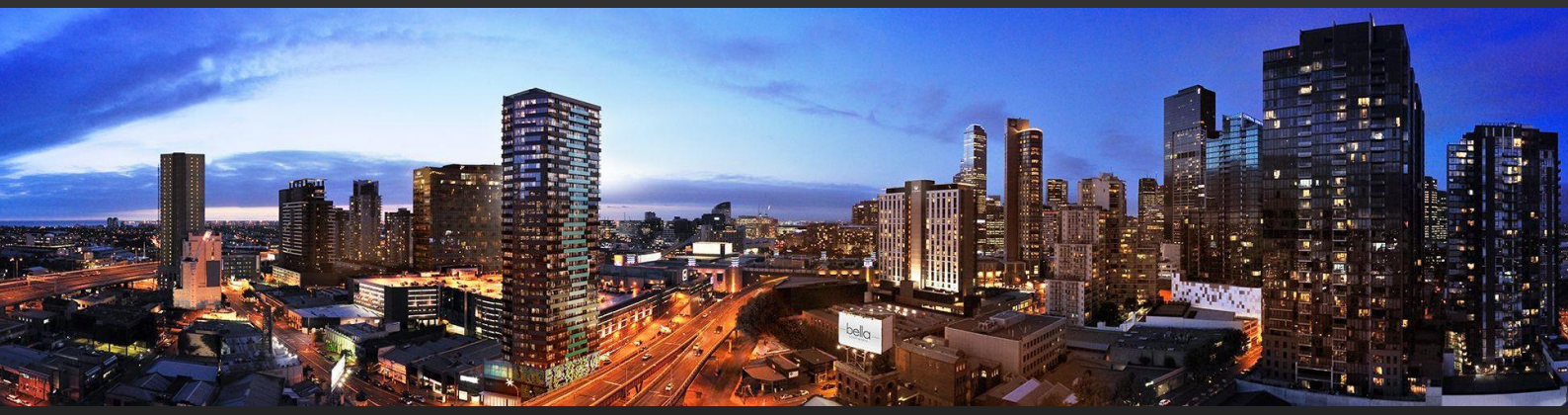
23-47 Villiers Street, North Melbourne

Transport Impact Assessment



230570TIA001C-F

28 August 2024

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DOCUMENT INFORMATION

Prepared for	Sentinel Corporation		
File Name	230570TIA001C-F	**Report Date**	28 August 2024
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one*mile****grid*** *operates from Wurundjeri Woiworung Country of the Kulin nation. We acknowledge and extend our appreciation to the Wurundjeri People, the Traditional Owners of the land. We pay our respects to leaders and Elders past, present and emerging for they hold the memories, the traditions, the culture, and the hopes of all Wurundjeri Peoples.*

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1 INTRODUCTION

onemile**grid** has been requested by Sentinel Corporation to undertake a Transport Impact Assessment of the proposed build-to-rent residential development at 23-47 Villiers Street, North Melbourne.

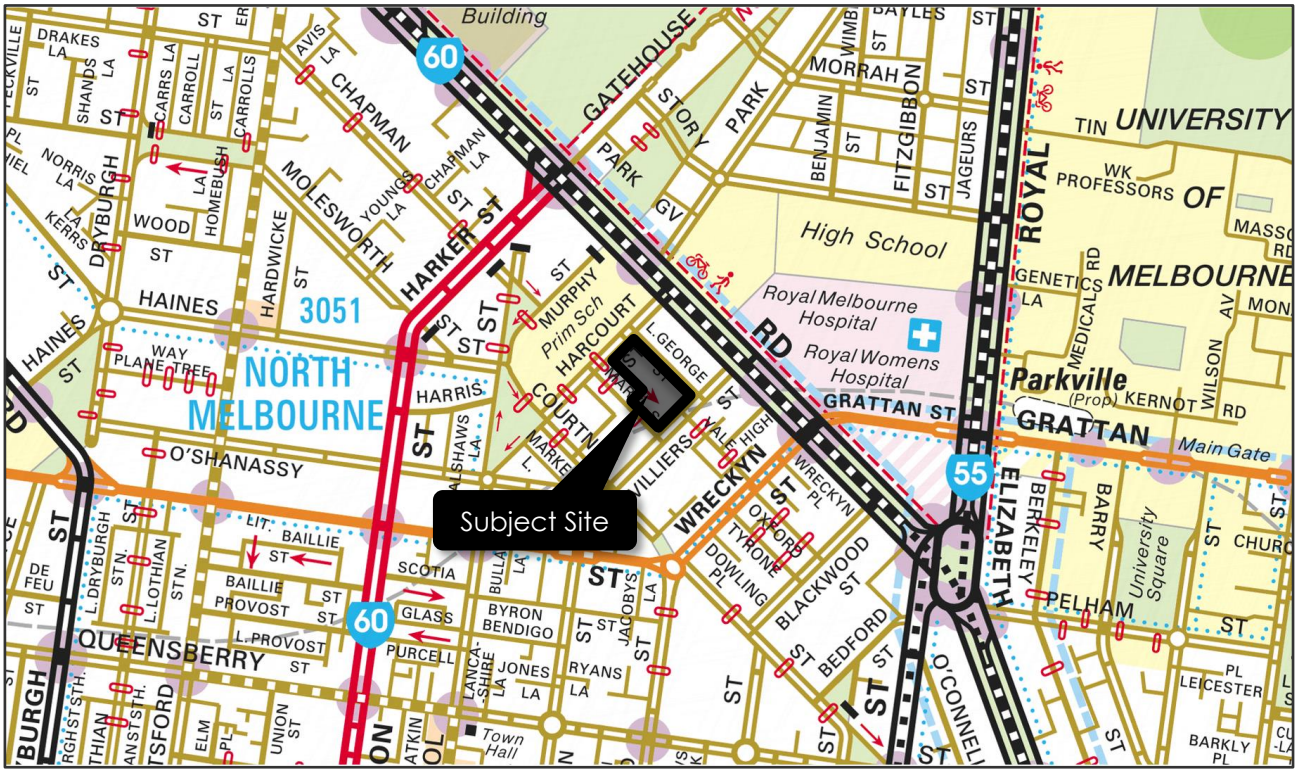
As part of this assessment the subject site has been inspected with due consideration of the development proposal, traffic and parking data has been sourced, and relevant background information has been reviewed.

2 EXISTING CONDITIONS

2.1 Site Location

The subject site is addressed as 23-47 Villiers Street, North Melbourne and is located southwest of Flemington road, approximately 400 m northwest of the Haymarket roundabout, as shown in Figure 1.

Figure 1 Site Location



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The site is bound by Villiers Street, Mary Street, Harcourt Street and Little George Street for 74 m, 47 m, 56 m and 102 m respectively whilst encompassing a total site area of 6,528 m².

The site is currently occupied and operated by the Australian Red Cross National Office and is provided with front and rear at-grade car parks comprising 7 and 53 spaces, which are accessed via Villiers Street and Harcourt Street along the southeast and northwest boundaries of the site respectively.

Land use in the immediate vicinity of the site comprises of various commercial, medical and educational facilities, and includes The Royal Melbourne Hospital and Melbourne University to the east of the site.

An aerial view of the subject site is provided in Figure 2.

Figure 2 Site Context (6 July 2023)

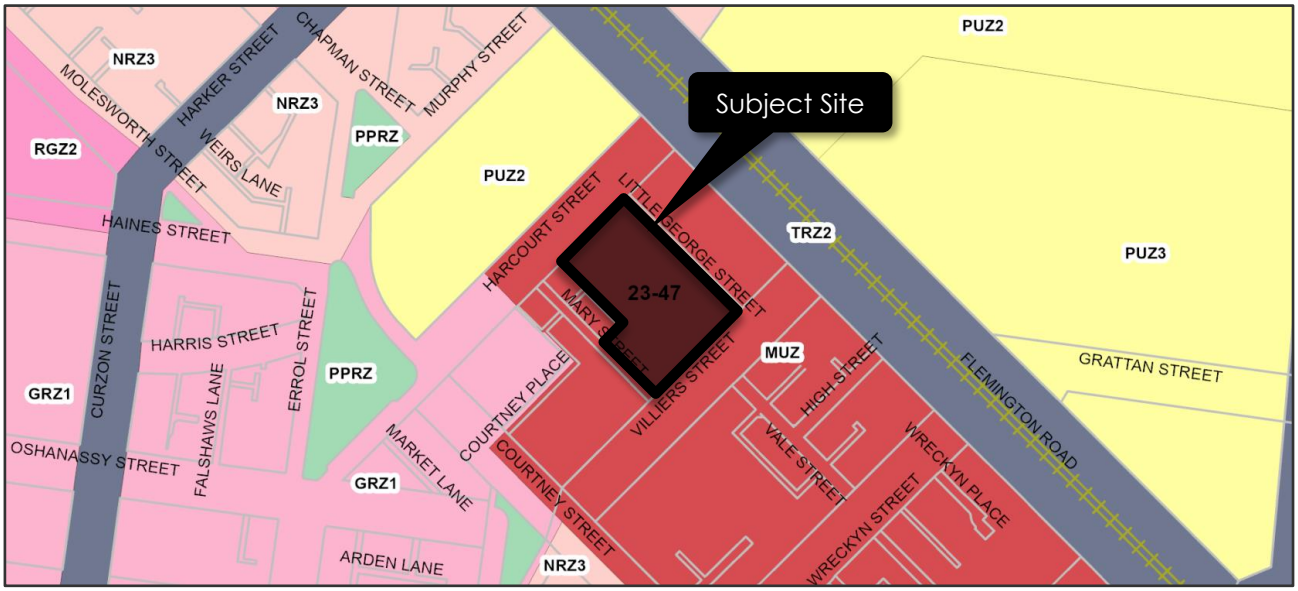
Copyright Nearmap

2.2 Planning Zones and Overlays

It is shown in Figure 3 that the site is located within a Mixed Use Zone (MUZ) whilst the following Design and Development Overlay schedules apply to the site:

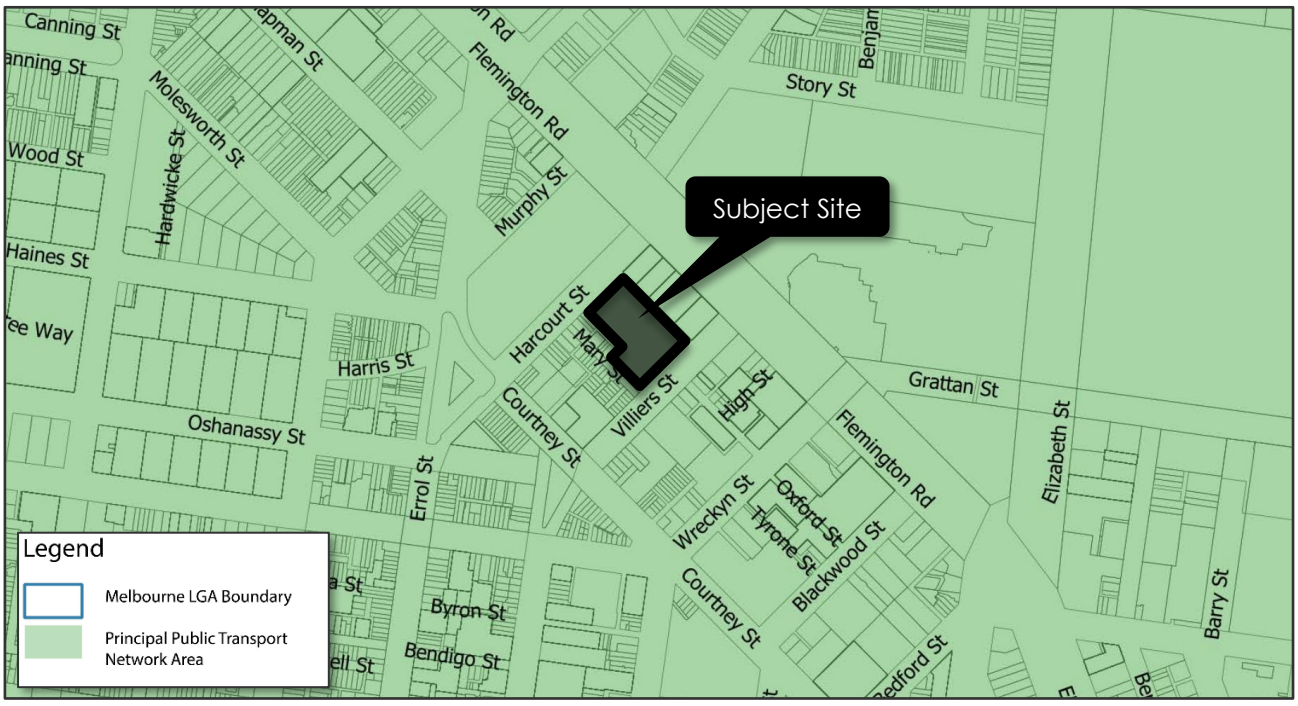
- Schedule 61 (DDO61)
- Schedule 61 (Area 2) (DDO61-A2)
- Schedule 65 (DDO65)
- Schedule 70 (DDO70)

Figure 3 Planning Scheme Zones



The site falls within the Principal Public Transport Network Area, as shown in Figure 4.

Figure 4 Principal Public Transport Network Area Map



2.3 Road Network

2.3.1 Villiers Street

Villiers Street is a local road generally aligned northeast-southwest, running between Flemington Road in the northeast, and Courtney Street to the southwest,

At the frontage of the site, Villiers Street operates as a divided road that offers a single traffic lane, bicycle lane and parking lane in each direction separated by a central median of on-street parking. Breaks are provided within the parking median to allow for turning between carriageways. All parking spaces on the northwest and southeast side of the road adjacent the site are generally restricted to 2-hour parking between 7:30am and 6:30pm, Monday to Friday, and 7:30am and 12:30pm, on Saturdays.

The central parking median is restricted to 4-hour parking between 7:30am and 6:30pm, Monday to Friday, and 7:30am and 12:30pm, on Saturdays

The cross-section of Villiers Street at the frontage of the site is shown in Figure 5.

Figure 5 Villiers Street Cross-Section

A signed 40 km/h speed limit applies to Villiers Street in the vicinity of the site.

2.3.2 Harcourt Street

Harcourt Street is a local road generally aligned northeast-southwest, running between Flemington Road in the northeast, and terminates at the O'Shanassy Street, Errol Street and Flemington Road roundabout to the southwest

At the frontage of the site, Harcourt Street operates as a divided road that offers a single traffic lane, bicycle lane and parking lane in each direction separated by a central median of on-street parking. Breaks are provided within the parking median to allow for turning between carriageways. Parking spaces on the northwest and southeast side of the road adjacent the site are generally restricted to 5-hour and 2-hour parking respectively, between 7:30am and 6:30pm, Monday to Friday, and 7:30am and 12:30pm, on Saturdays. 30-minute parking, loading zones and permit parking spaces are provided intermittently on both sides of the road.

The central parking median is restricted to 4-hour and 2-hour parking to the north and south respectively, between 7:30am and 6:30pm, Monday to Friday, and 7:30am and 12:30pm, on Saturdays

The cross-section of Harcourt Street at the frontage of the site is shown in Figure 6.

Figure 6 Harcourt Street Cross-Section

A signed 40 km/h speed limit applies to Harcourt Street in the vicinity of the site.

2.3.3 Little George Street

Little George Street is a local road generally aligned northwest-southeast, running between Harcourt Street in the north, and Villiers Street to the south.

Little George Street operates a single-width two-way road facilitating vehicle movements in both directions adjacent the site. 'No Stopping' and 'No Parking' restrictions are applied on both sides of the road along the length of Little George Street.

The cross-section of Little George Street at the frontage of the site is shown in Figure 7.

Figure 7 Little George Street Cross-Section

2.3.4 Mary Street

Mary Street is a local road generally aligned northwest-southeast, running between Harcourt Street in the north, and Villiers Street to the south.

Mary Street provides a single traffic lane facilitating one-way south-eastbound vehicle movements adjacent to the site. 'No Stopping' restrictions are applied on both sides of the road along the length of Mary Street.

The cross-section of Mary Street at the frontage of the site is shown in Figure 7.

Figure 8 Mary Street Cross-Section

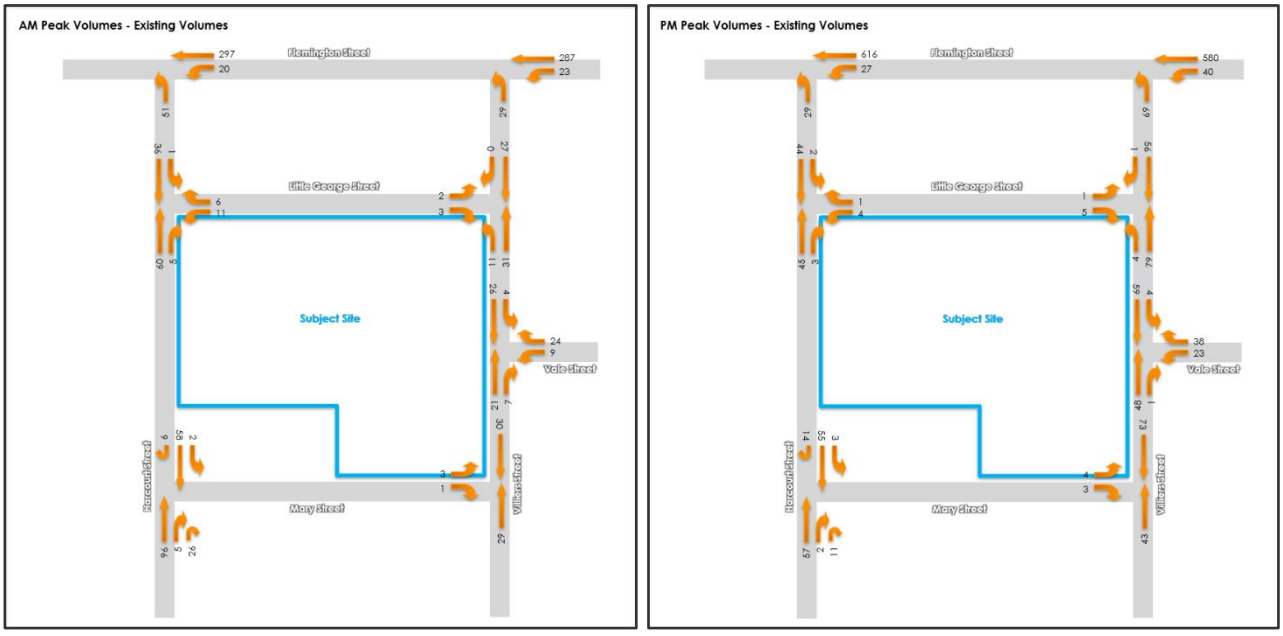
2.4 Traffic Volumes

Traffic volume surveys were undertaken by Trans Traffic Survey on behalf of **one**mile**grid** on Tuesday 15th August 2023, between 7:00am and 9:30, and 2:30pm and 6:30pm, at the following intersections:

- Flemington Road / Villiers Street;
- Flemington Road / Harcourt Street;
- Villiers Street / Little George Street;
- Villiers Street / Vale Street;
- Villiers Street / Mary Street;
- Harcourt Street / Little George Street; and
- Harcourt Street / Mary Street.

The peak hour results of the surveys are shown in Figure 9.

Figure 9 Existing Peak Hour Traffic Volumes – Thursday 15th August 2023



To assess the existing operation of the nearby primary intersection of intersection of Flemington Road with Villiers Street and Harcourt Street, the existing traffic volumes have been input into SIDRA Intersection, a traffic modelling software package.

The SIDRA Intersection software package has been developed to provide information on the capacity of an intersection with regard to a number of parameters. Those parameters considered relevant are, Degree of Saturation (DoS), 95th Percentile Queue, and Average Delay, and Level of Service (LoS), as described in Table 1.

Table 1 SIDRA Intersection Parameters

Parameter	Description
Degree of Saturation (DoS)	The DoS represents the ratio of the traffic volume making a particular movement compared to the maximum capacity for that particular movement. The value of the DoS has a corresponding rating depending on the ratio as shown below.
	Degree of Saturation / **Rating** Up to 0.60 – Excellent 0.61 – 0.70 – Very Good 0.71 – 0.80 – Good 0.81 – 0.90 – Fair 0.91 – 1.00 – Poor Above 1.00 – Very Poor
	It is noted that whilst the range of 0.91 – 1.00 is rated as 'poor', it is acceptable for critical movements at an intersection to be operating within this range during high peak periods, reflecting actual conditions in a significant number of suburban signalised intersections.
Average Delay (seconds)	Average delay is the time delay that can be expected for all vehicles undertaking a particular movement in seconds. This includes time taken to accelerate or decelerate, time taken to undertake the manoeuvre, and delay at a hold line or stop line.
95th Percentile (95%ile) Queue	95%ile queue represents the maximum queue length in metres that can be expected in 95% of observed queue lengths in the peak hour.
Level of Service (LoS)	A qualitative measure of sign-controlled intersection performance, based on the average delay experienced by a driver. A LoS of A, B, C or D suggests acceptable intersection performance. A LoS of E or F suggests mitigation measures or upgrades may be warranted.

The value of the average delay and Level of Service for a sign-controlled intersection has a corresponding rating, as shown in Table 2.

Table 2 Rating of Delay and V/C Ratio, and Level of Service

Rating	Delay &V/C Ratio	Level of Service
Excellent	≤ 10 seconds	A
Very Good	10 – 15 seconds	B
Good	15 – 25 seconds	C
Fair	20 – 35 seconds	D
Poor	30 – 50 seconds	E
Very Poor	50+ seconds	F

Given the proximity of the surveyed intersections, they have been modelled as a network model, which accounts for coordination of signal phasing between adjacent intersections, and capacity reductions caused by downstream queueing effects.

The results of the existing Flemington Street / Villiers Street and Flemington / Harcourt Street intersection analysis are provided in Table 3 and Table 4 respectively.

Table 3 Flemington Road / Villiers Street – Existing Conditions

Approach	Degree of Saturation	Avg. Delay (sec)	Queue (m)	Level of Service
Combined AM Peak (8:00am – 9:00am)				
Villiers Street	0.02	7	1	A
Flemington Road	0.09	0	0	A
Combined PM Peak (2:30pm – 3:30am)				
Villiers Street	0.07	8	3	A
Flemington Road	0.17	0	0	A

Table 4 Flemington Road / Harcourt Street – Existing Conditions

Approach	Degree of Saturation	Avg. Delay (sec)	Queue (m)	Level of Service
Combined AM Peak (8:00am – 9:00am)				
Harcourt Street	0.04	4	1	A
Flemington Road	0.09	0	0	A
Combined PM Peak (2:30pm – 3:30am)				
Harcourt Street	0.03	5	1	A
Flemington Road	0.19	0	0	A

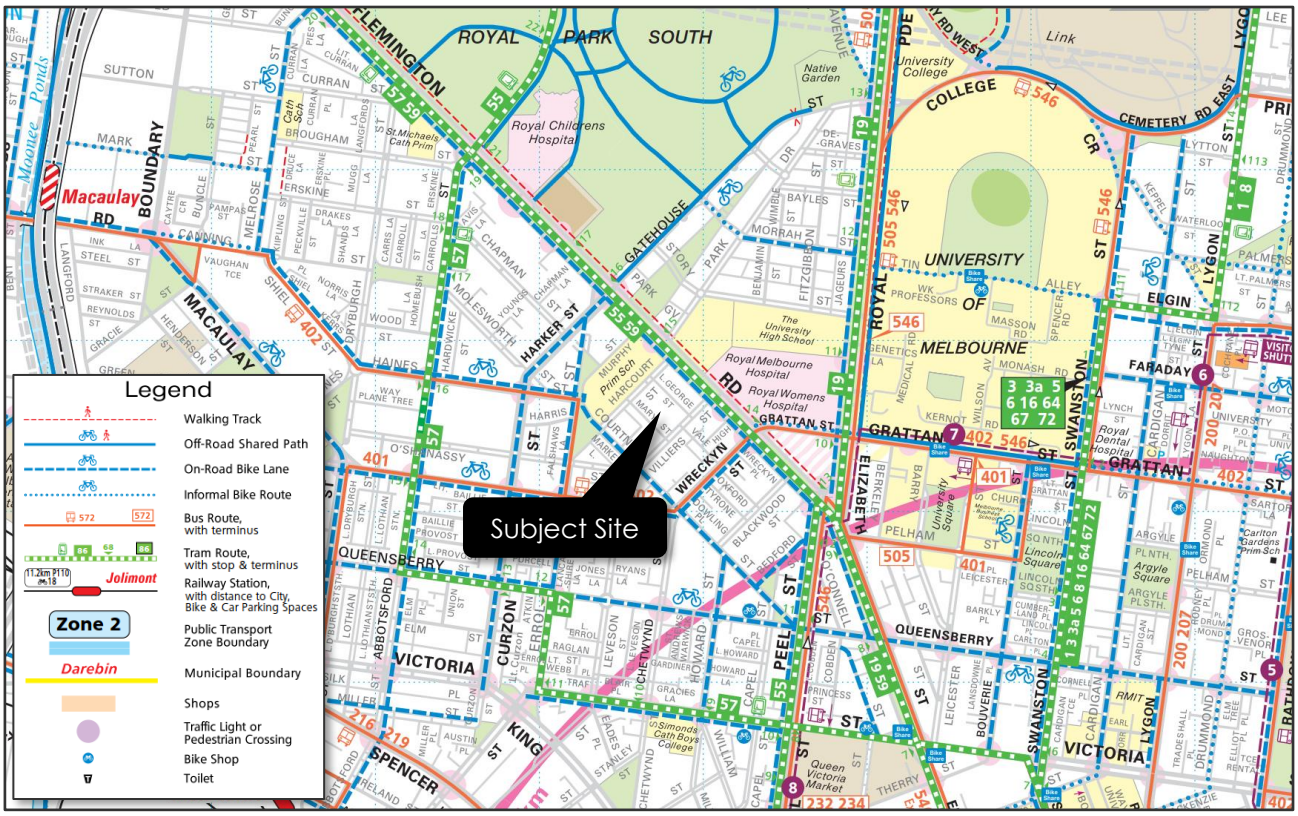
As shown above, the two primary intersections in the vicinity of the site are currently operating under excellent conditions during both the morning and afternoon peak hours with minimal queues and delays experienced by motorists. However, it is acknowledged the majority of existing traffic and associated queues and delays occur along the main Flemington Road carriageway and with the respective intersections to Elizabeth Street (Royal Parade) and Harker Street.

2.5 Sustainable Transport

2.5.1 General

An extract of the TravelSmart Map for the City of Melbourne is shown in Figure 10, highlighting the public transport, bicycle and pedestrian facilities in the area.

Figure 10 TravelSmart Map



2.5.2 Public Transport

The full public transport provision in the vicinity of the site is shown in Figure 11 and detailed in Table 5.

Figure 11 Public Transport Provision

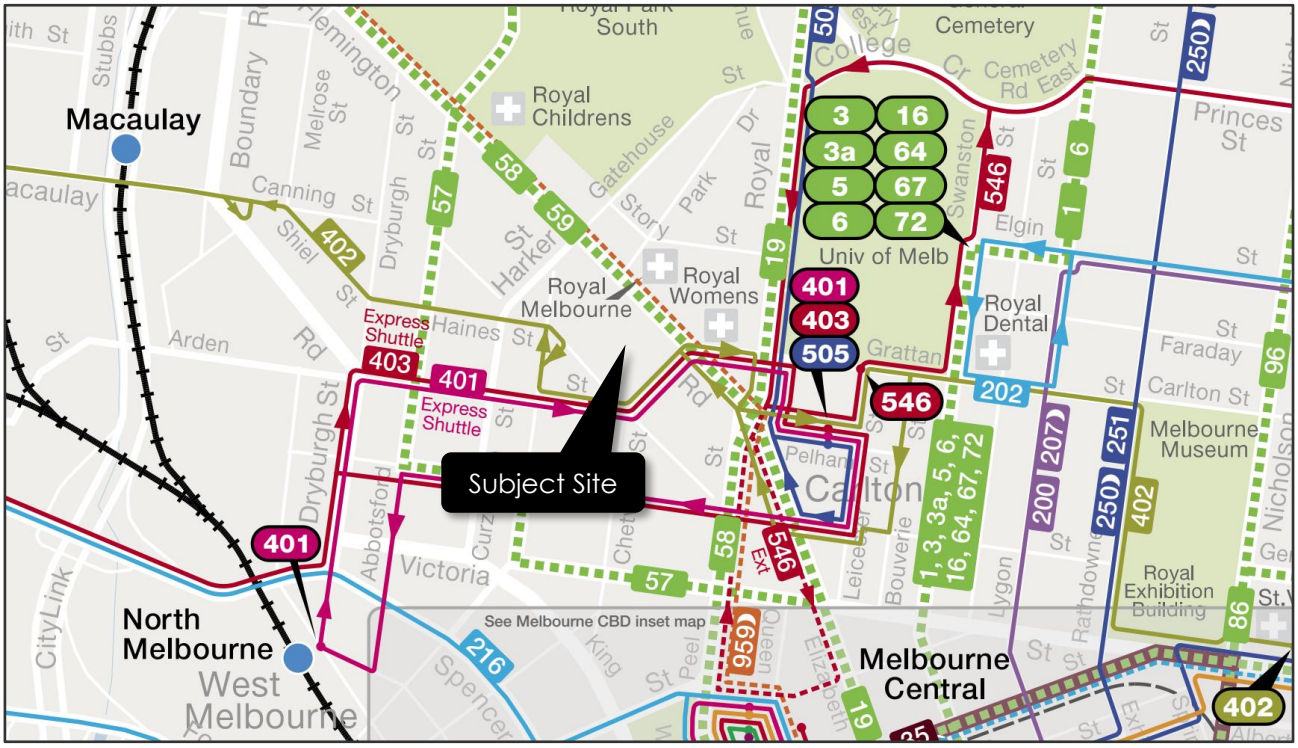


Table 5 Public Transport Provision

Mode	Route No.	Route Description	Nearest Stop/Station
Tram	58	West Coburg – Toorak	Murphy Street / Flemington Street
	59	Airport West – Flinders Street Station & City	
Bus	401	North Melbourne Station – Melbourne University Loop via Royal Melbourne Hospital	Royal Melbourne Hospital / Grattan Street
	402	Footscray Station – East Melbourne via North Melbourne	Harcourt Street / Courtney Street
	403	Footscray Station – Melbourne University via Royal Melbourne Hospital	Melbourne University / Pelham Street

The site has very good public transport accessibility, with a variety of transport modes and services servicing the vicinity of the site. The site has a Transit Score rating of 100/100 and is considered to be a Rider's Paradise, with world-class public transportation.

In addition to the existing public transport facilities provided adjacent to the site, the Melbourne Metro Tunnel is currently being constructed to the north of the subject site. The tunnel is being constructed between Kensington and South Yarra, and will provide two underground stations within the Melbourne CBD and three underground stations surrounding the CBD. The Melbourne Metro Tunnel will provide a direct connection between the existing Sunbury line and the Cranbourne/Pakenham line which will reduce the amount of train services requiring the existing City Loop. It is anticipated that the construction works for the Melbourne Metro Tunnel will be complete by the end of 2025, with the resultant Metropolitan Melbourne rail map shown below in Figure 13.

Furthermore, Parkville Metro station is currently being constructed on the eastern side of Royal Parade along Grattan Street. Four train station entrances are proposed for the Parkville Metro Station including an entrance at the south-eastern corner of the Royal Melbourne Hospital. The provision of an entrance to the immediate north of the site will provide excellent access to the Sunbury line and the Cranbourne/Pakenham line, as well as the Melbourne CBD where additional Metropolitan Melbourne and V/Line rail services are provided. The proposed Parkville Metro Station is shown in Figure 12.

Figure 12 Proposed Parkville Metro Station

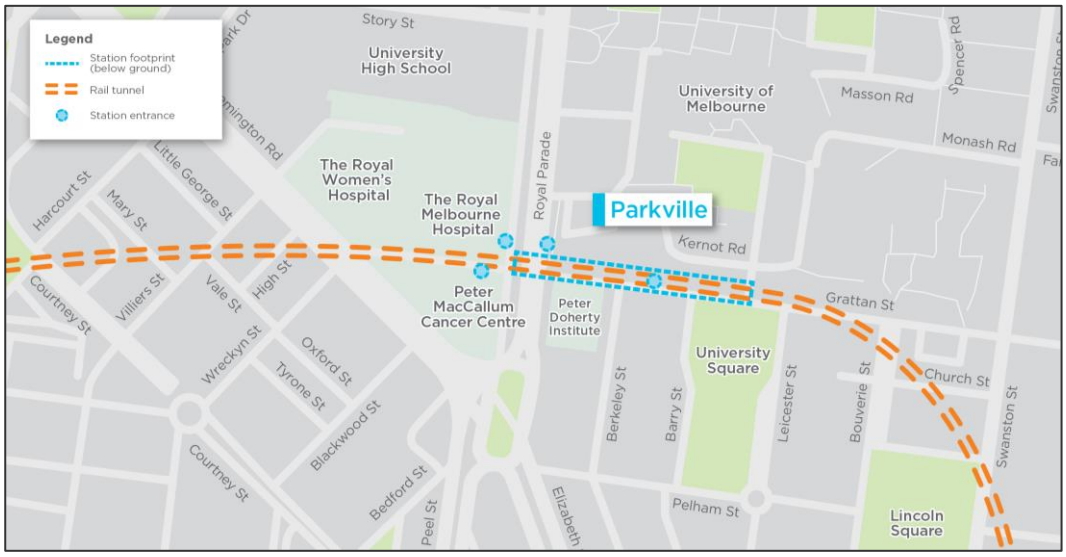
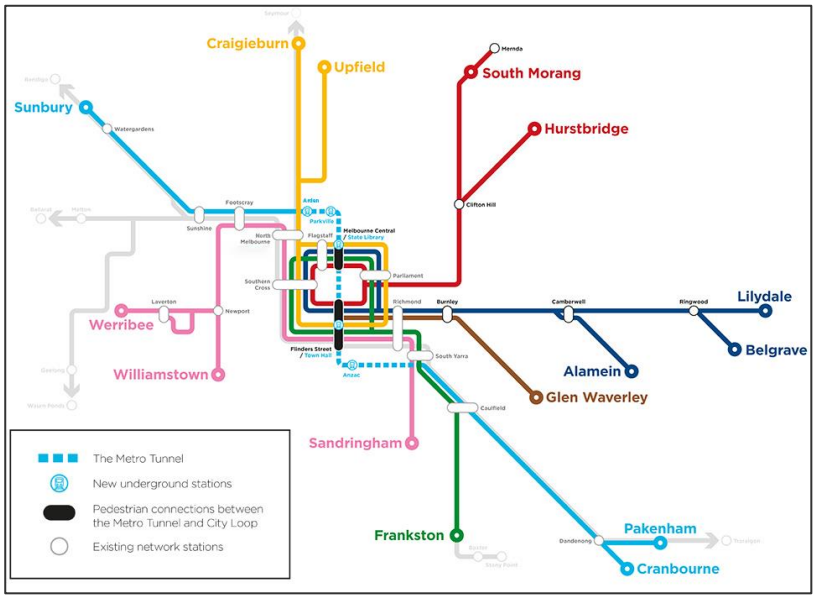


Figure 13 Future Metropolitan Melbourne Rail Map



2.5.3 Bicycle Facilities

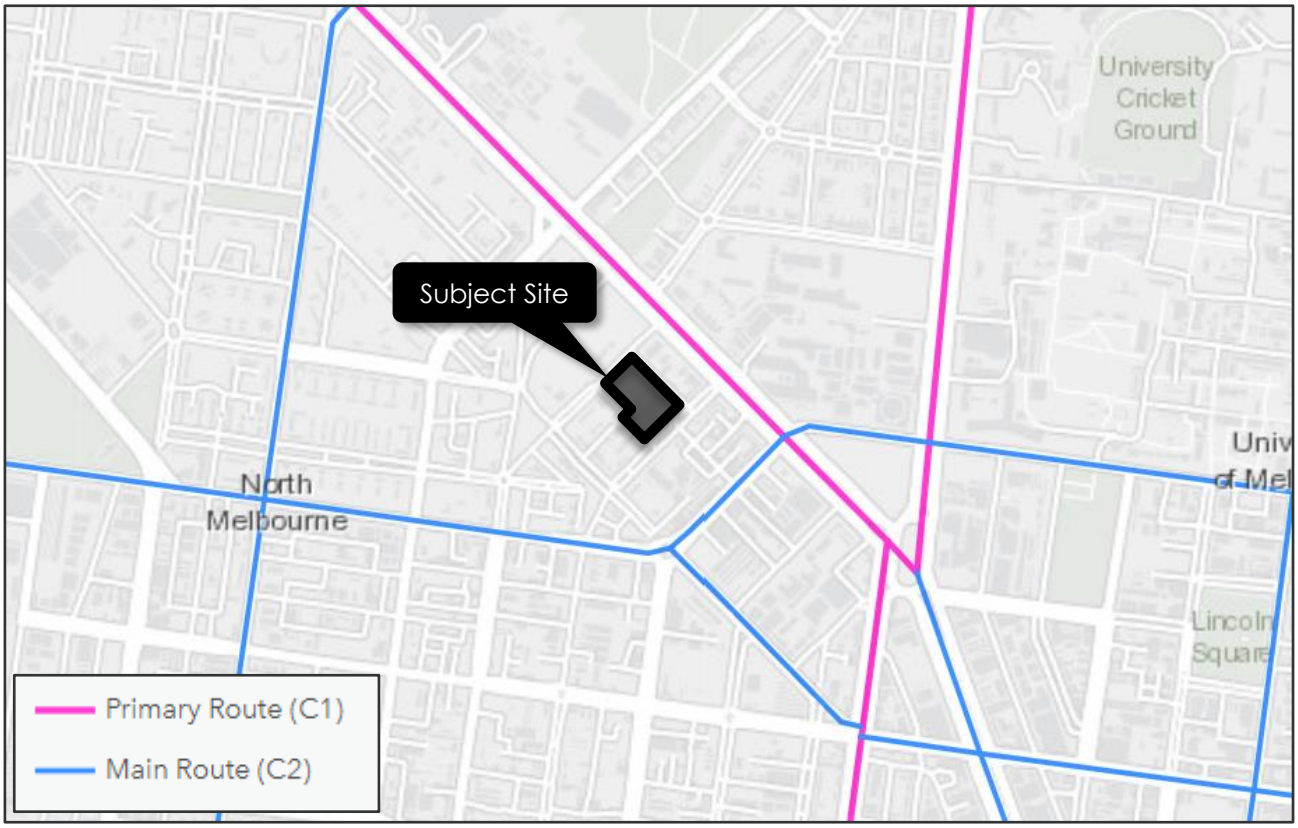
2.5.3.1 Strategic Cycling Corridors

Strategic Cycling Corridors are important routes for cycling for transport and link up important destinations including the Central City, National Employment and Innovations Clusters, Metropolitan Activity Centres and other destinations of metropolitan and regional significance.

Strategic Cycling Corridors (SCC) are considered to be the arterials for bicycles, and have been designed to provide connected, low stress and safe routes, intended primarily for the use of cyclists for transport (rather than recreation).

The SCCs in the vicinity of the site are shown in Figure 14.

Figure 14 Strategic Cycling Corridors



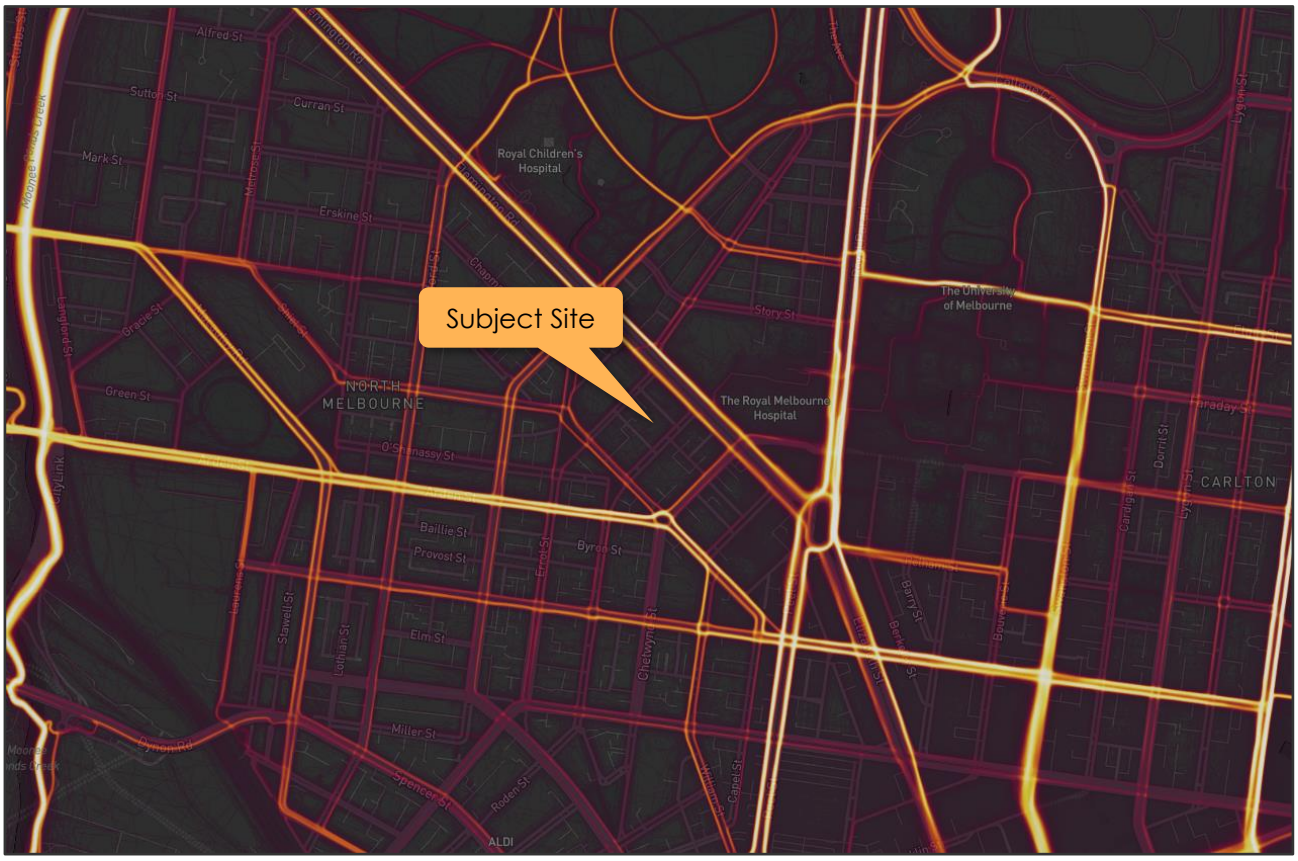
2.5.3.2 Strava

Strava is a social network and training tool for cyclists, runners and swimmers. Users record their physical activity using a dedicated GPS device or utilise the mobile app, and upload the file to their profile.

Strava anonymised this information and makes it available through their "Global Heatmap" tool, showing aggregated all public activities over the last two years across the world.

A view of the cycling heatmap in proximity to the study area is provided below in Figure 15. Routes of higher usage are brighter in colour.

Figure 15 Strava Cycling Heatmap



As shown above, primary routes in and out of the study area comprise:

- Flemington Road;
- Royal Parade;
- Arden Street; and
- Moonee ponds Creek Trail.

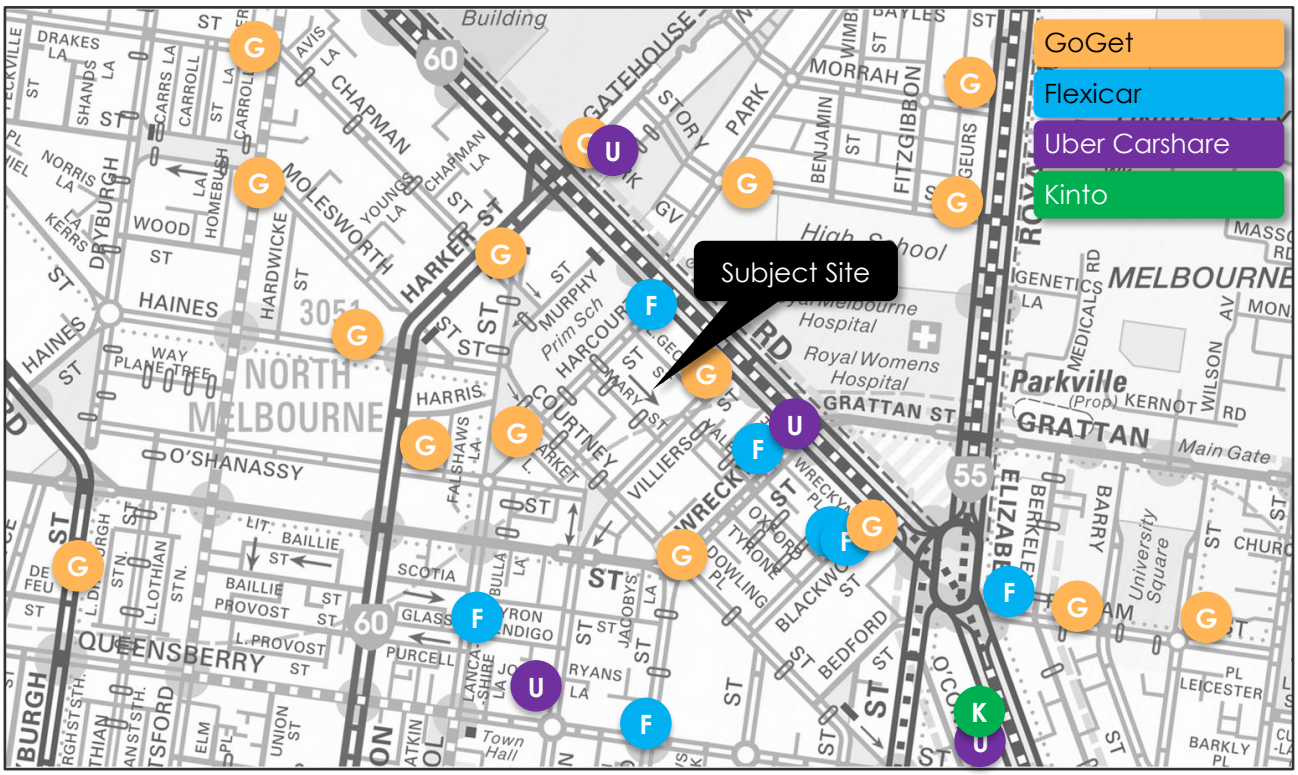
It is noted that this information includes all cycling activities recorded on the platform, inclusive of weekend trips, and all trips throughout the day. Additionally, the data is skewed towards sports cyclists, given that the bulk of commuter and recreational cyclists will not be tracking their rides.

2.5.4 Share Cars

Car sharing is becoming increasingly popular within highly populated areas for both employees and residents, where parking is restrictive and expensive. Car sharing operates similar to a car rental company, except users join as members and are charged on an hourly rate rather than a daily.

The location of the share cars within close proximity of the site are shown in Figure 16.

Figure 16 Share Car Locations



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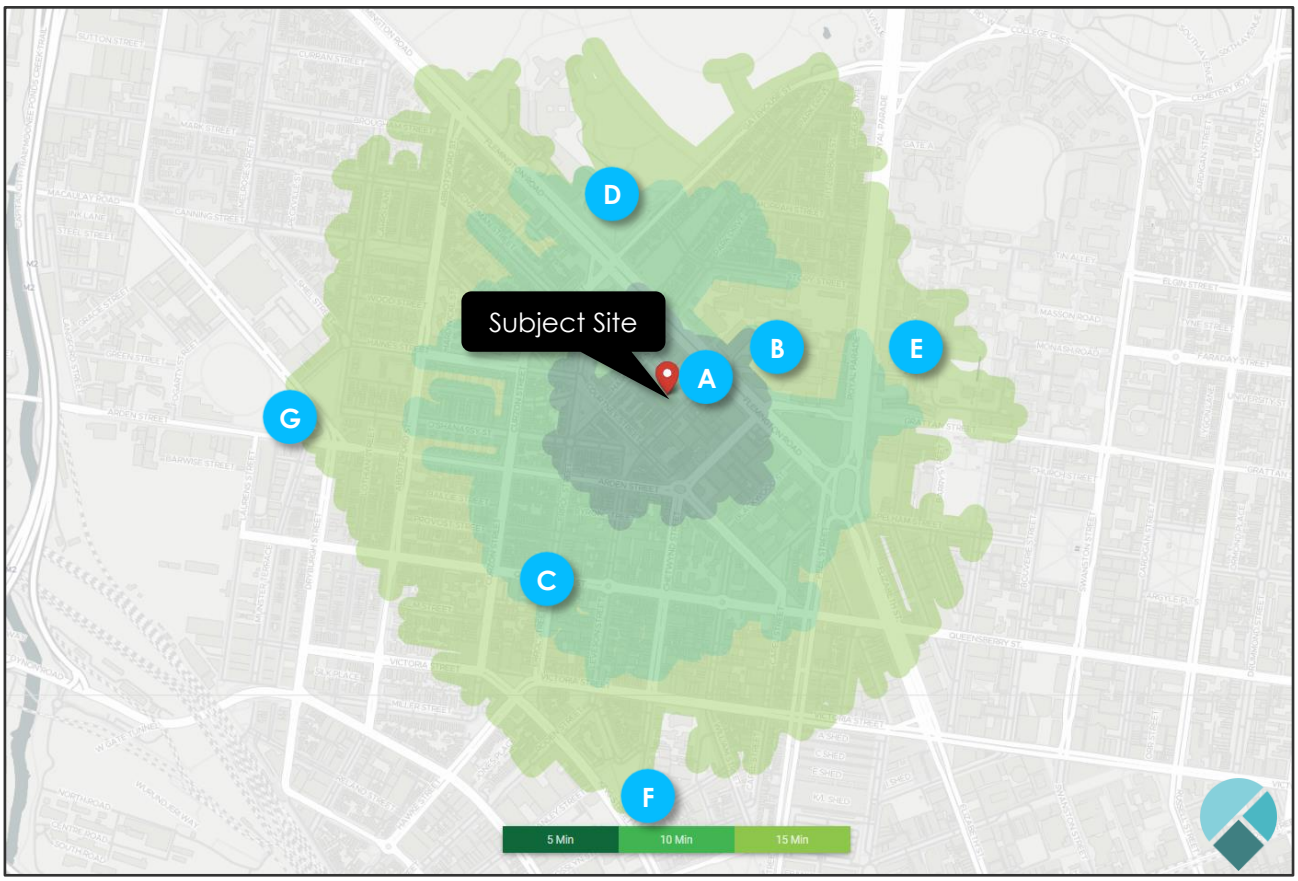
2.5.5 Pedestrian Accessibility

In addition to having good access to public transport modes, the site is well-located for pedestrian accessibility, with a number of recreation, education, shopping and employment uses located within 10 - 15 minutes' walk of the site.

Figure 17 shows a pedestrian walk time map for the site, with the major facilities in the vicinity of the site identified in Table 6.

Figure 17 Pedestrian Walk-Time Map



Courtesy of Targomo

Table 6 Site Facilities

Ref	Facility	Approx. Distance
A	IGA Xpress North Melbourne	100 m
B	The Royal Melbourne Hospital	300 m
C	Queensberry Street / Errol Street Junction	500 m
D	Royal Park	500 m
E	Melbourne University	700 m
F	Queen Victoria Market	800 m
G	North Melbourne Recreation Reserve	

Walkability is a measure of how friendly an area is to walking. Walkability has many health, environmental, and economic benefits. Factors influencing walkability include the presence or absence and quality of footpaths or other pedestrian rights-of-way, traffic and road conditions, land use patterns, building accessibility, and safety.

The site has a Walk Score rating of 96/100 and considered to be a Walkers Paradise, where daily errands do not require a car.

2.6 Private Transport

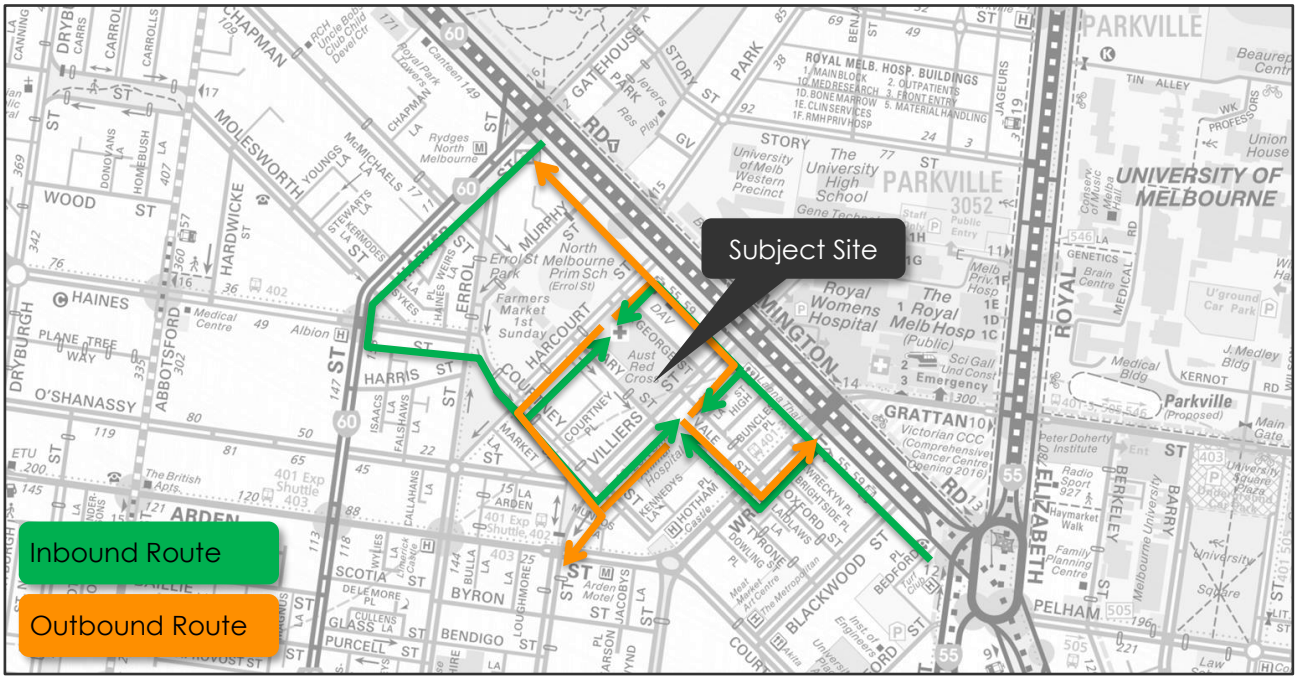
The Uber Movement app uses aggregated trip data from the Uber app to provide vehicular travel time data. Figure 18 below shows the expected travel time to drive a car from the subject site to different locations across Melbourne.

Figure 18 Travel Time Map

Copyright Uber

In addition, a view of the primary vehicle ingress and egress routes to the subject site are shown in Figure 19.

Figure 19 Vehicle Inbound and Outbound Route



3 DEVELOPMENT PROPOSAL

3.1 General

It is proposed to develop the subject site for the purposes of a multi-storey, high-density residential development associated with the build-to-rent (BTR) scheme.

The development will consist of two buildings, with the eastern building labelled as 'Building A (Villiers Street)' and western building labelled as 'Building B (Harcourt Street)'.

A breakdown of the proposed residential development schedule is shown in Table 7.

Table 7 Proposed Residential Development Schedule

Building	*Component*	*No./Area*
Building A (Villiers Street)	Studio Apartment	10
	1-Bedroom Apartment	107
	2-Bedroom Apartment	46
	3-Bedroom Apartment	18
	Sub-Total	**181**
Building B (Harcourt Street)	Studio Apartment	11
	1-Bedroom Apartment	103
	2-Bedroom Apartment	49
	3-Bedroom Apartment	9
	Sub-Total	**172**
Total		**353**

In addition, an ancillary office with a floor area of 108 m² is proposed in Building A along the Villiers Street frontage.

The development is proposed with two dedicated loading areas and two waste rooms, one for each building respectively, to facilitate the various loading requirements and waste collection. Access to each loading area is provided via a consolidated central access point located along Little George Street on the lower ground 1 level, and will permit forward entry and exit.

3.2 Car Parking and Vehicular Access

A total of 264 parking spaces are proposed across four levels and are allocated as detailed in Table 8.

Table 8 Car Parking Allocation

Type	*No. Spaces*
Residential	260 spaces (4 x DDA, 8 x tandem, 13 x EV, 2 x car share)
Staff	4 spaces (1 x DDA)
Total	**264 spaces**

Three vehicle access points are provided to the site via Little George Street, with the eastern and western access points providing access to the residential parking spaces on the ground floor level and lower ground 2 to basement levels respectively. The central access point is to provide vehicle access to the loading area and staff parking spaces on the lower ground 1 level.

The three vehicle access points are spread out along Little George Street, with landscape buffers in between, to reduce the dominance of the vehicle access points while allowing for safe and efficient access to the site.

Due to the 5.6 m level difference across the site, the topography of Little George Street lends itself to provide convenient access directly to an upper and lower car parking level without the requirement for internal ramps.

Furthermore as a result of the frequency and size of the of vehicle accessing the loading bays (waste collection, deliveries and removalists for moving in/out) it is preferred to separate entries for car park and loading/unloading. Separating car parking and loading entries removes the risk of residents interacting with reversing loading vehicles on the site.

The project provides a 5 m setback to the northern boundary to facilitate the widening of Little George Street. This provides a two-way carriageway, on-street car parking for pick up/drop off, integrated landscape and a 1.8 m wide footpath on the south-western side of Little George Street. This enhances vehicle movement and access to both the proposed development and existing Flemington Road properties. Landscaping within Little George Street is designed in accordance with City of Melbourne Guidelines.

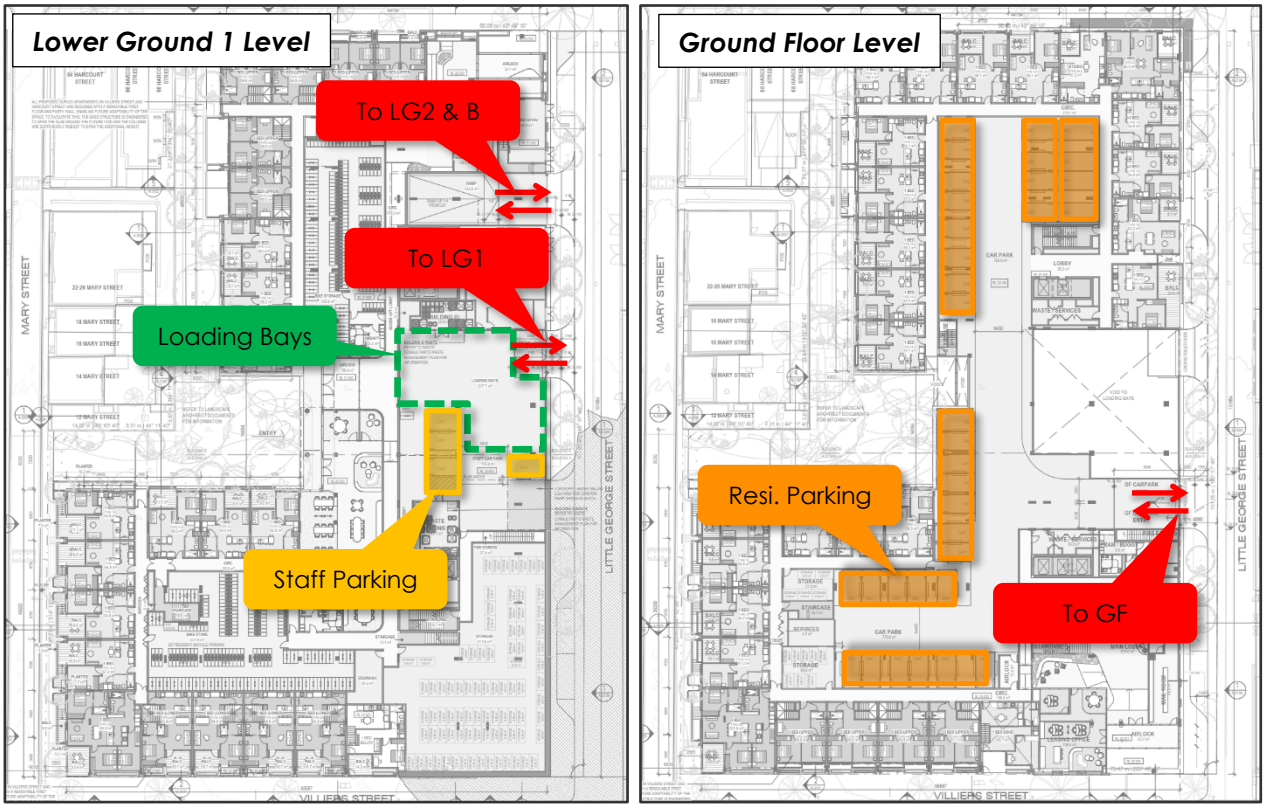
As a result of widening Little George Street and accommodating two way vehicle access as well as access to the proposed development, the existing crossovers to the site are able to removed on both Villiers Street and Harcourt Street.

3.3 Loading and Waste Facilities

The development is proposed with two dedicated loading areas and two waste rooms, one for each building respectively, to facilitate the various loading requirements and waste collection. Access to each loading area is provided via a consolidated central access point located along Little George Street on the lower ground 1 level, and will permit forward entry and exit.

A view of the three vehicle access points proposed across the lower ground 1 level and ground floor level and associated car parking and loading arrangements is shown in Figure 20.

Figure 20 LG1 & GF Vehicle Access, Parking and Loading Arrangements



3.4 Bicycle and Motorcycle Parking

A total of 445 bicycle parking spaces are proposed and are allocated as detailed in Table 9.

Table 9 Bicycle Parking Allocation

Type	*No. Spaces*
Residential	353 spaces
Visitor	88 spaces
Staff	4 spaces
Total	**445 spaces**

All bicycle parking is to be provided through a combination of standard horizontal bicycle parking hoops (140 spaces) and vertically mounted bicycle racks (305 spaces).

The residential bicycle parking are to be provided within two secure compounds located on the lower ground 1 level and accessed via the Mary Street building frontage.

Visitor parking will be provided both internally within the abovementioned secure compound (76 spaces), and intermittently externally along the Mary Street and Little George Street road frontages (6 spaces per road frontage).

The staff bicycle parking is to be provided adjacent the four staff car parking spaces in the form of two horizontal hoops.

In addition, a total of 12 motorcycle spaces are provided onsite, with 6 spaces provided in the basement level and the remaining 6 located on the lower ground 2 level.

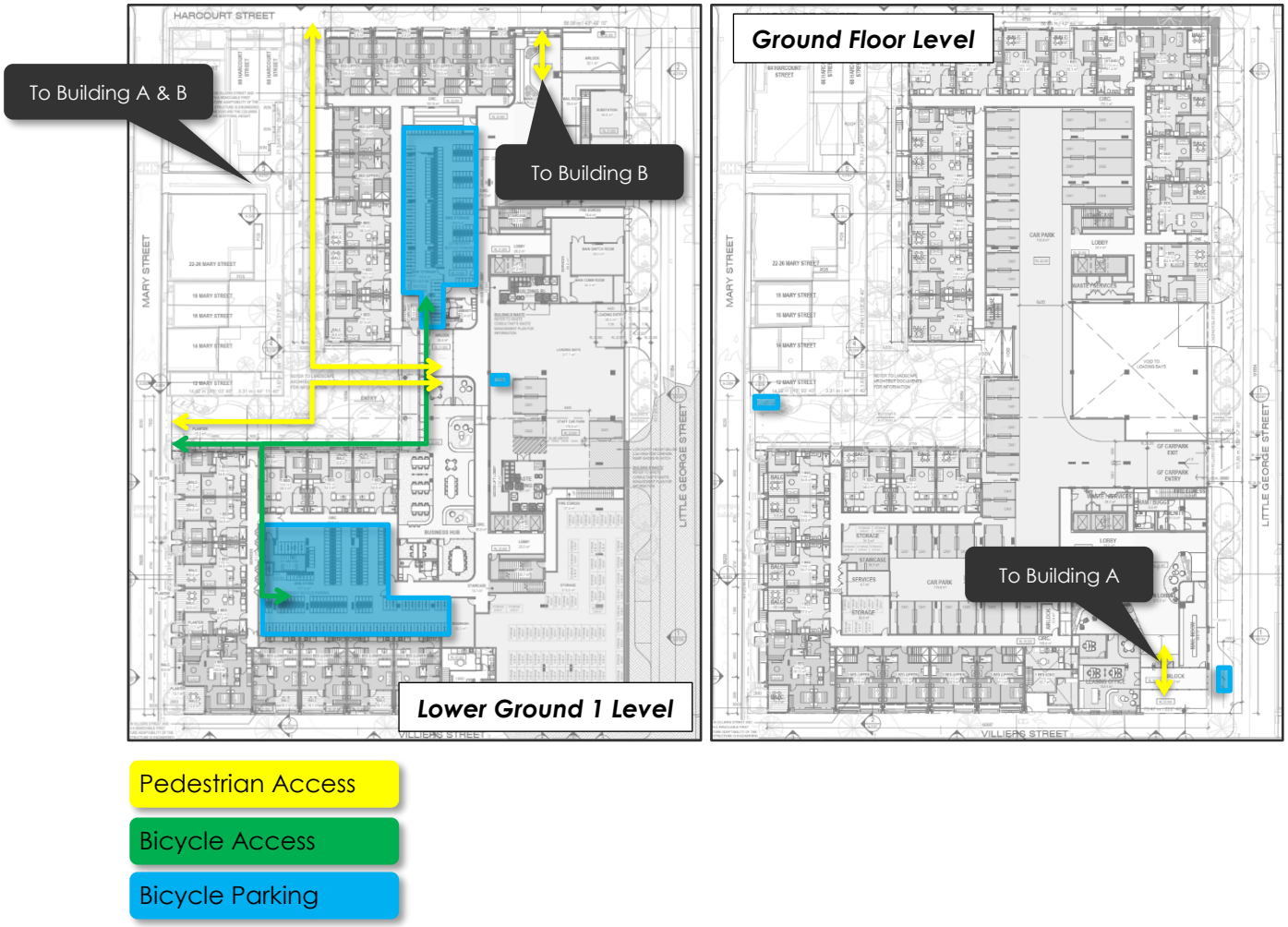
3.5 Pedestrian Access

Each building will be provided with a dedicated main building entrance at the northeast and northwest corner of the site via Villiers Street and Harcourt Street to Building A and B respectively.

The proposed building will be setback approximately 3 m from the southeastern corner of the site to increase the existing 1.5 m footpath along Mary Street whilst a landscaped laneway is proposed along the southwestern corner of the site, intersecting with Harcourt Street. The above will serve as a secondary pedestrian access to the building.

A view of the pedestrian and bicycle wayfinding routes to/from the site is shown in Figure 21.

Figure 21 Pedestrian Access and Bicycle Parking Wayfinding



4 DESIGN ASSESSMENT

4.1 Melbourne Planning Scheme – Clause 52.06

onemile**grid** has undertaken an assessment of the car parking layout and access for the proposed development with due consideration of the Design Standards detailed within Clause 52.06-9 of the Planning Scheme. A review of those relevant Design Standards is provided in the following sections.

4.1.1 Design Standard 1: Accessways

A summary of the assessment for Design Standard 1 is provided in Table 10.

Table 10 Clause 52.06-9 Design Assessment – Design Standard 1

Requirement	*Comments*
Be at least 3 metres wide.	Satisfied – Width of accessway to/from the loading bays is 6.4 m whilst width of accessways to parking areas are 7.0 m
Have an internal radius of at least 4 metres at changes of direction or intersection or be at least 4.2 metres wide.	Satisfied
Allow vehicles parked in the last space of a dead-end accessway in public car parks to exit in a forward direction with one manoeuvre.	Satisfied
Provide at least 2.1 metres headroom beneath overhead obstructions, calculated for a vehicle with a wheel base of 2.8 metres.	Satisfied – A minimum height clearance of 2.2 m is achieved
If the accessway serves four or more car spaces or connects to a road in a Transport Zone 2 or Transport Zone 3, the accessway must be designed so that cars can exit the site in a forward direction.	Satisfied
Provide a passing area at the entrance at least 6.1 metres wide and 7 metres long if the accessway serves ten or more car parking spaces and is either more than 50 metres long or connects to a road in a Transport Zone 2 or Transport Zone 3.	Satisfied
Have a corner splay or area at least 50 per cent clear of visual obstructions extending at least 2 metres along the frontage road from the edge of an exit lane and 2.5 metres along the exit lane from the frontage, to provide a clear view of pedestrians on the footpath of the frontage road. The area clear of visual obstructions may include an adjacent entry or exit lane where more than one lane is provided, or adjacent landscaped areas, provided the landscaping in those areas is less than 900mm in height.	Satisfied
If an accessway to four or more car parking spaces is from land in a Transport Zone 2 or Transport Zone 3, the access to the car spaces must be at least 6 metres from the road carriageway.	N/A – Does not connect to a Transport Zone

4.1.2 Design Standard 2: Car Parking Spaces

All car spaces on-site are proposed with a minimum width of 2.6 m, length of 4.9 m and are accessed from aisles of no less than 6.4 m whilst the spaces provided in tandem have been suitably separated by 500 mm. Therefore, the proposed car parking design is accordance with Design Standard 2 of the Planning Scheme.

Swept path diagrams have been prepared, which are attached within Appendix A, demonstrating that access to critical car spaces with an 85th percentile passenger vehicle (B85).

4.1.3 Design Standard 3: Gradients

A summary of the assessment for Design standard 3 is provided in Table 11.

Table 11 Clause 52.06-9 Design Assessment – Design Standard 3

Requirement	*Comments*
Accessway grades must not be steeper than 1:10 (10 per cent) within 5 metres of the frontage to ensure safety for pedestrians and vehicles. The design must have regard to the wheelbase of the vehicle being designed for; pedestrian and vehicular traffic volumes; the nature of the car park; and the slope and configuration of the vehicle crossover at the site frontage. This does not apply to accessways serving three dwellings or less.	Satisfied – A maximum grade of greater than 1:10 is proposed for the first 5 metres from the property boundary at each of the three access points
Ramps (except within 5 metres of the frontage) must have the maximum grades as outlined in Table 3 (of Design standard 3) and be designed for vehicles travelling in a forward direction.	Satisfied – A maximum grade of 1:4 is proposed
Where the difference in grade between two sections of ramp or floor is greater that 1:8 (12.5 per cent) for a summit grade change, or greater than 1:6.7 (15 per cent) for a sag grade change, the ramp must include a transition section of at least 2 metres to prevent vehicles scraping or bottoming.	Satisfied – A maximum change in grade of 12.5 % is proposed.

4.2 Bicycle Parking

Bicycle parking is proposed to be provided in a mixture of vertically mounted and staggered bicycle racks and on-ground bicycle hoops.

The vertical mounted racks have been designed in accordance with the Australian Standard; specifically, they are located at 500 mm centres, with an envelope of 1.2 m provided for bicycles and a 1.5 m access aisle.

The bicycle hoops have been designed in accordance with the Australian Standard; specifically, they are provided at one metre centres, with an envelope of 1.8 m provided for bicycles and a 1.5 m access aisle.

In addition, the 140 bicycle parking spaces proposed as on-ground hoops exceeds the Australian Standard requirement for 20% of spaces being provided on-ground.

4.3 Motorbike Parking

The motorcycle parking bays within the basement have been designed with a minimum width of 1.2 m and a length of 2.5 m in accordance with the Australian/New Zealand Standard for Parking facilities, Part 1: Off-street car parking (AS/NZS 2890.1:2004).

Furthermore, the aisle width adjacent the motorcycle parking exceeds 3.2 m, which is considered to be suitable for motorcycle access.

5 SUSTAINABLE DESIGN

Melbourne City Council has published the Sustainable Design Assessment in the Planning Process document (SDAPP), which aims to achieve best practice in environmentally sustainable development from the design stage through to construction and operation.

The Transport chapter outlines a number of ways in which Council encourage reduced reliance on cars and increased use of alternative forms of transport, including:

- For residential developments, provide at least one secure bicycle parking space per dwelling and one visitor bicycle parking space per 4 dwellings;
- For non-residential developments, provide at least one secure bicycle parking space for 10% of building occupants and sufficient end of trip facilities (showers and lockers);
- For non-residential developments, provide one bicycle space for visitors per 500 m² net lettable area;
- Non-residential developments greater than 1,000 m² to be accompanied by a Green Travel Plan;
- Incorporate electric vehicle charging infrastructure into the development; and
- Allocate 5% of, or at least 5, parking spaces for motorcycles and/or small vehicles.

Further discussion in relation to the proposed bicycle parking provision is detailed in Section 7.

6 LOADING

Clause 65 (Decision Guidelines) of the Melbourne Planning Scheme identifies that:

> *"Before deciding on an application or approval of a plan, the responsible authority must consider, as appropriate: The adequacy of loading and unloading facilities and any associated amenity, traffic flow and road safety impacts."*

The proposed developments provided two loading bays on the lower ground 1 floor level, one for each of the two buildings for waste collection and general loading purposes for all components.

The two loading bays have been designed to accommodate loading vehicles up to an 8.8 m medium rigid vehicles (MRV), allowing for forward entry and exit for loading and waste collection vehicles up to 8.8 m.

Swept path diagrams have been prepared, and are attached in Appendix A, demonstrating adequate site access and circulation within the loading area provided on the lower ground 1 level with an 8.8 m MRV.

The provision for loading is therefore considered appropriate for the proposed use.

7 BICYCLE PARKING

The bicycle parking requirements for the subject site are identified in Clause 52.34 of the Melbourne Planning Scheme, which specifies the following requirements for the proposed development.

Table 12 Clause 52.34 – Bicycle Parking Requirements

Component	*No/Area*	*Requirement*	*Total*
Dwelling (four or more storeys)	353 dwellings	1 space per 5 dwellings for residents 1 space per 10 dwellings for visitors	71 35
Total			**106**

Considering the above, the proposed provision of 445 exceeds the requirements of the Planning Scheme, and is therefore considered appropriate.

Furthermore, the Sustainable Design Assessment in the Planning Process document (SDAPP) is a document which aims to achieve best practice in environmentally sustainable development from the design stage through to construction and operation.

The transport chapter outlines a number of ways in which Council encourage reduced reliance on cars and increased use of alternative forms of transport.

With regard to bicycle parking, the document recommends the following bicycle parking provisions:

- 1 space per dwelling for residents (353 spaces);
- 1 spaces per 4 dwellings for residential visitors (88 spaces);

The proposed bicycle parking provision of 353 resident spaces and 88 visitor spaces satisfies the recommended residential and visitor rates.

8 CAR PARKING

8.1 Statutory Car Parking Requirements

8.1.1 Car Parking Requirements – Clause 52.06

The car parking requirements for the subject site are identified in Clause 52.06 of the Melbourne Planning Scheme. In this regard, Clause 52.06 also identifies that where any part of the land is identified as being within the Principal Public Transport Network Area, the Column B car parking rates apply to the proposed development. As shown in Figure 4, the site is located within the Principal Public Transport Network Area, and therefore, the Column B rates apply.

Subsequently, the car parking requirement is as follows.

Table 13 Clause 52.06 – Car Parking Requirements

Use	*No/Area*	*Rate*	*Car Parking Measure*	*Total*
Dwelling	326	1	to each one or two bedroom dwelling, plus	326
	27	2	to each three or more bedroom dwelling (with studies or studios that are separate rooms counted as bedrooms), plus	54
	353	0	for visitors to every 5 dwellings for developments of 5 or more dwellings	0
Total				**380**

Based on the above calculations, a total of 380 parking spaces are required for the proposed development.

8.1.2 Proposed Car Parking Provision

It is proposed to provide a total of 264 car parking spaces on-site, which equates to a shortfall of 116 spaces when compared to the Planning Scheme requirements.

In this regard, Clause 52.06-7 of the Melbourne Planning Scheme indicates that an application to reduce (including reduce to zero) the requirement for car spaces must be accompanied by a Car Parking Demand Assessment. The Assessment must assess the car parking demand likely to be generated by the proposed development, having consideration to:

- The likelihood of multi-purpose trips within the locality which are likely to be combined with a trip to the land in connection with the proposed use.
- The variation of car parking demand likely to be generated by the proposed use over time.
- The short-stay and long-stay car parking demand likely to be generated by the proposed use.
- The availability of public transport in the locality of the land.
- The convenience of pedestrian and cyclist access to the land.
- The provision of bicycle parking and end of trip facilities for cyclists in the locality of the land.
- The anticipated car ownership rates of likely or proposed visitors to or occupants (residents or employees) of the land.
- Any empirical assessment or case study.

An assessment of the likely parking demands and the appropriateness of reducing the car parking provision below them is set out as follows.

8.2 Car Parking Demand Assessment

8.2.1 Car Ownership Rates

Car ownership data from the 2021 Census for the City of Melbourne was sourced from the Australian Bureau of Statistics (ABS), and was further assessed to determine the proportion of dwellings where residents do not own or otherwise have the need to park a vehicle at their place of residence

For development types similar to that proposed, the data is outlined in Table 14.

Table 14 2021 Census Car Ownership – City of Melbourne

Dwelling Type	*Average Car Ownership*	*% Dwellings with no Vehicles*
Studio Apartment	0.11	89.4%
1-Bedroom Apartment	0.30	72.9%
2-Bedroom Apartment	0.49	56.8%
3-Bedroom Apartment	0.96	33.0%

Application of the above car owner rates to the proposed apartment mix gives the estimated average parking demand detailed in Table 15.

Table 15 Anticipated Car Ownership Demand

Component	*No. Dwelling*	*Avg. Car Ownership*		*% Dwellings with 0 Vehicles*	
		Rate/Dwelling	*Demand*	*Rate*	*Demand*
Studio Apartment	17	0.11	2	89.4%	15
1-Bedroom Apartment	210	0.30	63	72.9%	153
2-Bedroom Apartment	95	0.49	47	56.8%	54
3-Bedroom Apartment	27	0.93	25	33.0%	9
Total	**353**	**0.46** *	**137 spaces**	**64.6%***	**231 dwellings**

Average

The ABS data clearly indicates that there is a market for dwellings that do not provide, and therefore do not attract the price premium associated with a car parking space. Given the site's location with respect to public transport services and other services, it is expected that dwellings within the subject site would be particularly appealing to potential owners/tenants who do not have the need to park a vehicle at their place of residence.

Considering the location of the site within an activity centre, and its proximity to local amenities and public transport, it is expected that parking demands will be equivalent to the average rates described above.

Furthermore, it should be recognised that resident parking demands are, in part, dependent on car parking provisions, insofar as an owner/tenant with the need to park a vehicle is unlikely to occupy a dwelling that does not provide a car parking space. This is particularly true in areas where on-street parking is restricted to short durations, meaning on-street parking is not a viable alternative to on-site parking for residents.

With the site's location to public transport and other amenities, and on-street parking in the area generally being largely restricted, it is considered reasonable to assume that resident parking demands generated by the proposed dwellings will amount to the parking provision of 138 spaces.

8.2.2 Build to Rent (BTR) Housing

A study of Build to Rent (BTR) developments was undertaken by Charter Keck Cramer, which determined the car parking provision for 6 sites in Melbourne

The number of apartments within each development and the car parking provision is detailed in Table 16.

Table 16 Build to Rent Car Parking Provision

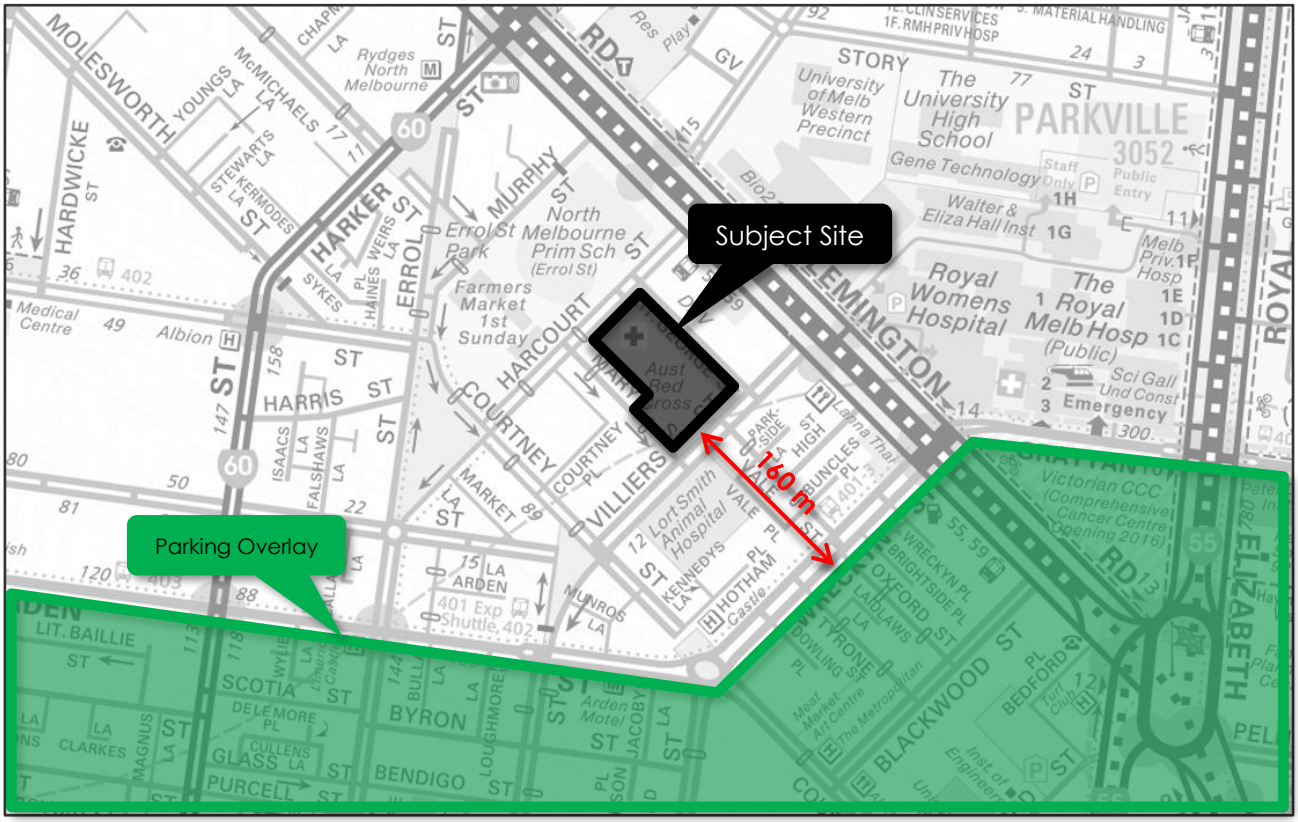
Development	*Apartments*	*Parking Provision (per dwelling)*
Home Richmond (Grocon, Richmond)	368	0.54
Home Southbank (Grocon, Southbank)	405	0.18
South Yarra Flex Housing Tower (Greystar, South Yarra)	304	0.28
South Yarra BTR Tower (Greystar, South Yarra)	382	0.19
LIV Flinders West (Mirvac, Melbourne)	474	0.18
LIV Albert Fields (Mirvac, Brunswick)	527	0.45
Average	**401**	**0.30**

It is shown that build to rent sites in Melbourne have an average provision of 0.30 car parking spaces per dwelling.

8.2.3 Parking Overlay (Schedule 12 to the Parking Overlay)

It is acknowledged the boundary of the Schedule 12 of the Parking Overlay (PO12) applies to the area approximately 160 m southeast of the site, as shown in Figure 22.

Figure 22 Parking Overlay (PO12)



Schedule 12 to the parking overlay specifies that a maximum of 1 car space be provided per dwelling, subsequently equating a maximum of 352 car spaces which can be provided for the proposed development. As such, the proposed provision is therefore technically in accordance with the parking overlay rates applied to the area just south of the subject site.

8.3 Anticipated Parking Demand

Based on the above census data, case study data and parking overlay assessment, the proposal to provide a total of 264 car parking spaces to service the proposed development, which is in excess of anticipated parking demand (or in accordance) with the assessment outlined above, and is therefore considered an acceptable arrangement.

Regardless, a further review of the proposed car parking provision has been undertaken. With reference to the Planning Scheme, Clause 52.06-7 of the Melbourne Planning Scheme further indicates that a permit may be granted to reduce the number of parking spaces, in consideration to a number of considerations. A further detailed review of the car parking provision is as follows.

8.4 Review of Car Parking Provision

8.4.1 City of Melbourne Transport Strategy

The City of Melbourne Transport Strategy 2030 is a sustainable transport strategy, aimed at achieving an integrated transport network to service the future needs of the community and businesses by the year 2030.

The City of Melbourne aims to achieve this through 13 key outcomes outlined in the transport strategy, as follows:

- *Outcome 1: Safe streets for people*
- *Outcome 2: Safe streets for bike riding*
- *Outcome 3: Transport interchanges as welcoming people-places*
- *Outcome 4: Fewer non-essential vehicles in the municipality*
- *Outcome 5: Reduced delay for people using efficient transport*
- *Outcome 6: More people riding bikes*
- *Outcome 7: Use kerb space more efficiently*
- *Outcome 8: Efficient and reliable public transport for everyday life*
- *Outcome 9: Integrated transport planning for Victoria*
- *Outcome 10: New technologies deliver net community benefit*
- *Outcome 11: Vehicle automation supporting a people-focussed city*
- *Outcome 12: Zero-emissions transport*
- *Outcome 13: Equitable and efficient transport pricing*

As indicated above, Council's policy is targeted towards moving people in a safe and sustainable manner.

Additionally, the Transport Strategy proposes a series of actions in response to the outcomes above. Of note, under Outcome 4 of the Transport Strategy, Action 16 states the following:

> *Review off-street parking policies to support better outcomes in all spatial planning in the municipality.*

It is clear that there are a number of benefits to reducing car parking provision including overall cost, congestion, and environmental and social aspects. These benefits are paramount when considering future development and should take precedence.

8.4.2 Impact of Parking Supply on Traffic Congestion

A recent VCAT decision (Ronge v Moreland CC [2017] VCAT 550 (9 May 2017)) highlighted the value of reduced car parking provision with regard to traffic congestion, identifying the potential adverse impact of providing parking to comply with Clause 52.06, as below:

"*Our roads are already congested and will be unimaginably so if a 'business-as-usual' approach is accepted through until 2050. The stark reality is that the way people move around Melbourne will have to radically change, particularly in suburbs so well served by different modes of public transport and where cycling and walking are practical alternatives to car based travel.*

A car parking demand assessment is called for by Clause 52.06-6 [now Clause 52.06-7] *when there is an intention to provide less car parking than that required by Clause 52.06-5.*
However, discussion around existing patterns of car parking is considered to be of marginal value given the strong policy imperatives about relying less on motor vehicles and more on public transport, walking and cycling. Census data from 2011 or 2016 is simply a snapshot in time, a base point, but such data should not be given much weight in determining what number of car spaces should be provided in future, for dwellings with different bedroom numbers.

Policy tells us the future must be different. Oversupplying parking, whether or not to comply with Clause 52.06, has the real potential to undermine the encouragement being given to reduce car based travel in favour of public transport, walking and cycling."

"*One of the significant benefits of providing less car parking is a lower volume of vehicle movements and hence a reduced increase in traffic movements . . .*"

This has been realised in some inner suburban areas, with maximum (rather than minimum) parking rates applying to developments.

8.4.3 Recent VCAT Decisions

There have been recent VCAT decisions where reduced parking rates for residential developments have been supported, including cases where the provision of zero parking spaces were accepted[1,2].

The tribunal indicated some key criteria for when considering a waiver in residential parking, including:

- Access to public transport with consideration to time of travel, diversity in routes and frequency of services;
- Walkability of the surrounding area; and
- Access to alternative transport.

The subject site has excellent public transport accessibility, with a wide variety of transport modes and services operating in the immediate vicinity of the site, including a number of tram services located at the Haymarket roundabout approximately 400 m from the site. These tram services operate along Flemington Road, Royal Parade, Elizabeth Street and Peel Street in the vicinity of the site. Numerous bus and train services also operate further afield of the site. The site has a Transit Score rating of 100/100 and is considered to be a Rider's Paradise, with world-class public transportation.

Furthermore, Parkville Metro station is currently being constructed on the eastern side of Royal Parade along Grattan Street. Four train station entrances are proposed for the Parkville Metro Station including an entrance at the south-eastern corner of the Royal Melbourne Hospital. The provision of an entrance to the immediate north of the site will provide excellent access to the Sunbury line and the Cranbourne/Pakenham line, as well as the Melbourne CBD where additional Metropolitan Melbourne and V/Line rail services are provided.

Additionally, the site is well-located for pedestrian accessibility, with a number of recreation, education, shopping and employment uses located within walking distance of the site. The site has a Walk Score rating of 96/100 and is very walkable, with most errands able to be accomplished on foot, and

With regard to active transport, Flemington Road is provided with on-road bicycle lanes on both sides of the road, providing resident with access to alternative transport modes.

In light of the above, the site is considered to meet all the key criteria points for a waiver in residential parking provision.

[1] Dinopolous v Darebin
[2] Vincent v Moreland

8.4.4 Alternative Modes of Transport

As noted above, the site has very good access to Public Transport, with numerous trains, trams and bus services in the vicinity of the site. The provision of very good public transport ensures that residents will have good access to alternative transportation modes.

9 TRAFFIC

9.1 Traffic Generation

Surveys undertaken by **one**mile**grid** and other traffic engineering firms at residential dwellings have shown that the daily traffic generation rates vary depending on the size, location and type of the dwelling, the parking provision and proximity to local facilities and public transport.

Table 17 provides a summary of the typical traffic generation rates (both peak hour and daily) for a variety of dwelling types.

Table 17 Typical Residential Traffic Generation Rates

Dwelling Type	*Peak Hour*	*Daily*
Detached low density	0.8 – 1.0 vph	8 – 10 vpd
Larger medium density townhouses and apartments	0.5 – 0.7 vph	5 – 7 vpd
Smaller medium density townhouses and apartments	0.25 – 0.5 vph	2.5 – 5 vpd
High density apartments (with parking)	0.1 – 0.3 vph	1 – 3 vpd

Generally, where a site is closer to high-quality public transport, or local services and amenities (e.g., a full-line supermarket), lower traffic generation rates occur.

Medium to high density dwellings in inner areas generate traffic with rates between 3.0 and 6.0 movements per dwelling. Considering the location of the subject site and moreover the excellent access to public transport, it is expected that generation rates will be towards the lower end of the range. For the purposes of a conservative assessment, a daily rate of in the order of 5.0 movements per day per dwelling will be adopted with 10% occurring during the peak hours.

Application of the above rates indicates that the 260 on-site residential parking spaces will generate in the order of 1,300 vehicle movements per day, inclusive of the 130 vehicle movements during the morning and afternoon peak hour periods. Furthermore, during the morning peak, it is estimated that 80% of the residential traffic will be outbound, while during the afternoon peak, 60% of the residential traffic will be inbound.

Based on the above, the anticipated traffic generated by the proposed development is shown in Table 18.

Table 18 Anticipated Traffic Generation

Period	*Inbound*	*Outbound*	*Total*
AM Peak	26	104	130
PM Peak	78	52	130
Daily	**650**	**650**	**1,300**

9.2 Traffic Distribution

With consideration to the location of the two residential access points (227 spaces serviced by the western access and 34 spaces serviced by the eastern access), the existing traffic volumes and associated direction of travel (as detailed in Section 2.4), the location of the site in relation to the arterial road network, public transport facilities, schools, recreation and retail and employment precincts, the directional distribution shown in Table 19 has been adopted.

Table 19 Adopted Directional Traffic Distribution

Origin/Destination	*Percentage*
North via Flemington Road	60%
South via Courtney Street	40%

Furthermore, it is assumed all vehicles utilising the western access point will enter/exit via Harcourt Street and whilst all vehicles utilising the eastern access point will enter/exit via Villiers Street.

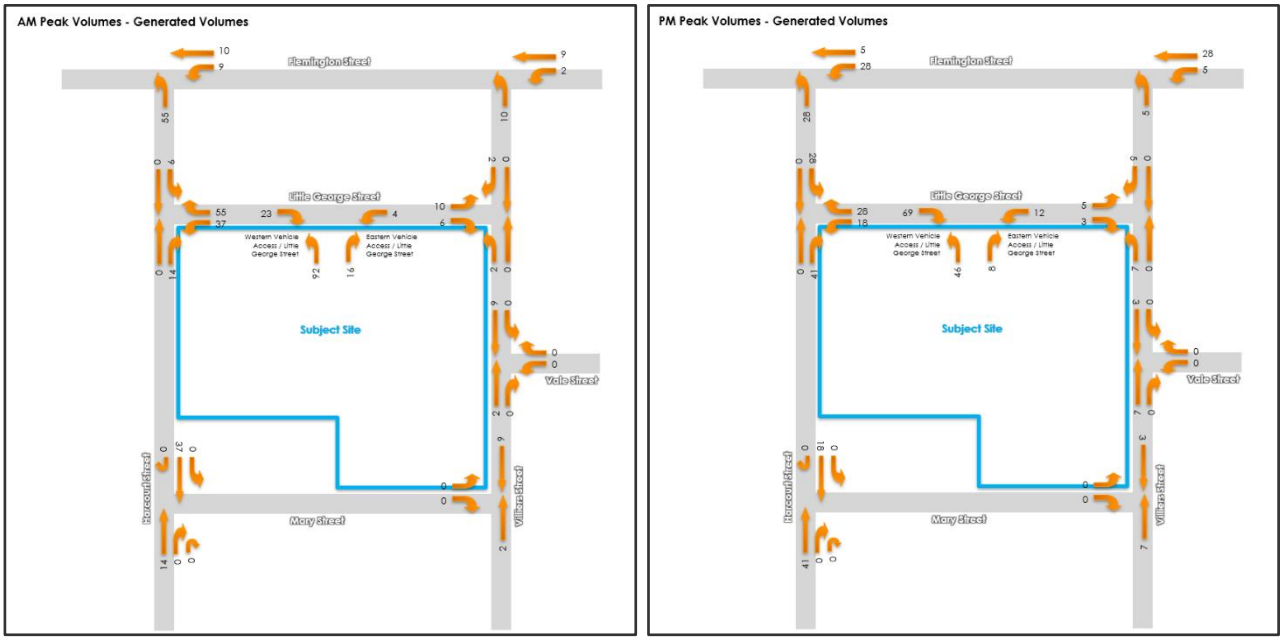
Moreover, given the one way nature of Flemington Road, it is noted outbound vehicles via the north in one peak period will return to the site via the south in the other peak period (from the southern end of Harcourt Street or Villiers Street).

Similarly, vehicles outbound in one peak period via the south will return to the site in the opposite peak period via the north (from Flemington Street).

9.3 Generated Traffic Volumes

Based on the above traffic generation and directional distribution, the following traffic volumes during the AM and PM peak hour periods are expected to be generated by the proposed development.

Figure 23 Peak Hour Generated Traffic Volumes

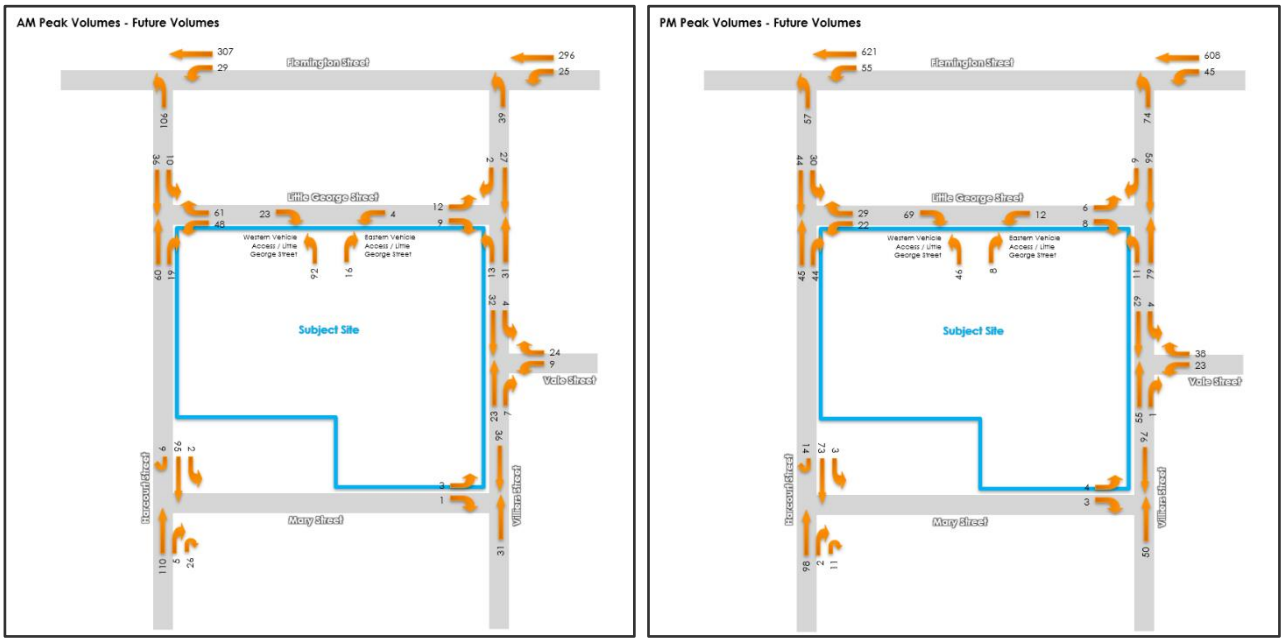


9.4 Resultant Future Traffic Volumes

Based on the above, the future traffic volumes can be calculated by superimposing the anticipated traffic volumes to be generated by the proposed development to the existing traffic volumes.

The resultant peak hour traffic volumes are shown in Figure 24.

Figure 24 Peak Hour Resultant Future Traffic Volumes



9.5 Traffic Impact

Reviewing the volumes above, it is noted that a maximum of 131 vehicle movements per hour are expected for any one movement, equivalent to two vehicle trips nearly every one minute. Once split even further between the two residential access points, the traffic volumes generated by the proposed development are very low, and are expected to be easily absorbed into the surrounding road network.

To assess the future operation of the nearby primary intersection of intersection of Flemington Road with Villiers Street and Harcourt Street, the resultant future traffic volumes have been input into SIDRA Intersection.

The results of the future operation of the Flemington Street / Villiers Street and Flemington / Harcourt Street intersection analysis are provided in Table 20 and Table 21 respectively.

Table 20 Flemington Road / Villiers Street – Existing / Future Conditions

Approach	DoS		Avg. Delay (sec)		Queue (m)		LoS	
	Existing	Future	Existing	Future	Existing	Future	Existing	Future
AM Peak								
Villiers Street	0.02	0.03	7	7	1	1	A	A
Flemington Road	0.09	0.09	0	0	0	0	A	A
PM Peak								
Villiers Street	0.07	0.07	8	8	3	2	A	A
Flemington Road	0.17	0.18	0	0	0	0	A	A

Table 21 Flemington Road / Harcourt Street – Existing / Future Conditions

Approach	DoS		Avg. Delay (sec)		Queue (m)		LoS	
	Existing	Future	Existing	Future	Existing	Future	Existing	Future
AM Peak								
Harcourt Street	0.04	0.08	4	4	1	2	A	A
Flemington Road	0.09	0.09	0	1	0	0	A	A
PM Peak								
Harcourt Street	0.03	0.05	5	5	1	1	A	A
Flemington Road	0.19	0.19	0	1	0	0	A	A

10 CONCLUSIONS

It is proposed to develop the subject site for the purposes of a multi-storey, high-density residential development associated with the build-to-rent (BTR) scheme.

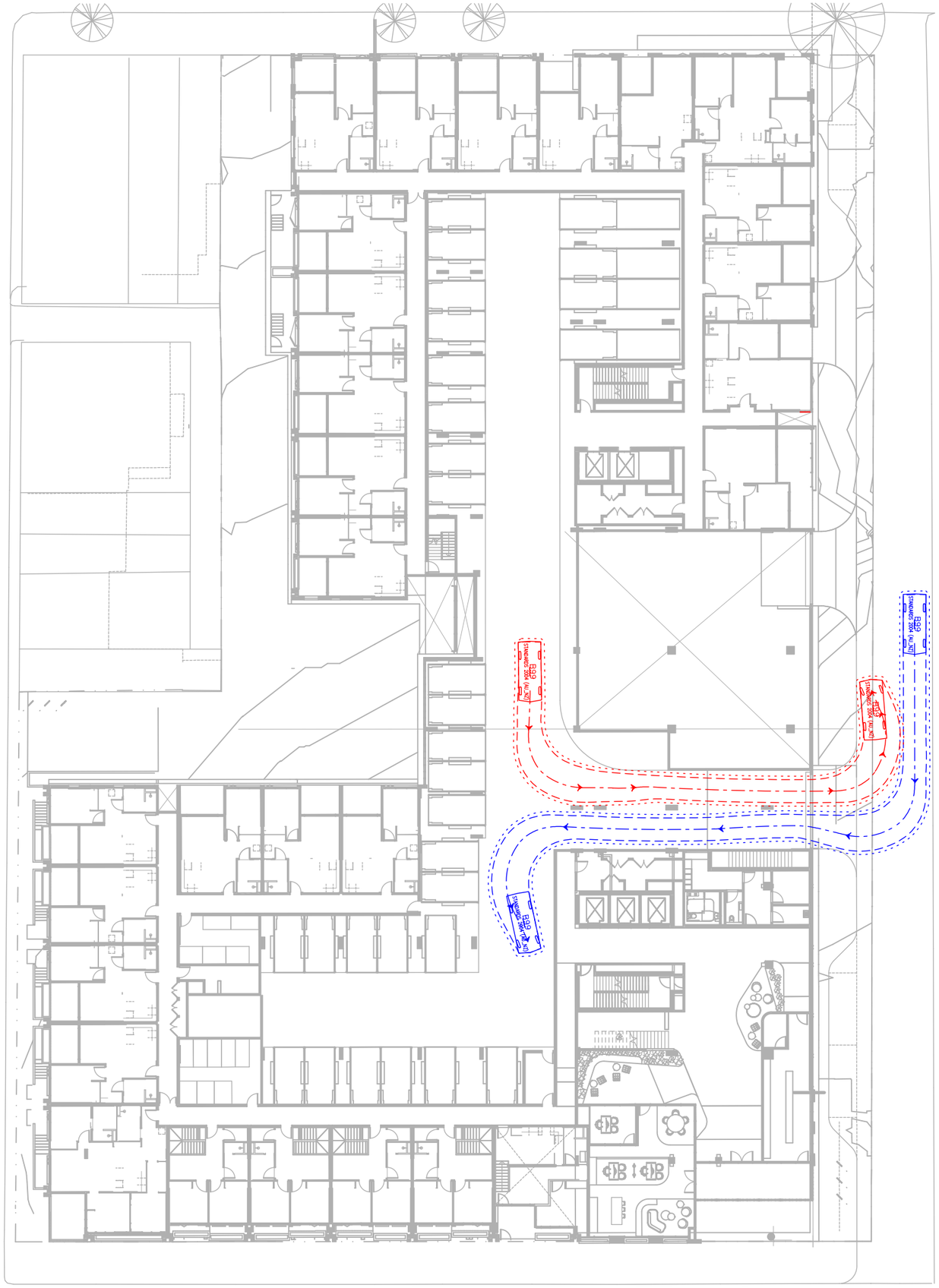
Considering the analysis presented above, it is concluded that:

- The car parking layouts and accesses have been designed generally in accordance with the requirements of the Planning Scheme and are considered appropriate;
- The proposed bicycle parking access design is considered acceptable;
- The proposed loading arrangements are considered acceptable;
- The proposed provision of resident and visitor bicycle parking is considered appropriate; The proposed supply of car parking for the build-to-rent dwellings are in line with parking demands from case study data, and therefore is appropriate for the proposed development
- The anticipated traffic volumes generated by the development is not expected to have an impact on the operation of the surrounding road network; and
- There are no traffic engineering reasons which would preclude a permit from being issued for this proposal.

Appendix A Swept Path Diagrams

VILLIERS STREET

LITTLE GEORGE STREET



N

5.20
0.95 3.05

B99 meters
Width : 1.94
Track : 1.84
Lock to Lock Time : 6.0
Steering Angle : 33.9

SWEPT PATH LEGEND
- — — — — DESIGN VEHICLE SWEPT PATHS SHOWN DASHED
- - - - - - - - - 300mm CLEARANCE ENVELOPE SHOWN DOTTED

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Wurundjeri Woiwurung Country
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Phone (03) 9939 8250

Drawing Title
27-47 VILLIERS STREET, NORTH MELBOURNE
VEHICLE SITE ACCESS - GROUND 1
SWEPT PATH ANALYSIS

Designed	Approved	Melway Ref
TCW	JS	43 E4

Scale
1:400 @ A3
0 2 4 8

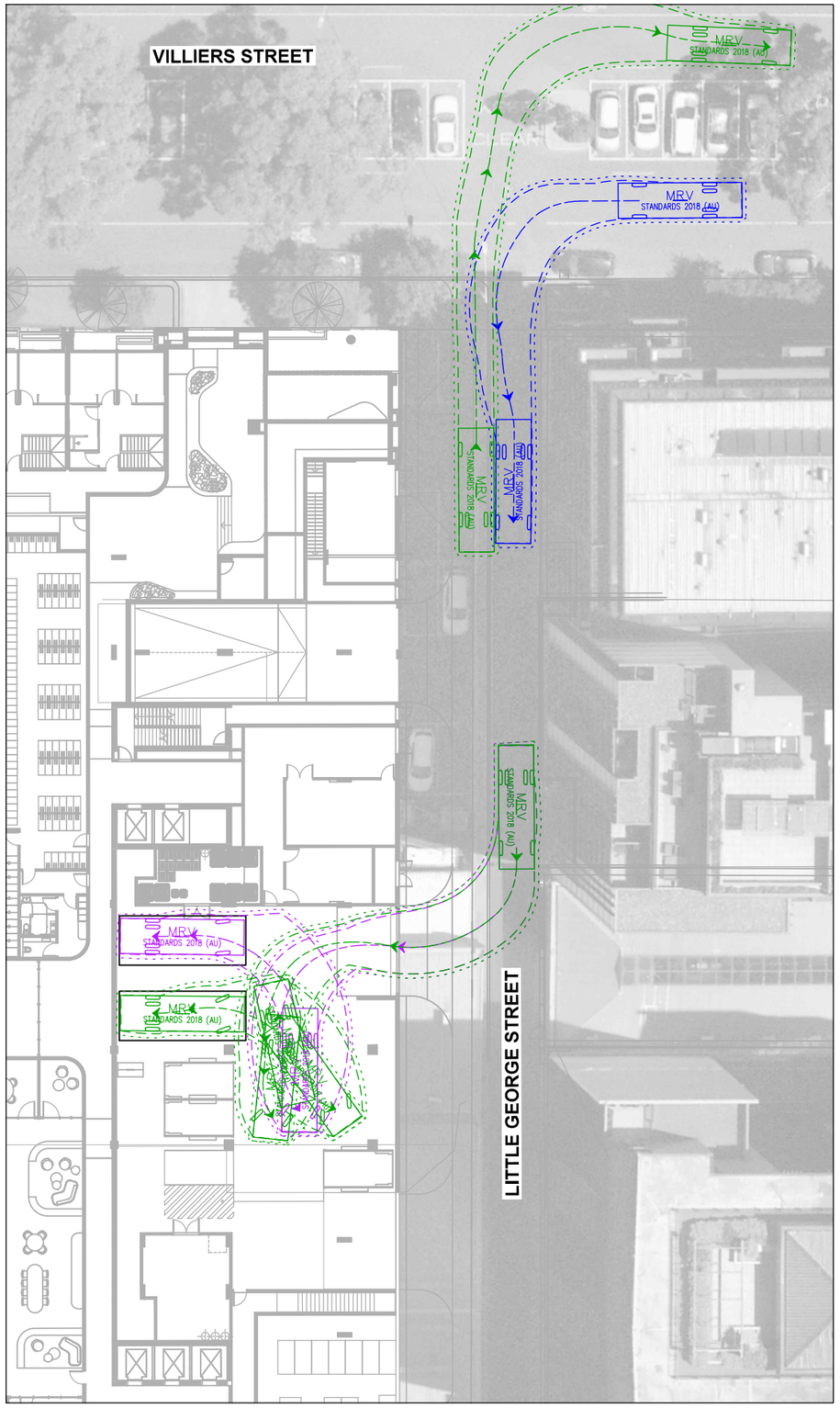
Project Number	Drawing Number	Revision
230570	SPA100	F

CAD File: N:\Projects\2023\230570\Drawings\230570SPA100.dgn

Date Plotted: 18-04-2024 8:45:39 AM

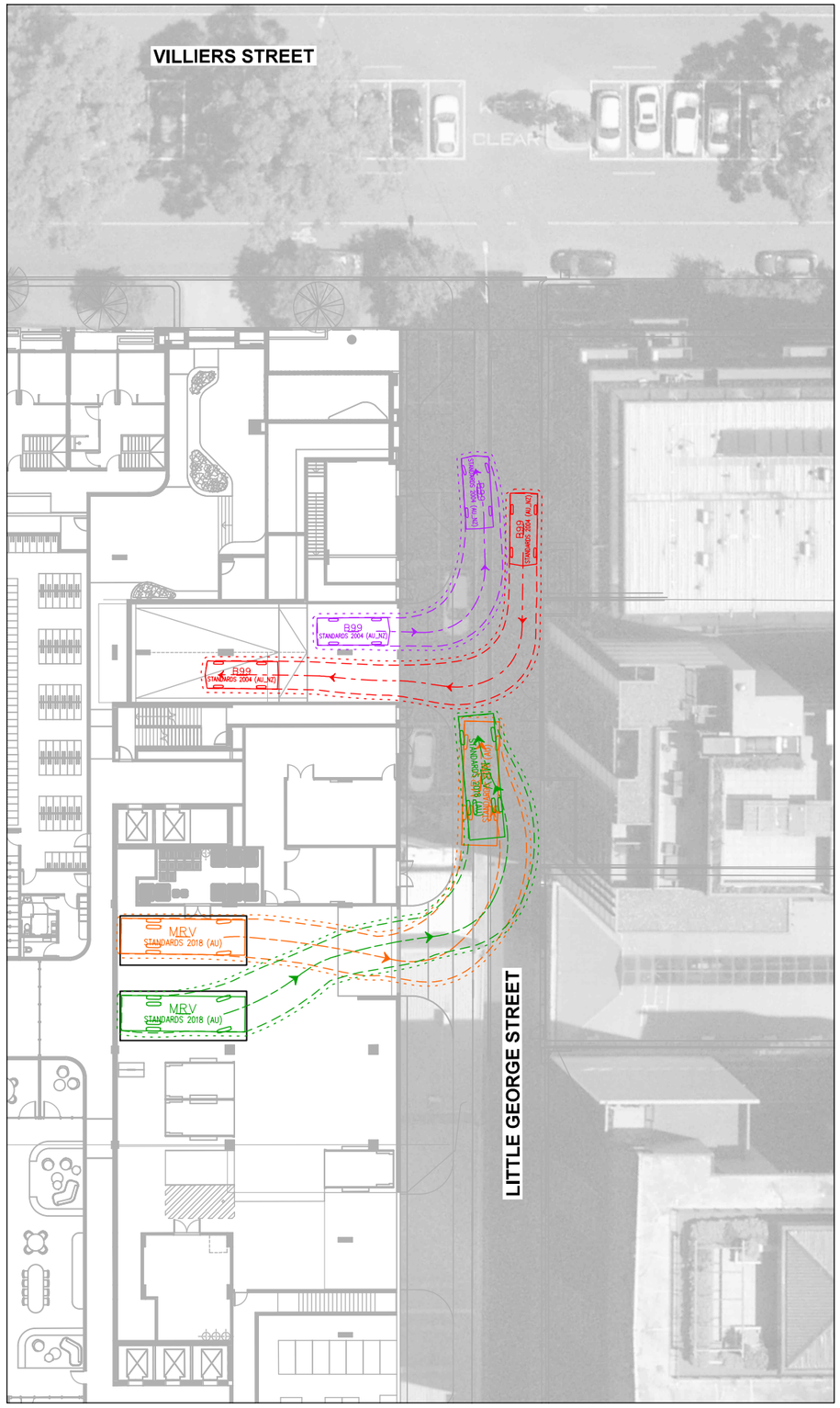
onemilegrid operates from Wurundjeri Woiwurung Country of the Kulin nation.
We acknowledge and extend our appreciation to the Wurundjeri People, the Traditional Owners of the land. We pay our respects to leaders and Elders past, present and emerging for they hold the memories, the traditions, the culture, and the hopes of all Wurundjeri Peoples.

Aerial Photography
Aerial photography provided by Nearmap



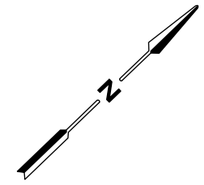
ENTRY MANOEUVRES

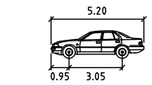
- — — — — DESIGN VEHICLE SWEPT PATHS SHOWN DASHED
- - - - - - - - - 300mm CLEARANCE ENVELOPE SHOWN DOTTED



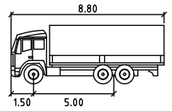
EXIT MANOEUVRES

- — — — — DESIGN VEHICLE SWEPT PATHS SHOWN DASHED
- - - - - - - - - 300mm CLEARANCE ENVELOPE SHOWN DOTTED





B99	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.9



MRV	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 34.0

CAD File: N:\Projects\2023\230570\Drawings\230570SPA200.dgn

Date Plotted: 18-04-2024 8:45:42 AM

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Aerial Photography
Aerial photography provided by Nearmap

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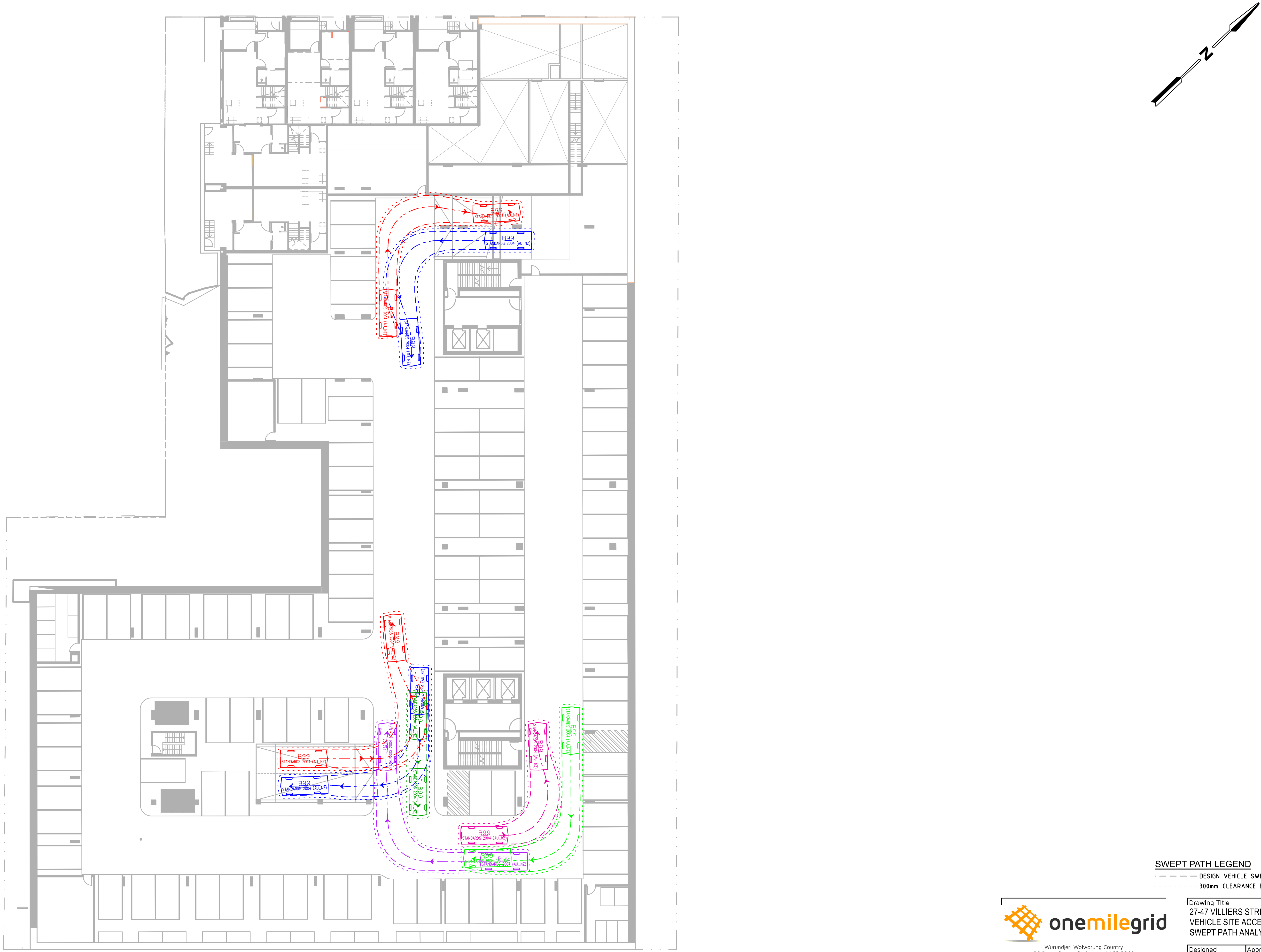
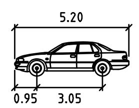
Scale
1:400 @ A3
0 2 4 8

Drawing Title
27-47 VILLIERS STREET, NORTH MELBOURNE
VEHICLE SITE ACCESS - LOWER GROUND 1
SWEPT PATH ANALYSIS

Designed	Approved	Melway Ref
TCW	JS	43 E4

Project Number	Drawing Number	Revision
230570	SPA200	F





B99 meters
Width : 1.94
Track : 1.84
Lock to Lock Time : 6.0
Steering Angle : 33.9

SWEPT PATH LEGEND

- — — — — DESIGN VEHICLE SWEPT PATHS SHOWN DASHED
- - - - - - - - - - 300mm CLEARANCE ENVELOPE SHOWN DOTTED

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Drawing Title
27-47 VILLIERS STREET, NORTH MELBOURNE
VEHICLE SITE ACCESS - LOWER GROUND 2
SWEPT PATH ANALYSIS

Designed	Approved	Melway Ref
TCW	JS	43 E4

Scale	Project Number	Drawing Number	Revision
1:400 @ A3 (0 2 4 8)	230570	SPA300	F

CAD File: N:\Projects\2023\230570\Drawings\230570SPA300.dgn
Date Plotted: 18-04-2024 8:45:45 AM

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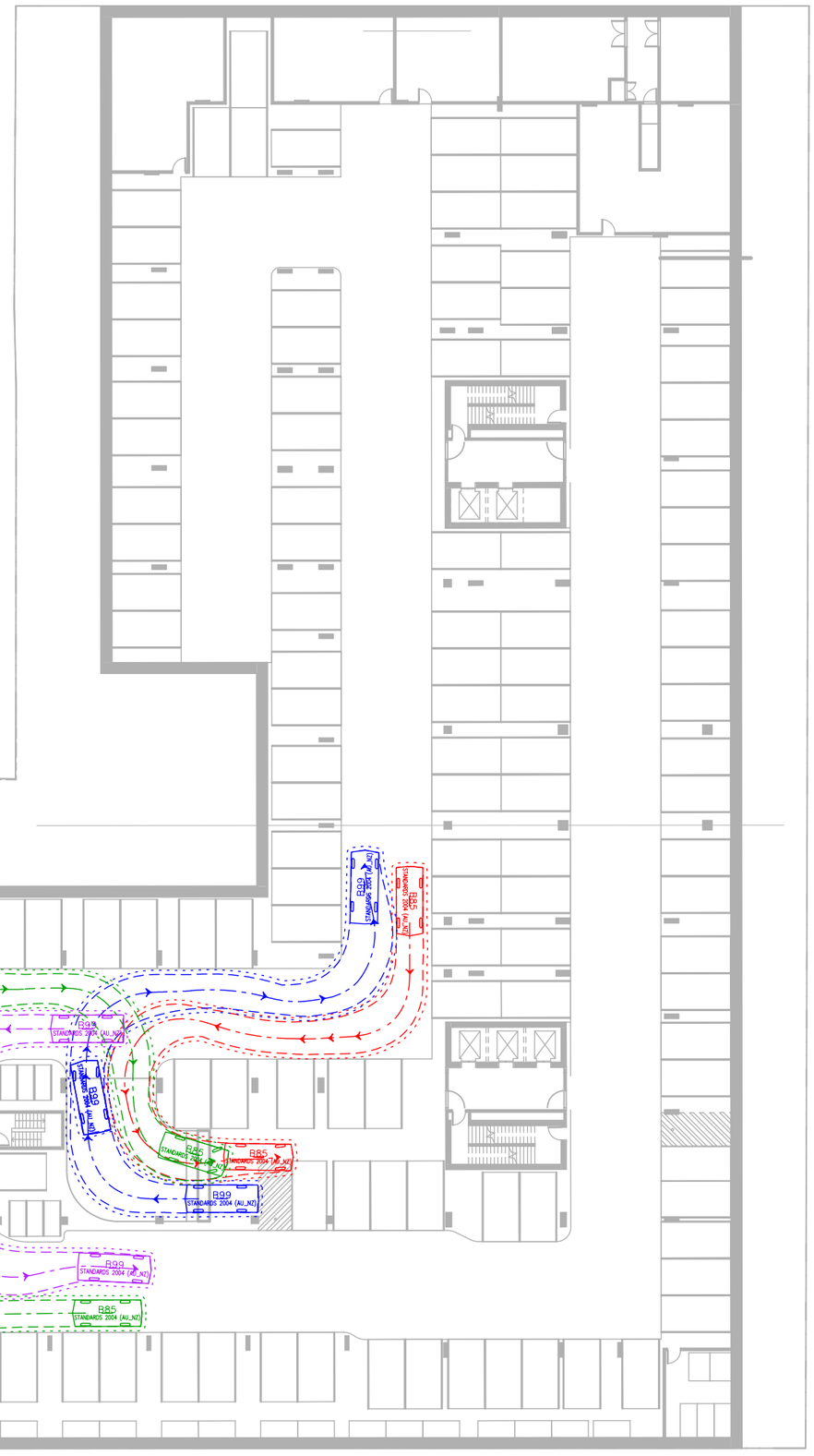
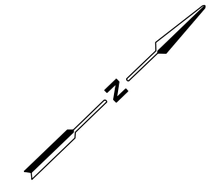
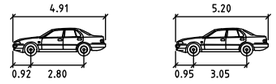
Aerial Photography
Aerial photography provided by Nearmap







B85	meters	B99	meters
Width	: 1.87	Width	: 1.94
Track	: 1.77	Track	: 1.84
Lock to Lock Time	: 6.0	Lock to Lock Time	: 6.0
Steering Angle	: 34.1	Steering Angle	: 33.9

SWEPT PATH LEGEND

- — — — — DESIGN VEHICLE SWEPT PATHS SHOWN DASHED
- - - - - - - - - 300mm CLEARANCE ENVELOPE SHOWN DOTTED

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Drawing Title
27-47 VILLIERS STREET, NORTH MELBOURNE
VEHICLE SITE ACCESS - BASEMENT
SWEPT PATH ANALYSIS

Designed	Approved	Melway Ref
TCW	JS	43 E4

Scale
1:400 @ A3
0 2 4 8

Project Number	Drawing Number	Revision
230570	SPA400	F

CAD File: N:\Projects\2023\230570\Drawings\230570SPA400.dgn

Date Plotted: 18-04-2024 8:45:47 AM

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