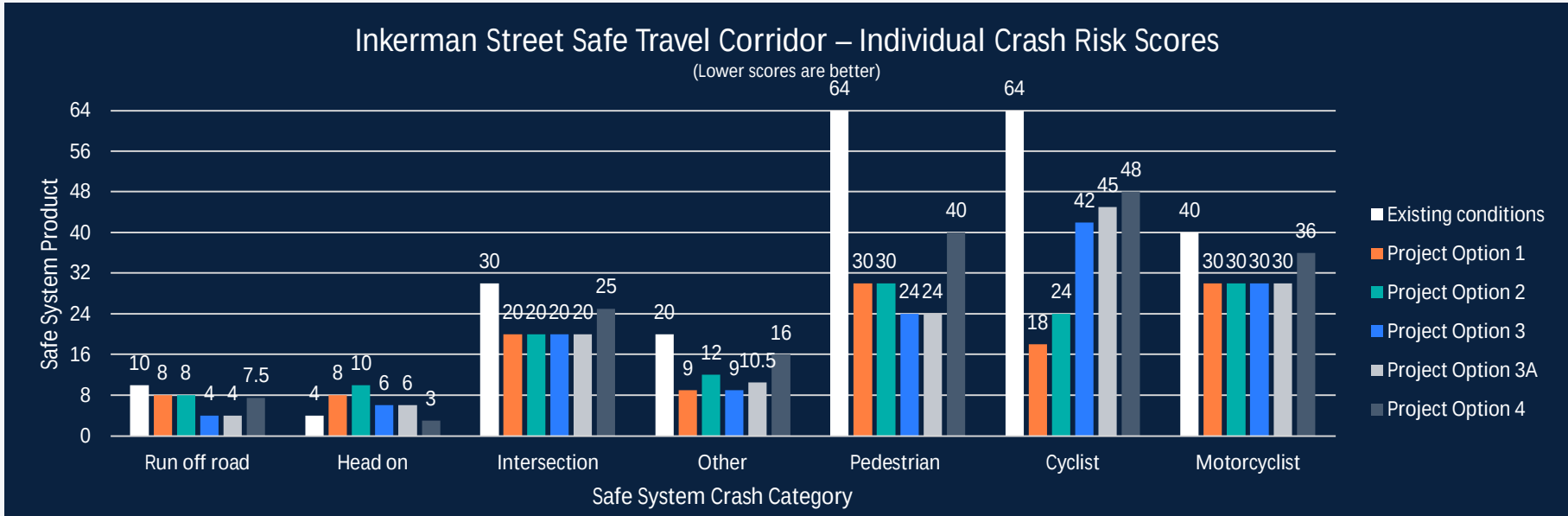
Option 2
(Kerbside bicycle lanes with parking on both sides)



Option 3 & Option 3A
(Kerbside parking on both sides with traffic-side bicycle lanes – Option 3A is the same, but with reduced parking impacts)

Option 4
(As per existing conditions, with minor traffic calming and safety improvements)

Inkerman Street Safe Travel Corridor – Overall Safe System Assessment (/448) (Lower scores are better)	
Existing Conditions	232
Project Option 1	123
Project Option 2	134
Project Option 3	135
Project Option 3A	139.5
Project Option 4	175.5



4. Multi-criteria Assessment

Appraisal Framework

Appraisal Process

The options were assessed using Multi-Criteria Assessment against the following criteria categories, with each category containing multiple sub-criteria. Evaluation is carried out for each option based on the scale of Positive to Negative effects for each sub-criteria

Appraisal Criteria

Seven themes have been used to develop a set of criteria to assess each section of the corridor and concept

Safety

The corridor plan should provide a safe place for people of all ages and abilities to ride. It should consider conflicts with vehicles, driveways and how bicycle lanes interact with side streets, while maintaining a safe environment for all road users.

Comfort / Attractiveness

The corridor plan should aim to improve the overall user experience for users of all ages, abilities and trip purposes.

Providing attractive connections encourages more people to switch to active modes for a wider range of trip purposes.

Operation

The corridor plan should maintain current levels, or improve the level of service for waste collection, street cleaning, public lighting and compliance with standards for best practice.

Impacts to traffic operations, performance and access to properties should be minimised.

Social / Inclusion

The corridor plan should promote active transport along the corridor as a viable and attractive mode, connecting various land uses. The corridor plan should deliver an environment that is inclusive and accessible for all of the community.

Gender Impact

The corridor plan should provide a safe place for needs of women, men and gender diverse people.

It should create better and fairer outcomes, and make sure all people have equal access to opportunities.

Environmental

The corridor plan should deliver outcomes that can lead to reduced emissions generated by cars, health benefits associated with active transport and quieter transport corridors. It should also allow for greening of the corridor by allowing for more trees to be planted, canopies to be created and improve air quality.

Financial

Financial assessment of the corridor plan should consider more than just the capital costs to deliver. Benefits derived from reducing crashes causing serious injury between pedestrians, bicycle riders and vehicles and longer-term environmental costs should also be included in the assessment, along with ongoing maintenance costs.

Summary of Appraisal Criteria and Sub Criteria

Safety

- Pedestrian
- Bicycle Rider
- Vehicles
- Option Response to Crash History

Comfort / Attractiveness

- Level of Traffic Stress - Cyclist
- Pedestrian Attractiveness - Signalised Intersections
- Pedestrian Attractiveness - Midblock Crossings
- Bicycle rider's experience of traffic nuisance (noise, smell, air quality)

Operation

- CoPP Waste Collection and Street Cleaning
- Traffic flows and intersection performance
- Public Lighting compliance to design standards
- Access and delay to emergency vehicles
- Bicycle treatment compliance with design standards and guidelines and best practice

Social / Inclusion

- Inclusivity (hand cycles, recumbants, cargo bike, bike with trailer, etc)
- Resident (adjacent on street parking)
- Business, Community services and facilities impact (access & on street parking)
- Landscape, visual amenity and placemaking
- Disbenefits (impacts) to pedestrians and other modes of transport
- Alignment with Move, Connect, Live

Gender Impact

- Safety Aspects
- Flexible and inclusive use
- Driving and parking

Environmental

- Greening (inclusion and removal, trees with road space)
- Protection, maintenance and future installation of rain gardens
- Flood mitigation and impacts on drainage infrastructure

Financial

- Capital cost
- Benefit Cost Ratio (Cost vs Crash History Mitigation)
- Benefit Cost Ratio (Cost vs Volume of Cyclists)
- Ongoing maintenance

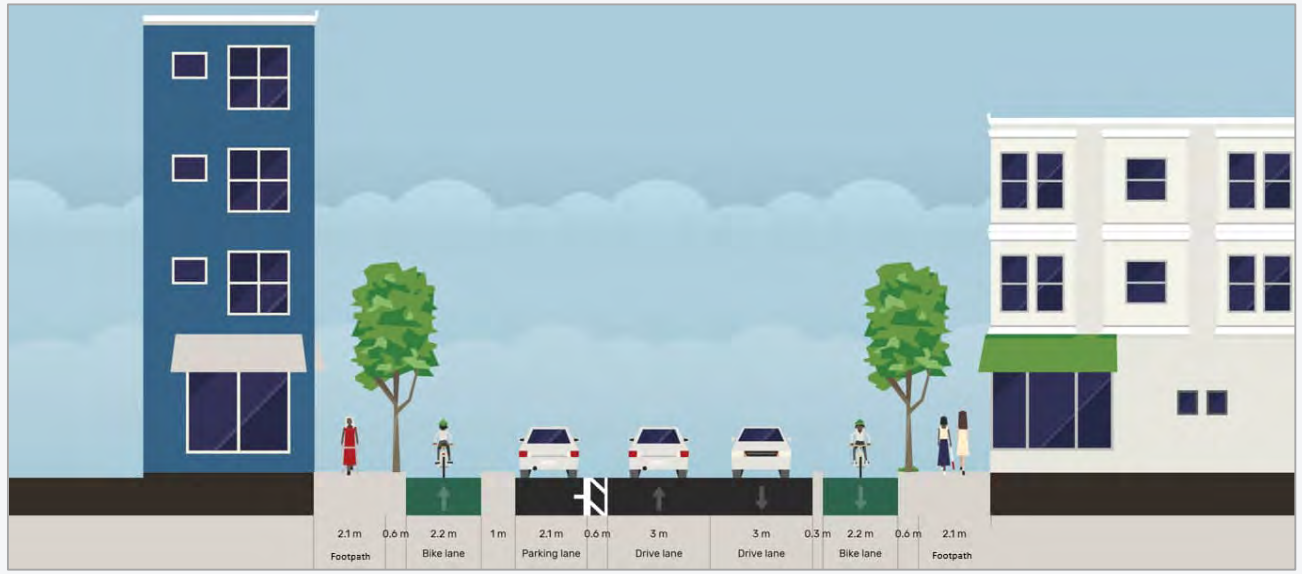
Evaluation Ratings

A 5-scale rating system has been developed drawing upon guidance from the Australian Transport Assessment and Planning Guidelines. For the nominated criteria, the performance of each option is assessed against of the existing condition or base case.

Rating Level	Description
Large Positive	Major positive effects resulting in significant and long term improvements / enhancements for the physical, social or economic environment. Benefits may extend beyond the scope of the project.
Moderate Positive	Moderate positive effects with potential short or medium term benefits to the existing physical, social or economic environment. Benefits may be in terms of new opportunities or outcomes of enhancement or improvement.
Neutral	No discernible or predicted positive or negative effects.
Moderate Negative	Moderate negative effects with potential short or medium term consequences. May require management strategies to mitigate negative effects.
Large Negative	Major negative effects with significant and long term consequences for the physical, social or economic environment. May require considering concept, design or location re-scope and extensive management strategies to mitigate negative effects.

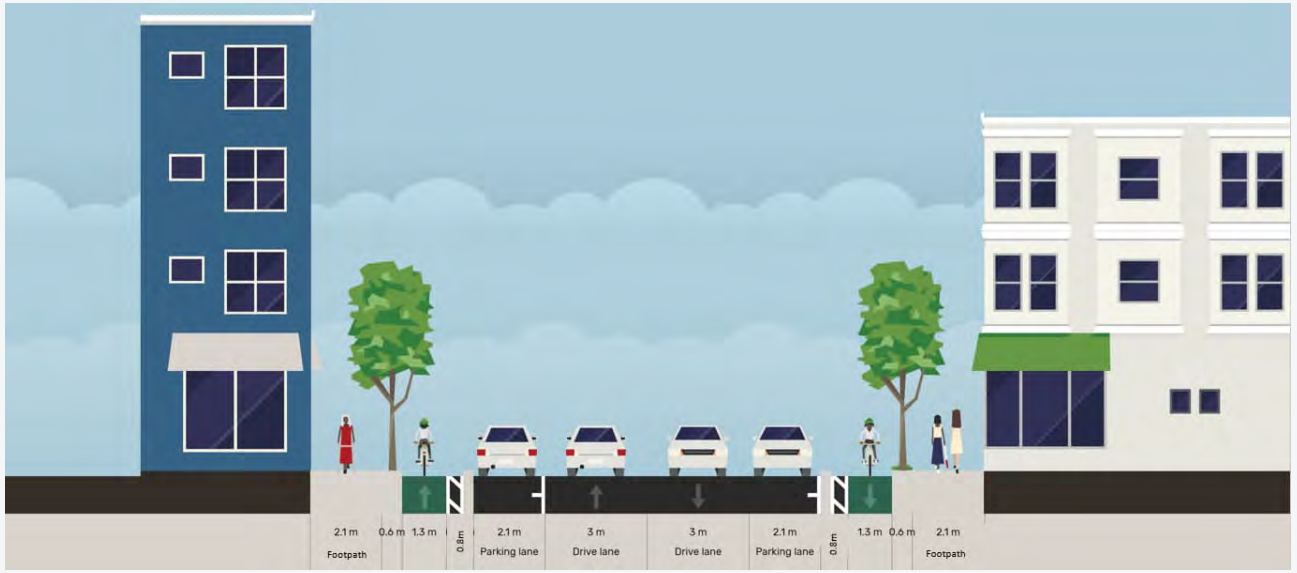
5. Options Appraisal

St Kilda Road to Hotham Street
Option 1



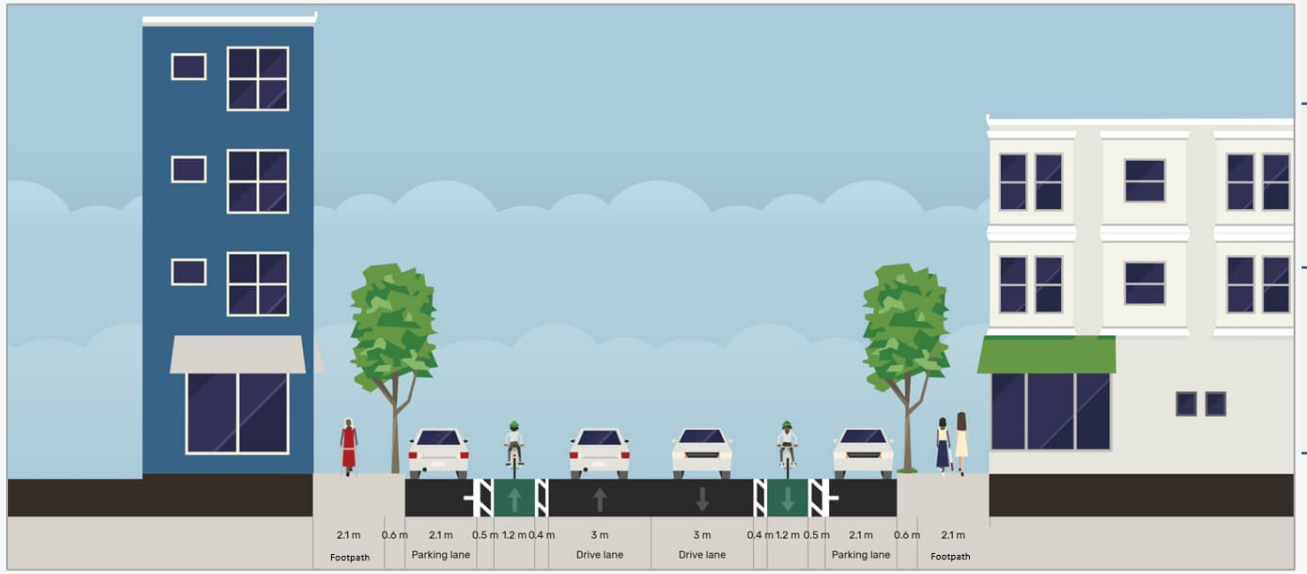
Theme	Criteria	Effect
Safety	Pedestrian	
	Bicycle Rider	
	Vehicles	
	Option Response to Crash History	
Comfort / Attractiveness	Level of Stress - Cyclist	
	Pedestrian Attractiveness - Signalised Intersections	
	Pedestrian Attractiveness - Midblock Crossings	
	Bicycle rider's experience of traffic nuisance (noise, smell, air quality)	
Operation	CoPP Waste Collection and Street Cleaning	
	Traffic flows and intersection performance	
	Public Lighting	
	Access and delay to emergency vehicles	
	Compliance with standards and best practice	
Social / Inclusion	Inclusivity	
	Residents access & on street parking	
	Business, Community services and facilities impact (access & off street parking)	
	Landscape, visual amenity and placemaking	
	Disbenefits (impacts) to pedestrians and other modes of transport	
	Alignment with Move, Connect, Live	
Gender Impacts	Safety Aspects	
	Flexible and inclusive use	
	Driving and parking	
Environment	Greening (inclusion and removal, trees with road space)	
	Protection, maintenance and future installation of rain gardens	
	Flood mitigation and impacts on drainage infrastructure	
Financial	Capital cost	
	Benefit Cost Ratio (Cost vs Crash History Mitigation)	
	Benefit Cost Ratio (Cost vs Volume of Cyclists)	
	Ongoing maintenance	

St Kilda Road to Hotham Street
Option 2



Theme	Criteria	Effect
Safety	Pedestrian	
	Bicycle Rider	
	Vehicles	
	Option Response to Crash History	
Comfort / Attractiveness	Level of Stress - Cyclist	
	Pedestrian Attractiveness - Signalised Intersections	
	Pedestrian Attractiveness - Midblock Crossings	
	Bicycle rider's experience of traffic nuisance (noise, smell, air quality)	
Operation	CoPP Waste Collection and Street Cleaning	
	Traffic flows and intersection performance	
	Public Lighting	
	Access and delay to emergency vehicles	
	Compliance with standards and best practice	
Social / Inclusion	Inclusivity	
	Residents access & on street parking	
	Business, Community services and facilities impact (access & off street parking)	
	Landscape, visual amenity and placemaking	
	Disbenefits (impacts) to pedestrians and other modes of transport	
	Alignment with Move, Connect, Live	
Gender Impacts	Safety Aspects	
	Flexible and inclusive use	
	Driving and parking	
Environment	Greening (inclusion and removal, trees with road space)	
	Protection, maintenance and future installation of rain gardens	
	Flood mitigation and impacts on drainage infrastructure	
Financial	Capital cost	
	Benefit Cost Ratio (Cost vs Crash History Mitigation)	
	Benefit Cost Ratio (Cost vs Volume of Cyclists)	
	Ongoing maintenance	

St Kilda Road to Hotham Street
Option 3



Theme	Criteria	Effect
Safety	Pedestrian	
	Bicycle Rider	
	Vehicles	
	Option Response to Crash History	
Comfort / Attractiveness	Level of Stress - Cyclist	
	Pedestrian Attractiveness - Signalised Intersections	
	Pedestrian Attractiveness - Midblock Crossings	
	Bicycle rider's experience of traffic nuisance (noise, smell, air quality)	
Operation	CoPP Waste Collection and Street Cleaning	
	Traffic flows and intersection performance	
	Public Lighting	
	Access and delay to emergency vehicles	
	Compliance with standards and best practice	
Social / Inclusion	Inclusivity	
	Residents access & on street parking	
	Business, Community services and facilities impact (access & off street parking)	
	Landscape, visual amenity and placemaking	
	Disbenefits (impacts) to pedestrians and other modes of transport	
	Alignment with Move, Connect, Live	
Gender Impacts	Safety Aspects	
	Flexible and inclusive use	
	Driving and parking	
Environment	Greening (inclusion and removal, trees with road space)	
	Protection, maintenance and future installation of rain gardens	
	Flood mitigation and impacts on drainage infrastructure	
Financial	Capital cost	
	Benefit Cost Ratio (Cost vs Crash History Mitigation)	
	Benefit Cost Ratio (Cost vs Volume of Cyclists)	
	Ongoing maintenance	

St Kilda Road to Hotham Street
Summary

This table shows the multi-criteria appraisal of the concept options.
The multi-criteria appraisal results in the options preferring as follows:

- Option 1 (most favourable)
- Option 3
- Option 2 (least favourable)

Theme	Criteria	Option 1	Option 2	Option 3
Safety	Pedestrian			
	Bicycle Rider			
	Vehicles			
	Option Response to Crash History			
Comfort / Attractiveness	Level of Stress - Cyclist			
	Pedestrian Attractiveness - Signalised Intersections			
	Pedestrian Attractiveness - Midblock Crossings			
	Bicycle rider's experience of traffic nuisance (noise, smell, air quality)			
Operation	CoPP Waste Collection and Street Cleaning			
	Traffic flows and intersection performance			
	Public Lighting			
	Access and delay to emergency vehicles			
	Compliance with standards and best practice			
Social / Inclusion	Inclusivity			
	Residents access & on street parking			
	Business, Community services and facilities impact (access & off street parking)			
	Landscape, visual amenity and placemaking			
	Disbenefits (impacts) to pedestrians and other modes of transport			
	Alignment with Move, Connect, Live			
Gender Impacts	Safety Aspects			
	Flexible and inclusive use			
	Driving and parking			
Environment	Greening (inclusion and removal, trees with road space)			
	Protection, maintenance and future installation of rain gardens			
	Flood mitigation and impacts on drainage infrastructure			
Financial	Capital cost			
	Benefit Cost Ratio (Cost vs Crash History Mitigation)			
	Benefit Cost Ratio (Cost vs Volume of Cyclists)			
	Ongoing maintenance			

6. Next Steps

- Community Engagement
- Preferred Option Identification
- Council Endorsement
- Detailed Design
- Project Delivery

SMEC

Member of the Surbana Jurong Group

We’re redefining exceptional

Through our specialist expertise, we’re challenging boundaries to deliver advanced infrastructure solutions.

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