Greenvale North (Part 2) Precinct Structure Plan

Transport Impact Assessment

REFERENCE: 300304339

PREPARED FOR VICTORIAN PLANNING AUTHORITY | MAY 2024

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Stantec

Revision schedule

Rev No	Date	Description	Signature of Typed Name (documentation on file)			
			Prepared by	Checked by	Reviewed by	Approved by
A-Dr	05/05/2023	Draft	Y. Leow	S. Beardall	R. Humphreys	S. Beardall
A	18/05/2023	Final	Y. Leow	S. Beardall	R. Humphreys	S. Beardall
A	24/05/2023	Final #2	Y. Leow	S. Beardall	R. Humphreys	S. Beardall
B	07/09/2023	Final	Y. Leow	S. Beardall	R. Humphreys	S. Beardall
C	6/05/2024	Amended Final	Y. Leow	S. Beardall	R. Humphreys	S. Beardall
D	28/05/2024	Amended Final #2	Y. Leow	S. Beardall	R. Humphreys	

Executive Summary

Stantec has been engaged by Satterley to undertake a transport impact assessment in support of the proposed Greenvale North Part 2 Precinct Structure Plan (PSP) in collaboration with the Victorian Planning Authority's (VPA).

While significant planning has been completed for the surrounding land parcels, planning for the Greenvale North (Part 2) PSP has only recently been earmarked for commencement by the VPA. The delivery of its key transport connections will be crucial for the liveability of future residents and those adjacent communities.

The Greenvale North Part 2 PSP is located within the middle portion of the Greenvale North R1 PSP area (formerly known as the investigation area) and directly abuts the Craigieburn West PSP to the north (completed) and Greenvale North (R1) PSP to the east and west (completed).

The research documented in this report indicates the development of this land for residential purposes is consistent with relevant strategic transport policy and planning for the North Growth Corridor. Of note, the site's interface constraints of being physically restricted to the south and the west, dictate that traffic must occur to/from the east via Aitken Boulevard or the north via a connection into the recently approved Craigieburn West PSP area. The connection to the north is subject to the delivery of land uses within the Craigieburn West PSP.

Traffic surveys of the existing roads within the vicinity indicates that in some instances the surrounding key connector and arterial roads are carrying volumes near or over their theoretical targeted volume thresholds, even without the additional traffic anticipated to be generated by the Craigieburn West PSP. It is noted that a number of transport infrastructure projects within the broader area are planned to be delivered to meet the vision of the north growth corridor is achieved. It is clear that the delivery of key projects including upgrades to Mickleham Road and Aitken Boulevard will influence the travel behaviours, with duplications and new links changing the level of accessibility in the corridor.

The Greenvale North Part 2 PSP area is expected to generate 3,600 vehicle trips per day and is expected to be adequately supported by an internal road network. This level of traffic is considered to be modest when considered in context with the surrounding precincts and land use uplift expected within the North Growth Corridor. The additional traffic generated by the PSP area is not anticipated to significantly impact the existing traffic conditions already recorded on the key roads within the vicinity of the site.

The traffic assessment documented in this report considers the traffic impacts at the macro level of the broader road network in the longer term. Micro level traffic analysis for peak hour assessments would be undertaken at subsequent town planning applications. Similarly, specific upgrades to existing intersections would be completed at this stage. Notwithstanding, the % uplift in traffic volumes along the key roads within the vicinity is considered low and would not necessarily warrant the need to contribute to any planned infrastructure projects in the area.

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1 Introduction

1.1 Background & Proposal

Stantec has been engaged by Satterley to undertake a transport impact assessment in support of the proposed Greenvale North Part 2 Precinct Structure Plan (PSP) in collaboration with the Victorian Planning Authority (VPA).

The site forms part of the Greenvale North (Part 2) PSP area and will connect with neighbouring PSPs including Greenvale North R1 PSP to the east and the Craigieburn West PSP to the north. The PSP area will include predominantly residential development and when complete will deliver a local street network that is bus capable, has walking and cycling paths and approximately 402 residential lots.

It is anticipated that the site will gain access to the broader road network primarily via the proposed Access Street – Level 2 that will connect to the Craigieburn West PSP area in the north and via the existing (constructed) road network to the east.

No direct vehicle access will be provided to the Greenvale North R1 PSP area to the west, however an opportunity exists to provide active travel connections through the drainage reserve to this precinct. The Future Urban Structure (FUS) plan for the PSP area is reproduced in Figure 1.1.

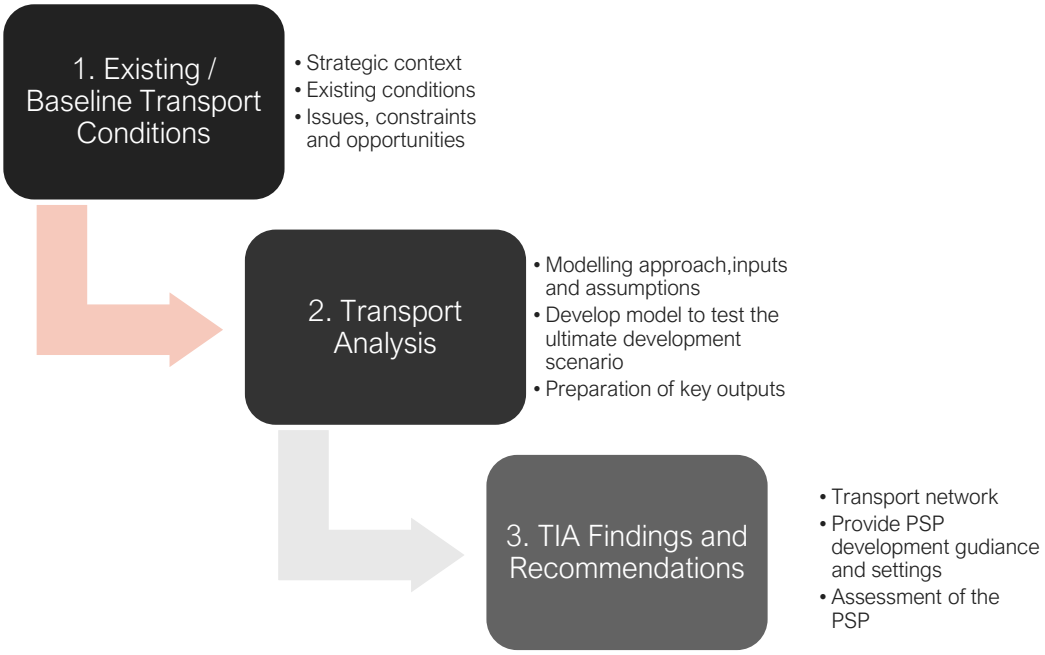
Figure 1.1: Proposed Future Urban Structure (FUS) Plan

1.2 Purpose & Structure of this Report

The purpose of this study is to assess the traffic and transport planning elements of the PSP and the network's suitability to support the proposed land uses. The study relies upon transport analysis to inform and support the preparation of the PSP.

An overview of the key tasks associated with this engagement are provided in Figure 1.2[1].

Figure 1.2: Project Process Overview - Key Tasks



The process has been iterative between the transport centric activities and the development of other aspects of the PSP, such as land use, open space and built form. As such, all the information provided in this report has been considered and revised through the precinct planning process in collaboration with the client (Satterley) and the VPA.

1.3 References

In preparing this report, reference has been made to the following:

- Hume Planning Scheme
- Craigieburn West Precinct Structure Plan
- Greenvale North R1 Precinct Structure Plan
- The North Growth Corridor Plan
- Traffic Impact Assessment for Craigieburn West PSP prepared by OneMileGrid, dated 9 November 2020
- Traffic Impact Assessment – Addendum 1 prepared by OneMileGrid, dated 1 April 2023
- Future Urban Structure Plans for the proposed PSP prepared by VPA (provided May 2024),

[1] With respect to Strategic Transport Modelling, Stantec has relied on recent work completed as part of the adjacent Craigieburn West PSP. Refer to Section 6.1 of this report.

2 Planning Context

2.1 Precinct Planning

The traffic impact assessment prepared for the Greenvale North (Part 2) PSP forms part of the broader precinct structure planning process, which is undertaken by the VPA in accordance with the Precinct Structure Planning Guidelines: New Communities in Victoria (2021). The Guidelines are based on planning for 20-minute neighbourhoods, a principle in Plan Melbourne 2017-2050 that advocates for living locally to ensure accessible, safe and attractive local communities.

In Greenfield areas, the PSP 2.0 guidelines are adopted, and the purpose of the guidance is to set out what should be addressed in preparing or assessing a PSP and to set aspirational targets to streamline and optimise delivery of government policy.

2.2 Corridor Planning

The Greenvale North (Part 2) PSP is located within and towards the southwestern extent of the North Growth Corridor (NGC). The NGC, as with the other Growth Corridor Plans, are carefully thought out strategic integrated land use and transport plans that provide a strategy for the development of Melbourne's growth corridors and form the basis of structure planning.

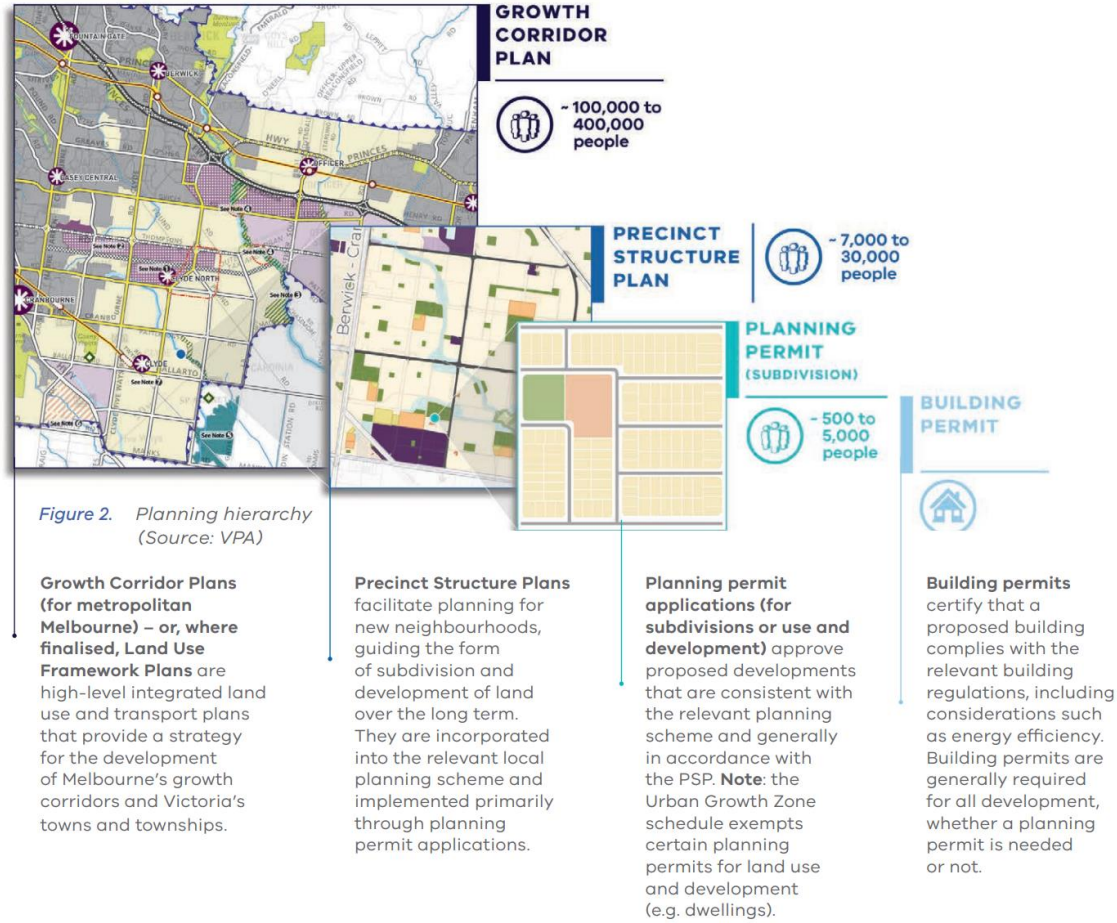
Figure 2.1: Northern Growth Corridor Plan Extract

The NGC identifies the existing and planned transport infrastructure within the corridor. In the vicinity of the Greenvale North Part 2 PSP area, Aitken Boulevard, located east of the PSP, and Craigieburn Road, located north of the PSP, are identified as part of the high-capacity Principle Public Transport Network (PPTN). Mickleham Road is located to the west of the PSP and is nominated as an arterial road corridor that also forms the western extent of the urban growth boundary.

The NGC also identifies the development of the Outer Metropolitan Ring (OMR) / E6 Transport Corridor which is located north west of the site. The OMR will incorporate a grade separated crossing with Aitken Boulevard/Pattersons Road and Freeway interchange with the Hume Freeway which will create an opportunity for new rail and transport links to Werribee, Melton, Tullamarine, Craigieburn, Mickleham and Epping. The timing and funding for the delivery of the OMR is unconfirmed but it is anticipated to be a long-term project (i.e., 15-20years +).

Figure 2.2 provides the relationship between the Corridor Plans and Precinct Structure Plans which has been sourced from the VPA.

Figure 2.2: Planning Hierarchy



2.3 Strategic Planning

There is a range of preceding and parallel planning policies and guidelines that informs the development of the Greenvale North (Part 2) PSP which are summarised in Table 2.1.

Table 2.1: Relevant Policies and Guidelines

Activity	Description	Implications
Plan Melbourne	Plan Melbourne is the Victorian Government's long-term planning strategy, guiding the way the city will grow and change to 2050.	Key transport related policies relating to the NGC and the Greenvale North Part 2 PSP include: • Facilitating investment in Melbourne's outer areas to increase local access to employment • Creating a city of 20-minute neighbourhoods • Requiring development in growth areas to be sequenced and staged to better link infrastructure delivery to land release • Providing guidance and certainty for land use and transport development through the Principal Public Transport Network and the Principal Freight Network
North Growth Corridor Plan	The North Growth Corridor plan sets the regional framework for its urban growth based on the strategic directions of Melbourne	It shows broad land use patterns, committed and proposed transport networks and regional open space. As it relates to the Greenvale North Part 2 PSP, the Growth Corridor Plan identifies the following key road based transport infrastructure projects: • Aitken Boulevard as part of the Principal Public Transport Network with potential high-capacity Public Transport Services • Craigieburn Road as part of the Principal Public Transport Network

	2030.	with potential high-capacity Public Transport Services • Mickleham Road a primary arterial road • The Outer Metropolitan Ring Road incorporating freeway network, principal freight network
Hume Integrated Land Use and Transport Strategy (HILATS)	The strategy aims to establish a vision across Hume's Growth Corridor for transport actions that will encourage vibrant and liveable communities for residents.	The Hume Integrated Land Use and Transport Strategy identifies six key objectives to guide future transport decisions in Hume. The HILATS highlights focus on increasing opportunities for walking and cycling, supporting high quality public transport network, and maintaining safe and efficient road system. The introduction of the Greenvale North Part 2 PSP will provide the potential for a public transport connection between the Craigieburn West and Greenvale North Part 1 PSP's.
Craigieburn West PSP	Craigieburn West PSP is located immediately north of the Greenvale North Part 2 PSP. The PSP was approved and gazetted in September 2021.	A key transport outcome that has occurred through the development of the PSP that relates to Greenvale North Part 2, include a north-south road connection to the Greenvale North PSP area. Strategic transport modelling assumptions adopted for the Craigieburn West PSP assessment form the primary basis of the assumptions adopted used for this assessment.
Greenvale North R1 PSP	The Greenvale North R1 PSP area is located immediate east and west of the Greenvale North Part 2 PSP area. The PSP was approved and gazetted in February 2011.	Majority of the Greenvale North R1 PSP is completed and occupied. No road connection is provided along the site's western boundary due to the topographical characteristics of the bund. Several road connections to the existing local streets are proposed along the site's eastern boundary to facilitate east-west connectivity to Aitken Boulevard.

2.4 Strategic Transport Infrastructure Projects

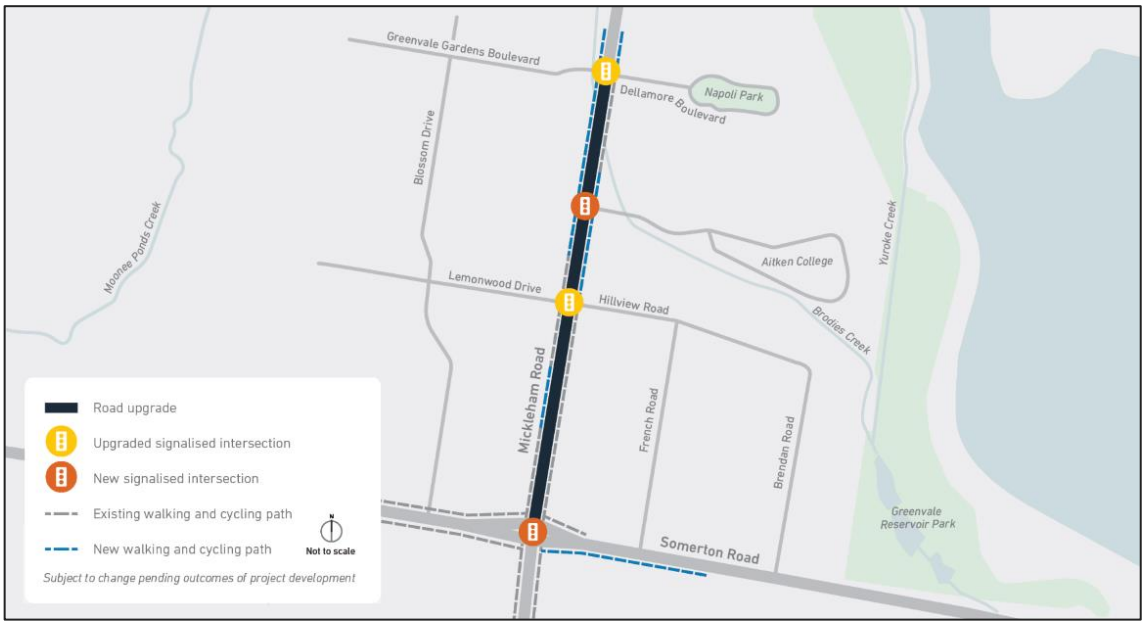
A number of transport infrastructure projects within the broader area are planned to be delivered to meet the vision of the north growth corridor. The timing of delivery of each of the projects will influence the way in which traffic travels through the network, with duplications and new links changing the level of accessibility in the corridor. Whilst this report considers the PSP in the context of the full delivery of the transport infrastructure within the corridor, this section identifies projects that are committed in the short to medium term that have the potential to influence the travel patterns in the immediate precinct.

Mickleham Road Upgrades

The Australian Government has committed $109.54 million to deliver targeted upgrades on Mickleham Road between Somerton Road and Dellamore Boulevard in Greenvale. The upgrades will replace the roundabout at Somerton Road intersection with traffic signals and add extra traffic lanes in each direction on Mickleham Road. The proposed upgrades are expected to reduce congestion and improve travel times, efficiency and connectivity of the road network. Further, future (long term) traffic volumes on Mickleham Road will be influenced by the delivery the network within the north Growth Corridor including the OMR.

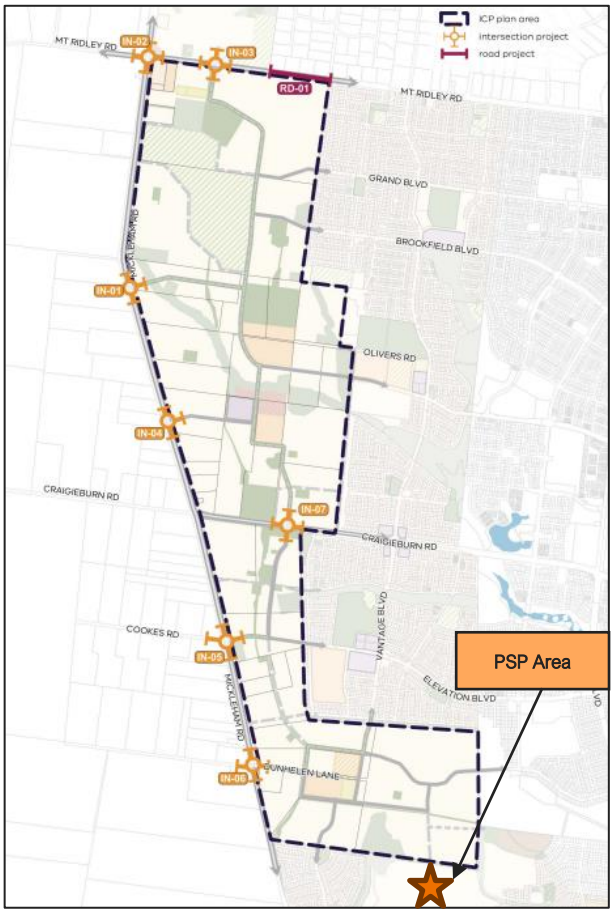
The project will also complete a business case for Stage 2 to investigate upgrades from Dellamore Boulevard to Craigieburn Road. The project is currently in the planning phase and is expected to commence construction in mid 2023 and completed in early 2025.

Figure 2.3: Mickleham Road Upgrades



Elsewhere, along the Mickleham Road corridor, the Craigieburn West nominates intersection and road upgrades projects that are expected to be delivered in support of land use activation within the Craigieburn West PSP. These projects are shown below in Figure 2.4.

Figure 2.4: Craigieburn West PSP Transport Infrastructure Projects



Aitken Boulevard Upgrades

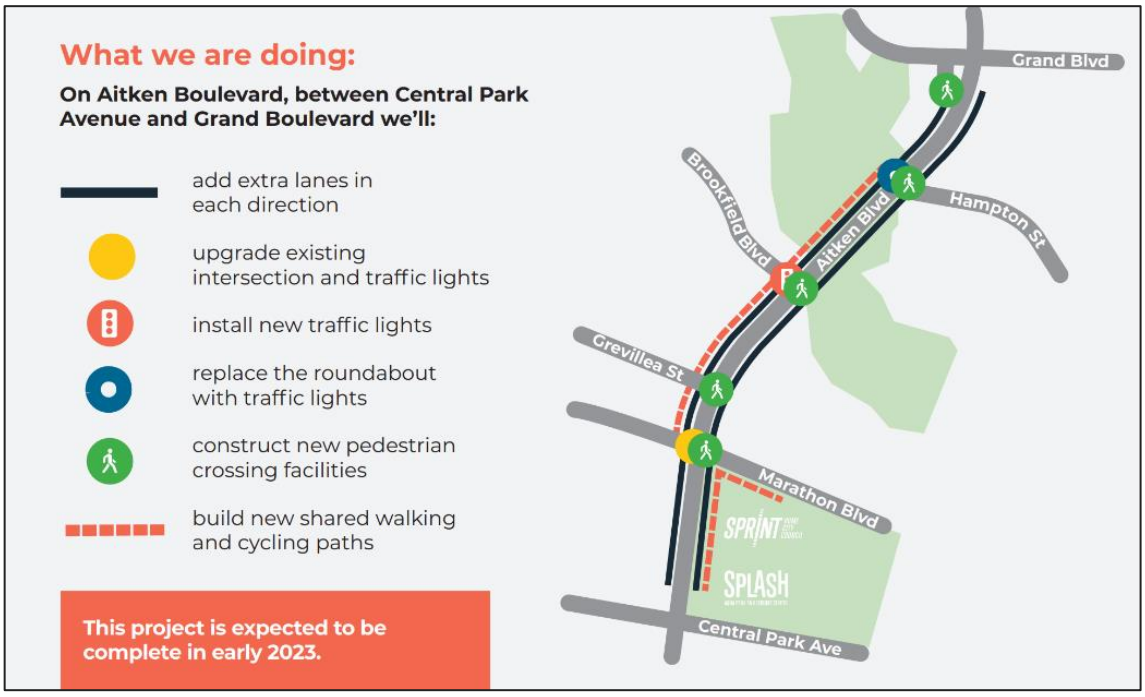
The Victorian Government has commenced construction of the upgrades of Aitken Boulevard as part of the Roads to Recovery Program. The project will include the duplication of Aitken Boulevard between Grand Boulevard and Marathon Boulevard to include an additional lane in each direction, replacing the roundabout with traffic lights and the signalisation of existing intersections.

The project is expected to alleviate traffic congestion and cater for the higher traffic volumes along Aitken Boulevard. Stage 1 of the project has just commenced construction and is expected to be completed in September 2023.

A larger than typical road reservation has been set aside for the ultimate design of the balance of Aitken Boulevard to potentially accommodate the delivery of a Bus Rapid Transit (BRT), a high-capacity public transport system. The location of the potential BRT within the road reserve will be subject to further investigation. At the time of preparing this report, the timing, funding and delivery of any BRT was unconfirmed.

Figure 2.5 shows the proposed upgrades works at Aitken Boulevard between Central Park Avenue and Grand Boulevard.

Figure 2.5: Aitken Boulevard Upgrades



Source: Hume City Council

It is noted that the Craigieburn West PSP/DCP does not identify any transport-based infrastructure projects or upgrades on Aitken Boulevard.

The Greenvale North R1 PSP/DCP identifies a 50% contribution to upgrade the signalised intersection of Aitken Boulevard and James Miriam Drive.

Outer Metropolitan Ring (OMR)

The OMR is a planned transport corridor that will create the opportunity for new rail, freight and road links through the Werribee, Melton, Tullamarine, Craigieburn, Mickleham and Epping areas to be provided as transport and land use demand warrants.

It is anticipated that the proposed OMR will start at Princes Freeway near Werribee and continue north connecting to the existing E6 reservation at Findon Road. The proposed OMR route in relation to the subject site is illustrated in the figure below.

The timing of and the funding mechanism for the delivery of the OMR is also unconfirmed but anticipated to be a long-term project (i.e., 15-20years +).

FIGURE 1-4: OUTER METROPOLITAN RING ROAD/E6 TRANSPORT CORRIDOR

3 Site Context

3.1 Subject Site

The site is located approximately 30km north of Melbourne and is situated in the North Growth Corridor between Mickleham Road and Aitken Boulevard. The site has a frontage of 530m to Peet's Aspect Estate' residential subdivision abutting its western boundary.

The site (referred to as the Greenvale North (Part 2) PSP is located within the middle portion of the Greenvale North R1 PSP area[2], which is intended to guide the development of the surrounding remnant farmland zoned Rural Conservation Zone 3 (RCZ3) to primarily residential land uses. The surrounding properties are predominately residential in nature to the east and west and zoned as either General Residential Zone 1 (GRZ1) or Urban Growth Zones (UGZ). Directly to the south of the site is Greenvale Reservoir and to the north is Aitken Hill Conference and Events Centre. Kolbe Catholic College is located some 500 metres east of the site. Notably Yuroke Creek runs in a north-south alignment through the site near its western boundary.

The location of the site and the surrounding environs is shown in Figure 3.1.

Figure 3.1: Subject Site and its Environs (Nearmap)

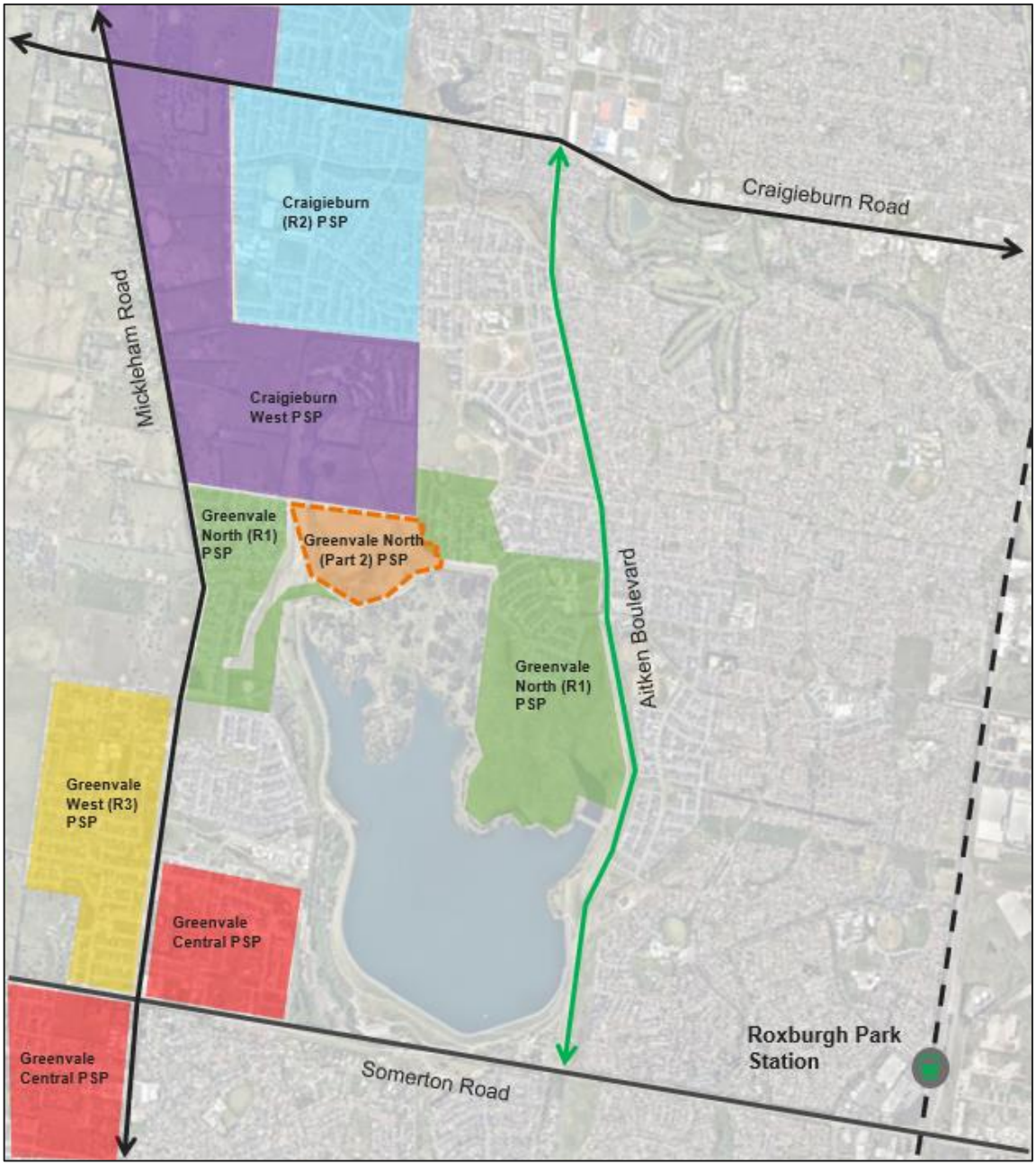
[2] Referred to as investigation as within the Greenvale R1 PSP

3.2 Adjacent PSP Areas

The Greenvale North Part 2 PSP area directly abuts the Craigieburn West PSP to the north (completed) and Greenvale North (R1) PSP to the east and west (completed). Additionally, Craigieburn R2, Greenvale West R2 and Greenvale Central PSP areas are located in the vicinity of the site.

The location of the site and the surrounding PSP areas are shown in Figure 3.2.

Figure 3.2: Greenvale North Part 2 PSP and Surrounding PSP Areas



3.2.1 Craigieburn West PSP

The Craigieburn West PSP is located immediately north of the Greenvale North Part 2 PSP area. The PSP was recently approved and gazetted in January 2022. The PSP area is currently primarily vacant and construction has not yet commenced.

The Craigieburn West PSP area will comprise predominantly standard residential development and a local town centre at the centre. Additionally, there will also be five schools, a variety of local parks, sports reserves and green link linear reserve.

Of significant relevance to the site, both the Traffic Impact Assessment prepared by OneMileGrid (dated November 2020) for the Craigieburn West PSP and the approved PSP (Transport Plan 5) detail a north-south road connection to the Greenvale North PSP area.

3.2.2 Greenvale North R1 PSP

The Greenvale North R1 PSP area is located east and west of the Greenvale North Part 2 PSP area. The PSP was approved and gazetted in February 2011. The Greenvale North R1 PSP area is comprised of residential uses and majority of the PSP area is completed and occupied.

No road connection is provided along the site's western boundary due to the topographical characteristics of the future bund that will be constructed to address drainage requirements for the broader precinct. Several road connections to the existing local streets are proposed along the site's eastern boundary to facilitate east-west connectivity to Aitken Boulevard.

3.3 Existing Transport Network

3.3.1 Preamble

The Greenvale North (Part 2) PSP area is bounded by four arterial roads including Mickleham Road to the west, Craigieburn Road to the north and Somerton Road to the south. A secondary arterial road (Aitken Boulevard) is located to the east of the site.

Currently, local roads are constructed to the east of the site providing a connection to the PSP area. The road network to the north of the site is currently unconstructed. The key local roads surrounding the PSP area include:

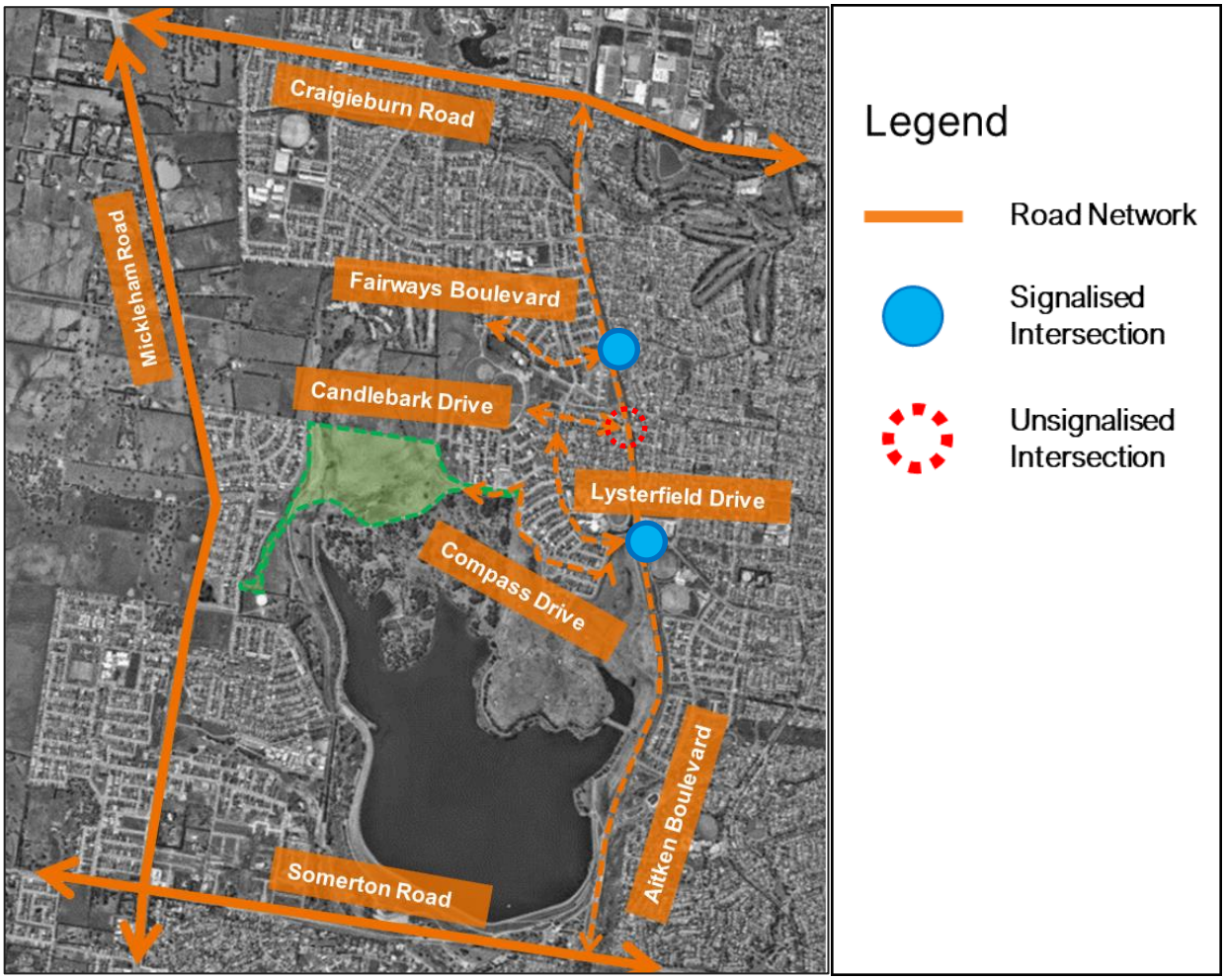
- Fairways Boulevard (Connector Street),
- Lysterfield Drive (Connector Street),
- Compass Drive (Access Street), and
- Candlebark Drive (Access Street).

The key intersections in the vicinity of the PSP area include:

- Fairways Boulevard / Aitken Boulevard (traffic signals),
- Candlebark Drive / Aitken Boulevard (unsignalised left in left out), and
- Lysterfield Drive / Aitken Boulevard / James Mirams Drive (traffic signals).

The surrounding road network and key intersections are illustrated in Figure 3.3 and further details of the key roads are outlined in Section 3.2.2 of the report.

Figure 3.3: Key Roads and Intersections



3.3.2 Road Network

Mickleham Road

Mickleham Road is a primary arterial road that runs generally in a north-south alignment to the west of the subject site (currently controlled by DoTP). It is a two-way road and is generally configured with a two-lane, 7m wide carriageway, with 2m road shoulders at both sides set within a 20m wide road reserve (approximately). Near the site, Mickleham Road has a posted speed limit of 80 km/hr.

Mickleham Road carries approximately 16,000[3] vehicles per day within the vicinity of the subject site.

Aitken Boulevard

Aitken Boulevard is a secondary arterial road that runs generally in a north-south alignment to the east of the site between Somerton Road in the south, and Mount Ridley Road in the north (currently controlled by DoTP). It is a two-way road and is generally configured with a two-lane, 7m wide carriageway, with a 2.4m wide footpath located on its western side. In the vicinity of the site, Aitken Boulevard has a posted speed limit of 60 km/hr.

Aitken Boulevard carries approximately 22,700[4] vehicles per day within the vicinity of the subject site.

[3] Sourced from Department of Transports open data maps (ArcGIS) for annual average daily traffic volumes in 2021.

[4] Sourced from tube counts survey conducted between 2 to 8 March 2023 as per Figure 3.8

Fairways Boulevard

Fairways Boulevard is a collector road (council controlled) connecting to the intersection with Aitken Boulevard. Currently, only the eastern portion of Fairways Boulevard has been constructed. The western portion of Fairways Boulevard will be constructed with the activation of the Craigieburn West PSP.

Fairways Boulevard provides a two-way road and is generally configured with a 11.9m wide carriageway, with a traffic lane in each direction, footpath on both sides and kerbside parking on both sides of the road. Fairways Boulevard is contained within a 22m wide road reserve.

Fairways Boulevard carries approximately 7,800[4] vehicles per day within the vicinity of the subject site.

Lysterfield Drive

Lysterfield Drive is a collector road (council controlled) with a curved L-shaped alignment in the vicinity of the site. Lysterfield Drive runs north from James Mirams Drive at the intersection with Aitken Boulevard to Candlebark Drive, where it will continue as Olympus Drive as part of future development.

Lysterfield Drive provides a two-way road and is generally configured with a 10.5m wide carriageway, with a 2.2m wide footpath located on its east/north side and a 1.8m wide footpath on its west/south side. The road also contains kerbside parking which is provided on the north/east side of the road and is generally unrestricted. Lysterfield Drive is contained within a 20m wide road reserve.

Lysterfield Drive carries approximately 9,150[4] vehicles per day within the vicinity of the subject site.

Candlebark Drive

Candlebark Drive is a local road generally aligned east-west, running west from Aitken Boulevard to Lysterfield Drive, where it continues west for approximately 180 metres before terminating. Candlebark Drive provides a two-way road configured with a single 10.5m wide carriageway with unrestricted kerbside parking provided on both sides of the road.

Candlebark Drive carries approximately 500[4] vehicles per day within the vicinity of the subject site.

Compass Drive

Compass Drive is a local road with a Z-shaped alignment connecting to Lysterfield Drive to the east. Compass Drive provides a two-way road configured with a single 7.3m wide carriageway with kerbside/indented parking provided on both sides of the road.

Compass Drive carries approximately 1,750[4] vehicles per day within the vicinity of the subject site.

Koomba Crescent

Koomba Crescent is a local road connecting Compass Drive and Lysterfield Drive. Koomba Crescent provides a two-way road configured with a single 7.3m wide carriageway with kerbside parking provided on both sides of the road.

Koomba Crescent carries approximately 1,300[5] vehicles per day within the vicinity of the subject site.

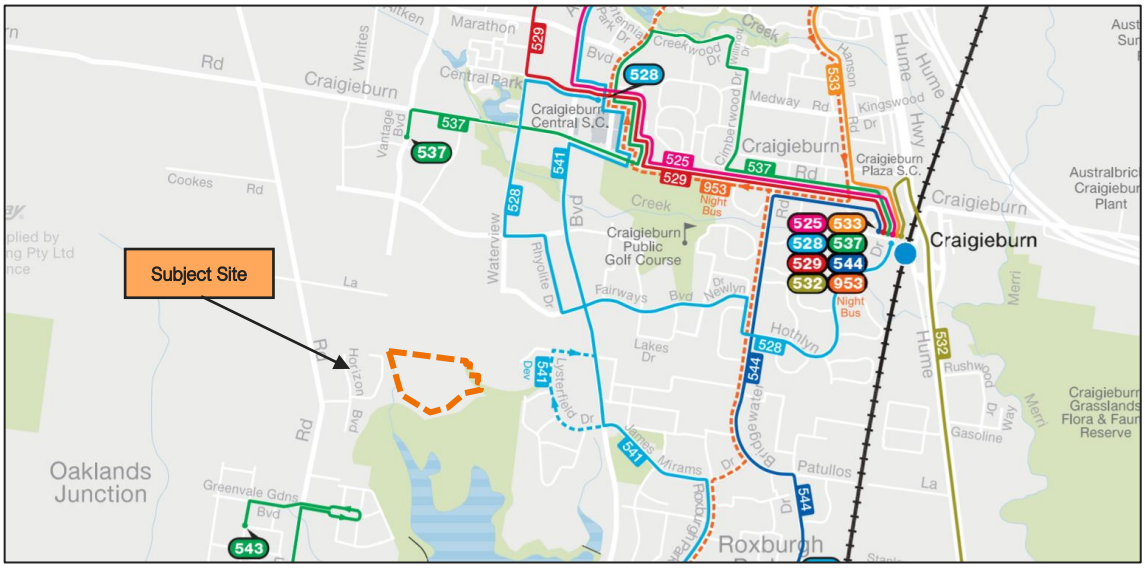
[5] Sourced from tube counts survey conducted by Hume City Council between 15 to 22 March 2023

3.3.3 Public Transport Network

Currently convenient public transport services are limited in the vicinity of the site. The nearest public transport route is Bus Route 541 running from Broadmeadows Station to Roxburgh Park. The nearest bus stop for this service is located on Lysterfield Drive, approximately 550m east of the site.

The public transport provision in the vicinity of the site is shown in the figure below.

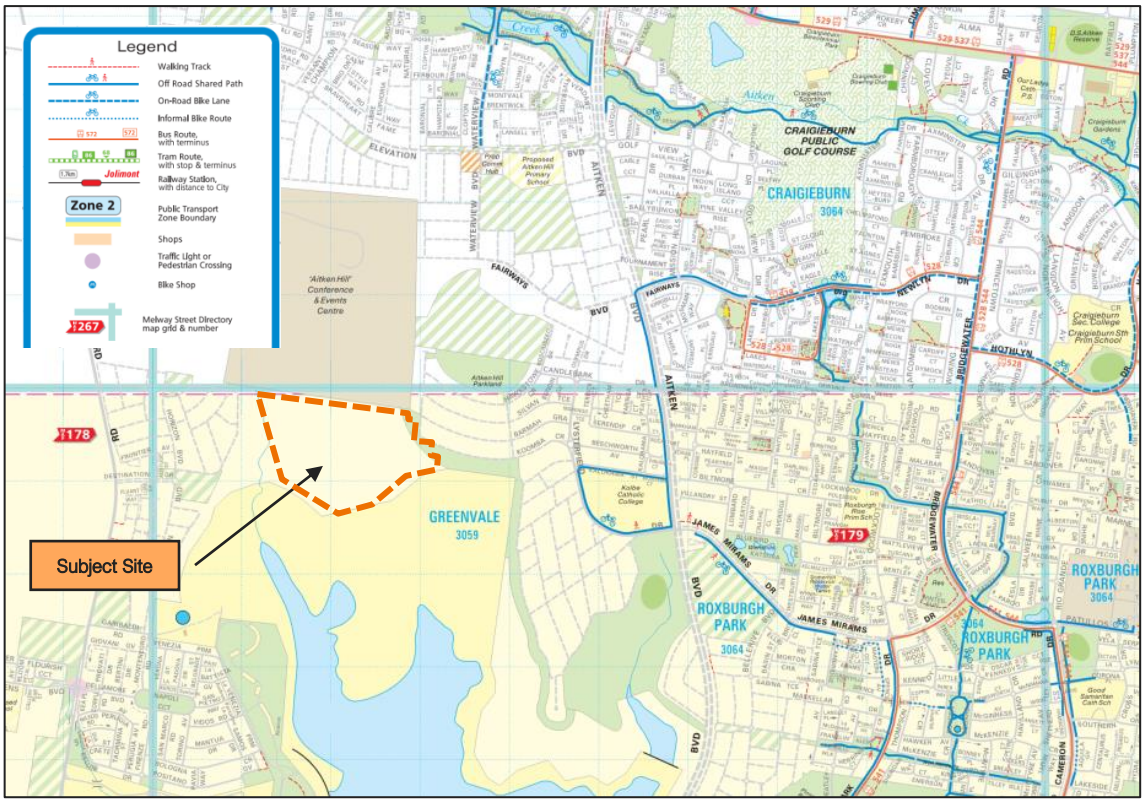
Figure 3.4: Public Transport Provision



3.3.4 Cycling Facilities

The site is surrounded by vacant greenfield sites with limited cycling infrastructure. It is expected that the cycling network will continue to develop around the subject site as meaningful levels of development are achieved across the nearby PSP areas. There are no on-road bicycle lanes within the immediate vicinity of the subject site.

Figure 3.5: City of Hume TravelSmart Map



3.3.5 Pedestrian Facilities

Sealed pedestrian paths are generally provided along both sides of the local roads within the vicinity of the site. A shared path is provided along Compass Drive between the site and Aitken Boulevard.

Signalised pedestrian crossings are provided at the intersections of Mickleham Road / Destination Drive & Lysterfield Drive / Aitken Boulevard / James Mirams Drive.

Figure 3.6: Existing Pedestrian Infrastructure

3.4 Safety

A review of the reported casualty collisions history for the roads and intersections internal to and adjoining the Greenvale North Part 2 PSP area has been sourced from VicRoads CrashStats accident database.

This database records all accidents causing injury that have occurred in Victoria since 1987 (as recorded by Victoria Police) and categorises these accidents as follows:

- Fatal injury: at least one person was killed in the accident or died within 30 days as a result of the accident.
- Serious injury: at least one person was sent to hospital as a result of the accident.
- Other injury: at least one person required medical treatment as a result of the accident

Figure 3.7 illustrates the location of these accidents.

Figure 3.7: CrashStats Accidents in the Vicinity of Site

A summary of the accidents for the last five year period (2015-2020) is presented in Table 3.1.

Table 3.1: CrashStats Summary

Locations	Fatality	Serious Injury	Other Injury
Fairways Boulevard / Aitken Boulevard Intersection		1	
Aitken Boulevard north of Compass Drive			1
Aitken Boulevard / Compass Drive Intersection		1	
Aitken Boulevard south of Compass Drive		1	
Lysterfield Drive / Aitken Boulevard Intersection			1
Lysterfield Drive near Aitken Boulevard			1

The crash analysis does not include any incident within the local road network in the vicinity of the PSP area however there are some accidents recorded along the arterial road. These accidents do not highlight any safety issues or trends that could be associated with access to/from the PSP area.

3.5 Traffic Volumes

Pneumatic tube counts were undertaken for a one-week period from Thursday 2 March 2023 to Wednesday 8 March 2023 at the following locations:

- Aitken Boulevard, north of Fairways Boulevard,
- Aitken Boulevard, south of Lysterfield Drive,
- Candlebark Drive, west of Aitken Boulevard,
- Compass Drive, south of Lysterfield Drive,
- Fairways Boulevard, west of Aitken Boulevard, and
- Lysterfield Drive, west of Aitken Boulevard.

In addition to the above, Hume City Council has provided pneumatic tube counts results of Koomba Crescent which was undertaken between Wednesday 15 March 2023 to Tuesday 22 March 2023.

The locations of the traffic surveys undertaken are identified in Figure 3.8 below and the results of the tube count surveys are summarised in Table 3.2.

Figure 3.8: Traffic Survey Locations

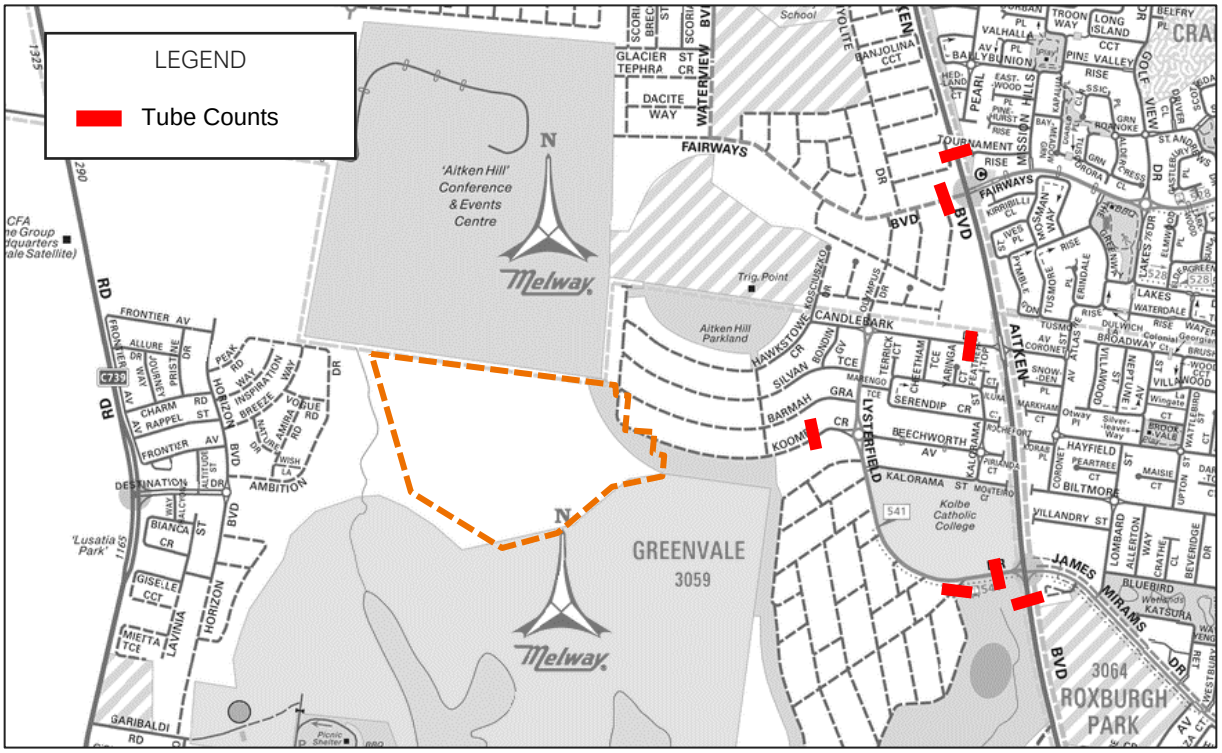


Table 3.2: Tube Count Summary

Road	Weekday Daily Volume One-way (vpd)		Weekday Daily Volume Two-way (vpd)	85th Percentile Speed
Aitken Boulevard (north of Fairways Boulevard)	9,629 (Northbound)	9,682 (Southbound)	19,311	64.4 km/h
Aitken Boulevard (south of Lysterfield Drive)	11,321 (Northbound)	11,328 (Southbound)	22,649	62.6 km/h
Candlebark Drive (west of Aitken Boulevard)	337 (Eastbound)	199 (Westbound)	536	46.8 km/h
Compass Drive (south of Lysterfield Drive)	926 (Northbound)	829 (Southbound)	1,756	30.1 km/h
Fairways Boulevard (west of Aitken Boulevard)	3,603 (Eastbound)	4,215 (Westbound)	7,818	54.2 km/h
Lysterfield Drive (west of Aitken Boulevard)	4,324 (Eastbound)	4,8495 (Westbound)	9,173	53.0 km/h
Koomba Crescent (east of Compass Drive)	665 (Eastbound)	635 (Westbound)	1,300	47.9 km/h

The daily volumes recorded on key roads have been assessed against the indicative target traffic volumes outlined within the VPA's Engineering Design and Construction Manual for Subdivision in Growth Areas based on their road classifications. A comparison of the recorded traffic volumes against the indicative theoretical capacities is summarised in Table 3.3 below.

Table 3.3: Theoretical Capacity Assessment

Road	Road Classification	Theoretical target volumes (vpd)	Recorded Daily Traffic Volumes (vpd)	Within Theoretical Capacity?
Aitken Boulevard	Secondary Arterial Road	12,000-20,000	22,649	No
Candlebark Drive	Access Street – Level 2	2,000-3,000	536	Yes
Compass Drive	Access Street – Level 2	2,000-3,000	1,756	Yes
Fairways Boulevard	Connector Street	3,000-7,000	7,818	No
Lysterfield Drive	Connector Street	3,000-7,000	9,173	No
Koomba Crescent	Access Street – Level 1	1,000-2,000	1,300	Yes

The above indicates the following:

- Aitken Boulevard is currently carrying up to 22,269 vehicles per day which is above its theoretical capacity of a secondary arterial road with a single lane in each direction.
- Candlebark Drive and Compass Drive are best described as an Access Street – Level 2 and are currently operating well within its theoretical capacity of 2,000-3,000 vehicles per day.
- The two connector roads (Fairways Boulevard and Lysterfield Drive) are currently operating above their theoretical capacity of 7,000 vehicles per day.
- Koomba Crescent is best described as an Access Street – Level 1 and is currently operating within its theoretical capacity of 1,000-2,000 vehicles per day.

4 Greenvale North Part 2 PSP

The proposed Greenvale North Part 2 PSP area comprise predominantly residential development and proposes to deliver an indicative yield of approximately 400 lots over 8.16ha area. The urban structure plan is illustrated in Figure 4.1 and indicates a water easement will run from the southwestern boundary to the site's northeast corner. A number of scattered trees will be retained across the site, primarily in the southwestern corner as part of local open space.

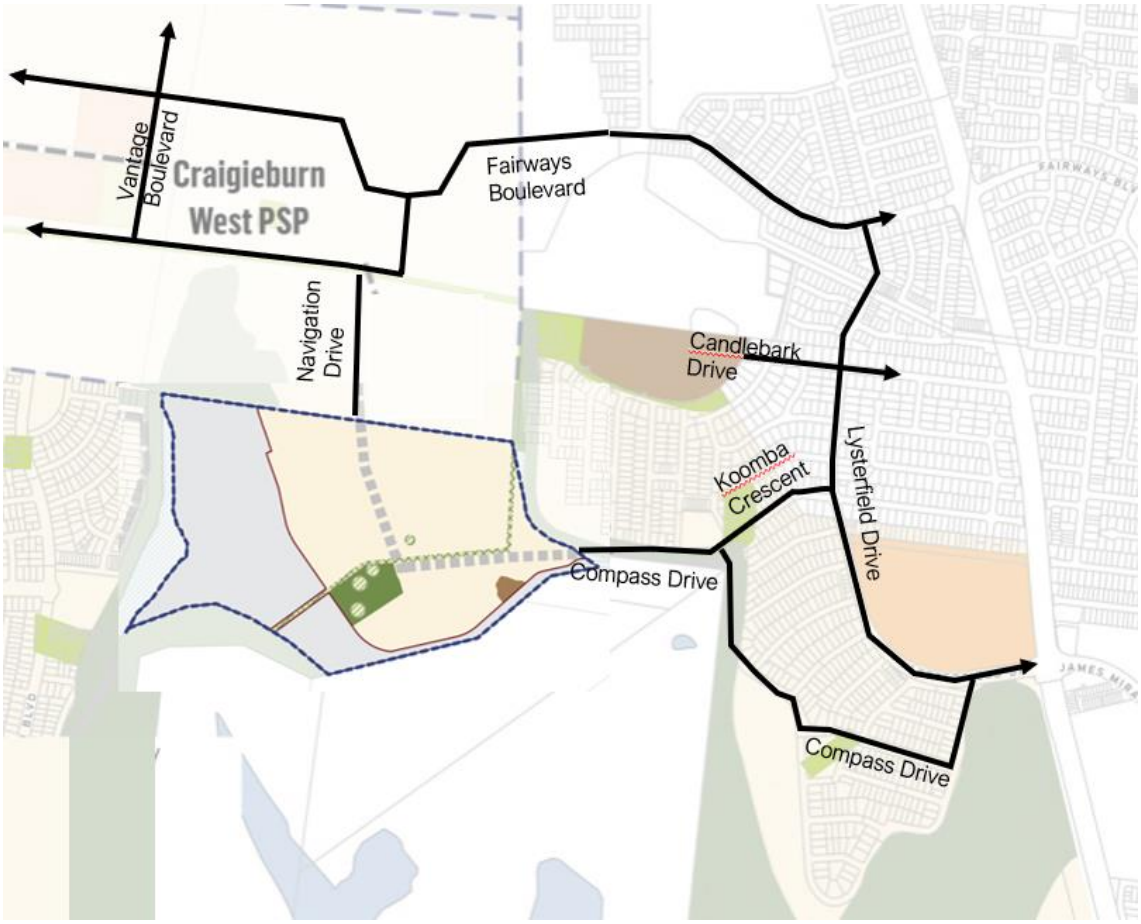
Figure 4.1: Proposed Urban Structure Plan

5 Vehicle Access & Internal Road Network

5.1 Connections to External Road Network

The proposed road network and its connections to the adjacent PSP areas of Greenvale North R1 and Craigieburn West are illustrated in Figure 5.1.

Figure 5.1: Proposed Road Network and Connections to Adjacent PSPs



Vehicle access to the PSP area from within the Greenvale North R1 PSP will be provided to/from east via Aitken Boulevard as follows:

- Lysterfield Drive / Aitken Boulevard signalised intersection
- Candlebark Drive / Aitken Boulevard left in / left out intersection

Vehicle access to the Craigieburn West PSP area will be provided via the north-south Access Street and onwards to the west to Mickleham Road and to the north via Craigieburn Road as follows:

- Dunhelen Lane / Mickleham Road signalised intersection
- Elevation Boulevard / Mickleham Road signalised intersection
- Connector Street / Craigieburn Road signalised intersection.

Vehicle access to the north is reliant on the land activation of the adjacent land and therefore cannot be relied upon in an interim scenario with great certainty.

Initially, until a point in time that the Craigieburn West PSP is developed, vehicle access to the broader network can occur via the existing local roads to the east (i.e. Lysterfield Drive, Candlebark Drive and Fairways Boulevard), which provide connections to Aitken Boulevard.

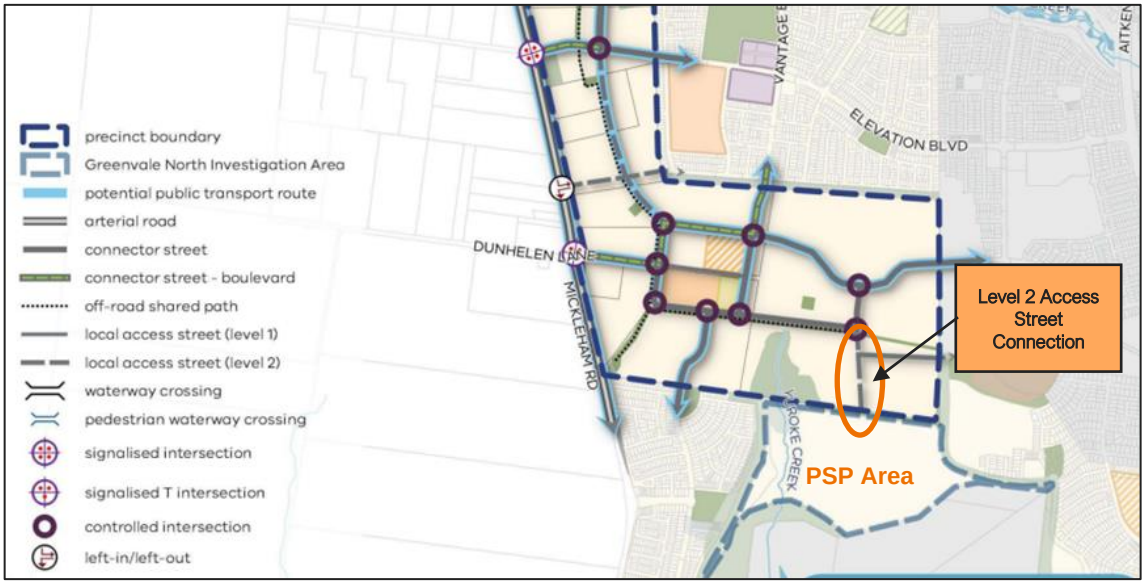
5.2 Internal Road Network

The internal road network within the PSP will be managed by Council and will follow the natural features within the PSP area. Guidance for the appropriateness of the proposed internal road network can be sought from the standard Engineering Design and Construction Manual (EDCM) for Subdivision in Growth Areas, the Hume Planning Scheme neighbouring Craigieburn West and Greenvale North R1 PSP's.

The key road network within the PSP area is shown in Figure 5.3. A summary of the road characteristics of the internal road network is presented in Table 5.1.

At a high-level, the proposed internal road network is logical and integrates with the neighbouring road network. The development includes the provision of a Level 2 21m wide access street, operating as the major north-south spine linking to the north into the Craigieburn West PSP area.

Figure 5.2: Craigieburn West PSP - Road Network



Additionally, the proposed PSP area provides a logical connection to the existing local road network to the east of the site. A 19m wide east-west local Access Street (Level 2) is proposed along the southern boundary of the site which connects to the existing Compass Drive.

As illustrated in the draft masterplan, the PSP is supported by lower order local roads including Level 1 Access Streets and 12m wide laneways to help connect future residents to the network. Further, several road connections to neighbouring local streets along the sites northern boundary will be extended to continue as through roads within the PSP area.

Figure 5.3: Proposed Key Road Network

Table 5.1: Proposed Road Hierarchy and Indicative Transport Elements

Street Type	Proposed Road Reservation	Carriageway Width	Parking Provision	Pedestrian Provision	Amenity Capacity Threshold
Access Street-Level 2 (Bus Capable)	21.0m	11.6m	Indented parking on both sides of the road	1.5m footpath on both sides Cyclist to mix with on-road traffic	2,000 – 3,000vpd [1]
Access Street-Level 2 (Bus Capable) (Easement)[2]	19.0m	7m	Indented parking on south side of the road	1.5m footpath on southern side 2.5m shared path on northern side [3]	2,000 – 3,000vpd [1]

[1] Based on capacity threshold values outlined in EDCM for growth areas and Clause 56.06 of the Hume Planning Scheme.

[2] Adjacent to utilities easement.

[3] Shared path is located on the opposite side of existing shared path along Compass Drive. Details regarding the crossing of the shared paths can be addressed as part of the subdivision.

Table 5.1 indicates that the proposed indicative internal road hierarchy will be generally consistent with the requirements outlined within the VPA's typical PSP guidelines and standard Engineering Design and Construction Manual for Subdivision in Growth Areas and is considered appropriate.

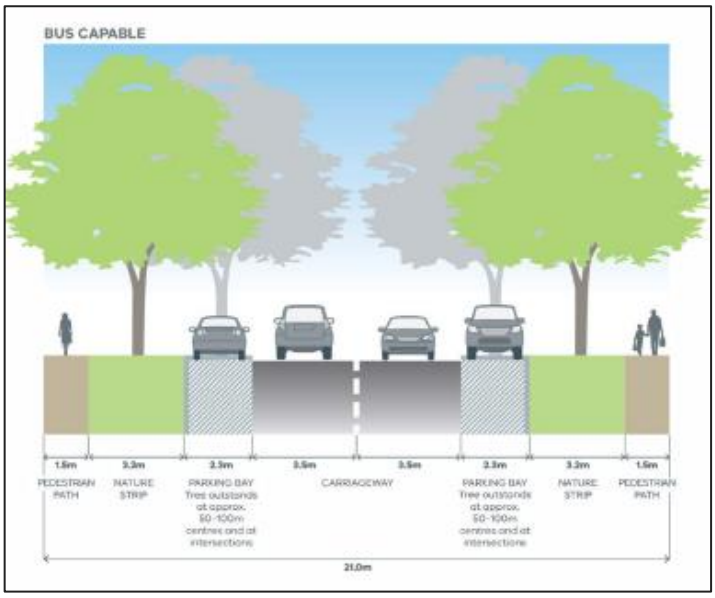
5.3 Indicative Road Cross-Sections & Design Elements

The road cross-sections for the Greenvale North Part 2 PSP have not been confirmed. For reference purposes the following set out commentary around the potential cross-sections that may be adopted as part of the internal road network.

The primary north-south road within the site connecting to the Craigieburn West PSP to the north is nominated as an Access Street – Level 2, with a 21m wide road reservation providing a 7.0m wide trafficable carriageway and 1.5m wide pedestrian paths on both sides. This cross section is bus capable and is consistent with the proposed cross section within the Craigieburn West PSP and has a nominated daily traffic volume amenity threshold of between 2,000 to 3,000 vehicles per day.

The cross section for a Local Access Street Level 2 is shown below.

Figure 5.4: 21m Access Street - Level 2 Cross Section



The primary east-west road adjacent to the easement will connect to the already constructed Compass Drive to the east and retain the existing 19m wide road reservation. This is consistent with the existing road cross-section along Compass Drive which currently provides a 7.0m wide trafficable carriageway and indented car parking on the north side of the road. It is proposed to provide a 1.5m wide footpath on the north side and a 3m wide shared path on the south side of the road.

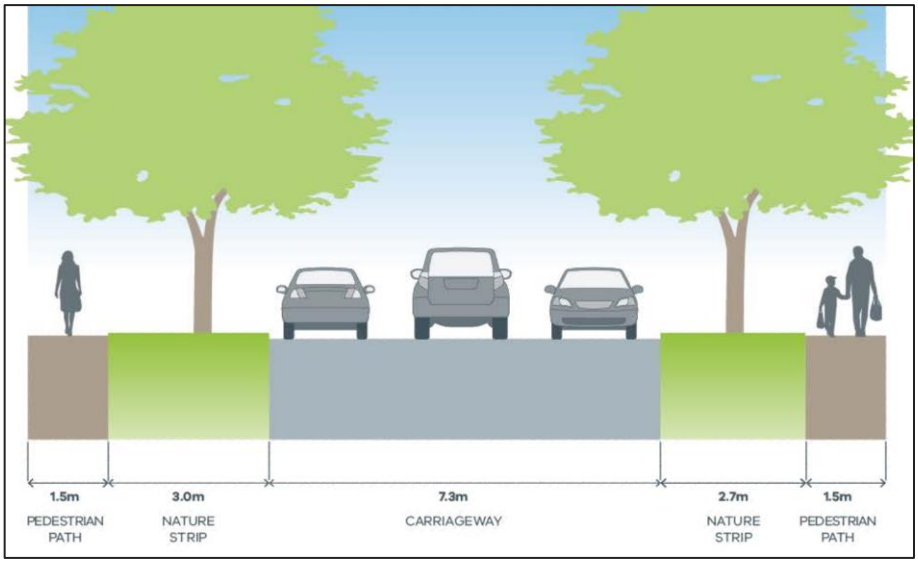
The existing cross-section along Compass Drive is considered appropriate to be adopted as a 7.0m carriageway width is capable of accommodating buses.

An extract of the existing Compass Drive adjacent to the PSP is shown in Figure 5.5.

Figure 5.5: Compass Drive - 19m Access Street Level 2 Cross Section

Lower order road including an Access Streets - Level 1 may be adopted in the internal road network, with a 16m wide road reservation providing 7.3m wide carriageway (catering for on road parking) and 1.5m wide pedestrian paths on both sides[6]. This is based on the typical cross sections within the Craigieburn West PSP and has a nominated amenity capacity threshold of between 1,000 to 2,000 vehicles per day. An extract of the road cross section is reproduced below.

Figure 5.6: 16m Access Street - Level 1 Cross Section



Elsewhere within the site, laneways may be adopted in the internal road network. The proposed laneways are expected to be designed with a reservation of 12.0m and it is expected that a cross section incorporating a trafficable zone of at least 5.5m can be provided for vehicle movements (including emergency and waste collection vehicles). It is also proposed that some of the width in excess of the 5.5m minimum trafficable area could be used for bin storage on waste collection day and landscaping opportunities between garages.

[6] A road reservation of 14m-14.5m is proposed where roads will front a reserve which will accommodate a footpath.

6 Strategic Transport Assessment

6.1 Preamble

Given the relatively modest size of the proposed PSP area (i.e., catering for approx. 400 residential lots), it is not considered that comprehensive strategic modelling is warranted. Rather, this report applies a first principles assessment of the impacts of the PSP on the existing and future road network, having regard for the recent work completed as part of the adjacent Craigieburn West PSP which was approved in 2021.

A spreadsheet traffic model (April 2023) was developed to support the Craigieburn West PSP that covered both an interim (2031) and ultimate (2046) scenario. This represents the most recent and relevant piece of traffic modelling completed that considers the land use activation in the vicinity of the subject site.

A review of the report indicates that the transport modelling prepared in support of the Craigieburn West PSPS did not consider the traffic impacts associated with development of the subject site (Greenvale North Part 2 PSP).

Based on the above, this assessment seeks to understand:

- Whether the internal road network of the PSP adequately serves the development planned, and
- Whether the road network surrounding the PSP can adequately accommodate the development planned.

It is noted that this assessment focuses on the daily traffic impacts associated with the proposed PSP and the full delivery of the Growth Corridor Plan. The peak period traffic generation has not been included, noting a detailed assessment of its impact is typically dealt with as part of residential subdivision and/or town planning applications.

6.2 Traffic Generation

6.2.1 Subject Site Generated Traffic

For the purposes of this assessment, a daily traffic generation rate of 9.0 vehicle movements per dwelling has been adopted. Application of the above traffic generation rate to the approximately 400 residential dwellings of the PSP results in the order of in the order of 3,600 daily vehicle movements.

It is noted that the traffic generation rate adopted is informed by the recently completed Craigieburn West PSP. The traffic generation is expected to reduce over time following the delivery of additional land use such as schools and services within Craigieburn West PSP that promote walking and cycling connections and the delivery of public transport services. On this basis the traffic generation rate of 9 movements per day is considered to conversative on the high side. For context, recent surveys undertaken by Stantec of completed residential developments in the vicinity of the site recorded a daily traffic generation in the order of 6-7 vehicle movements per dwelling.

Application of the lower traffic generation rate would result in a net decrease of 800 -1,200 vehicle movements per day in the longer term.

6.2.2 Traffic Activity Associated with Adjacent PSP Areas

Whilst the transport modelling prepared in support of the Craigieburn West PSP did not specifically contemplate activation of the Greenvale North Part 2 PSP, this section considers the traffic activity generated by surrounding PSP's and their impact on the transport network within the PSP. These include:

- Anticipated traffic generated from the Craigieburn West PSP will not typically elect to travel through the Greenvale North Part 2 PSP to reach the surrounding external road network due to the circuitous route required to reach Aitken Boulevard. Instead, drivers are likely to utilise the signals at Fairways Boulevard.
- It is noted that the traffic modelling undertaken for the Craigieburn West PSP is unclear on the precise traffic volumes assigned to Fairways Boulevard. It has been deduced that Fairways Boulevard would carry in the order of additional 3,250 daily vehicle trips by the Craigieburn West PSP[7]. This estimate is calculated based on the balance (1,900vpd) of 4,300vpd along Fairways Boulevard after subtracting 2,400vpd along Navigation Road.

[7] Estimated from One Mile Gride report "Craigieburn West PSP Traffic Impact Assessment" – Appendix D

- It is noted that Council has flagged that the Candlebark Drive connection from Craigieburn West PSP is not achievable due to the Mt Aitken Hilltop Park and Yarra Valley Water pipe track. In the absence of this connection, it has been assumed that 25% of the traffic volumes (675vpd) will be diverted south through the Greenvale North Part 2 PSP and other 75% will be diverted north/west/east. Of the 75%, it is assumed that the traffic generated to/from the east and south will use Fairways Boulevard (945vpd).

  Based on the above, the total anticipated traffic volumes generated to Fairways Boulevard is 2,845vpd and illustrated in Figure 6.1.

Figure 6.1: CW PSP Generated Daily Volumes extracted from OMG Addendum Report – Appendix D

- Whilst the Craigieburn West PSP did not consider through traffic in this PSP, Navigation Road will provide a link through the site. For the purposes of this assessment, it is estimated that 15% of the anticipated daily trips along Navigation Road will be diverted through the PSP. This results in up to an additional 360 daily trips from Craigieburn West PSP through the PSP area.

- It is anticipated that there may also be a nominal level of traffic generated by some portions of the residential dwellings within the Greenvale North R1 PSP to the immediate east that will elect to travel through the site to access Craigieburn West PSP area. For the purposes of this assessment, it has been assumed that approximately 15% of the residential catchment area (marked in red in Figure 6.2) will travel through the PSP to access destinations to the west. Based on approximately 215 residential lots within the catchment area, this could result in up to an additional 290 daily trips through the PSP.

Figure 6.2: Potential Route for Additional Traffic from Greenvale North R1 PSP Area through Subject Site

6.3 Traffic Distribution & Assignment

Guidance on the broader distribution of traffic to and from the site has been sourced from the transport modelling work prepared in support of the Craigieburn West PSP as follows:

Table 6.1: Traffic Distribution Summary

Direction	%	Notable Uses
North	35%	Craigieburn West PSP / Merrifield Employment Park / Folkestone Employment Park / Mickleham Town Centre / Craigieburn R2 PSP / Craigieburn Town Centre / Craigieburn Train Station
South	45%	Tullamarine Employment Area / Inner Melbourne / Western Ring Road Access
East	15%	Craigieburn R1 PSP / Roxburgh Park Train Station / Campbellfield Employment Area
West	5%	Sunbury

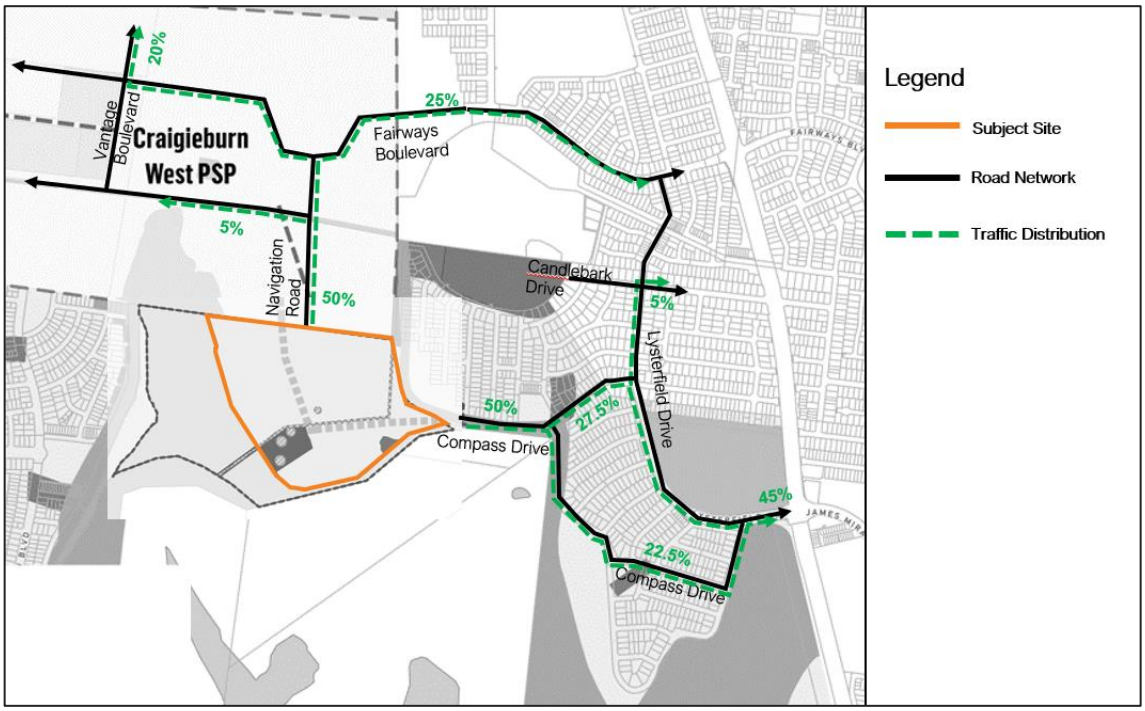
At a more localised level, the directional distribution and assignment of traffic generated by the site will primarily be limited to access to the north into the adjacent Craigieburn West PSP and to the east via the Greenvale North R1 PSP. Traffic movements will be influenced by a number of factors, including the:

- configuration of the arterial road network in the immediate vicinity of the site,
- existing operation of intersections providing access between the local and arterial road network,
- surrounding employment centres, retail centres and schools in relation to the site, and
- configuration of access points to the site.

For the purpose of this assessment, the following directional distributions have been adopted which are also illustrated in Figure 6.3:

- Traffic generated by destinations to and from the west of the site are expected to use the internal north-south access road (extension of Navigation Road) and disperse along the east-west connector road within the Craigieburn West PSP area.
- Traffic generated by destinations to and from the north of the site are expected to use the north-south access road (extension of Navigation Road) and disperse along Vantage Boulevard or Fairways Boulevard.
- The majority of traffic generated by destinations to and from the east are expected to use the north-south access road (extension of Navigation Road) and then disperse along Fairways Boulevard.
- The balance of traffic with destinations to and from the east of the site are expected to use the internal east-west access road (extension of Compass Drive) and connect to Aitken Boulevard via Compass Drive, Koomba Crescent and Lysterfield Drive.
- Traffic generated by destinations to and from the south of the site are expected to use the internal east-west access road (extension of Compass Drive) and connect to Aitken Boulevard via Compass Drive, Koomba Crescent and Lysterfield Drive.

Figure 6.3: Indicative Traffic Distribution



6.4 Daily Traffic Volumes

Based on the traffic generation and distribution assumptions provided in Section 6.3, the estimated daily site generated volumes within the Greenvale North R2 PSP area are presented in Figure 6.4. In addition, the anticipated daily traffic volumes inclusive of activity generated by external PSP areas in the immediate vicinity of the site that will either utilise the proposed internal road network or roads bordering the site are also detailed in Figure 6.5.

Figure 6.4: Site Generated Daily Traffic Volumes

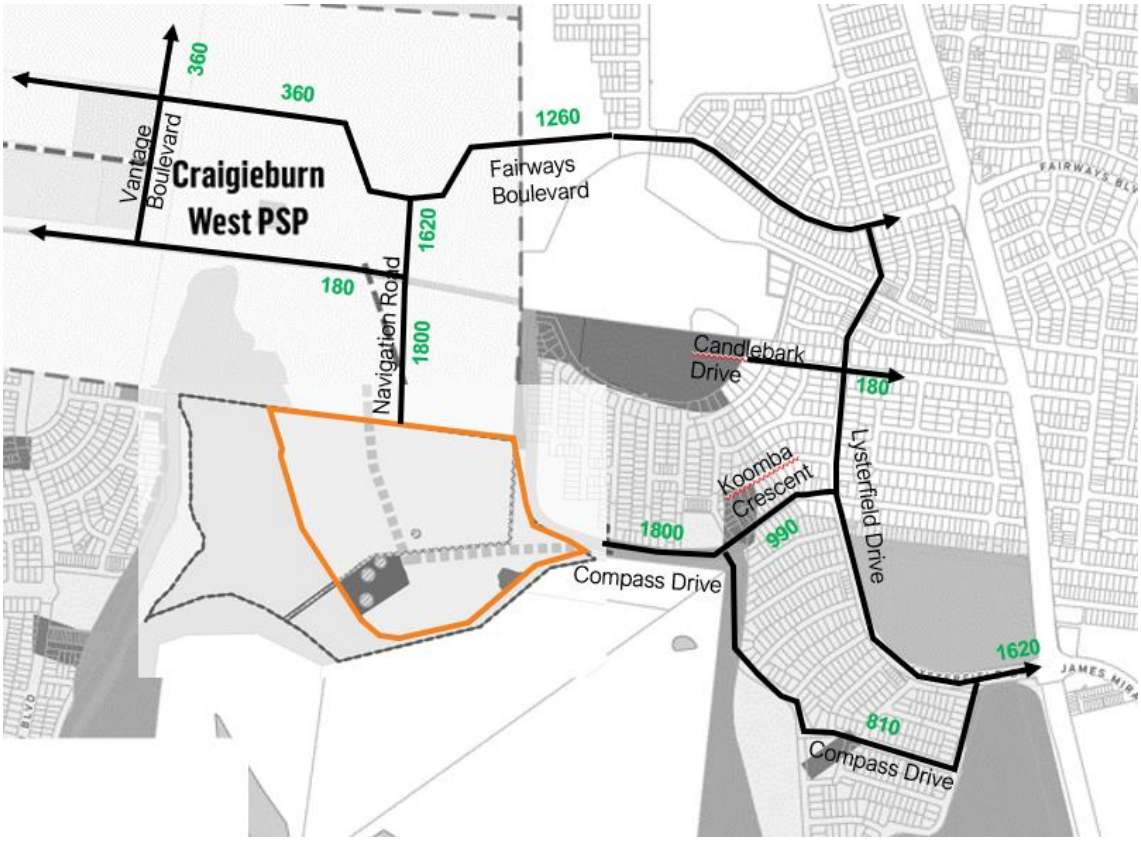


Figure 6.5: Anticipated Post Development Daily Traffic Volumes (inclusive of traffic activity from adjacent PSP areas)

7 Assessment of PSP

7.1 Road Network

7.1.1 Expected Daily Volumes

A midblock assessment comparing the daily volumes on key roads against the targeted volumes for the respective road classifications are outlined in Table 7.1. The road classifications and indicative theoretical capacities of local road networks are outlined within the VPA's Engineering Design and Construction Manual for Subdivision in Growth Areas which aim to:

- Standardise development submissions as much as possible and thus to expedite Council engineering approvals,
- Ensure that minimum design criteria are met in regard to the design and construction of infrastructure within the municipalities, and
- Provide flexibility to encourage innovation and best practice, and take into account regional or localised conditions within the growth areas.

Table 7.1: Midblock Capacity Assessment

Road Name	Road Classification	Target Volumes	Existing Daily Traffic Volumes (vpd)	Traffic Generated by Adjacent PSP (vpd)	PSP Generated Daily Traffic Volumes (vpd)	Anticipated Daily Traffic Volumes (vpd)	Within Target Volumes?
Proposed Internal Road Network within Greenvale North R2 PSP Area							
North-south Road (Navigation Road Extension)	Access Street – Level 2	2,000-3,000	N/A	1,325 [1]	1,800	3,125	No
East-west Road (Compass Drive Extension)	Access Street – Level 2	2,000-3,000	N/A	1,325 [1]	1,800	3,125	No
Surrounding Existing Local Road Network (to the east of the site)							
Aitken Boulevard (North of Fairways Boulevard)	Secondary Arterial Road	12,000-20,000	19,311	N/A [3]	540	19,851 [4]	Yes
Aitken Boulevard (South of Lysterfield Drive)	Secondary Arterial Road	12,000-20,000	22,649	N/A [3]	1,620	24,269 [4]	No
Fairways Boulevard (East)	Connector Street	3,000-7,000	7,818	2,845 [1]	900	11,563	No
Lysterfield Drive (West of Aitken Boulevard)	Connector Street	3,000-7,000	9,173	1,035	1,620	11,538 [6]	No
Candlebark Drive	Access Street – Level 2	2,000-3,000	536	0	180	716	Yes

Road Name	Road Classification	Target Volumes	Existing Daily Traffic Volumes (vpd)	Traffic Generated by Adjacent PSP (vpd)	PSP Generated Daily Traffic Volumes (vpd)	Anticipated Daily Traffic Volumes (vpd)	Within Target Volumes?
Compass Drive (South of Lysterfield Drive)	Access Street – Level 2	2,000-3,000	1,756	518	810	3,084	Yes
Koomba Crescent	Access Street – Level 1	1,000-2,000	1,300	517	990	2,807	Yes
Future Roads within Craigieburn West PSP							
Navigation Road (within CW PSP)	Access Street – Level 2	2,000-3,000	N/A	3,690 [5] [7]	1,800	5,490 [8]	No
East-West Connector Road (within CW PSP)	Connector Road	3,000-7,000	N/A	8,300 [7]	180	8,480	No
Fairways Boulevard (within CW PSP)	Connector Boulevard	7,000-12,000	N/A	6,000 [7]	720	6,720	Yes
Vantage Boulevard (within CW PSP)	Connector Boulevard	7,000-12,000	N/A	12,000 [7]	720	12,720	No
Dunhelen Lane (within CW PSP)	Connector Boulevard	7,000-12,000	N/A	12,200 [7]	180	12,380	No

[1] Volumes estimated from existing residential catchment to the east of the site and Craigieburn West PSP.

[2] Volumes estimated from 2021 OMG report prepared for CW PSP – Appendix D.

[3] Unable to be determined from Craigieburn West PSP transport impact assessment.

[4] Traffic volume estimates do not account for any additional demand generated by Craigieburn West PSP

[5] Includes nominal 290 daily trips from Greenvale North R1 PSP residential catchment

[6] Less nominal 290 daily trips diverted from Greenvale North R1 PSP residential catchment

[7] Volumes estimated from 2021 OMG report prepared for CW PSP – Appendix F.

[8] Less nominal 360 daily trips diverted from Navigation Road within Craigieburn West PSP.

The assessment above indicates the following:

Roads Within the Subject Site

- The north-south and east-west Access Streets within the site are expected to operate slightly above their targeted volume of 2,000-3,000 vehicles per day.

Existing External Roads

- Aitken Boulevard will carry an additional 1,620 vehicles per day generated by the Greenvale North R2 PSP area. Aitken Boulevard currently carries volumes exceeding 20,000 vehicles per day, even prior to activation of the Craigieburn West PSP.
- The two connector roads (Fairways Boulevard and Lysterfield Drive) are currently carrying traffic volumes of above their target of 7,000 vehicles per day. The activation of Greenvale North (Part 2) will result in an additional 1,260 and 1,620 vehicles per day respectively.

- Candlebark Drive is best described as an Access Street – Level 2 and is expected to operate within its targeted volume of 2,000-3,000 vehicles per day.
- Compass Drive is best described as an Access Street – Level 2 and is expected to operate slightly above its targeted volume of 2,000-3,000 vehicles per day.
- Koomba Crescent is best described as an Access Street – Level 1 and is expected to operate above its target volume of 1,000-2,000 vehicles per day.

Proposed Roads within Craigieburn West PSP

- The traffic model prepared by OneMileGrid in support of the approved Craigieburn West PSP indicates Navigation Road to the immediate north of the site will carry 3,400 vehicles per day under ultimate conditions. This volume is assumed to be irrespective of development of the subject site and is nearing its theoretical capacity threshold. Following delivery of the Greenvale North Part 2 PSP area, Navigation Road is expect to carry in the order of 5,490 daily vehicle trips.
- Fairways Boulevard is expected to operate within the targeted volume of 7,000-12,000 vehicles per day.
- Dunhelen Lane is expected to operate slightly above the targeted volume of 7,000-12,000 vehicles per day.
- The East-West Connector Road (located between Dunhelen Lane and Navigation Road) will carry 180 vehicles per day from the PSP and is expected to carry daily traffic volumes in the order of 8,490 which exceeds the nominated target volume of 7,000 vehicle trips for a Connector Road.
- Vantage Boulevard (to the immediate north of Fairways Boulevard) is expected to carry an additional 720 trips from the PSP totalling in the order of 12,720 vehicles per day. The traffic model prepared by OneMileGrid in support of the approved Craigieburn West PSP indicates that it will carry 12,000 vehicles per day which is greater than the target volumes for a Connector Road, regardless of the traffic from the PSP.

Further to the above, the table below examines the proportion of traffic volumes generated by the subject site to the existing local road network.

Table 7.2: Proportion of Traffic Volumes Generated to Nearby Road Network

Road Name	Existing Daily Traffic Volumes (vpd)	Traffic Generated by Adjacent PSP (vpd)	Traffic Generated by PSP (vpd)	Resultant Daily Traffic Volumes (vpd)	Proportion of Traffic Volume Generated by Adjacent PSP	Proportion of Traffic Volume Generated by PSP
Fairways Boulevard (East)	7,818	2,845	1,260	11,923	**24%**	**11%**
Lysterfield Drive (West of Aitken Boulevard)	9,173	1,035	1,620	11,538	**9%**	**14%**
Candlebark Drive	536	0	180	716	**0%**	**25%**
Compass Drive (South of Lysterfield Drive)	1,756	518	810	3,084	**17%**	**26%**
Koomba Crescent	1,300	517	990	2,807	**18%**	**35%**

7.1.2 Summary

The above assessment indicates the two key roads within the PSP are expected to carry no more than 3,125 vehicles per day, inclusive of traffic generated by other PSP areas in the immediate vicinity. This is slightly above the targeted theoretical daily amenity threshold of 2,000-3,000 vehicles per day for an Access Street – Level 2. Noting that the target volumes are 'amenity thresholds' rather than operational capacity, the proposed classification and cross sections are considered appropriate and will not compromise the operation of these roads.

An assessment of the road network in the vicinity of the site has also been undertaken to understand the implications of approving the PSP. The analysis found that there are many existing roads that are currently carrying daily volumes above their targeted volume amenity thresholds. These volumes are likely a result of the current conditions in the NGC as not all of the transport infrastructure is delivered. These patterns will change over time as the transport infrastructure identified in the Growth Corridor Plan is delivered. Importantly, the delivery of the OMR will also reduce the longer north south traffic demand on roads such as Aitken Boulevard.

Whilst an assessment of the network at full delivery of the corridor plan has not been undertaken in this report, the level of traffic anticipated from the PSP is not expected to be more than 1,620 on Aitken Boulevard and will not have an adverse impact on the road network.

The analysis also considers the impact that the PSP may have on the road network with the adjacent Craigieburn West PSP. When accounting the for the activation of the Craigieburn West PSP and the subject site, the daily traffic volumes on these roads is expected to increase. It is highlighted that these are targeted volumes spread across a typical day and the capacity of the road will is not expected to be compromised.

In practice, finite road networks which are at or near capacity are dynamic and often experience constant changes in performance and operation in response to local land use generators. Having consideration to these influences and the observed and recorded daily traffic volumes on the adjacent road network, a number of outcomes may occur when land use development is realised on the subject site and surrounding area under the current and proposed road network configuration. These include either individually or collectively:

- Subdued levels of traffic generation per land use unit area in comparison to sites which are less constrained and experience or interface with free-flow levels of network performance.
- A re-distribution or re-assignment of non-local traffic activity to other parallel or similar traffic routes either side of the subject site.
- A change in modal travel behaviour with the community both associated with the project and the surrounding area adopting or changing their transport mode from the private motor vehicle (it is acknowledged that mode shift will be limited until further upgrades to the public transport network are provided in the vicinity of the site).
- A change in the time of travel to either the shoulder or inter-peak road network peak hours especially for discretionary trips currently on the network (i.e., a spreading of peak hours).

As stated previously, traffic patterns and associated daily volumes are expected to adjust somewhat in the long term as key transport infrastructure projects are delivered in accordance with the North Growth Corridor Plan. These key planned projects are anticipated to alleviate congestion in the short and long term, including:

- the upgrades and duplication of Craigieburn Road and Mickleham Road (refer to Section 2.4 of this report) are expected to deliver additional capacity on these key arterial road links.
- the delivery of the Outer Metropolitan Ring Road/E6 corridor will influence traffic movements in Melbourne's north and west via the delivery of a 100km long high-speed road and rail transport link.
- Aitken Boulevard is expected to be upgraded to a 4-lane secondary arterial road to provide additional capacity.

These upgrades along with the delivery of increased public transport services throughout the North Growth Corridor will assist with the dispersing of traffic and facilitate a shift in transport mode choice via a reduction of reliance on private motor vehicle usage within the vicinity of the site.

Consideration has also been given to the level of traffic generated by the site with respect to the significant amount of development contemplated within the North Growth Corridor. For context, the full development of the subject site is expected to generate up to 3,600 daily traffic movements. This is considered marginal in a traffic engineering sense

when compared against the estimated volumes likely to be generated by the immediately adjacent Craigieburn West PSP (55,400 vehicles per day) and those traffic volumes already recorded on key roads within the vicinity of the site.

When considering the broader arterial network, the proportion of traffic of expected to be generated by the Greenvale North Part 2 PSP across the network, is modest with respect to the existing daily volumes on key roads in the vicinity of the site. Specifically, the % increase in traffic on these roads generally ranges between less than 1% up to15%.

The exception to this is the extension of Navigation Road (+40%) which represents the main north-south connection out of the site via the Craigieburn West PSP.

It is noted the above assessment considers the traffic impacts at the macro level in the longer term. Micro level traffic analysis such as peak hour assessments would be undertaken at subsequent subdivisional stages. Similarly, specific upgrades to existing intersections would be completed at later stages.

Notwithstanding, the % uplift in traffic volumes along the key roads within the vicinity is considered low and would not warrant the need to contribute to any planned infrastructure projects (i.e. new signalised intersections within Craigieburn West PSP) in the immediate vicinity of the site area.

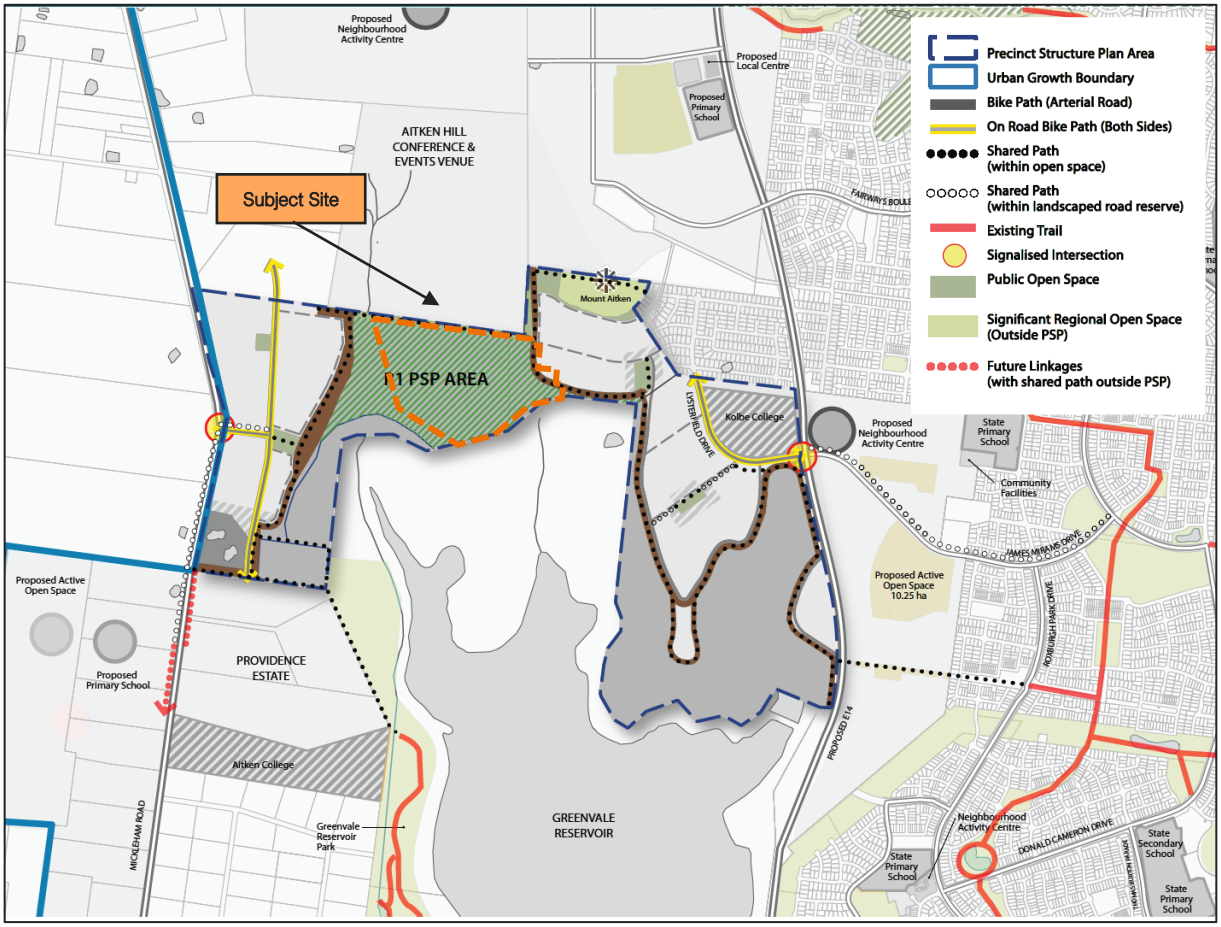
7.2 Walking and Cycling

7.2.1 Preamble

Guidance for the delivery of sustainable transport infrastructure can be sought from the neighbouring Craigieburn West and Greenvale North R1 PSPs. Specifically, Greenvale North R1 PSP indicates the provision of a continuous shared path with open space running along the northern boundary of the site.

The shared path network outlined within Greenvale North R1 PSP is shown in Figure 7.1 below.

Figure 7.1: Greenvale North R1 PSP – Path Network



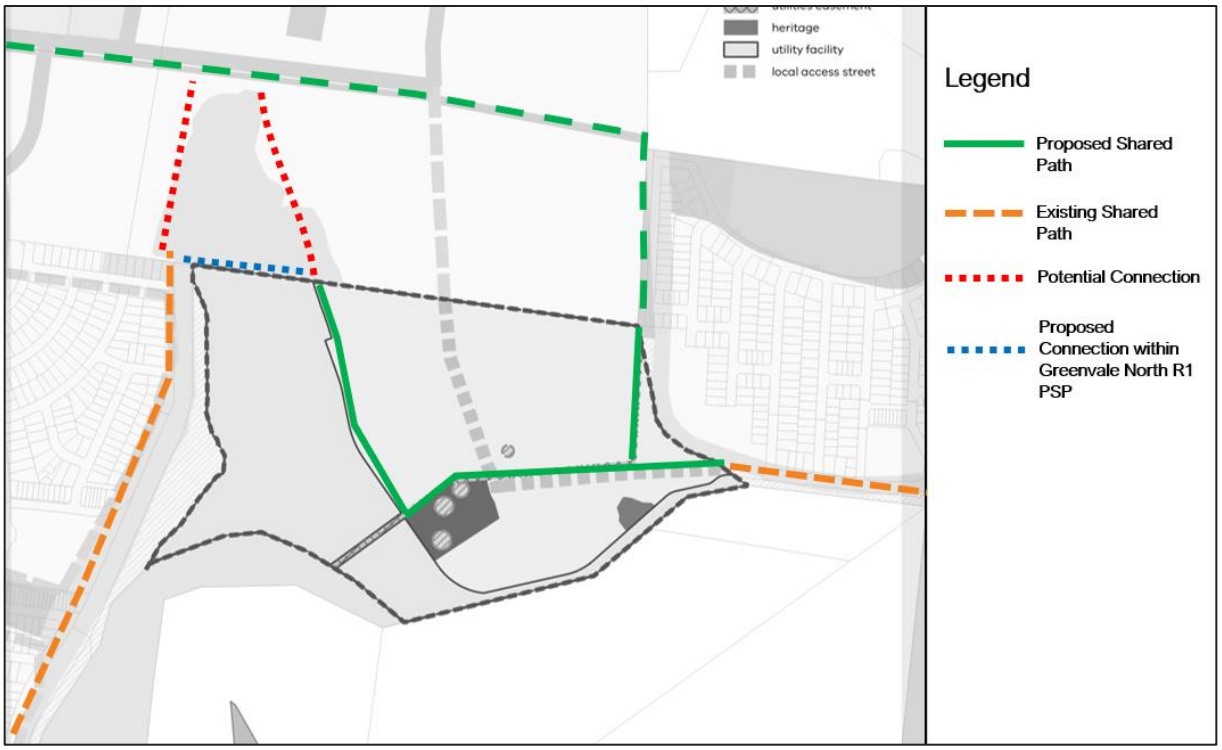
7.2.2 Proposed Pedestrian and Bicycle Network

A shared path network is proposed along the easement and around the western boundary of the PSP area. This deviates subtly from the shared path network in the Greenvale North R1 PSP but is considered to be acceptable as the shared path will still provide an accessible path network to the surrounding schools, Greenvale Reservoir at the south and surrounding PSP area.

Sealed footpaths will be provided on both sides of all the internal roads within the PSP area. These paths will connect to existing and future paths external to the site and therefore provide connectivity to the surrounding PSP area, including the reserve to the west of the site.

The proposed active travel links and potential opportunities to provide further connections are illustrated in Figure 7.2.

Figure 7.2: Proposed Active Travel Links



To provide a comprehensive shared path network throughout the site, there is an opportunity to connect to Greenvale North R1 PSP to the west. It is noted that a shared path connecting the PSP area and the west over the drainage reserve/bund is outlined within the Greenvale North R1 PSP (shown in blue in the above figure). This pedestrian connection is not proposed within the PSP area due to uncertainties surrounding the suitability and approval from the water authority, however there is an opportunity to further explore the provision of a pedestrian/bicycle connection between the subject PSP area and land to the west via an alternative route around the drainage reserve/bund to the north. This option also provides a connection to the proposed east-west green link within the Craigieburn West PSP.

7.3 Public Transport

With regard to public transport provision, guidance has been sought from to the Department of Transport's 'Public Transport Guidelines for Land Use and Development'. This document states the following in relation to public transport accessibility:

"Neighbourhoods should be designed for bus routes on strategically located connector roads so that dwellings will be within 400m of a bus route."

The Greenvale North R1 and Craigieburn West PSPs do not highlight a planned bus route connecting through the site. The nearest existing bus route (Route 541) operates along Lysterfield Drive which is located approximately 550m to the east of the site.

The Greenvale R1 PSP and Craigieburn West PSP nominate Mickleham Road as a potential future public transport route. Similarly, Aitken Boulevard is also identified as a future public transport route noting the North Growth Corridor Plan shows Aitken Boulevard as a "High Capacity Principal Public Transport Network". Additionally, future bus routes are identified along the connector roads to the west and north of the site and will be accessible to the site upon completion of the surrounding road network.

The proposed 21m wide Access Street – Level 2 road through the site is bus capable and will be able to accommodate a future bus route through the site, should a bus route through the site be realised in the future.

It is noted that further investigations may be required to determine the level of works and the practicality to accommodate a bus route within the existing urban environment outside of the proposed PSP area. In this regard, reference is made to the Advisory Committee's recommendation for the Craigieburn West PSP on the justification for works outside of the PSP which stated:

> *That said, the Committee was not persuaded that it would be appropriate to show additional local access streets as potential routes. The VPA's plan already identifies all connector streets as bus capable, with eight bus capable roads (and potential future bus routes) towards key destinations in the east including Craigieburn Station and Craigieburn Shopping Centre. While the VPA's Transport Plan is not dimensioned, based on the 400 metre walkable catchment it looks like all residential areas within the PSP would be within 800 metres of a bus capable road, and most would be within 400 metres. The need for further potential bus routes was not justified.*
>
> *The Committee finds:*
>
> - *It was not persuaded that including further potential internal bus routes in the PSP is justified.*

Having regard for this recommendation, in providing bus capable roads within the subject site, the PSP has met its obligations for public transport provision. Indeed, the DTP, as the responsible authority for implementing and managing the bus network, will be required to manage and deliver any necessary works for bus routes to be provided to the PSP external to the site.

7.4 Movement and Place

Movement and Place (M&P) is a framework that takes the aspirations of planning and transport and brings them together in the context of the road environment. It considers all the transport modes and road safety and also brings in 'Place' (an area as a destination for people), which previous road hierarchy frameworks have not done. It considers each mode or element on a 1 to 5 scale, with 1 been more significant (and generally of state or national importance) and 5 been less significant, and of local importance. Based on the significance of all the movement and place elements, prioritisation of modes and place can occur, and comparison to performance outcomes to meet benchmarks for the that level of modal significance.

For Greenvale North Part 2 PSP, a detailed M&P assessment has not been completed, however the principles are evident through a simple and logical network. The two higher order access roads provide the basis of a movement network connecting the site to the east and west. Further, the active travel links, including the shared path through the PSP and the ability for the two Access Roads to be bus capable, ensures that the site will be able to promote alternate modes as a method of transport.

This alignment is sound in principle and will reduce conflicts between competing modes and allow street designs to be developed.

8 Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made:

- The Greenvale North (Part 2) PSP has a total area of 8 hectares and abuts Craigieburn West PSP to the north and Greenvale North R1 PSP to the east and west.
- A draft concept plan has been prepared which proposes approximately 400 residential lots will be delivered within the PSP area.
- In the interim, the PSP area will be accessed via the existing road network within Greenvale North R1 PSP to the east. In the longer term, access opportunity to the north via the broader road network within the adjacent Craigieburn West PSP will also be available as the PSP area is delivered.
- At a high-level, the internal road network is logical and integrates with the neighbouring road network. Additionally, several road connections to neighbouring local streets along the site's northern and eastern boundaries will be extended to continue as through roads within the PSP area.
- The primary north-south road within the site connecting to the Craigieburn West PSP to the north is nominated as an Access Street – Level 2. Similarly, the main east-west road adjacent to the easement is likely to retain the existing characteristics of an Access Street – Level 2.
- The primary road within the site will be provided with a trafficable carriageway width of 7m to cater for a potential bus service through the site.
- A traffic generation rate of 9 vehicle trips per day per lot was adopted for the traffic assessment, consistent with the rate adopted for the Craigieburn West PSP. Application of these rates results in the PSP area generating 3,600 vehicle trips per day. This traffic generation rate is considered to be conservative on the high side and should a lower rate be realised then the resultant traffic generation would also reduce.
- The anticipated traffic distribution from the PSP area is generally consistent with the traffic distribution adopted for the traffic modelling undertaken for the Craigieburn West PSP.
- The midblock capacity assessment indicates that the internal roads within the PSP area are expected to operate slightly above their targeted volume of 2,000-3,000 vehicles per day.
- For existing external road networks, the assessment indicates:
    - Candlebark Drive is expected to continue to operate within its theoretical targeted volumes of 2,000-3,000 vehicles per day.
    - Compass Drive is expected to operate slightly above its theoretical targeted volumes of 2,000-3,000 vehicles per day.
    - Koomba Crescent is expected to operate above its theoretical targeted volumes of 1,000-2,000 vehicles per day.
    - The two connector roads (Fairways Boulevard and Lysterfield Drive) are currently carrying traffic volumes of above their theoretical targeted volumes of 7,000 vehicles per day and will continue to operate in excess of their theoretical targeted volumes following the development of the PSP.
    - Aitken Boulevard currently carries volumes exceeding 20,000 vehicles per day, prior to the activation of the Craigieburn West PSP and will continue to operate in excess of the targeted volumes following the development of the PSP.
- For future external road network, the assessment indicates:
    - Navigation Road is expected to carry in the order of 5,490 vehicle trips per day. The traffic model prepared by OneMileGrid in support of the approved Craigieburn West PSP indicates that Navigation Road to the immediate north of the site will carry 3,400 vehicles per day under ultimate conditions. This volume is assumed to be irrespective of development of the subject site and is nearing its theoretical capacity threshold based on target volumes
    - Fairways Boulevard is expected to operate within their theoretical targeted volume threshold of 7,000-12,000

vehicles per day.

- Dunhelen Lane is expected to operate slightly above its theoretical targeted volume threshold of 3 7,000-12,000 vehicles per day.
- The East-West Connector Road (located between Dunhelen Lane and Navigation Road) is expected to carry daily traffic volumes in the order of 8,480 which slightly exceeds the nominated target traffic volume threshold of 7,000 vehicle trips for a Connector Road.
- Vantage Boulevard (to the immediate north of Fairways Boulevard) is expected to carry in the order of 12,720 vehicle trips per day. The traffic model prepared by OneMileGrid for the approved Craigieburn West PSP indicates that it will carry 12,000 vehicles per day which is greater than the target volume threshold y of a Connector Road, regardless of the traffic from the PSP.

The proposed shared path network is logical and follows the watermain easement which provides pedestrian connections to surrounding schools, Greenvale Reservoir at the south and surrounding PSP area.

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