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Attention: Matthew Rose / Gordon Clark

Subject: Moss Vale Road North URA – Draft DCP
Lot 7 DP 618693 Bells Lane Meroo Meadow

Dear Sirs

Reference is made to the above draft DCP.

<https://pp.planningportal.nsw.gov.au/ppr/under-exhibition/moss-vale-road-north-urban-release-area-planning-proposal>

On behalf our client, HDB are submitting the following submission in response to the Moss Vale Road North URA – Draft DCP.

Following are the items we are requesting changes.

- Road widths
- Staging
- Small Lot Residential

Potential future rezoning, for Council's information only.

Road Widths

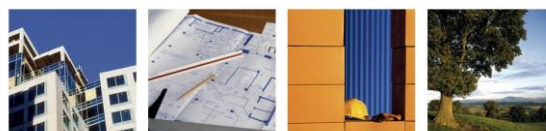
Several current landowners have commissioned an updated traffic report, which was prepared by ARC Traffic + Transport. A copy of this report is included in the submission. The purpose of the report was to assess the road widths proposed in the Draft DCP against current best practise.

The roads proposed in the draft DCP are as follows: -

Collector Road Tier 1	– 23.0m wide
Collector Road Tier 2	- 22.0m wide
Retail Street	– 23.2m wide
Local Street	– 22.6m wide
Access Street Tier 1	– 16.5m wide
Access Street Tier 2	– 16.5m wide
Riparian Steet	– 17.0m to 32m wide
Rear Laneway	– 11.0m wide
Shared Driveway	- Up to 8m wide

The ARC report proposes the following: -

Collector Road (entry)	– 21.9m
Collector Road	– 19.9m
Collector Road (riparian – one side development)	– 17.5m
Retail Street	– 19.0m
Local Street	– 16.0m
Riparian Street	– 16.0m
Laneway	– 11.0m
Rear Laneway	– 6.0m



This is further examined as follows:

Collector Roads

The ARC report: -

- Supports the 3.5m travelling lanes, proposed in the Draft DCP, exclusive of parking. The recommendations in the ARC report will not impact on the flow of traffic to future development areas.
- Recommends a reduction in parking width in accordance with AS2890.2.
- Indicates a minor reduction in verge width, on the side that a water main will not be installed.
- Indicates a reduced verge width on the side, where development will be limited to one side. Footpath and public utilities will not be required on this side of the road where development is not occurring. If further development occurs in the future, the developer (at the time) shall dedicate the additional width required for the verge.

Retail Street

The ARC report: -

- Recommends reducing the travelling lane widths to 3m each way rather than 4.5m each way.
- The travelling lanes are clear of parking and will not be impeded by the reduced width.

Local Street

The ARC report: -

- Simplifies the requirements and combines the Local Street, Access Street Tier 1 and Access Street Tier 2, from the Draft DCP, into one requirement for Local Streets.
- The Local Street network, in the ARC report, only provide access to the local area network and is acceptable for the projected traffic volumes.
- The Local Street requirements, in the ARC report, are similar to Access Street Tier 2 in the Draft DCP.

Riparian Street

The ARC report: -

- Is generally in accordance with the current requirements in the Draft DCP.
- Asset Protection Zones (APZ), adjacent to Riparian zones, should be measured from the edge of the managed area, not the edge of the pavement. This should be clarified in the draft DCP.

Laneway

The ARC report: -

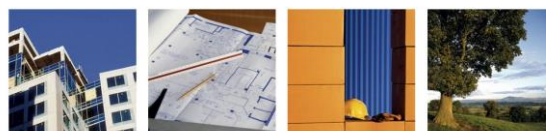
- Concurs with the current requirements in the Draft DCP.

Rear Laneway/Shared Driveway

The ARC report: -

- Provides a standard requirement for Rear Laneways/Shared Driveways, rather than a maximum width. This will provide consistency through the development.

It is requested that the current traffic report and road requirements in the Draft DCP be replaced with the ARC Traffic + Transport report.



Staging

The current Draft DCP, specifies development of the site in 7 stages. The rationale behind the staging is for the provision of major infrastructure and to prevent fragmented development.

The current staging does not consider the following: -

- Major infrastructure, stormwater & sewer, will be constructed from the east;
- The entry to the development, which Council has nominated as the first collector road to be constructed, is currently in private ownership and will remain in private ownership, within the land shown as stage 1. If stage 1 does not proceed or this development is delayed, it will stifle development of the urban release area; and
- Likely effect of lessening competition in the urban release area which may be defined as anti-competitive as defined by the Australian Competition and Consumer Commission.

It is requested that the staging be amended, to allow development to proceed in a way that is not reliant on one landowner. There are many reasons that may prevent development of this site in a timely manner. Allowing development, of an urban release area, to be reliant on one property owner, is prejudice to all other property owners within the urban release area.

It is requested that the staging be amended as follows: -

Stage 1

- Collector Roads into the development, from Moss Vale Road up to and including the area currently shown as Stage 6. This includes upgrading Bells Lane (an existing public road).
- Development within proximity of the collector roads.

Stage 2

- All other areas radiating out from the collector roads.

Consideration may need to be given to funding the upgrading of Bells Lane via works in kind (offset against contributions) or other developer funded agreements, which is equitable to all property owners within the urban release area. The applicant is open to working with Council and the other stakeholders, within the precinct, to negotiate and agree on a works in kind agreement.

Upgrading of Bells Lane, from Moss Vale Road to the area currently shown as stage 6 (the first 90° bend in Bells Lane), will allow fair and equitable development of the urban release area. It will also prevent development of the urban release area being reliant on one landowner. The upgrading of Bells Lane will also provide direct access to the location of the proposed Village Centre and Business Park, nominated at the intersection of Bells Lane and Abernethys Lane.

Development of the area, around Bells Lane, will make it easier to provide suitable stormwater and sewer infrastructure. This infrastructure will be developed from the eastern side of the urban release area.

In addition, by amending the staging as proposed and bringing forward the construction of Bells Lane, this will significantly reduce the future impact of any development within the precinct as there will be two major entry/exit to the site which will help alleviate any congestion during the construction of homes in the future.

It is requested that the current seven stages be reduced to two stages as mentioned above in order for each land owner to develop their respective landholdings.



Small Lot Residential

Currently, small lot residential is shown part way along Bells Lane, which will be one of the main collector roads through the development. Provision of small lot residential along Bells Lane, up to the first 90° bend, will allow residential development with limited vehicular movements from Bells Lane. Access could be provided from the rear, via shared driveways. Additional small lot residential, in this location, will also assist with the provision of low cost housing.

It is requested that small lot housing be extended along Bells Lane.

Future Rezoning of Lot 7 DP 618693

The northern section of the site was excluded from the previous rezoning process. A separate future application will be submitted for rezoning of this section of the site. Assuming successful future rezoning, the sewage system and stormwater system will drain into the Moss Vale Road North URA. The existing ridge, through the site, is close to the northern boundary. This forms a natural catchment boundary for the stormwater and sewage systems. Future road infrastructure will also come from the Moss Vale Road North URA. North of the site there is a watercourse, which would limit vehicular access opportunities.

It is requested that consideration be given to future development, which may be reliant on the proposed stormwater and sewage systems in the Moss Vale Road North URA.

Yours sincerely

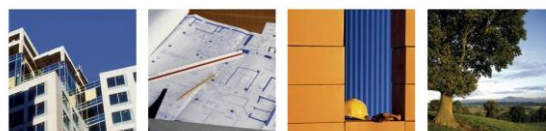
HDB Town Planning & Design



Rod Fletcher

Civil Designer

Enc: ARC Traffic Report





Transport Assessment

Moss Vale Road North Urban Release Area

for

Newquest Property

and

McDonald Jones Homes

and

Haverton Homes

and

Arissa Property Group

and

Mayrin Group

Document Control

Project No: 0251

Project: Moss Vale Road North URA

Client: Newquest Property, McDonald Jones Homes, Haverton Homes, Arissa Property Group and Mayrin Group

File Reference: P0251r1v6 Moss Vale Road North URA Transport Assessment

Revision History

Revision	Date	Details	Approved by
v1	9/02/2022	Preliminary 1	A. Reisch
v2	18/02/2022	Draft 1	A. Reisch
v3	17/03/2022	Draft 2	A. Reisch
v4	4/04/2022	Draft 3	A. Reisch
v5	19/04/2022	Draft 4	A. Reisch
v6	21/04/2022	Final 1	A. Reisch

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Appendix A: Concept Plans

Executive Summary

1. Overview

arc traffic + transport has been engaged by Newquest Property, McDonald Jones Homes, Haverton Homes, Arissa Property Group and Mayrin Group (collectively the **Proponents**) to prepare a Transport Assessment examining the future road network within the Moss Vale Road North Urban Release Area (the **MVRN URA**).

Part 6 of the Shoalhaven Local Environmental Plan (**Shoalhaven LEP**) provides for the MVRN URA to be developed to provide:

- Approximately 2,515 low density resident lots;
- A small retail centre with approximately 1,600m² Net Leasable Area (**NLA**);
- Significant open space;
- A future industrial sub-precinct north-west of the intersection of Moss Vale Road & Bells Lane (the **Business Park**); and
- A new road network providing access from Moss Vale Road into the MVRN URA, with the potential for future connections to other future residential precincts to the north, south and east of the MVRN URA.

2. Transport Assessment Tasks

The key focus of this Transport Assessment is an assessment of the road profiles adopted in the Concept Plans prepared by the Proponents, which differ from those provided in the Draft of Chapter NB4 of the Shoalhaven Development Control Plan (**Shoalhaven DCP**) for the MVRN URA (**MVRN Draft DCP**) in June 2021.

In determining whether the road profiles adopted in the Concept Plans are supportable, arc traffic + transport has considered the following:

- The development yields proposed for the MVRN URA;
- Trip generation and distribution within the road network, including consideration of additional traffic being generated through the MVRN URA further to potential future connections to adjacent resident precincts;
- The ability of the proposed road network, key intersections and road profiles to meet those future traffic volumes;
- The design of roads to appropriately provide for emergency vehicle access and – where required – form part of an Asset Potential Zone (**APZ**) so as to provide compliance with the Rural Fire Service (**RFS**) Planning for Bushfire Protection 2019 (**PBP 2019**) guidelines;
- A determination of appropriate road profiles for adoption in the final MVRN DCP based on all available information; and
- A determination of appropriate intersection treatments for adoption in the final MVRN DCP based on all available information.

3. Transport Assessment Findings

Further to the assessment, arc traffic + transport has determined the following:

i. Road Profiles

Average Annual Daily Traffic (**AADT**) volumes across most roads in the MVRN URA are very moderate, particularly in lower order roads away from the primary Collector Road network.

The overwhelming majority of local roads have traffic volumes that align with the 'control volumes' adopted in the Moss Vale Road North Internal Traffic Study (**MVRN ITS**) for *Access Streets*, having an AADT volume of less than 750 vehicle trips per day (**vpd**). As such, the traffic carrying capacity of higher order roads identified in the MVRN ITS – and specifically the *Local Street*, *Retail Street* and *Riparian Street* – is simply not required.

Traffic volumes in many sections of the Collector Road network within the MVRN URA are also significantly lower than the control volumes identified in the MVRN ITS, including sections where AADT volumes represent only a fraction of the 750vpd capacity of an Access Street.

While the traffic carrying capacity of roads is not the only consideration in determining appropriate road profiles – with Perimeter Road and Riparian Streets in particular also required to provide compliance with PBP 2019 - this Transport Assessment has concluded that there is substantial justification for the road profiles adopted in the Concept Plans, which include:

- A **Collector Road (Entry)** with a road reserve of 21.9m;
- A **Collector Road** with a road reserve of 19.9m;
- A **Riparian Collector Road** (adjacent to riparian, watercourse or gas line corridors, or land not included in the MVRN URA) with a minimum road reserve of 17.5m, to be widened where necessary to meet APZ requirements;
- A **Retail Street** with a road reserve of 19.9m;
- A **Local Street** with a road reserve of 16.0m;
- A **Riparian Street** (adjacent to riparian, watercourse or gas line corridors, or land not included in the MVRN URA) with a minimum road reserve of 16.0m to be widened where necessary to meet APZ requirements;
- A **Laneway** with a road reserve of 11.0m; and
- A **Rear Laneway** with a road reserve of 6.0m.

A key justification for these road profiles is simple reference to the broader Shoalhaven DCP and other Shoalhaven City Council (**Council**) guidelines. In this regard:

- The road profiles adopted in the Concept Plans are generally the same as those recently adopted in the Moss Vale Road South Development Control Plan (**MVRS DCP**) for the Moss Vale Road South Urban Release Area (**MVRS URA**), which provides for identical low density residential development as proposed for the MVRN URA;
- The road profiles adopted in the Concept Plans are generally the same as those recently approved by Council for several new residential subdivisions within the MVRS URA;

- The road profiles adopted in the Concept Plans are generally the same as those approved in low density residential developments across the Shoalhaven Local Government Area (**Shoalhaven LGA**);
- The road profiles adopted in the Concept Plan are entirely consistent with those identified in Section D1: Geometric Road Design of the AUS-SPEC engineering specifications (**AUS-SPEC D1**), which are Council's own adopted engineering specifications.

Justification for the road profiles adopted in the Concept Plans is also demonstrated with reference to NSW and National road design guidelines; in this regard:

- The road profiles adopted in the Concept Plans have similarly been adopted in DCPs prepared by local Councils and the Department of Planning, Industry & Environment (**DPIE**) for new residential areas in the Sydney North-West and Sydney South-West Growth Centres (**Growth Centres**);
- The road profiles adopted in the Concept Plans are entirely consistent with road design specifications for new residential precincts prepared by the Victorian, Queensland, South Australian and West Australian State Governments;
- The road profiles adopted in the Concept Plans are entirely consistent with the AMCORD residential design guidelines prepared by the Commonwealth Government; and
- The road profiles adopted in the Concept Plans are compliant with the requirements of PBP 2019.

In summary, it is the opinion of **arc traffic + transport** that the road profiles adopted in the Concept Plans are not only supportable, but are entirely consistent with existing Council, NSW and National design guidelines.

ii. MVRN URA Recommended Road Profiles

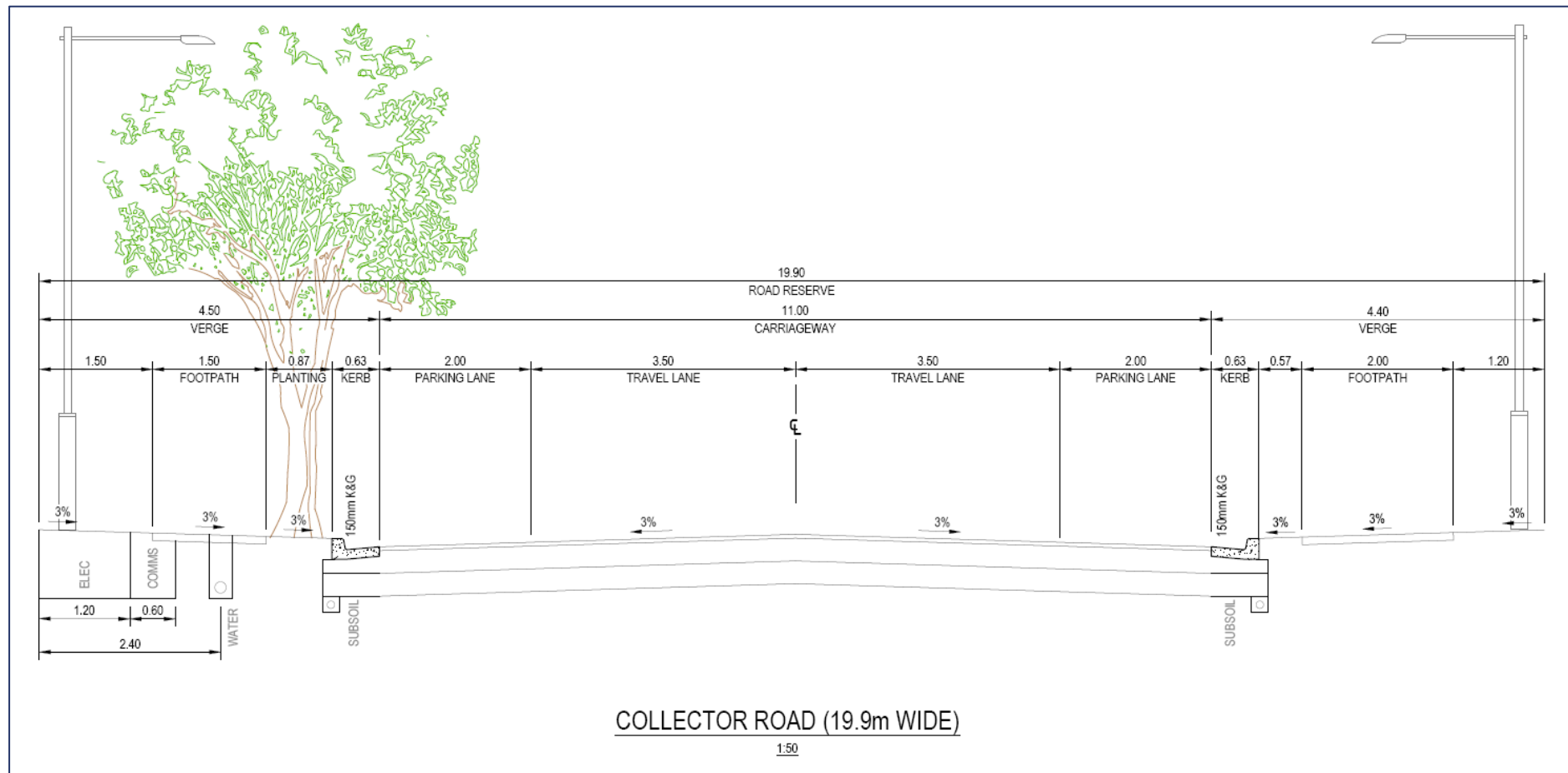
Further to the above, **arc traffic + transport** recommends that the road profiles shown in Section 7.4 of the MVRN Draft DCP be revised to include the road profiles adopted in the Concept Plans, the characteristics of which are summarised in **Table A** and figures below.

Table A: Recommended Road Profiles

Recommended Road Profiles	Verge (m)	Carriageway (m)			Verge (m)	Road Reserve (m)
		Lane	Median	Lane		
Collector (Entry)	4.5	5.5	2.0	5.5	4.4	21.9
Collector	4.5	5.5		5.5	4.4	19.9
Riparian Collector	5.0	5.5		5.5	1.5 ¹	17.5 ¹
Retail	4.5	5.0		5.0	4.5	19.0
Local	4.5	3.5		3.5	4.5	16.0
Riparian	4.5	5.0		5.0	1.5 ¹	16.0 ¹
Laneway	2.5	3.0		3.0	2.5	11.0
Rear Laneway	0.5	2.5		2.5	0.5	6.0

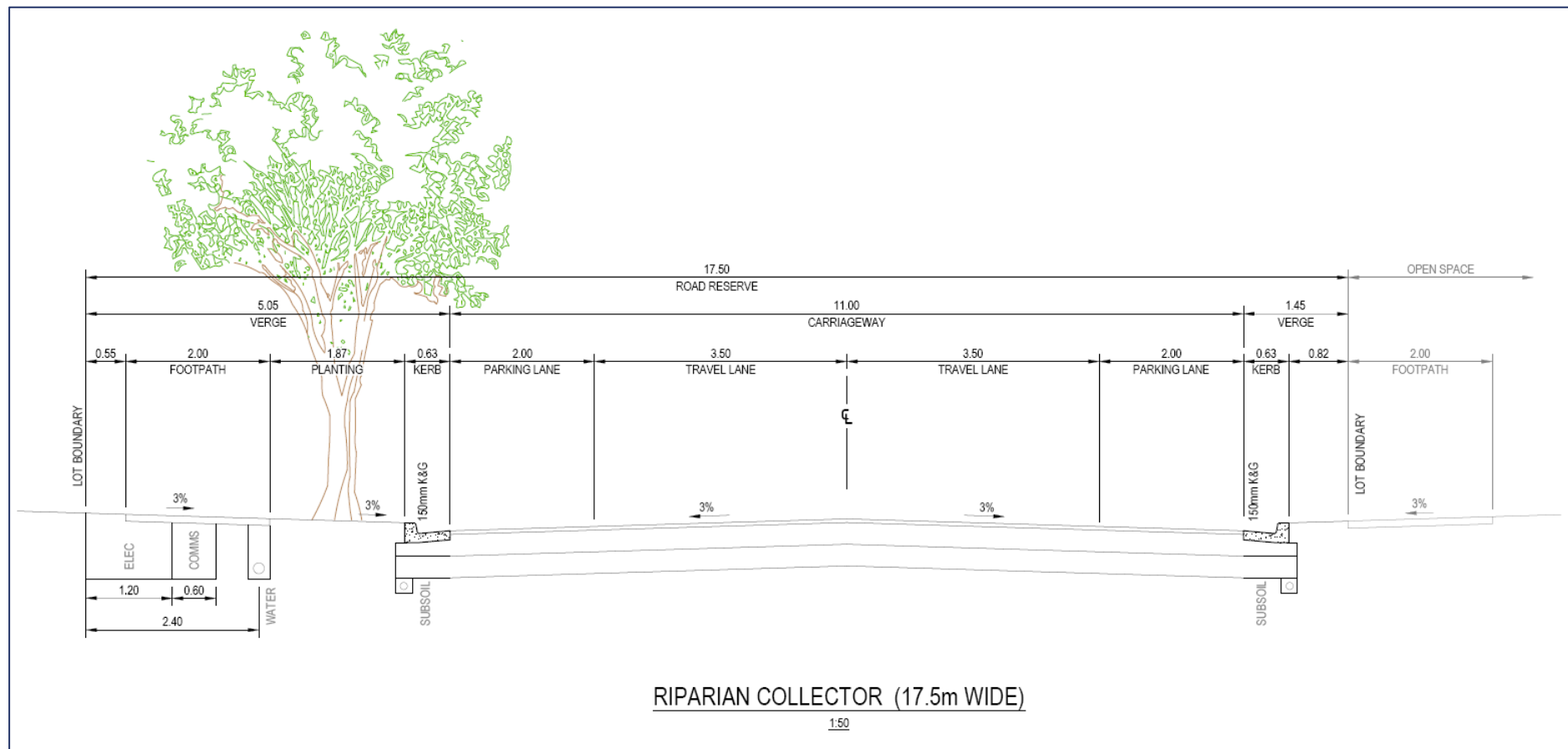
Note 1: In Riparian Collector Roads and Riparian Streets, the width of the verge adjacent to the riparian corridor, and in turn the total road reserve, will be dependent on the creation of an appropriate APZ width.

Figure B: Recommended Collector Road Profile



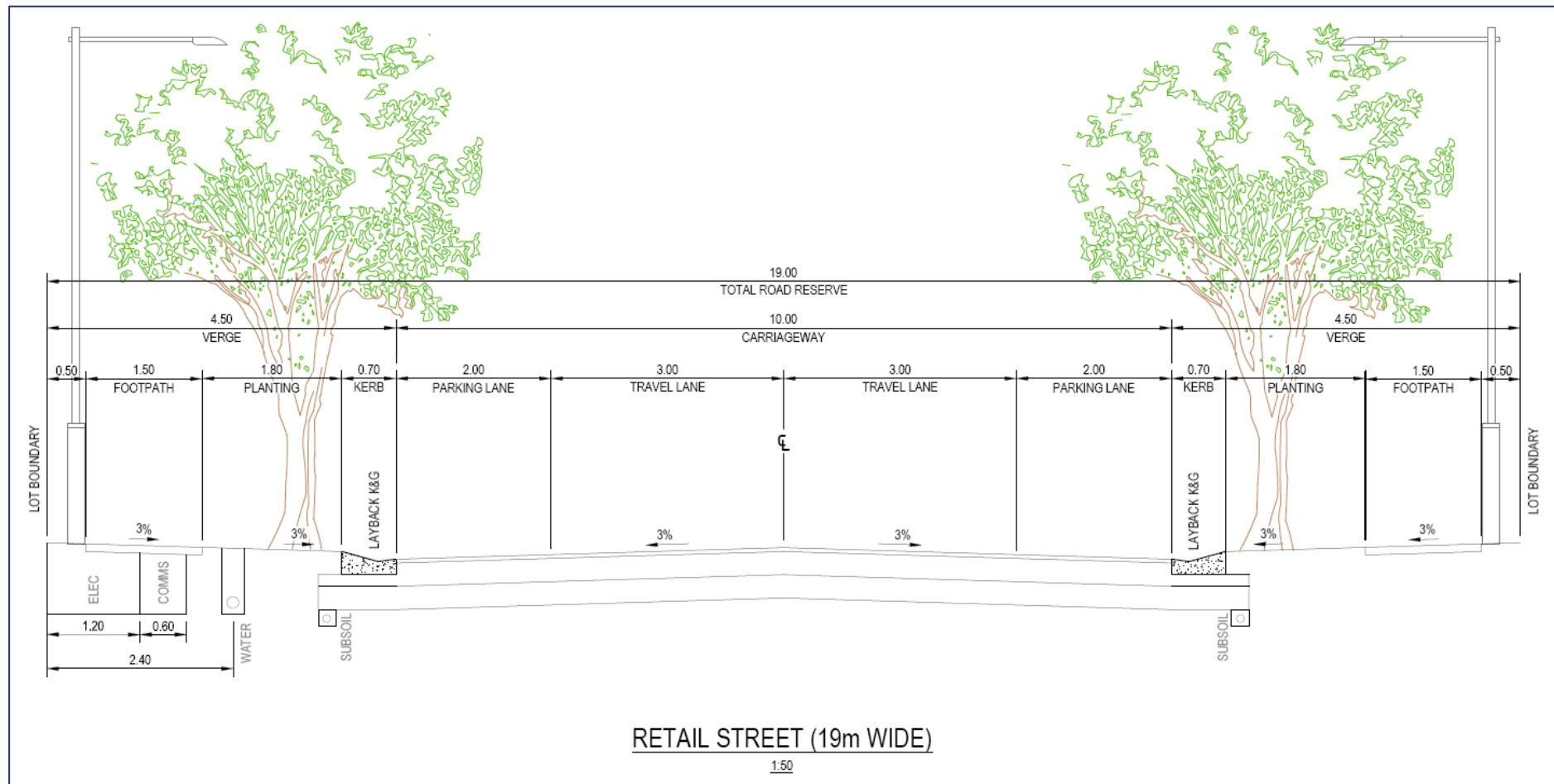
Source: Newquest

Figure C: Recommended Riparian Collector Road Profile



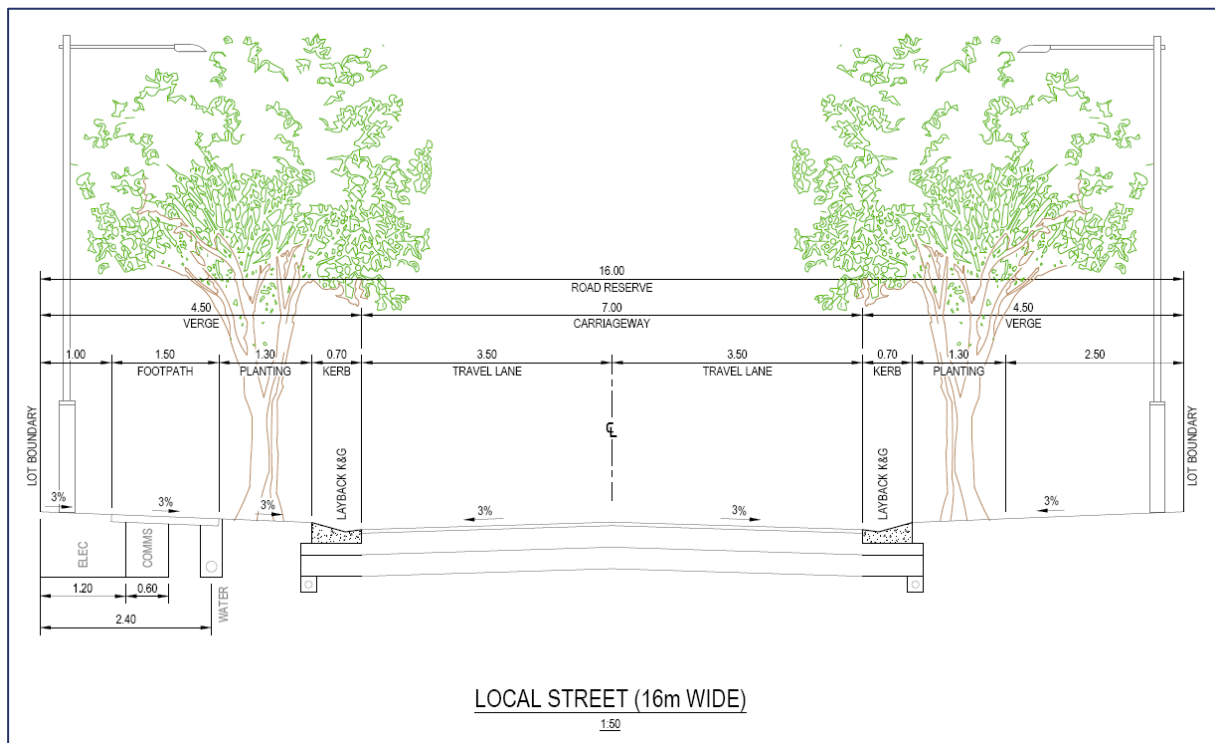
Source: Newquest

Figure E: Recommended Retail Street Profile



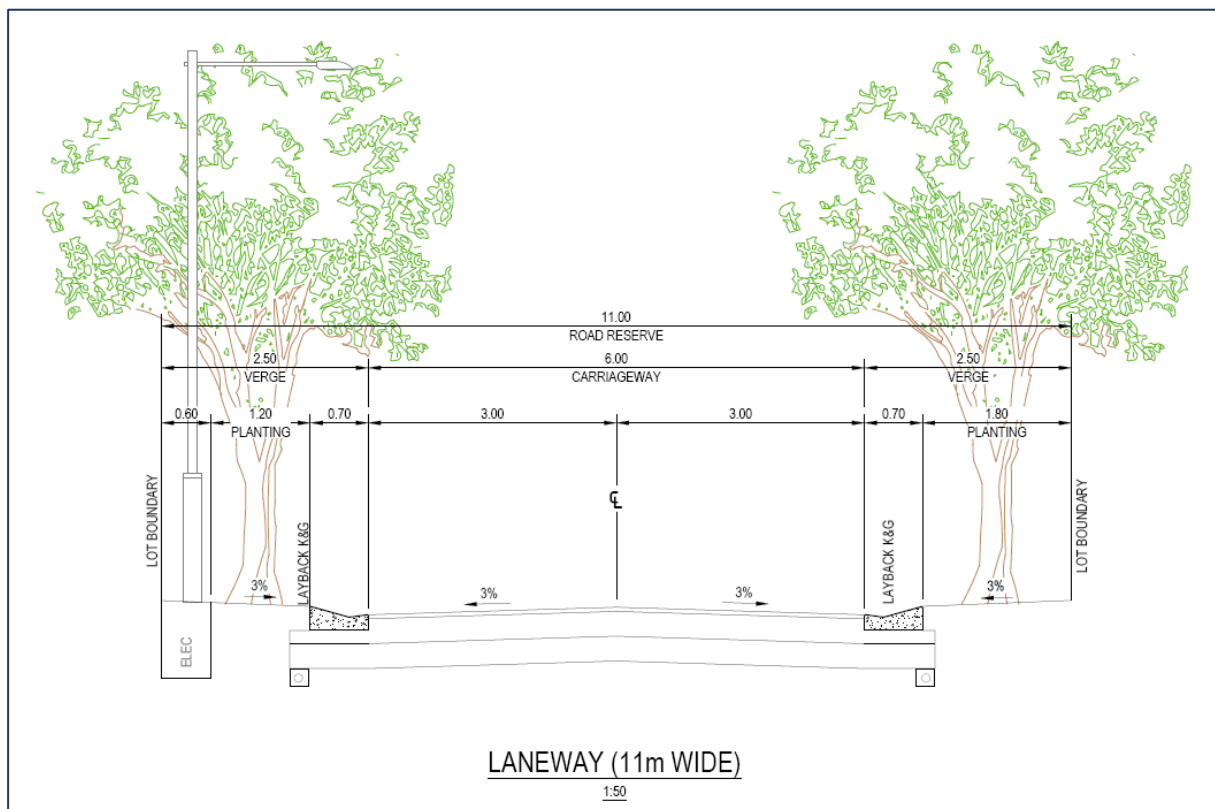
Source: Newquest

Figure F: Recommended Local Street Profile



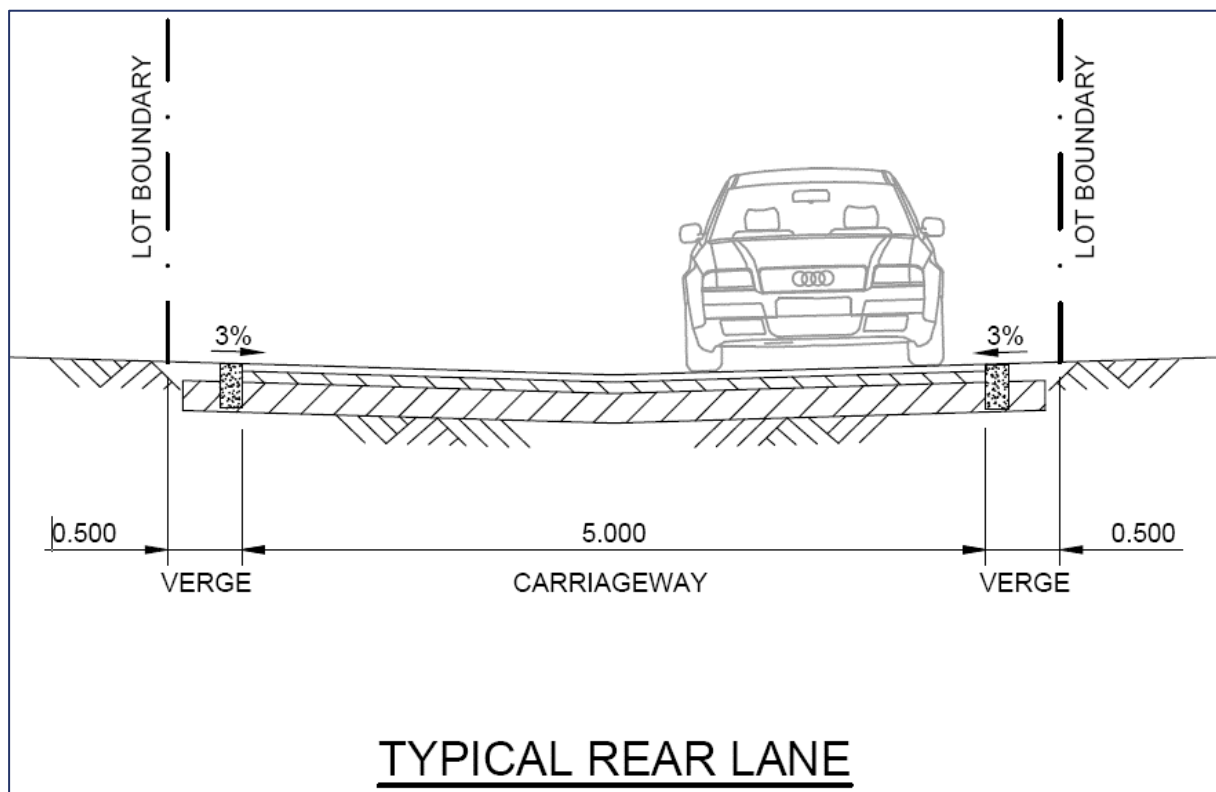
Source: Newquest

Figure G: Recommended Laneway Profile



Source: Newquest

Figure H: Recommended Rear Laneway Profile



Source: Haverton Homes

iii. Intersections

The MVRN Draft DCP provides a road network with a significant number of intersections operating under roundabout control. There is substantial justification for a reduction in the number of roundabouts further to consideration of their traffic volumes based on the 2041 forecast volumes provided in the MVRN ITS, and moreover consideration of the role and function of roundabouts in a low speed, low volume residential road network. In this regard;

- Other than a small number of intersections of Collector Roads, the majority of intersections operate with total traffic volumes of less than 350vpd, or with minor approach volumes of less than 30 vehicles per hour (**vph**), representing an average of less than 2vph in the minor approaches;
- Based on a review of other new residential road networks across NSW, there is no evidence for, or examples of, roundabouts being required in close proximity to each other at intersections of Collector Roads & Local Streets, or Local Streets & Local Streets, as identified in the MVRN Draft DCP;
- Based on a review of other new residential road networks across NSW, there is no evidence for, or examples of, roundabouts being required at the intersections of Local Streets as identified in the MVRN Draft DCP;
- Roundabouts provide poor outcomes for pedestrians and cyclists, as they are forced to divert from the optimum desire line (immediately adjacent to the corner of the intersection) to cross roundabout approaches; and

- Roundabouts provide extremely poor outcomes further to consideration of sustainable planning, with the total reserve area of a roundabout having a footprint of approximately 4 times a standard priority intersection, and a road surface area over 4 times a standard priority intersection. The recommended conversion of low volume roundabouts to priority intersections would reduce the road surface area across the MVRN URA by some 35,000m², the equivalent of approximately 7 football fields of road surface.

In summary, it is the opinion of [arc traffic + transport](#) that a reduction in the number of roundabouts across the MVRN URA is not only supportable, but is entirely consistent with existing Council, NSW and National road network design guidelines, and with responsible and sustainable planning practice.

iv. Internal Local Roads

Further to the above, the MVRN Draft DCP provides a road network with a significant number of interconnected local roads, which in turn results in a high number of 4-way intersections. While these intersections will operate at a good Level of Service, simply as a function of very minimal traffic demands, there is an opportunity to reduce the number of local roads, and particularly east-west oriented local roads, which would in turn result in more T intersections, which operate more efficiently (and, in general, safely).

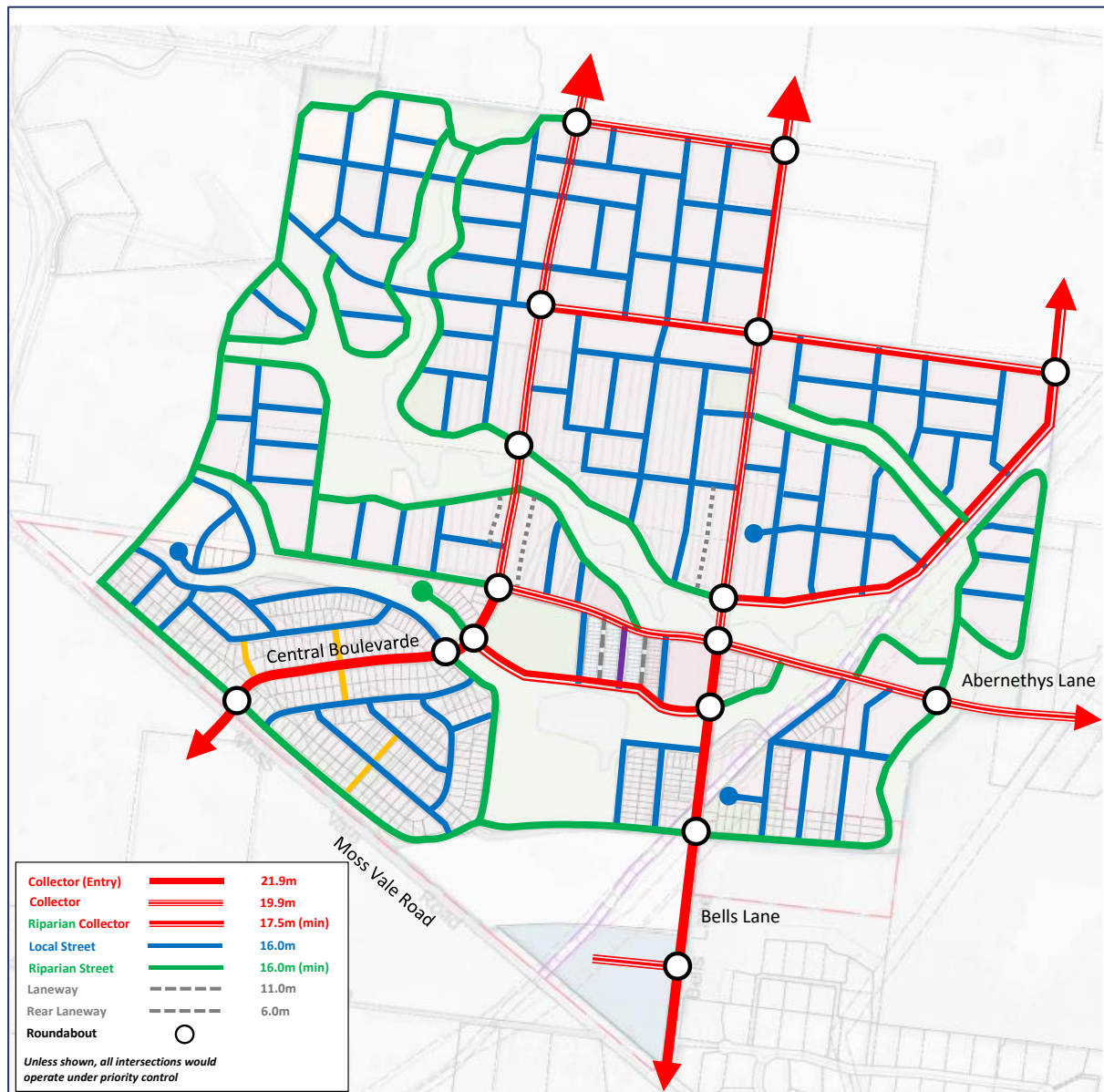
While the location of internal local roads for individual subdivisions within the broader MVRN URA will be dependent on a number of issues - including perhaps most important the need to provide certainty for adjacent land holders where local roads extend across multiple land holdings - there is certainly scope to revise these local roads, particularly in the northern parts of the MVRN URA.

Any such revisions would require consultation with Council and any adjacent land holders, and would need to have minimal if any impact on the broader Collector Road and Perimeter Road network.

4. Recommended Street Hierarchy and Network Plan

Further to our detailed assessment of the traffic and access characteristics of the MVRN URA, [arc traffic + transport](#) recommends that the *Street Hierarchy and Network Plan* provided as Figure 7 of the MVRN Draft DCP be revised in accordance with the Figure I below.

Figure I: Recommended Street Hierarch & Network Plan



Finally, it is acknowledged that there may be additional changes to the Concept Plans further to ongoing planning and design development by the individual Proponents (and other developers in the MVRN URA); however, these changes are not anticipated to significantly alter the identified structure of the Collector Road or Perimeter Road network.

1 Introduction

1.1 Overview

arc traffic + transport has been engaged by Newquest Property, McDonald Jones Homes, Haverton Homes, Arissa Property Group and Mayrin Group (collectively the **Proponents**) to prepare a Transport Assessment examining the future road network within the Moss Vale Road North Urban Release Area (the **MVRN URA**). Part 6 of the Shoalhaven Local Environmental Plan 2014 (**Shoalhaven LEP**) provides for the MVRN URA to be developed to provide:

- Approximately 2,515 low density resident lots;
- A small **Retail Centre** with approximately 1,600m² Net Leasable Area (**NLA**);
- Significant open space;
- A future **Business Park** north-west of the intersection of Moss Vale Road & Bells Lane; and
- A new road network providing access from Moss Vale Road into the MVRN URA, with the potential for future connections to other future residential precincts to the north and east of MVRN, and the Moss Vale Road South Urban Release Area (**MVRS URA**) to the south.

In accordance with the Shoalhaven LEP, and with specific reference to the MVRN URA Indicative Layout Plan (**MVRN ILP**) provided in the Draft of Chapter NB4 of the Shoalhaven Development Control Plan 2014 (**Shoalhaven DCP**) for the MVRA URA (**MVRN Draft DCP**), the Proponents have developed Concept Plans that align with broader development of the MVRN URA in line with the MVRN ILP. However, the road profiles adopted in the Concept Plans differ from those provided in the MVRN Draft DCP.

To this end, the road profiles adopted in the Concept Plans specifically reference the road profiles provided in the Moss Vale Road South Urban Release Area Development Control Plan (**MVRS DCP**), as well as road profiles detailed in other sections of the Shoalhaven DCP (for other existing and approved residential areas), and moreover in accordance with best practice road design.

Overall, the road profiles adopted in the Concept Plans are not significantly different to those outlined in the MVRN Draft DCP, with the primary difference being minor reductions in road reserve widths (again in line with the profiles detailed in the MVRS DCP and other Council and best practice guidelines) further to appropriate consideration of the traffic carrying capacity required of key roads, and consideration of other key factors such as bushfire requirements, pedestrian movements, bus routes and general residential amenity.

1.2 Transport Assessment Tasks

This TA examines the relevant access and traffic characteristics of the MVRN URA developed in accordance with the Concept Plans, with a particular focus on future traffic volumes in lower order roads across the MVRN URA; and in turn, whether the road profiles adopted in the Concept Plans appropriately accommodate those volumes, and moreover whether they provide appropriate planning outcomes to maximise the efficiency of the road network, as well as residential accessibility, safety, amenity and sustainability.

To address these issues, [arc traffic + transport](#) has considered the following:

- The development yields proposed for the MVRN URA;
- Trip generation and distribution within the road network, including consideration of additional traffic being generated through the MVRN URA further to potential future connections to adjacent resident precincts;
- The ability of the proposed road network, key intersections and road profiles to accommodate those future traffic volumes;
- The design of roads to appropriately provide for emergency vehicle access and – where required – part of the Asset Potential Zone (**APZ**) so as to provide compliance with the RFS's Planning for Bushfire Protection 2019 (**PBP 2019**) guidelines;
- A determination of appropriate road profiles for adoption in the final MVRN DCP based on all available information; and
- A determination of appropriate intersection treatments for adoption in the final MVRN DCP based on all available information.

1.3 Reference Documents

1.3.1 Planning Controls and Strategies

The Site lies within the Shoalhaven City Council (**Council**) Local Government Area (**Shoalhaven LGA**); key Council planning and strategic documents referenced in the preparation of this assessment include:

- The Shoalhaven DCP, with specific reference to the MVRN Draft DCP, the MVRS DCP and Chapter G11: Subdivision of Land (**Subdivision DCP**);
- The Shoalhaven LEP;
- Nowra-Bomaderry Structure Plan 2006 (**NBSP**); and
- Shoalhaven City Council Engineering Design Specifications (**Shoalhaven EDS**).

1.3.2 Background Reports

Numerous planning assessments have been prepared in relation to the MVRN URA; in this regard, this Transport Assessment references the following reports:

- Planning Proposal PP048: Shoalhaven Local Environmental Plan 2014 Moss Vale Road North Urban Release Area 2021, prepared by Council (**MVRN PP**);
- Moss Vale Road North Urban Release Area Traffic Study: Internal Traffic Analysis Report 2020, prepared by Bitzios Consulting (**MVRN ITS**);
- Moss Vale Road North Urban Release Area Traffic Study: External Traffic Analysis Report 2020, prepared by Bitzios Consulting; (**MVRN ETS**);
- Moss Vale Road North URA Transportation Analysis of Development Control Plan 2019, prepared by Stapleton Transportation & Planning (**MVRN TA**); and
- Bushfire Opportunities and Constraints Advice, Indicative Layout Plan, Moss Vale Road Urban Release Area 2021, prepared by eco logical (**MVRN Bushfire Report**).

1.3.3 Traffic, Transport and Road Design Guidelines

This TA also references general traffic, transport and road design guidelines, including:

- Guide to Traffic Generating Developments 2002, Roads & Traffic Authority (**RTA Guide**);
- Guide to Traffic Generating Developments – Updated Traffic Surveys 2013, Roads & Maritime (**RMS Guide**);
- Small Suburban Shopping Centre Data Report 2018, Bitzios Consulting on behalf of Roads & Maritime (**Shopping Centre Report**);
- Austroads Guide to Road Design Part 3: Geometric Design 2020 (**Austroads GRD3**);
- Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management 2020 (**Austroads GTM6**);
- Austroads Guide to Traffic Management Part 8: Local Street Management 2020 (**Austroads GTM8**);
- Development Design Specification D1: Geometric Road Design (Urban and Rural) 2018, AUS-SPEC (**AUS-SPEC D1**);
- AMCORD: A National Resource Document for Residential Development 1997, Commonwealth Government of Australia (**AMCORD**);
- Growth Areas Authority Victoria Engineering Design and Construction Manual for Subdivision in Growth Areas 2011, Victoria State Government (**VEDCM**);
- Street Design Manual: Walkable Neighbourhoods 2020, Queensland Government (**QSDM**);
- Western Australia Local Government Guidelines for Subdivisional Development 2017, Western Australia Government 2017 (**WAGSD**);
- South Australia Good Residential Design SA 1999, South Australian Government (**SGRD**);
- Roundabouts and Traffic Signals Guidelines for the Selection of Intersection Control 2015, WA Main Roads (**WA SIC Guidelines**);
- Development Control Plans (**DCPs**) prepared by the Department of Planning, Industry & Environment (**DPIE**) and sub-regional councils for low density residential precincts and key growth centre area across the Sydney metropolitan area; and
- PBP 2019.

1.4 Consultation

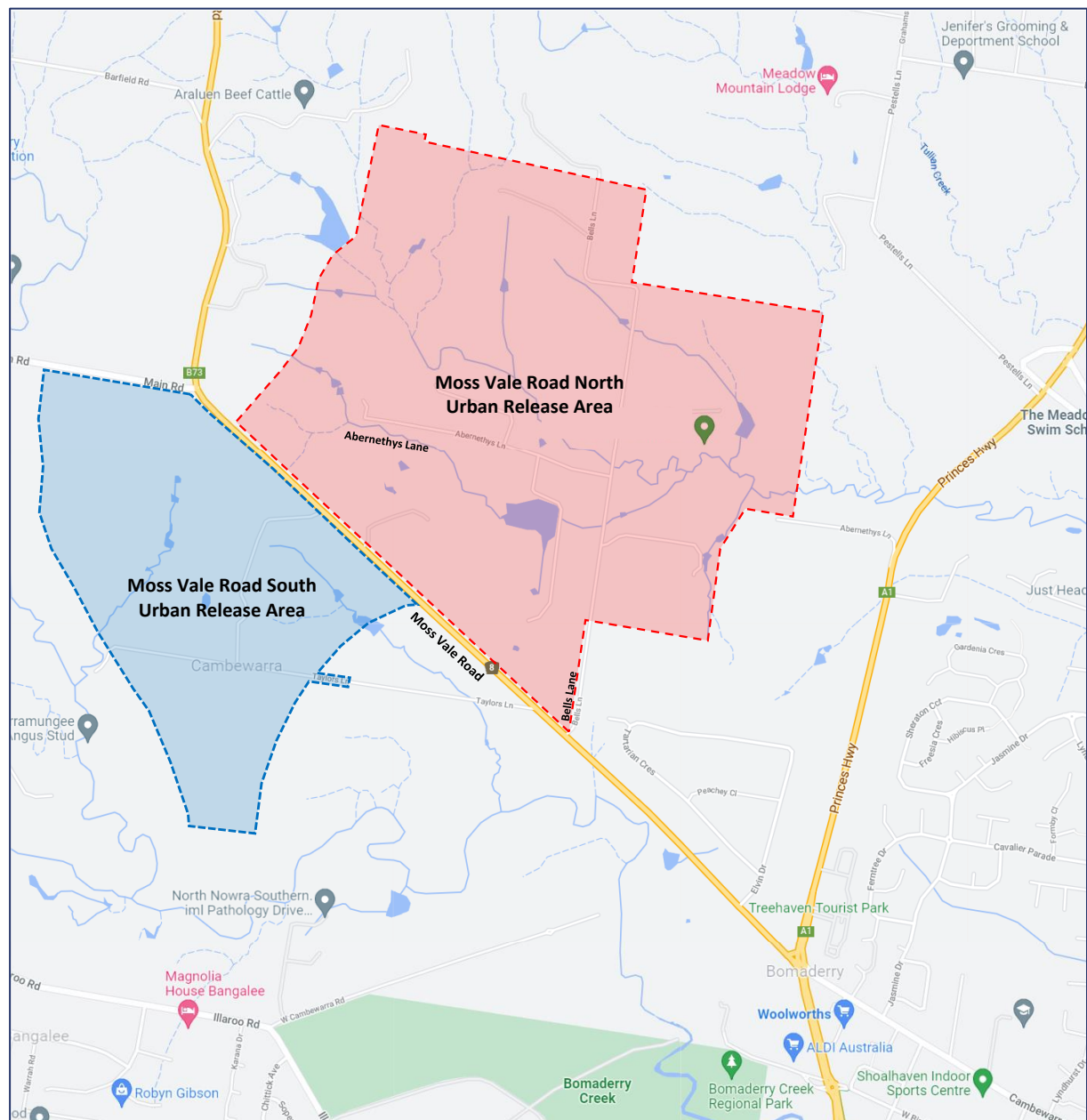
In preparing this TA, arc traffic + transport had the opportunity to discuss key issues with Council's Principal Transport Engineer, Mr Scott Wells, in February 2022; arc traffic + transport acknowledges the insights provided by Mr Wells in regard to the planning and underlying principles of development in the MVRN URA, insights which have greatly assisted in the preparation of this TA.

2 The Existing Site

2.1 Location

The MVRN URA is located on land north and east of Moss Vale Road, approximately 5km north-west of the Nowra CBD, and has an area of approximately 266 hectares. The MVRN URA and MVRN URA are shown in their local context in Figure 1, and their sub-regional context in Figure 2.

Figure 1: Site Location Local Context



Source: Google and Shoalhaven DCP

Figure 2: Site Location Sub-Regional Context



Source: Google and Shoalhaven DCP

2.2 Site Use

The Site is currently occupied by a small number of rural residential dwellings, with the majority of the land being rural pasture land and E2 Conservation Land (along the Abernethys Creek tributaries).

2.3 Site Access

The Site is currently accessed via residential driveways to Moss Vale Road, Bells Lane and Abernethys Lane.

3 Moss Vale Road North Urban Release Area

3.1 Overview

3.1.1 Concept Plan 2019

The MVRN URA was identified as a *New Living Area* in the NBSP adopted by Council in 2006 and endorsed by the NSW State Government in 2008. In 2019, the Moss Vale North Owners Group (**MVRNOG**) provided a submission (**Concept Plan 2019**) to Council proposing changes to the yields previously identified when the MVRN URA was in the early stages of planning, including an expanded MVRN URA footprint; a reduction in retail area; and the realignment of some riparian corridors based on updated technical studies.

Most importantly, Concept Plan 2019 also provided for an increase in the dwelling yield of the MVRN URA, from approximately 1,300 dwellings to between 2,500 and 3,000 dwellings.

3.1.2 MVRN URA PP

Concept Plan 2019, as well as a number of supporting documents relating to the key characteristics of the MVRN URA, were evaluated by Council and determined to align with the broader planning objectives for the MVRN URA, and in turn were largely adopted in the MVRN PP.

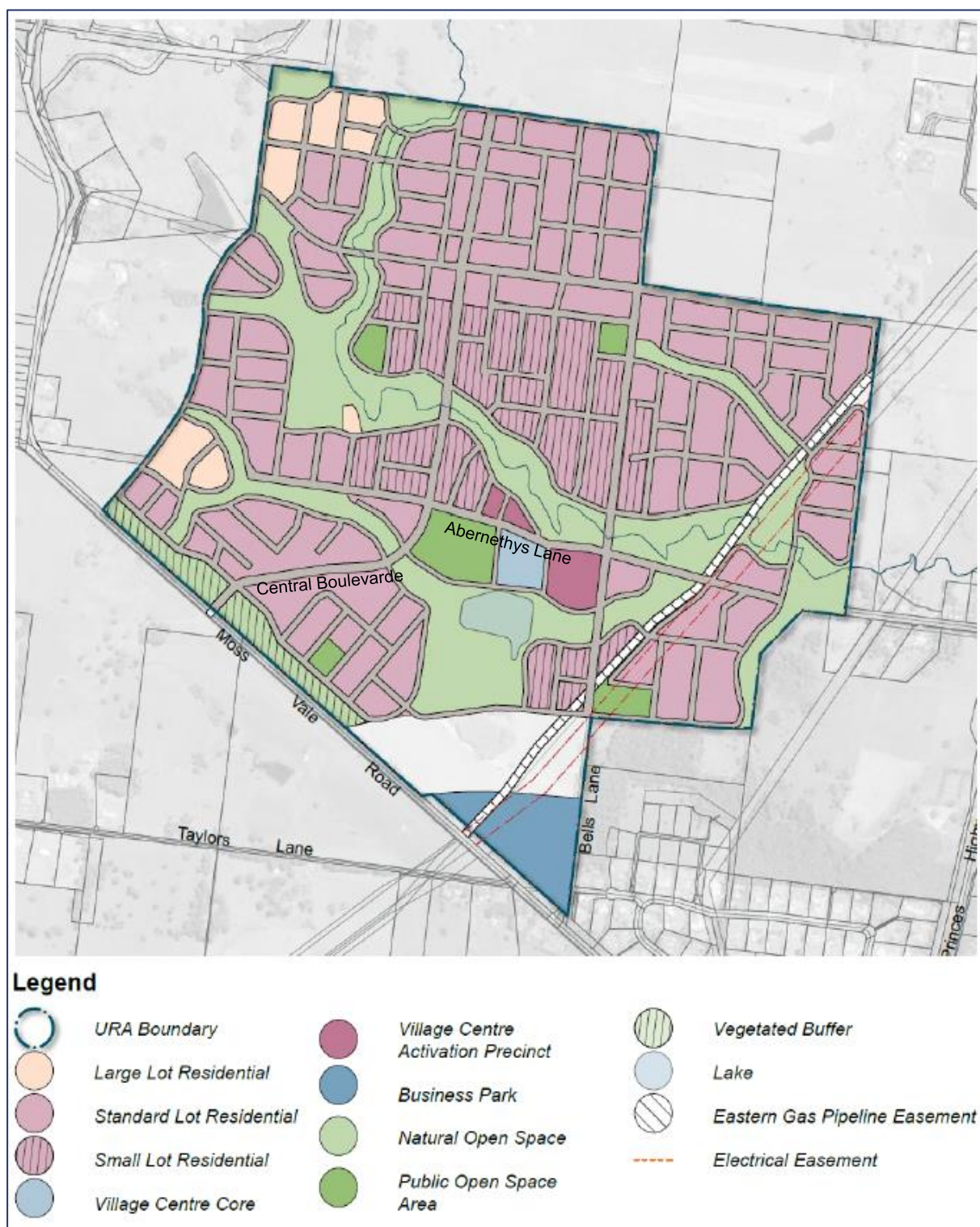
3.1.3 MVRN URA Draft DCP

Following the approval of the MVRN PP, Council commenced the preparation of the MVRN Draft DCP; the MVRN ILP is provided as Figure 3.2 of the MVRN Draft DCP, which is reproduced in Figure 3.

arc traffic + transport notes that the MVRN ILP – as well as other plans provided in the following sections - indicate a continuance of roads, bus and active transport infrastructure from the MVRN URA south across Moss Vale Road into the MVRS URA (and other future residential areas south of Moss Vale Road) at some future time.

In this regard, we note that Bells Lane would extend south to a connection to what has been termed in current planning documents as the *Far North Collector Road*, while the Central Boulevard would extend south to what has been termed the *MVRS URA Access Road*.

Figure 3: Moss Vale Road North Urban Release Area Indicative Layout Plan



Source: MVRN Draft DCP

3.2 Development Yields

Based on current information, the MVRN URA is anticipated to provide a total of approximately 2,515 residential dwellings, including high, medium and low density dwellings and a small number of larger rural residential lots. A total of approximately 1,600m² NLA of retail floorspace will also be provided in the Retail Centre south-west of the intersection of Bells Lane & Abernethys Lane.

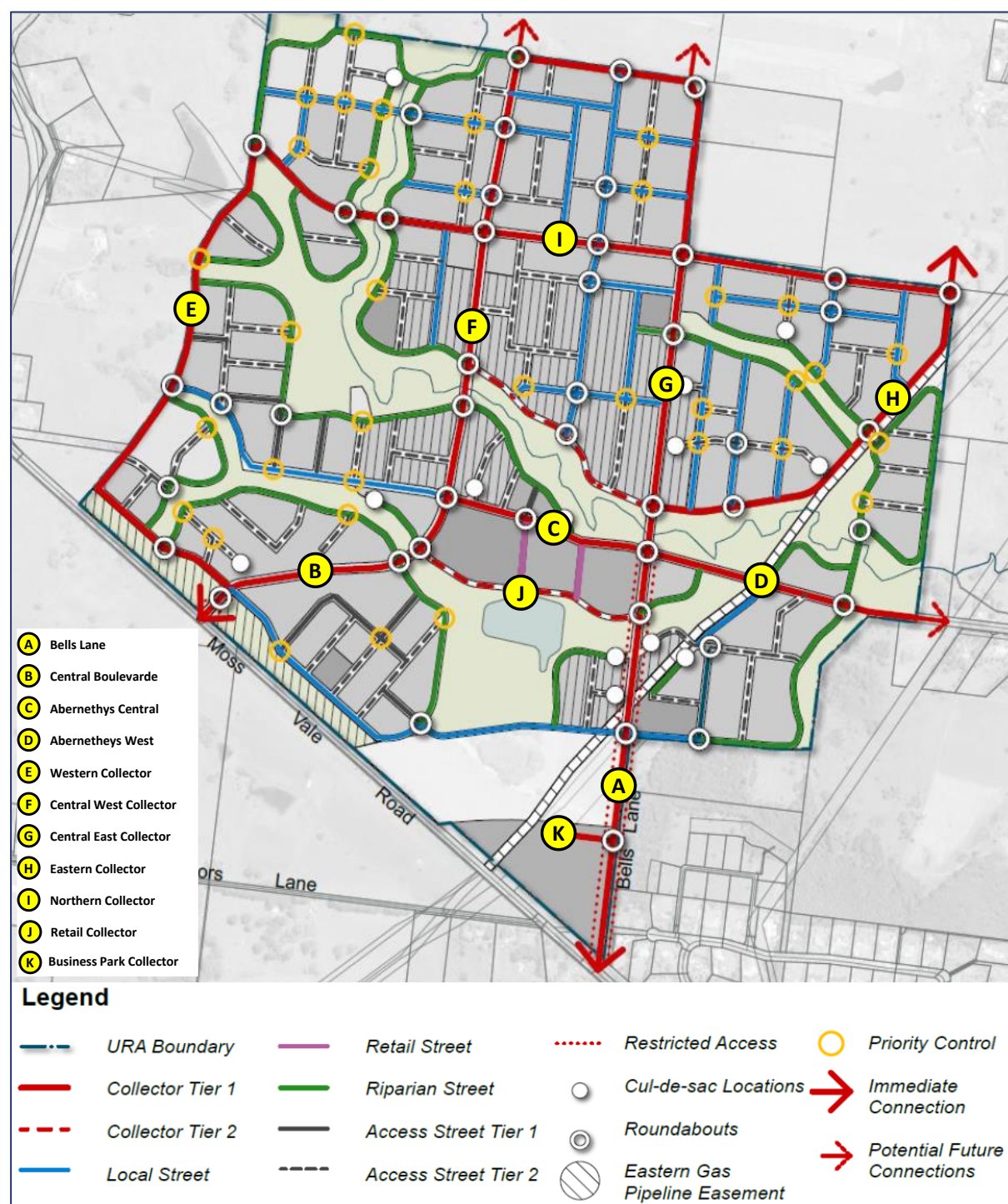
The MVRN ILP also indicates the development of a Business Park north-west of the intersection of Moss Vale Road & Bells Lane; however, the development of the Business Park is anticipated to be one of the final stages of development within the MVRN URA, at some time after 2041. Given some uncertainty in regard to the development of the Business Park, its traffic characteristics were not considered in the traffic reports which informed the MVRN Draft DCP, and moreover the trip generation by the Business Park would overwhelmingly be to/from Moss Vale Road, and as such would not be significantly relevant to the assessment of the internal road network provided in this TA.

3.3 General Transport Networks

3.3.1 MVRN Draft DCP Road Hierarchy

The *Street Hierarchy and Network Plan* for the MVRN URA (**MVRN SHNP**) is provided as Figure 7 of the MVRN Draft DCP, and is reproduced below, noting that **arc traffic + transport** has named a number of key roads for ease of reference in later sections of this Transport Assessment.

Figure 4: MVRN Draft DCP Street Hierarchy and Network Plan



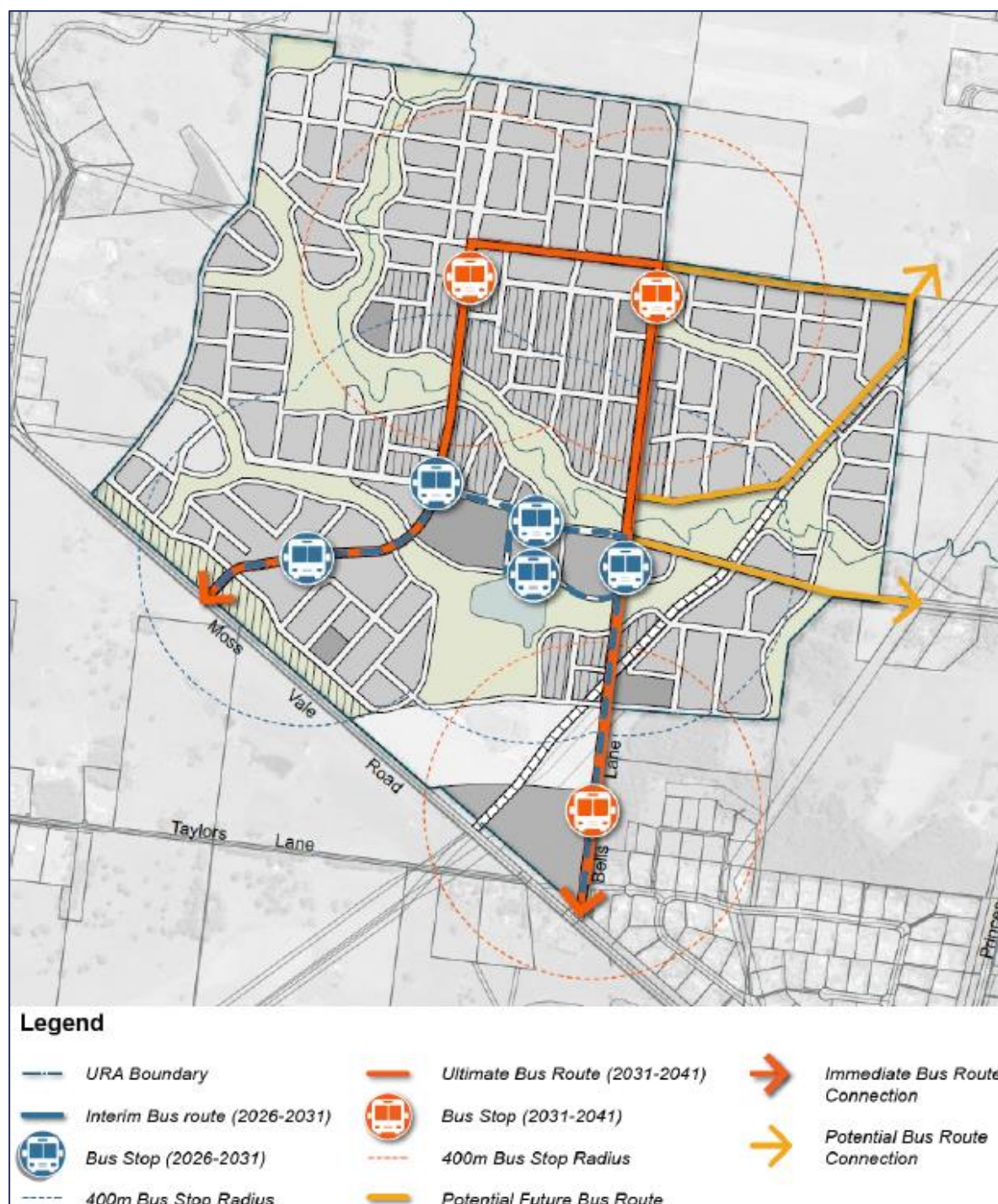
Source: MVRN Draft DCP and arc traffic + transport

A more detailed assessment of the street hierarchy and broader road network identified in the MVRN Draft DCP is provided in Section 4.

3.3.2 Public Transport Network

At this time, it is anticipated that bus services will operate along the primary Collector Road network, as well as providing access to the Retail Centre. An *Indicative Interim and Ultimate Public Transport Routes* plan (**MVRN Bus Plan**) is provided as Figure 8 of the MVRN Draft DCP, and is reproduced below.

Figure 5: Indicative Interim and Ultimate Public Transport Routes Plan



Source: MVRN Draft DCP

Section 6 of the MVRs DCP states the following in regard to bus capable roads:

The defined street hierarchy is determined by the placement and design of road types and achievement of the intended function. The street hierarchy is important to enable an accessible and connected movement network that integrates walking, cycling and public transport routes that are safe and convenient. The street types include:

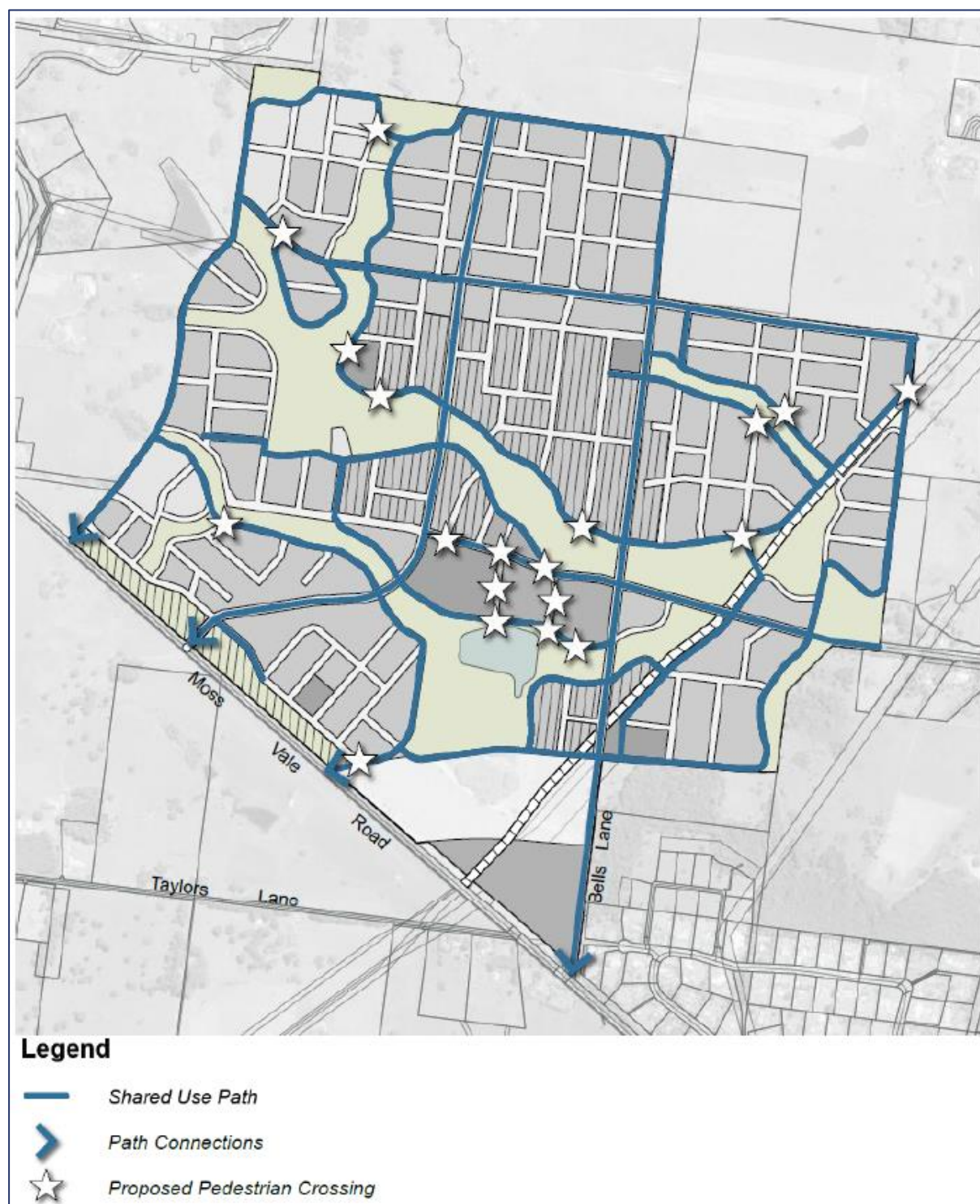
a. Collector Road – provides an attractive entry and loop around the URA which will facilitate the provision for a future public transport route. All dwellings within the URA are approximately 400m walking distance from the Collector Road.

Importantly, the Collector Road profiles adopted in the Concept Plans will provide the same level of bus capability as adopted by Council for the MVRs URA.

3.3.3 Active Transport

A Shared Use Pathway plan (**MVRN Active Plan**) is provided as Figure 18 of the MVRN Draft DCP, and is reproduced below.

Figure 6: Shared Use Pathway Plan



Source: MVRN Draft DCP

With reference to the MVRN Draft DCP road profiles, shared paths would be provided in Collector Roads, Local Streets and Retail Streets; shared paths would also be provided across the open space network, generally adjacent to Riparian Streets but not necessarily within the Riparian Street road reserve, as permitted with reference to Section 8.5.2.2. of the MVRN Draft DCP, which states that:

Where roads are adjacent to a public open space area, the verge widths may be reduced to a minimum of 1.5m subject to adequate provision of footpaths, utilities, fencing, required Asset Protection Zones or buffers to riparian corridors.

The design of all road profiles detailed in the MVRN Draft DCP are examined in detail in [Section 5](#).

3.4 Traffic

3.4.1 TRACKS Traffic Modelling

The broader trip generation of the MVRN URA was determined referencing TRACKS, Council's strategic land use model that simulates traffic conditions in the road network and allows the forecasting of changes to traffic volumes and distribution patterns resulting from, for example, road network upgrades or the introduction of new traffic generating development.

In association with Council, Bitzios prepared a TRACKS model that is referenced in both the MVRN ETS and MVRN ITS, and reflects all known land use developments and road network changes across the Shoalhaven LGA. The TRACKS model prepared by Bitzios also provided for the introduction of a significant number of new zones within the MVRN URA itself to allow for a more detailed assessment of internal road network operations; and new connections to adjacent residential precincts by 2041. Very significantly, the potential trip generation of these adjacent residential precincts to/through the MVRN URA road network is included in the TRACKS modelling.

3.4.2 Trip Generation

The trip rates adopted in the TRACKS model are reported in Figure 3.1 of the MVRN ETS, with the following note:

Trips have been separated into those that have destinations that are internal and external to the development. Development trip rates have also been calculated using both the base do0minimum [sic] network and the future infrastructure network so as to see how trip making behaviour may change with increased network capacity. Table 3-1 details the modelled trip rates for each model year from 2026-2041 and for both the AAST and 100th HH periods separately.

Table 3.1 of the MVRN ETS is reproduced below.

Table 1: TRACKS Model Trip Rates

Year	Period	Hour	Base Do-minimum Network			Future Infrastructure Network		
			External	Internal	Total	External	Internal	Total
2026	AAST	AMP	0.73	0.03	0.77	0.74	0.03	0.77
		PMP	0.73	0.03	0.76	0.74	0.03	0.77
	100 th HH	AMP	0.68	0.03	0.71	0.68	0.02	0.71
		PMP	0.85	0.04	0.89	0.87	0.03	0.90
2031	AAST	AMP	0.64	0.06	0.70	0.66	0.05	0.70
		PMP	0.64	0.05	0.70	0.66	0.05	0.70
	100 th HH	AMP	0.60	0.05	0.65	0.61	0.04	0.65
		PMP	0.73	0.07	0.80	0.76	0.02	0.82
2036	AAST	AMP	0.62	0.08	0.70	0.64	0.06	0.71
		PMP	0.62	0.08	0.70	0.64	0.06	0.71
	100 th HH	AMP	0.58	0.07	0.65	0.60	0.06	0.66
		PMP	0.69	0.10	0.79	0.75	0.08	0.83
2041	AAST	AMP	0.60	0.08	0.68	0.65	0.06	0.71
		PMP	0.60	0.07	0.67	0.66	0.05	0.71
	100 th HH	AMP	0.57	0.07	0.64	0.61	0.05	0.66
		PMP	0.66	0.11	0.77	0.76	0.06	0.82

Source: MVRN ETS

With reference Table 1, AAST stands for *Average Annual School Time* traffic volumes, and 100th HH stands for *100th Highest Hourly* traffic volumes; AAST represents average volumes on a school day, while 100th HH generally represents traffic volumes during holiday periods, noting that key roads across the Shoalhaven – including Moss Vale Road and Princes Highway - are particularly susceptible to higher volumes during holiday periods, and in turn can affect the distribution of trips across a broader sub-region, including those generated by the MVRN URA.

With regard to the trip rates themselves, Table 1 indicates a general reduction in trip rates over time; it is expected that this reduction results from more public and active transport trips, and the internalisation of trips, being generated as the MVRN URA develops.

3.5 Future Intersection Operations

3.5.1 Collector Road Roundabout Intersections

Further to the TRACKS model distribution of trips to the external and internal road network, the MVRN ITS provides a detailed assessment of the operation of the key intersections within the MVRN URA using the SIDRA intersection model. All of these key intersections have been designated as roundabouts, and modelled with a single lane on each approach and single circulation lane, noting that the width of the centre island was increased only at Collector Road roundabouts, though this has little bearing on the SIDRA analysis.

Based on the SIDRA analysis, the MVRN ITS reports that all Collector Road roundabouts operate *within acceptable limits of DOS [Degree of Saturation], delay times and LOS [Level of Service] outcomes for both AM and PM peak periods of 2041 AAST*. With reference to the more detailed SIDRA outputs for the Collector Road roundabout intersections provided in Appendix B of the MVRN ITS:

- All intersections operate at LOS A, indicating very minimal delays to all vehicles; and
- A maximum DOS of 0.58 is reported at the intersection of Bells Lane & Business Park Collector, which indicates that all intersections have more than appropriate capacity to accommodate 2041 traffic volumes.

3.5.2 Local Road Roundabout Intersections

The MVRN ITS also provides SIDRA analysis of numerous roundabout intersections of Collector Roads & Local Streets, and Local Streets & Local Streets. Further to SIDRA analysis, the MVRN ITS reports that all of these roundabouts operate *within acceptable limits of DOS, delay times and LOS outcomes for both AM and PM peak periods of 2041 AAST*. With reference to the more detailed SIDRA outputs for the local road roundabouts provided in Appendix B of the MVRN ITS:

- All intersections operate at LOS A, indicating very minimal delays to all vehicles; and
- A maximum DOS of 0.51 is reported at the intersection of Pestells Lane & Northern Collector & Eastern Collector, which indicates that all intersections have more than appropriate capacity to accommodate 2041 traffic volumes.

Further to the above, the majority of local roundabouts (being either Collector Roads & Local Streets, or Local Streets & Local Streets) operate with a DOS of less than 0.20 and virtually no delay, indicating that they are operating significantly below their capacity. Moreover, the minor approach volumes at these roundabouts are very minimal compared to the volumes on the major approaches. This in turn raises the question of whether roundabouts – which have a significant land footprint and road pavement area, and are not favoured for active transport crossings – are the most appropriate type of intersection in the local road network.

This issue is discussed further in [Section 4.4](#).

3.5.3 SIDRA Modelling & Road Profiles

In the context of this assessment, it is important to note that the SIDRA modelling does not consider the capacity of the key approaches to these Collector Road roundabouts based on their width, i.e. there would be no difference between the reported operation of these intersections if the approach road profiles adopted in the Concept Plans were used in the SIDRA modelling rather than the MVRN Draft DCP road profiles as the actual lane widths are generally unchanged.

4 Road Network Review

4.1 Overview

As discussed in the [Introduction](#), this Transport Assessment provides a critical review of the road profiles adopted in the MVRN Draft DCP. In determining appropriate road profiles, a key consideration is the amount of traffic that will be generated to each road; while there are certainly other road network considerations, including APZs, efficiency, amenity, safety and sustainability considerations, traffic volumes generally underpin the choice of a road profile.

This section provides a review of the traffic modelling provided in the MVRN ITS, and specifically examines future traffic volumes in key roads so as to determine whether the road profiles adopted in the MVRN Draft DCP are appropriate, or whether the alternative road profiles adopted in the Concept Plans are supportable.

In preparing the analysis below, [arc traffic + transport](#) has focused on the maximum future traffic volumes anticipated to be generated across the MVRN URA, i.e. the 2041 forecast volumes as detailed in the MVRN ITS.

4.2 Traffic Volumes

4.2.1 AADT Volumes

To determine future traffic volumes, [arc traffic + transport](#) has referenced the SIDRA outputs provided in Appendix A of the MVRN ITS for the forecast year 2041, i.e. with all external traffic generation connections. [Figure 7](#) provides a summary of the forecast Average Annual Daily Traffic (**AADT**) volumes in key roads across the MVRN URA.

With reference to our past work on small retail developments in new residential areas, the Retail Centre is anticipated to attract very few trips from the external road network, i.e. almost all trips would be generated within the MVRN URA, or as part of a shared trip (i.e. a commuter stopping at the Retail Centre on their way to/from work). A high proportion of trips are also anticipated to be public and particularly active transport trips given the excellent pedestrian and cycle connectivity across the MVRN URA.

Referencing trip rates adopted by [arc traffic + transport](#) for neighbourhood centres and villages in Gledswood Hills, Wagga Wagga, Dubbo and Spring Farm, it is anticipated that the Retail Centre would generate approximately 5 vehicle trips per hour (**vph**) and 10vph per 100m² NLA in the AM and PM peak periods respectively; in turn, it is estimated that the Retail Centre (1,600m² NLA) could generate:

- 64vph in the AM peak;
- 160vph in the PM peak; and
- Approximately 1,500vpd.

It is noted that the retail and neighbourhood centres recently assessed by [arc traffic + transport](#) generally included a small supermarket, general retail and food and beverage floorspace. Depending on the final land use mix in the Retail Centre, the estimated peak period and daily traffic volumes above may be higher or lower, but are not expected to be significantly different to these estimates.

Further to the above, the AADT volumes in the roads to the south and west of the Retail Centre would in turn be higher than reported in the MVRN ITS, but as discussed, the majority of trips would be local or part of a shared trip, and as such not significantly increase traffic volumes at adjacent intersections.

4.3 Road Hierarchy

4.3.1 Collector Roads

With reference to [Figure 7](#), the majority of Collector Roads across the MVRN URA will accommodate significantly lower volumes than the control volumes for Collector Road as detailed in the MVRN ITS (per [Table 4](#)) particularly in the northern and north-west parts of the MVRN URA.

Bells Lane between Northern Collector and Moss Vale Road is the only road with volumes greater than 5,000vpd, peaking at approximately 10,700vpd immediately north of Moss Vale Road, and at approximately 9,000vpd between Abernethys Central and Northern Collector.

These peak Collector Road volumes represent approximately 60% of the Tier 2 Collector Road control volume (per [Table 4](#)), and likely well less than 50% of the Tier 1 Collector Road volume.

Other than Central Boulevard, which has a traffic volume of 5,900vpd immediately north of Moss Vale Road, all other Collector Roads have traffic volumes of less 5,000vpd, which represents only 25% of the Tier 2 Collector Road control volumes (per [Table 4](#)).

Based on our discussions with Council, the Collector Road profiles in the MVRN Draft DCP specifically consider the potential for high traffic volumes to be generated to the Collector Road network further to connections being provided to other urban release areas to the north, south and east of the Site, and particularly Pestells Lane.

However, even based on these connections being in place in 2041, the traffic volumes across the Collector Road network are significantly less than their theoretical capacity; indeed, with only a handful of exceptions, the majority of Collector Roads through the northern, central and western parts of the MVRN URA have traffic volumes that are less than the Local Street control volume of 3,500vpd as detailed in the MVRN ITS (per Table 4).

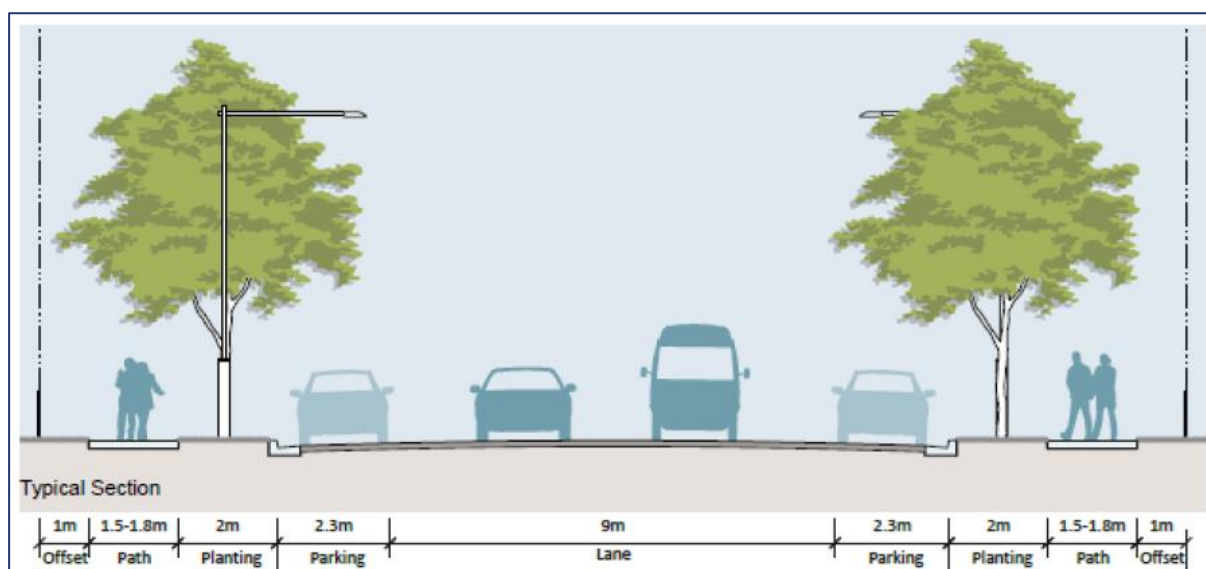
In turn, it is clear that there is significant justification for consideration of the Collector Road profiles adopted in the Concept Plans from a traffic capacity perspective.

4.3.2 Retail Streets and Local Streets

With reference to Figure 7 and Section 4.2.2, the Retail Streets providing access to the Retail Centre will accommodate very moderate AADT and peak hour traffic volumes (even further to the likely increases identified in Section 4.2.2), noting that these road will not provide direct access to adjacent residential areas, and as such there would be little traffic in these roads other than the retail traffic.

In addition, and as with the Collector Road profile discussed in Section 4.3.1, the Local Street and Retail Street profile in the MVRN Draft DCP appears to provide significantly more traffic carrying capacity than required; this profile is provided as Figure 12 of the MVRN Draft DCP, and is reproduced below.

Figure 8: MVRN Draft DCP Local & Retail Street Profile



Source: MVRN Draft DCP

As discussed with Council, the Local Street and Retail Street profile does not appear to reflect any current road design guidelines, and particularly the provision of a 9.0m carriageway for two-way traffic; **arc traffic + transport** is not aware of why this carriageway width is proposed, and indeed notes the potential that 3.5m traffic lanes have been misrepresented as 4.5m traffic lanes; regardless, there appears to be no justification for traffic lanes with this width from a traffic perspective (or general design perspective).

Further to the above, the MVRN SHNP indicates a requirement for the Local Street profile to be used in a number of small residential precincts across the MVRN URA; however, many of these Local Streets have traffic volumes of less than 500vpd, i.e. a traffic volume that – with reference to [Table 4](#) – would classify them as Tier 1 or Tier 2 Access Streets (control volume 350vpd – 750vpd). Indeed, the AADT volumes in these roads would represent less than 20% of the control volume for Local Streets (per [Table 4](#)).

4.3.3 Access Streets

With reference to [Figure 7](#), all Access Streets where SIDRA output data is available have traffic volumes of less than 500vpd, and our assessment of the potential trip generation of Access Streets where SIDRA is not available indicates similar findings based on the number of dwelling being served and the trip rates identified in the MVRN ETS (per [Table 1](#)).

It is noted that the traffic carrying capacity of a Tier 1 Access Street (350vpd – 750vpd) is higher as it provides dedicated parking lanes, while the Tier 2 Access Street (less than 350vpd) does not provide a width for two-way traffic and on-street parking, potentially resulting in two-way traffic using a single traffic lane where on-street parking occurs.

Notwithstanding, the width of the Access Street profiles is the same, with the Tier 1 Access Street parking lane width being used for wider footpaths on both sides of the Tier 2 Access Street.

4.3.4 Riparian Streets

With reference to [Figure 7](#), all Riparian Streets where SIDRA output data is available have traffic volumes of less than 500vpd. However, the Riparian Street profile in the MVRN Draft DCP is actually wider than the Access Street profiles at 17.0m, and includes two traffic lanes and a parking lane, and a 2.5m path (nominally a shared path) within the road reserve.

While this design – and specifically the location of the shared path and verge width – is discussed further in [Section 5](#), it is noted that the Riparian Street has a control volume of up to 3,500vpd, and as such the traffic volumes identified in the Riparian Streets represents less than 20% of their capacity. In addition, the Riparian Street profile provides no additional traffic carrying capacity when compared to the Tier 1 Access Street (i.e. unobstructed two-way traffic) yet is identified as having 500% more capacity than a Tier 1 Access Street.

4.3.5 Laneways

Traffic volumes in Laneways and Rear Laneways are anticipated to be very minor; with reference to the Concept Plans, it is anticipated that Laneways will be provided in the Retail Centre, while Rear Laneways would be provided in residential sub-precincts providing for medium and higher density residential development.

4.3.6 Road Hierarchy Summary

With reference to sections above, the 2041 forecast traffic volumes across the MVRN URA road network are significantly lower than the carrying capacity of all roads in the road hierarchy detailed in the MVRN ITS and MVRN Draft DCP.

4.4 Intersections

4.4.1 Overview

As discussed, the MVRN Draft DCP identifies the use of roundabout treatments as the primary traffic control device at intersections across the MVRN URA.

Roundabouts serve a dual purpose, being an efficient means of providing for all turning movements at [what are general low volume] intersections, but they also improve road safety by reducing vehicle speeds. Conversely, roundabouts – and particularly roundabouts of Local Streets – often provide no pedestrian crossings, and also significantly increase the road pavement area which is contrary to sustainable planning practice.

Sections below provide an assessment of the use of roundabouts as opposed to priority control intersections.

4.4.2 Intersection Control Selection

Table 3.6 of GTM6 provides guidance in regard to the most appropriate intersection treatments in a new residential road network, and is reproduced below in [Table 2](#).

Table 2: Austroads GTM Part 6 Suitability of Intersection Type to Location

Road type	Primary arterial	Secondary arterial	Collector and local crossing road	Local street
Roundabouts				
Primary arterial	A	A	X	X
Secondary arterial	A	A	A	X
Collector & local crossing road	X	A	A	O
Local street	X	X	O	O
Traffic signals				
Primary arterial	O	O	O	X
Secondary arterial	O	O	O	X
Collector & local crossing road	O	O	X	X
Local street	X	X	X	X
Stop signs or give way signs				
Primary arterial urban/(rural)	X/(X)	X/(O)	A	A
Secondary arterial urban/(rural)	X/(O)	X/(O)	A	A
Collector & local crossing road	A	A	A	A
Local street	A	A	A	A

A = Most likely to be an appropriate treatment
O = May be an appropriate treatment
X = Usually an inappropriate treatment.

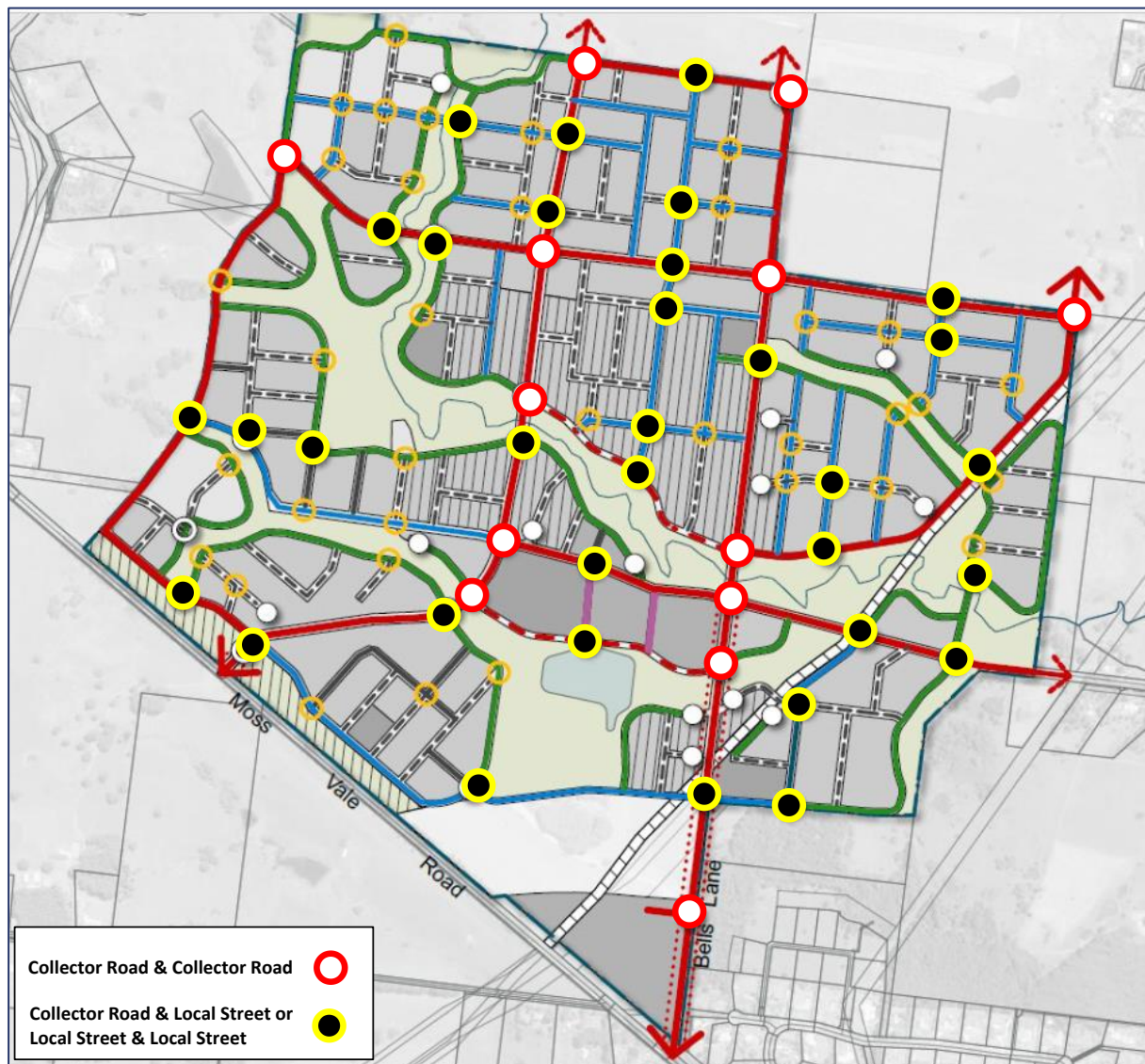
Source: GTM Part 6

With reference to Table 2, GTM 6 indicates that roundabouts are *most likely to be an appropriate treatment* at the intersection of Collector Roads, and *may be an appropriate treatment* at the intersection of Collector Roads & Local Streets, and Local Streets & Local Streets. **arc traffic + transport** notes that a Local Street as described in GTM 6 would include a Local Street, Access Street and Riparian Street as per the MVRN Draft DCP road profiles.

Moreover though, while roundabouts are considered to potentially be an appropriate treatment for the intersections of lower order roads, GTM 6 confirms that the most appropriate treatment for Collector Road & Local Street intersections, and Local Street & Local Street intersections is a priority (Stop or Give Way) intersection.

Roundabout intersections of Collector Roads & Local Streets, and of Local Streets & Local Streets, as currently detailed in the MVRN SHNP are shown in Figure 9.

Figure 9: MVRN URA Roundabout Intersections



Source: MVRN ITS and arc traffic + transport

4.4.3 Low Volume Roundabouts

Table 3.5 of GTM 6 also references some of the other considerations when determining whether roundabouts are appropriate at local intersections, noting the following:

Roundabouts

- Can be used at a wide range of sites and improve safety by simplifying conflicts, reducing speeds and providing clear indication of priority.
- Are useful where there is a high proportion of right-turning traffic.
- Perform best when traffic flows are balanced.
- Cyclists (especially when turning right) find it more difficult and uncomfortable to negotiate multilane roundabouts. An off-road facility may be required for cyclists in some cases.

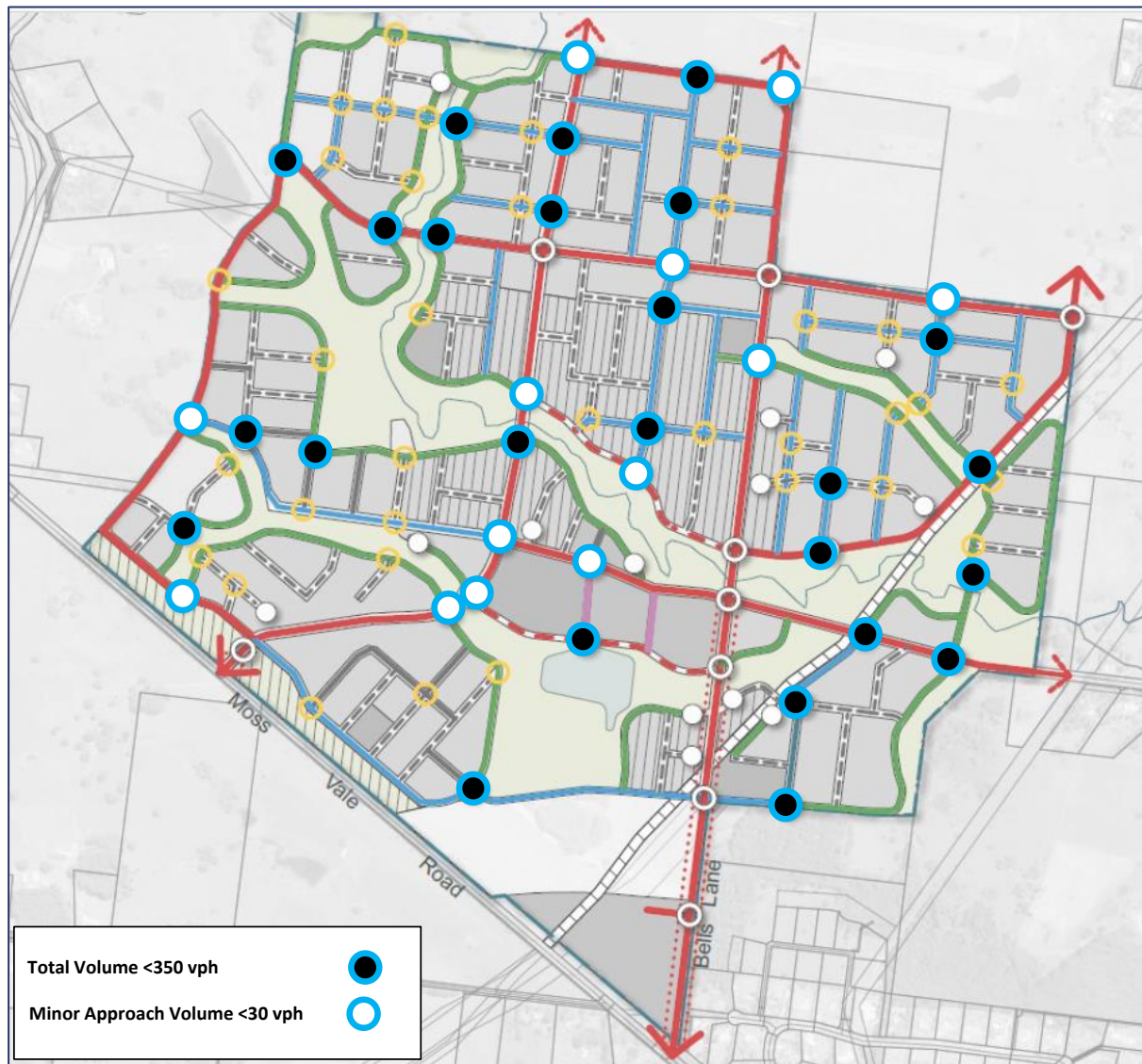
- *Single lane roundabouts may be useful as a local area traffic management device (i.e. reducing vehicle speeds) but suitable pedestrian treatments are likely to be required to offset the loss of pedestrian priority, such as wombat crossings.*

These sentiments were more recently expressed in a technical paper prepared by Dr Rahmi Akçelik, the creator of SIDRA, who stated that:

An intersection with highly unbalanced traffic flows (that is, a very high traffic volume on the main street and very light traffic on the side street) may not be an ideal candidate for a roundabout.

Further to the above, the actual traffic volumes at the majority of the intersections of Collector Roads & Local Streets are very moderate, and have very unbalanced traffic flows; this is (with reference to the MVRN ITS SIDRA outputs) the same at essentially all of the Local Street roundabouts. [Figure 10](#) shows those roundabouts where the total traffic volume at the intersection is less than 350vph, or where the minor approach volume is less than 30vph (i.e. 1 vehicle every 2 minutes).

Figure 10: Low Volume Roundabouts



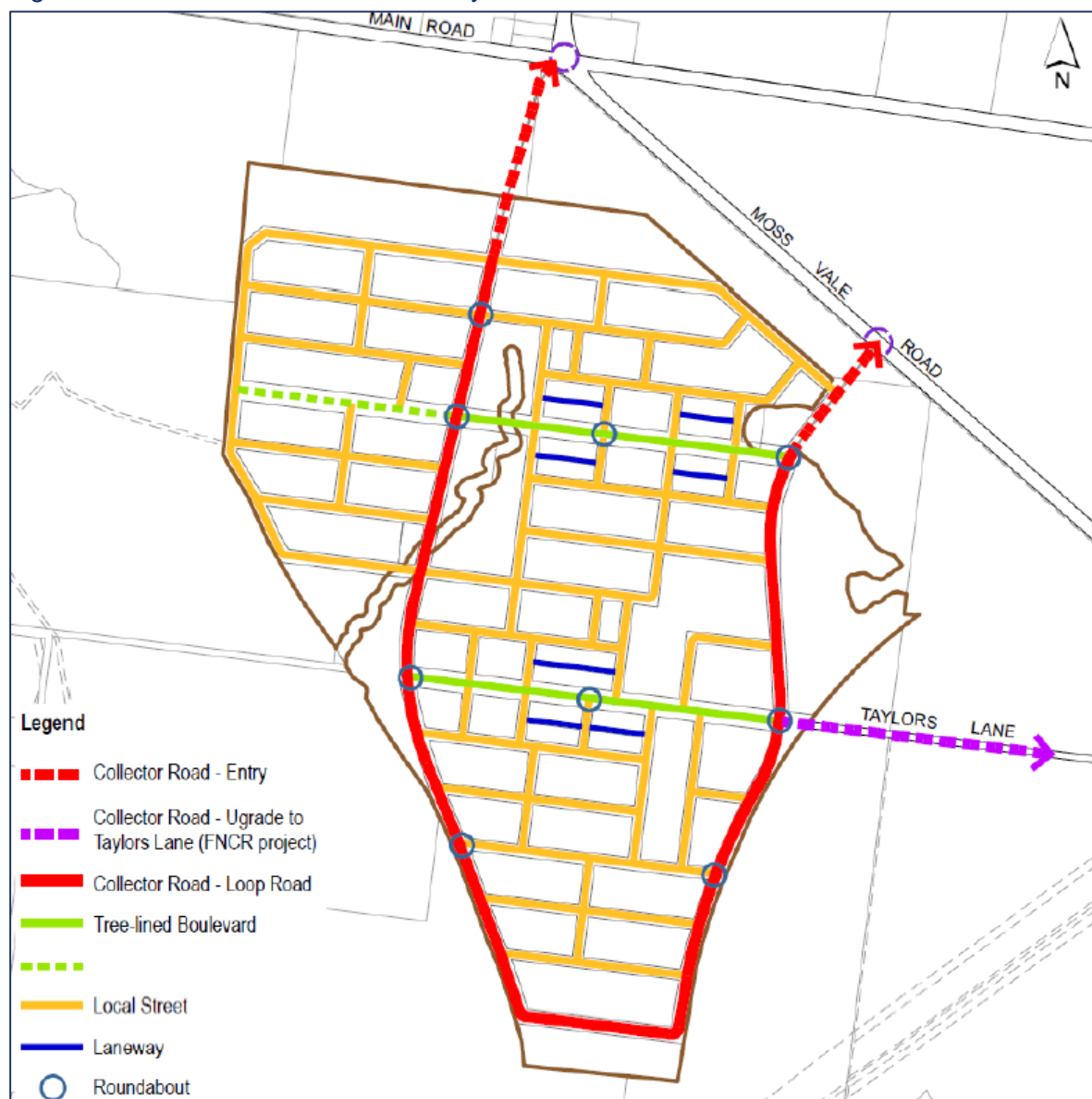
Source: MVRN ITS and arc traffic + transport

4.4.4 MVRN URA Intersection Control Selection

With reference to sections above, it is the opinion of arc traffic + transport that a large number of local intersections across the MVRN URA could be provided as priority intersections rather than roundabouts. As discussed, roundabouts do play a role in reducing speed, but the majority of these local road roundabouts have traffic volumes that simply do not warrant this higher order treatment that is unfavourable to pedestrians, and moreover requires an unsustainable area of road surface.

These factors appear to have been considered in the MVRN DCP, which provides roundabouts at the key Collector Road intersections, but then only at a small number of internal intersections, as show in the Street Hierarchy & Network Plan provided as Figure 9 of the MVRN DCP, which is reproduced below.

Figure 11: MVRs DCP Street Hierarchy and Network Plan



Source: MVRs DCP

With reference to Figure 11, roundabouts along the Collector Roads are generally spaced more than 300m apart (other than in the vicinity of the core east-west Boulevard) and there are few roundabouts within the internal (local road) network. Moreover, the spacing on the Collector Road roundabouts appears to have considered the potential for speeding along what are long stretches of relatively straight road, rather than providing roundabouts at the intersections of Collector Roads and local crossing roads.

This is not the case in the MVRN Draft DCP road network, where almost every local road, whether it be a crossing road or single approach, is provided with a roundabout.

Certainly, the positioning of roundabouts in the MVRN Draft DCP road network may to some extent consider the need for speed management along Collector Roads, but the provision of roundabouts at almost every Collector Road & Local Street intersection, and at Local Street intersections, is simply not warranted from a road safety (or, as discussed, traffic carrying) perspective.

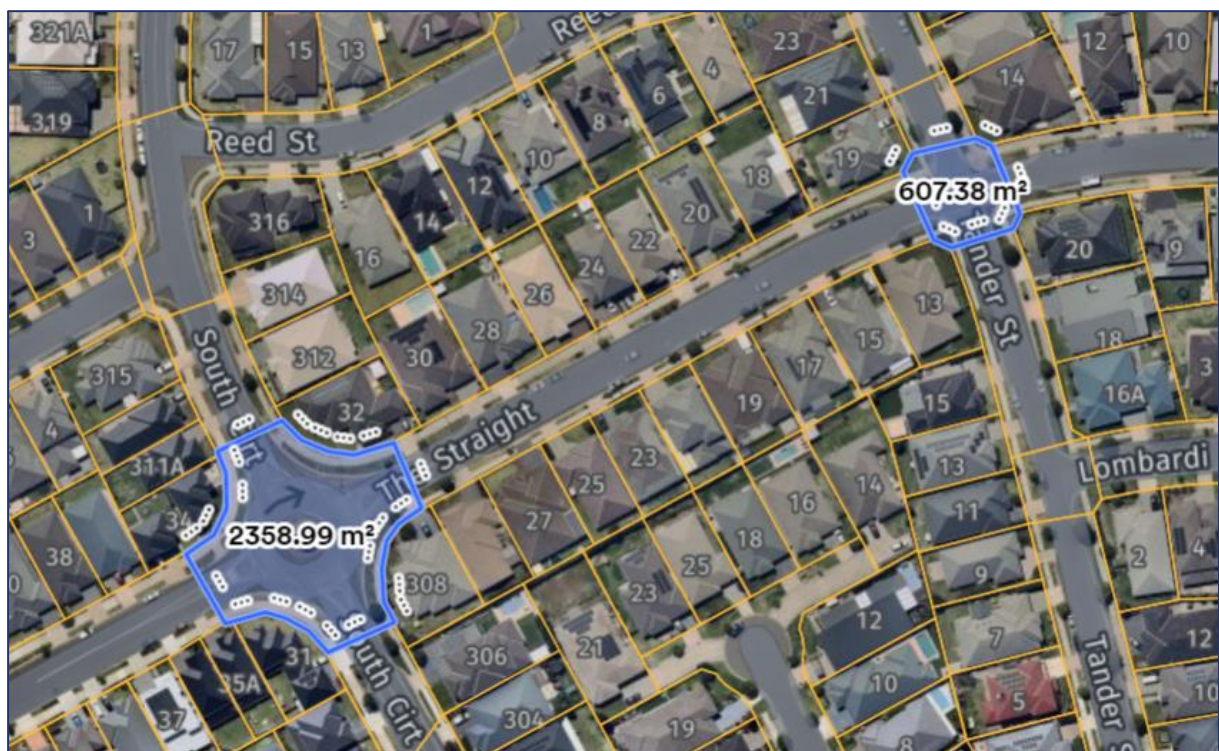
4.4.5 Environmental Sustainability

While often overlooked, the footprint of a roundabout is significantly greater than a simple priority intersection, and as such it is not an environmentally sustainable planning outcome when roundabouts are used so frequently.

As a means of comparison, arc traffic + transport has assessed the general area and road pavement requirements for adjacent single lane roundabout and priority intersections recently constructed along The Straight in Oran Park; The Straight has a Collector Road profile and the minor road a Local Street profile.

The total area required for the roundabout and priority intersection, and the road surface area of the roundabout and the priority intersection, are shown in the figures below.

Figure 12: Oran Park Intersections Total Area Footprint



Source: Nearmap and arc traffic + transport

Figure 13: Oran Park Intersection Pavement Footprint



Source: Nearmap and arc traffic + transport

With reference to the figures above, the total area required to provide the roundabout treatment is approximately 2,360m², almost 4 times the area of a priority intersection (approximately 610m²). When considering the pavement only, the roundabout treatment requires approximately 1,500m² of road surface, more than 4 times the area of the priority intersection (approximately 340m²).

Viewed another way, and with reference to the revision of intersections controls recommended by arc traffic + transport in Section 4.4.7, approximately 16 of the MVRN URA intersections currently designated as roundabouts could instead be provided as priority intersections; the reduction in road surface area resulting from such would be some 35,500m², or the equivalent of 7 football fields of road surface.

Clearly, there are significant environmental benefits arising from a reduction in the number of roundabouts in the MVRN URA road network.

4.4.6 Best Practice

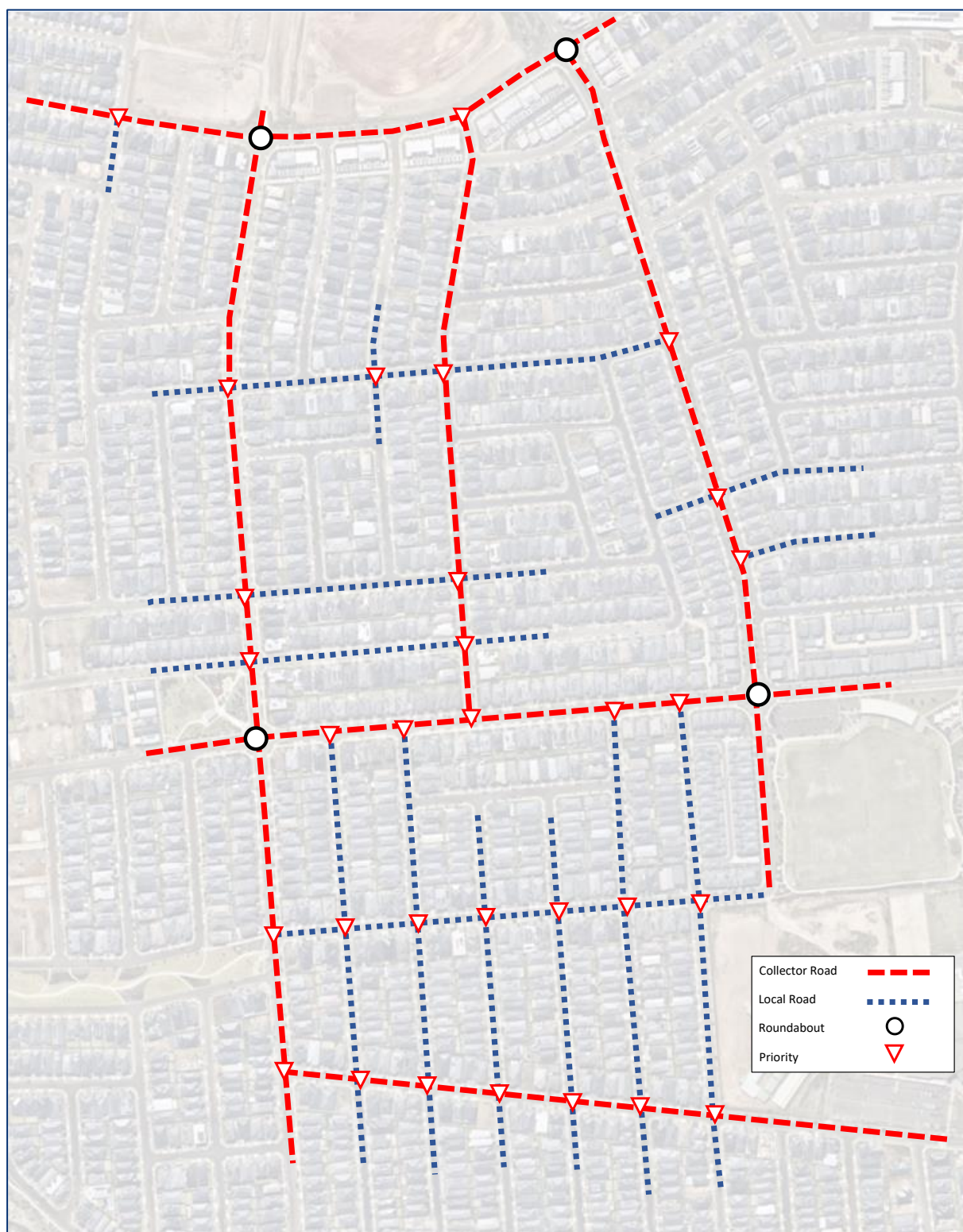
Finally, based on our review of numerous new residential road networks, there are few instances where roundabouts are provided at the intersections of Collector Roads & Local Streets, or at Local Street intersections, to the extent proposed in the MVRN Draft DCP.

Figure 15: Residential Road Network Oran Park



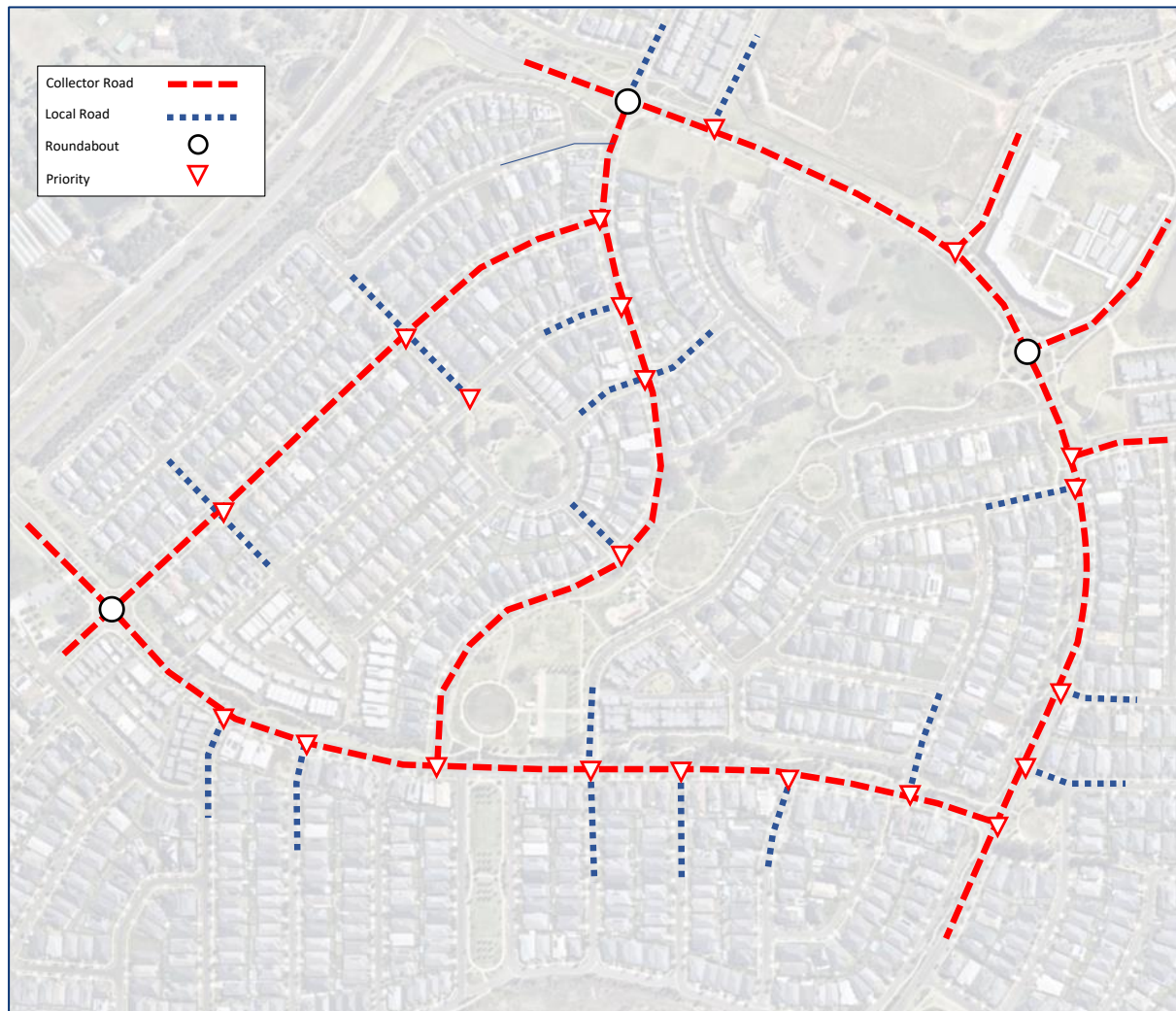
Source: Nearmap and arc traffic + transport

Figure 16: Residential Road Network Marsden Park



Source: Nearmap and arc traffic + transport

Figure 17: Residential Road Network Gledswood Hills



Source: Nearmap and arc traffic + transport

With reference to the figures above, all of which arc traffic + transport has prepared traffic assessments for, we note the following:

- The use of roundabouts has been deliberately minimised given their footprint, and moreover because the traffic generated to/from local roads is so minor that roundabouts are not required to provide efficient traffic operations;
- With regard to Oran Park and Gledswood Hills in particular, the AADT volumes along some of the key Collector Roads – such as The Straight and Scaife Street, and The Hermitage Way respectively - are significantly higher than the 2041 AADT volumes forecast for the majority of the MVRN URA Collector Roads, yet the majority of intersections – including Collector Road & Collector Road and Collector Roads & Local Streets – operate under priority control;
- The distance between roundabouts (or other control devices) in these new road networks is in many instances well over 500m; and

- Further to our review of these new road networks, we have not been able to find a single example of a roundabout being provided at the intersections of Local Streets.

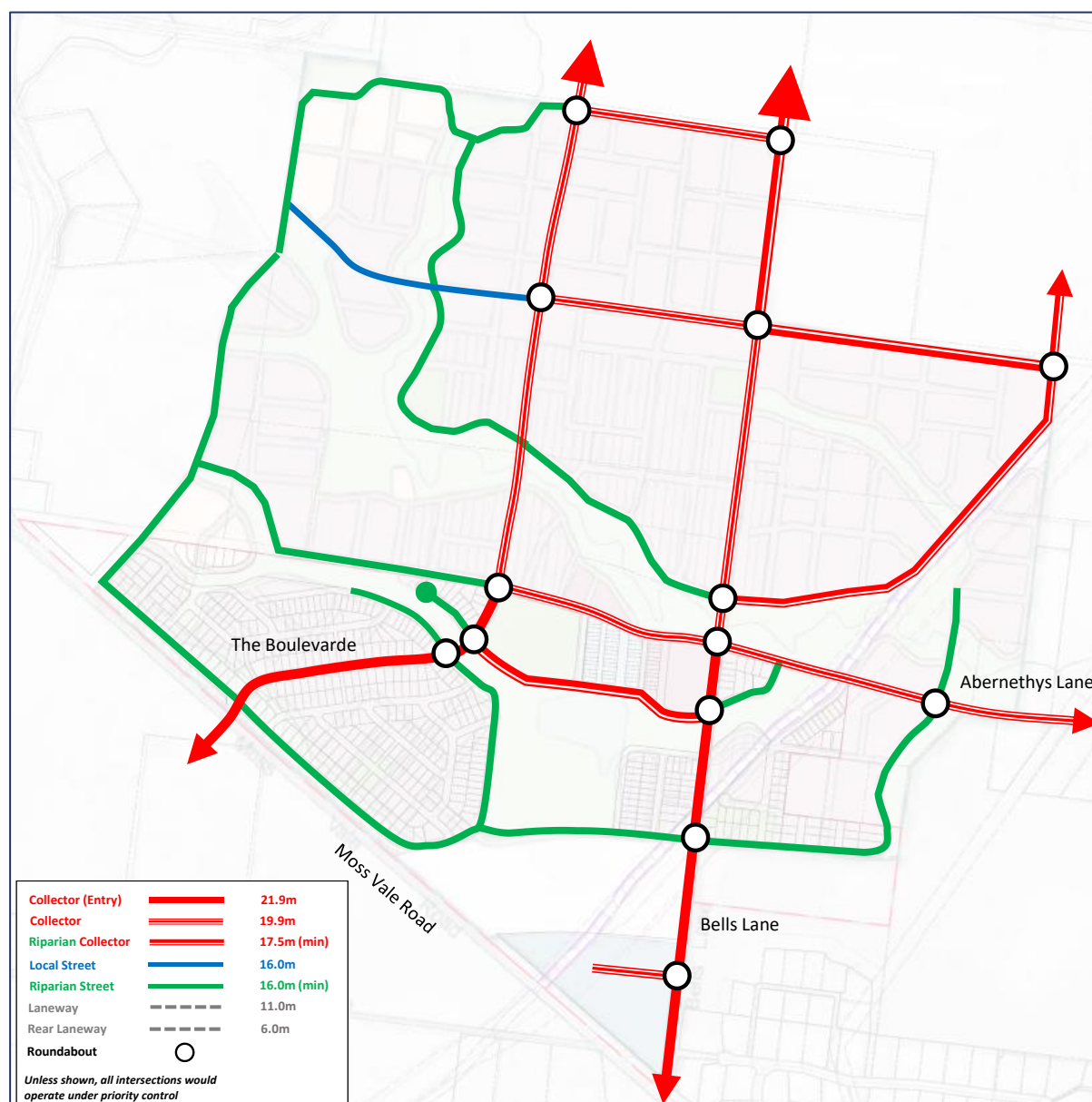
4.4.7 Roundabout Treatment Recommendations

With reference to sections above, [arc traffic + transport](#) has provided recommendations in regard to which roundabouts could justifiably be converted to priority intersections further to consideration of the following:

- The retention of all Collector Road intersections as roundabouts;
- The examples provided in the MVRS DCP and new residential road networks across NSW in regard to the location and spacing of roundabouts;
- Traffic volumes, including minor approach volumes to higher order roads, and total volumes at Local Street roundabouts; and
- Intersections that do not have well aligned approaches, and as such may require an additional level of control.

Further to these considerations, [Figure 18](#) shows the [arc traffic + transport](#) recommended roundabout locations within the MRN URA road network.

Figure 18: Recommended Roundabout Locations

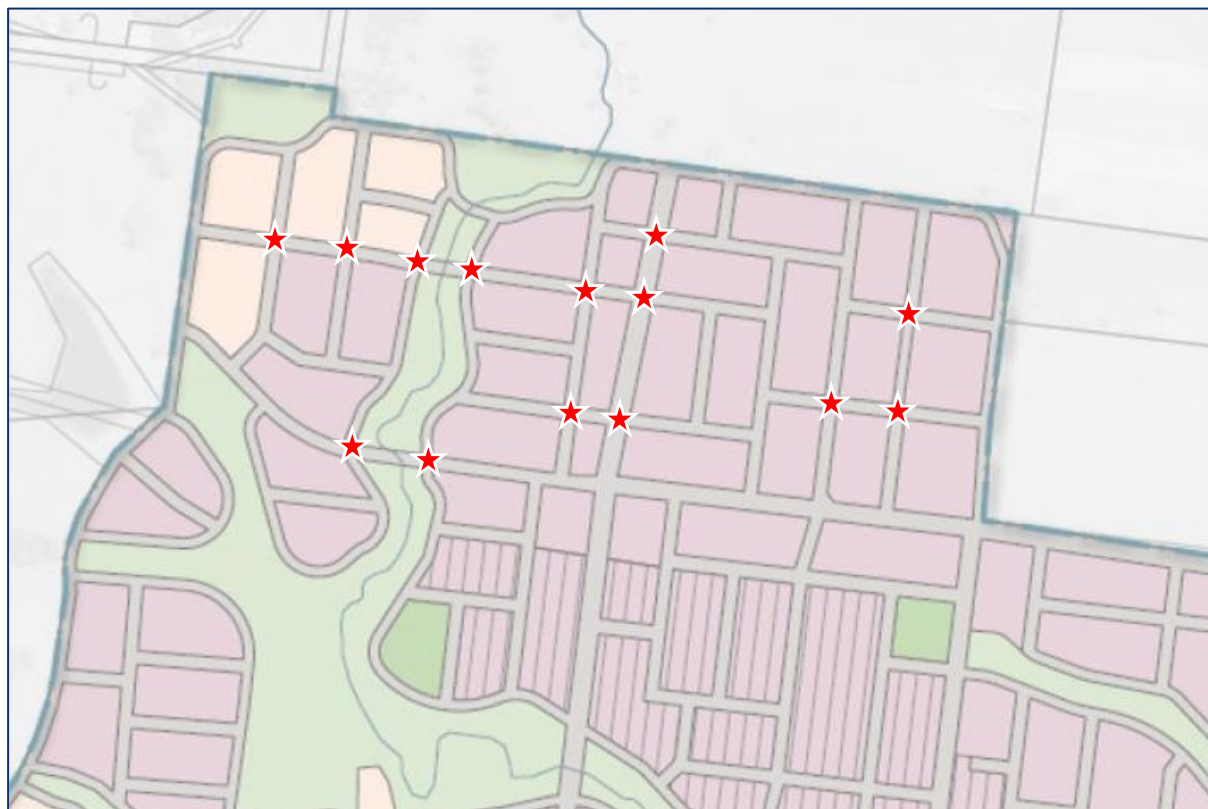


4.5 Local Road Networks

Briefly, the local road networks within some sub-precincts of the MVRN URA provide a significant number of close parallel streets (running both north-south and east-west) which in turn results in a large number of 4-way intersections of local roads, and of Collector Roads & Local Streets.

This is particularly the case in the northern part of the MVRN URA, as shown in Figure 19.

Figure 19: Northern MVRN URA 4-Way Intersections



Source: MVRN Draft DCP and arc traffic + transport

4-way intersections with [what will be] very low traffic volumes do not necessarily operate with higher delays or less safety than 3-Way intersections, and as shown in the figures of new residential areas (Figure 14 to Figure 17) 4-Way intersections are used in many instances. However, in the new residential areas shown in these figures, there is a more balanced trip distribution to the north, south, east and west, and as such having more north-south and east-west roads increases general accessibility.

This is not the case in the MVRN URA, where the overwhelming majority of trips will be to/from the south, and as such the local roads will essentially serve only to connect residents with the Collector Roads. This suggests the potential for the removal of some east-west local roads, which would largely be unused other than residents of these roads.

While fixing the location of internal local roads within the broader MVRN URA will of course be dependent on a number of issues - including perhaps most importantly the need to provide certainty for adjacent land holders where local roads extend across multiple land holdings - there is certainly scope to revise these local roads, particularly in the northern parts of the MVRN URA.

Any such revisions would require consultation with Council and any adjacent land holders, and would need to have minimal if any impact on the broader Collector Road and Perimeter Road network.

4.6 Pedestrian Footpaths

The road profiles adopted in the Concept Plans provide for a footpath on at least one side of all roads, which differs from the MVRN Draft DCP road profiles which require a footpath or shared path on both sides of all roads.

This requirement is not the case for local roads in the MVRS DCP, and moreover different to recent approved/constructed residential subdivisions in the Shoalhaven LGA including (for example) the residential subdivision at Twin Waters where in most roads footpaths are not provided on either side of the road. Importantly, Paragraph A36 of the Subdivision DCP specifically notes that footpaths are not required on both sides or even 1 side of lower roads, stating the following:

A36.1 Footpaths and cycleways are provided in accordance with Table 3 Residential Streets and Road Types (Section 5.7)

OR

A36.2 Footpaths are provided on one side of streets with traffic volumes over 2000vpd.

Note: No footpaths are required on streets with a traffic volume of <2000vpd as pedestrians can share with vehicles in a low speed environment.

Table 3 of the Subdivision DCP also states that no footpaths are required for Access Streets, but somewhat contradictorily the control volume for an Access Street is 500vph, while the control volume for a Local Street is 2,000vph, for which Table 3 indicates that a footpath is required.

A review of the requirements for footpaths, and the road profiles adopted in the Concept Plans in general, is provided in Section 5.

5 Road Profile Review

5.1 Overview

As discussed in the [Introduction](#), a key focus of this Transport Assessment is a review of the road profiles detailed in the MVRN Draft DCP, which – along with being different from those proposed in the Concept Plans and provided in the MVRN DCP – are also at times contrary to sustainable and economically viable planning, and moreover at odds with numerous NSW and National road design guidelines.

This section examines the road profiles outlined in the MVRN Draft DCP, and provides a critical assessment of whether they are appropriate for the MVNR URA, or if there is justification for them to be revised in the final MVRN DCP in line with the road profiles adopted in the Concept Plans.

5.2 MVRN Draft DCP Road Profiles Background

5.2.1 MVRN OG Proposed Road Profiles

A suite of detailed road profiles were prepared by the MVRNOG in the 2019 Concept Plan submitted to Council; the key road profiles proposed by the MVRNOG are summarised in [Table 3](#).

Table 3: MVRNOG Proposed Road Profiles

MVRNOG Road Profiles	Verge (m)			Carriageway (m)					Verge (m)			Minimum Road Reserve (m)
	Offset	Path	Plant	Parking	Lane	Medium	Lane	Parking	Plant	Path	Offset	
Collector Road (Median)	0.5	2.5	1.3	2.1	4.5	3.0 - 5.0	4.5	2.1	2.3	1.5	0.5	24.8
Collector Road (No Median)	0.5	2.5	1.3	2.1	4.5		4.5	2.1	2.3	1.5	0.5	21.8
Local	0.5	2.5	1.3	2.1	2.75 - 3.5		2.75 - 3.5	2.1	2.3	1.5	0.5	18.3
Retail	0.5	1.5	2.0	5.5	4.5		4.5	5.5	2.0	1.5	0.5	28.0
Rural Edge	0.5	2.5	1.3		2.75		2.75	2.1	2.3	1.5	0.5	16.2
Riparian Edge			1.0		2.75		2.75	2.1	2.3	1.5	0.5	12.9
Green Street 1	0.5	2.5	1.3	2.1	2.75		2.75		2.3	1.5	0.5	16.2
Green Street 2	0.5	2.5	1.3	2.1	3.5			2.1	2.3	1.5	0.5	16.3
Green Edge			1.0		4.0			2.1	2.3	1.5	0.5	11.4
Laneway			0.5		2.5				0.5			6.0

Source: MVRN ITS

5.2.2 MVRN ITS Recommended Road Profiles

In providing commentary and analysis of the MVRNOG proposed road profiles, and of road profiles in general, Section 5.6.1 of the MVRN ITS states the following:

In the absence of any national or state guidelines (e.g. Austroads, TfNSW) for determining daily capacity of road typologies, a review of Council's and surrounding local government area's (LGAs) road cross sections was undertaken. The road typology of the development is defined based on the number of vehicles per day, shown in Table 5.4.

Table 5.4 of the MVRN ITS is reproduced below.

Table 4: MVRN TA Road Profile Traffic Volume Controls

Road Type	Control volume in vehicles per day (v)
Collector Road – Tier 1	$17,500 \leq v \leq 35,000^1$
Collector Road – Tier 2	$v \leq 17,500$
Local Street	$v \leq 3,500$
Riparian Street	$v \leq 3,500$
Access Street – Tier 1	$350 \leq v \leq 700$
Access Street – Tier 2	$v \leq 350$

Source: MVRN ITS

Further to consideration of the MVRNOG proposed road profiles, Section 5.6.3 of the MVRN ITS details its recommended road profiles, a summary of which are provided in Table 5.

Table 5: MVRN ITS Recommended Road Profiles

MVRN ITS Road Profiles	Verge (m)			Carriageway (m)			Verge (m)			Minimum Road Reserve (m)
	Offset	Path	Plant	Parking	Lane	Parking	Plant	Path	Offset	
Collector Tier 1	1.0 - 1.5	1.5 - 2.0	1.5	3.5	7.0	3.5	1.5	1.5 - 2.0	1.0 - 1.5	23.0
Collector Tier 2	1.0 - 1.5	1.5 - 2.0	1.5	3.0	7.0	3.0	1.5	1.5 - 2.0	1.0 - 1.5	22.0
Local Street and Retail Street	1.0	1.5 - 1.8	2.0	2.3	9.0	2.3	2.0	1.5-1.8	1.0	20.6
Riparian Road	2.0				7.0	2.3	2.0	1.5	1.0	15.8
Access Tier 1	1.0	1.5	1.0	2.0	5.5	2.0	1.0	1.5	1.0	16.5
Access Tier 2	1.0	1.5 - 2.0	1.5 - 2.0		7.5		1.5 - 2.0	1.5 - 2.0	1.0	16.5
Laneway			2.5		6.0		2.5			11.0

Source: MVRN ITS

With reference to [Table 5](#) and [Table 3](#) respectively, the following differences between the MVRN ITS recommended profiles and the MVRNOG proposed profiles are noted:

- The width of the Collector Road is widened, though it does not provide a central median;
- The width of the Retail Street and Local Street is widened as a result of wider parking lanes, but there is also a significant widening of the carriageway (see also [Section 4.3.2](#));
- The Riparian Street provides wide traffic lanes and verges similar to the proposed Green Street 1 and Green Street 2, but does not consider a narrower profile where there is adjacent open space; and
- The Access Streets are in both cases wider than any of the MVRNOG proposed local road profiles.

5.2.3 MVRN Draft DCP Road Profiles

Further to their assessment of the MVRN ITS recommended road profiles, Council provided additional minor revisions to the road profiles; a summary of the road profiles detailed in the MVRN Draft DCP is provided in [Table 6](#).

Table 6: MVRN Draft DCP Road Profiles

MVRN Draft DCP Road Profiles	Verge (m)			Carriageway (m)			Verge (m)			Minimum Road Reserve (m)
	Offset	Path	Plant	Parking	Lane	Parking	Plant	Path	Offset	
Collector Tier 1	1.0 - 1.5	1.5 - 2.0	1.5	3.5	7.0	3.5	1.5	1.5 - 2.0	1.0 - 1.5	23.0
Collector Tier 2	1.0 - 1.5	1.5 - 2.0	1.5	3.0	7.0	3.0	1.5	1.5 - 2.0	1.0 - 1.5	22.0
Local Street and Retail Street	1.0	1.5-1.8	2.0	2.3	9.0	2.3	2.0	1.5 - 1.8	1.0	20.6 - 21.2
Riparian	2.5				7.0	3.0	4.5			17.0
Access Tier 1	1.0	1.5	1.0	2.0	5.5	2.0	1.0	1.5	1.0	16.5
Access Tier 2	1.0	1.5 - 2.0	1.5 - 2.0		7.5		1.5 - 2.0	1.5 - 2.0	1.0	16.5
Laneway			2.5		6.0		2.5			11.0

Source: MVRN Draft DCP

With reference to Table 6 and Table 5 respectively, the only difference between the MVRN Draft DCP profiles and those recommended in the MVRN ITS is the width of the Riparian Street, which has a widened verge (from 1.5m to 2.0m) and parking lane (from 2.3m to 3.0m).

No detail in regard to the reasons for the widened Riparian Street is available.

5.3 Shoalhaven DCP Road Profiles

5.3.1 Shoalhaven DCP General Residential Subdivision

The Subdivision DCP provides guidance for the development of residential precincts across the Shoalhaven LGA where a site-specific chapter of the Shoalhaven DCP is not available, and includes a road classification system based on AADT volumes. This classification is detailed in Table 1 of Chapter D11, which is reproduced below.

Table 7: Shoalhaven DCP Classification of Roads

	Speed km/h ¹	AADT ²	Carriageway Widths ³
Access Street (Minor)⁴ Access streets generally are streets where the residential environment is dominant, traffic is subservient, speed and volume are low and pedestrian and cycle movements are facilitated.	30	<500	6.0 min
Laneways	15	<15	3.5 to 5.0 ⁵
Local Street The collector streets collect traffic from Access Streets and connects to a major road.	40	<2000	7.0 to 9.0 max
Collector Street	50	<3000	7.0 to 9.0 ⁶
Local Distributor Road	60	3000 to 6000	7.0 to 9.0

Source: Shoalhaven DCP

Referencing this classification scheme, Figure 3 of the Subdivision DCP provides a summary of road types and profiles for general application to residential subdivisions, and is reproduced below.

Table 8: Residential Road Types and Profiles

Street Type	Verge Width	Street Reserve Width Avge	Kerb Type	Street Longitudinal Grade Max	Pavement Treatment	Footpath Requirement	Parking Provision within Street Reserve	Entrance Kerb Return Radium
Access Street	4.0 min	16	Layback	16%	AC, paving block or stamped or patterned concrete	No	Carriageway	6
Local Street	4.5 min	18	Layback	16%	AC	1.2m	Carriageway	6
Laneway	1 min	7	Barrier or concrete V-drain	16%	AC or concrete	No	No	5
Collector Street	4.5 min	20	Barrier	16%	AC	1.2m	Carriageway	8
Local Distributor		22	Barrier	16%	AC	1.2m or 2m cyclepath	No Parking	8

Source: Subdivision DCP

Based on our review of Nearmap images and Council's DA Tracker, the Access Street profile has recently been/is in the process of being constructed in new residential subdivisions surrounding Twin Waters Reserve and in the northern part of South Nowra, and has also been used along what could only be classified as Collector Roads with a significantly higher AADT than 500vpd, such as Basil Street. This Access Street profile is also the dominant road profile for existing local roads generating more than 500vpd, such as Arthur Street in South Nowra.

5.3.2 AUS-SPEC D1

AUS-SPEC is a national local government specification system for *the life cycle management of assets*, and is generally considered to be the national specification system for local government assets; AUS-SPEC D1 in particular is used by State Government agencies and local Councils across Australia as their primary road design reference.

Critically, Council's Shoalhaven EDS directly references AUS-SPEC D1, but neither the MVRN ITS nor the MVRN Draft DCP reference the AUS-SPEC D1 specifications – Council's own specifications – when determining road profiles.

Notwithstanding, Table D.1.5 of AUS-SPEC D1 provides guidance in regard to road classifications and profiles to be adopted in new residential developments, as summarised in Table 9.

Table 9: AUS-SPEC D1 Road Classification and Profiles

AUS-SPEC Road Profiles	Traffic (vpd)	Verge Both Sides (m)	Carriageway (m)			Path	Road Reserve
			Parking	Lane	Parking		
Distributor Road	3,000+	3.5	Yes	13.0	Yes	One side	20.0
Collector	3,000	3.5	Yes	11.0	Yes	One side	18.0
Local	2,000	3.5	Yes	7.0 - 9.0	Yes	One side	15.0 - 17.0
Access Street	100	3.0	Yes	6.0	Yes	No	14.0

Source: AUS-SPEC D1

With reference to Table 9, the road profiles adopted in the Concept Plans are entirely consistent with the AUS-SPEC D1 specifications, again noting that these are Council's own engineering specifications.

5.3.3 Moss Vale Road South DCP

The MVRN DCP road profiles – developed for a low density residential area essentially identical to the MVRN URA – provide a very relevant reference for road profiles for the MVRN URA. The MVRN DCP road profiles are summarised in Table 10.

Table 10: MVRN DCP Road Profiles

MVRN Draft DCP Road Profiles	Verge (m)						Verge (m)			Road Reserve (m)
	Offset	Path	Plant	Lane	Median	Lane	Plant	Path	Offset	
Collector (Entry)	1.5	1.5	1.5	5.5	2.0	5.5	1.2	2	1.2	21.9
Collector	1.5	1.5	1.5	5.5		5.5	1.2	2	1.2	19.9
Local	1.0	1.5	2.0	3.5		3.5	4.5			16.0
Laneway			2.5	3.0		3.0	2.5			11.0

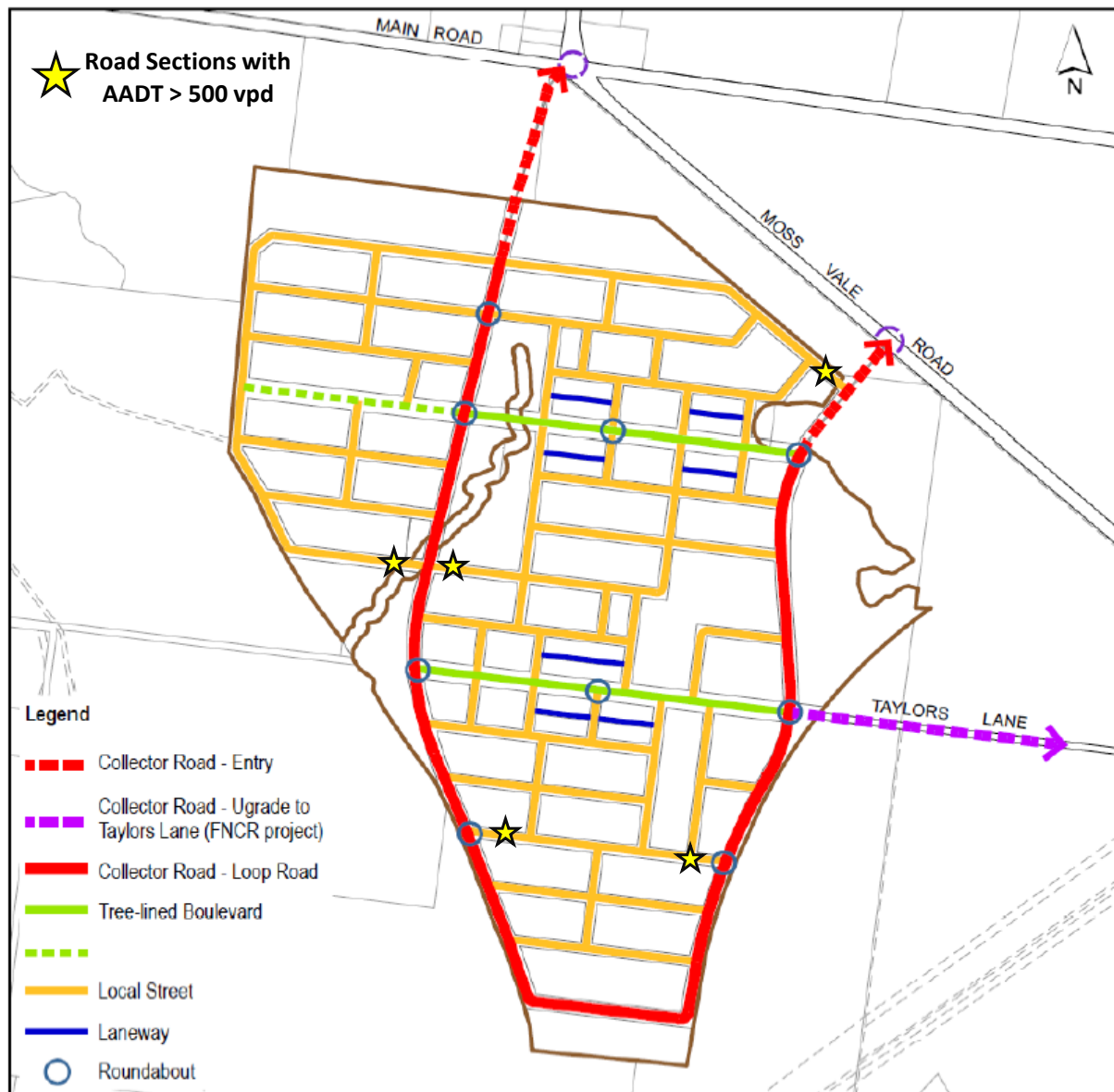
Source: MVRN DCP

With reference to Table 10, the MVRN DCP provides only a single Local Street profile, which – with reference to Table 7 - we anticipate would be adopted for local roads with an AADT of up to 3,000vpd.

In this regard, numerous roads designated as Local Streets in the MVRN DCP would provide a minor collector road function, i.e. providing the connection between numerous local roads and the designated Collector Road in the MVRN URA, and in turn have an AADT volume of between 500vpd and 2,000vpd.

Some of these roads are indicated in Figure 20 below, referencing the Street Hierarchy and Network Plan provided as Figure 9 in the MVRN DCP.

Figure 20: Moss Vale Road South DCP Street Hierarchy and Network Plan



Source: MVRs DCP and arc traffic + transport

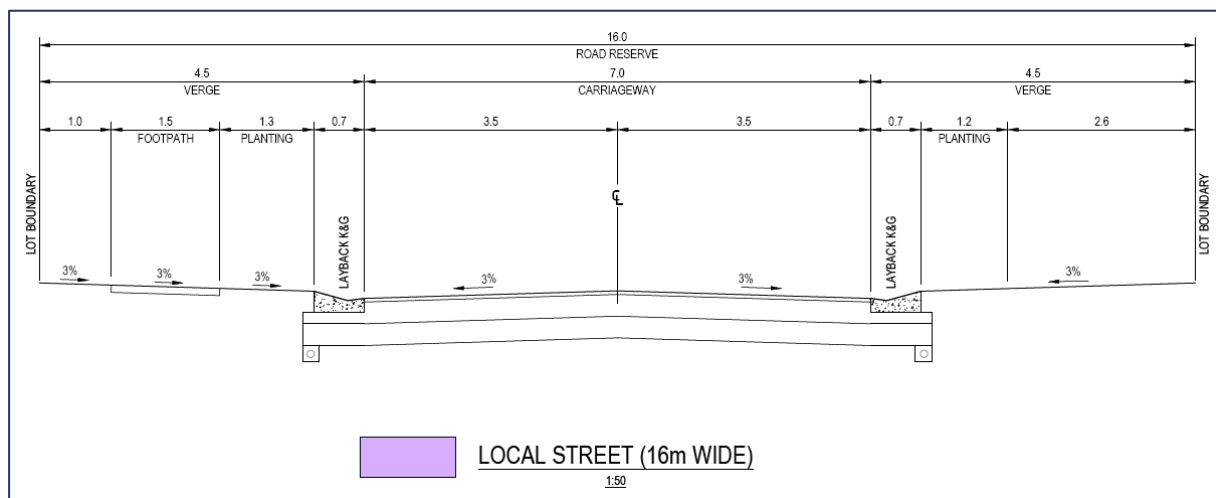
5.3.4 MVRs Precinct Recent Approvals

Further to the above, a number of residential developments within the MVRs URA have been approved by Council, including:

- 49 Taylors Lane, Cambewarra (74 residential lots);
- 169 Taylors Lane, Cambewarra (140 lots); and
- Lot 116 DP 3060, Cambewarra (80 lots).

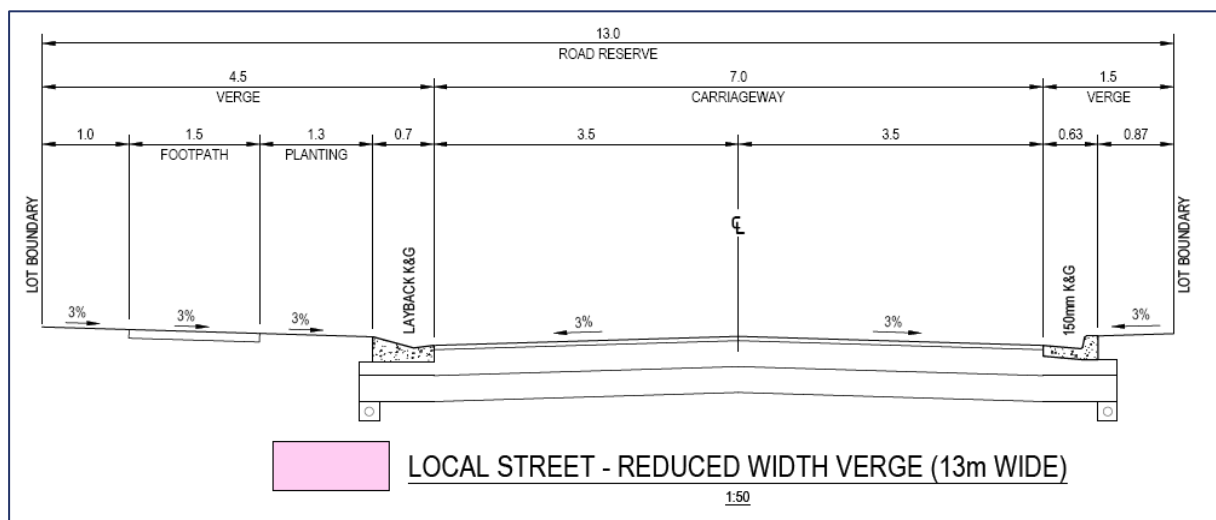
The traffic studies submitted with each of these developments were prepared by Cardno, and each provides essentially the same structure and assessment parameters. With specific regard to this Transport Assessment, the road classifications stipulated in the Growth Centres Development Code (2006) were adopted by Cardno for each traffic study, and are reproduced below.

Figure 22: Approved Local Street Profile



Source: Lot 116 DA

Figure 23: Approved Local Street (Reduced Width Verge)



Source: Lot 116 DA

Importantly in the context of this assessment, the approved Collector Road and Local Street profiles are identical to those proposed adopted in the Concept Plans, while the *Local Street – Reduced Width Verge* differs only from the Riparian Street adopted in the Concept Plans further to consideration of the verge width required to accommodate an appropriate APZ.

5.3.5 Berry West of Princes Highway Low Density Residential Development

The Berry DCP provides road profiles for new low density residential development in Berry west of the Princess Highway; the road profiles provided for this area in the Berry DCP are summarised in Table 12.

Table 12: Berry West of Princes Highway Road Profiles

Berry DCP Road Profiles	Verge (m)			Carriageway (m)			Verge (m)			Road Reserve (m)
	Offset	Path	Plant	Parking	Lane	Parking	Plant	Path	Offset	
Collector (Entry)	1.0	2.0	2.5		9.0		5.5			20.0
Local			5.0		6.0		5.0			16.0
Perimeter			3.0		8.0		5.0			16.0
Access (Riparian)			5.0		6.0		1.5			12.5
Laneway			2.5		6.0		2.5			11.0

Source: Shoalhaven DCP

As with the MVRs road profiles, the key Local Street profile provides a 16.0m road reserve, while the Collector Road profile is marginally wider (at 20.0m) than the MVRs DCP Collector Road, though it would essentially provide the same cross section.

The Berry DCP also includes a profile for a Local Street adjacent to a drainage reserve, which is a similar situation to the Riparian Street adopted in the Concept Plans; in most instances, this profile recognises that paths would be provided separately within the open space corridor, with the note to Table 10 of Chapter N3 stating:

Where roads are provided directly adjacent to the drainage reserve, except for the Entry Road, the verge width next to the drainage reserve may be reduced to a minimum of 1.5m subject to adequate provision of shared paths, utilities, street trees, bollards and compliance with safety standards and any bushfire management requirements.

As part of the active transport network, a shared path is required to run along the southern side of the drainage reserve as shown in the Indicative Layout Plan. This shared path can be provided within the road reserve or within the drainage reserve provided flood risks are managed in accordance with Shoalhaven DCP 2014 and any relevant state policy.

5.3.6 Shoalhaven DCP Road Profiles Summary

With reference to sections above, the road profiles identified in numerous sections of the Shoalhaven DCP, and indeed road profiles approved by Council, are essentially identical to those proposed in the Concept Plans.

5.4 NSW Council Road Profiles

While Section 5.6.1 of the MVRN ITS suggests that its determination of appropriate road profiles was *based on a review of Council's and surrounding local government area's (LGAs) road cross sections*, the review of Shoalhaven DCP road profiles provided in [Section 5.3](#), and a review of road profiles adopted by other Councils and DPIE for new low density residential subdivision, indicates road profiles quite different to those adopted in the MVRN Draft DCP.

arc traffic + transport has reviewed DCP road profiles adopted by numerous Councils and DPIE for residential growth centres across NSW; a summary of our review for each of the key road profiles is provided in sections below.

5.4.1 NSW DCP Collector Road Profiles

Collector Road profiles as provided in available DCPs for new residential Growth Centres are summarised in [Table 13](#); where available, the summary includes the stated volume controls for different road types, as well as a more detailed breakdown of the road reserve components.

Table 13: NSW DCP Collector Road Profiles

Collector Road DCP Profiles	Traffic (vpd)	Verge (m)	Carriageway (m)	Verge (m)	Road Reserve (m)
Camden (Major)		4.5	11.0	4.5	20.0
Camden (Minor)		4.0	8.0	4.0	16.0
Campbelltown		4.5	11.0	3.5	19.0
Catherine Hill		4.5	11.0	4.5	20.0
Hawkes Creek		4.5	11.0	4.5	20.0
Kiama	3,000	3.5	9.5	3.5	16.5
Liverpool		4.5	11.0	3.5	19.0
Marsden Park		4.5	12.0	3.5	20.0
North Kellyville		4.5	12.0	3.5	20.0
North West Growth Centre		4.5	11.0	4.5	20.0
Oran Park		4.6	10.3	3.3	18.2
Shellharbour	3,000	3.5	9.0	3.5	16.0
Sutherland		3.5	11.0	3.5	18.0
Vineyard		4.5	11.0	4.5	20.0
Wollongong (Major)	15,000	4.8	12.4	4.8	21.9
Wollongong (Minor)	9,000	5.3	11.2	4.5	21.0

Source: NSW Councils and DPIE

With reference to Table 13, a majority of Collector Road profiles require an average road reserve of 19.0m – 20.0m; the most common Collector Road cross-section provides an 11.0m carriageway which would accommodate traffic, parking and bus set down; and verges of 3.5m or 4.5m. These characteristics are entirely consistent with the Collector Road profile in the MVRs DCP, and the Collector Road profile adopted in the Concept Plans.

Importantly, there are number of sections of Collector Roads adjacent to open space/reserves in the MVRN URA. The MVRs DCP does address this type of road, with Section 7.4.2.2 stating:

Where roads are adjacent to a public open space area, the verge widths may be reduced to a minimum of 1.5m subject to adequate provision of footpaths, utilities, fencing, required Asset Protection Zones or buffers to riparian corridors.

Reference is also made to a number of the Growth Area DCPs prepared by DPIE; Clause 11 of Section 3.3.1 of the Camden GCP DCP (for example) states the following:

Where roads are adjacent to public open space or drainage land...the verge width on the side adjacent to the open space, drainage land...may, in certain circumstances, be reduced to a minimum of 1m, subject to:

- *Appropriate arrangements for the provision of public utilities*
- *Provision of appropriate pedestrian access*
- *Compliance with road safety, and*
- *Acoustic attenuation, bushfire asset protection zone, and riparian corridor requirements.*

Pedestrian infrastructure on both sides of these Collector Roads is important moving forward so as to provide for active travel and also to allow bus services to operate in these roads in both directions. As such, a Riparian Collector Road profile has been adopted in the Concept Plans that provides a shared path (2.0m) adjacent to riparian, watercourse or gas line corridors, or land not being developed as part of the MVRN URA (see also [Section 5.4.3](#)); the width of the reserve in these Riparian Collector Road will in some instances also be widened to provide an appropriate APZ.

5.4.2 NSW DCP Local Street Profiles

Local Street profiles as provided in Council or DPIE DCPs for new residential growth centres are summarised in [Table 14](#); where available, the summary again includes the volume controls for different road types, as well as a more detailed breakdown of the road reserve components.

It is noted that some DCPs provide a number of different profiles for local roads, generally characterised as Local Streets or Access Streets and the like. The summaries in [Table 14](#) relate to the highest order (widest road reserve) Local Street provided in each DCP.

Table 14: NSW DCP Local Road Profiles

Local Road DCP Profiles	Traffic (vpd)	Verge (m)	Carriageway (m)	Verge (m)	Road Reserve (m)
Camden		4.0	7.0	4.0	15.0
Campbelltown		3.5	9.0	3.5	16.0
Catherine Field		3.5	9.0	3.5	16.0
Hawkes Creek		3.5	9.0	3.5	16.0
Huntlee		4.5	7.2	4.0	15.7
Kiama	1,000	3.5	8.0	3.5	15.0
Liverpool		3.9	7.2	3.7	14.8
Marsden Park		3.5	9.0	3.5	16.0
North West Growth Centre		3.5	9.0	3.5	16.0
Oran Park		3.5	7.4	3.5	14.4
Shellharbour	1,500	3.5	8.0	3.5	15.0
Sutherland	1500	3.5	9.0	3.5	16.0
Turner Road		3.5	7.4	3.5	14.4
Vineyard		3.5	9.0	3.5	16.0
Wollongong (Access)	1,000	4.5	8.1	4.5	17.1
Wollongong (Local)	3,000	4.5	9.8	4.5	18.8

Source: NSW Council's and DPIE

With reference to Table 14, the majority of Local Road profiles require a road reserve of 16.0m, with the most common cross-section providing a 9.0m carriageway which would accommodate traffic and parking, and verges of 3.5m. These characteristics are again almost identical to the Local Street profile in the MVRs DCP, and moreover the Local Street profile adopted in the Concept Plans.

5.4.3 NSW DCP Riparian Street Profiles

As discussed in Section 4.3.4, the MVRs DCP provides for a narrowed verge (1.5m) adjacent to open space/reserves. More broadly, Riparian Street profiles (relating to roads adjacent to open space/reserves) as provided in Council or DPIE DCPs for new residential growth areas are summarised in Table 15 below; where available, the summary includes a more detailed breakdown of the road reserve components.

Table 15: NSW DCP Riparian Street Profiles

Riparian Street DCP Profiles	Verge (m)	Carriageway (m)	Verge (m)	Road Reserve (m)
Camden	4.0	8.0	1.0	13.0
Liverpool	3.9	7.2	1.0	12.1
Campbelltown	3.5	8.0	1.6	13.1
Wollongong	4.0	7.0	2.45	13.45
Huntlee	4.5	7.2	1.5	13.2
Marsden Park	3.5	9.0	1.0	13.5
Hawkes Creek	3.5	5.6	4.0	13.1
Vineyard	3.5	5.6	4.0	13.1

Source: NSW Council's and DPIE

With reference to Table 15, there is some variety in the cross-section provided for Riparian Streets, with some providing only a narrow carriageway for two-way traffic, and others providing for on-street parking, generally on one side of the road. Notwithstanding, the most common road reserve width for Riparian Streets is 13.1m, which is less than proposed in the Concept Plans, but generally the same as approved by Council for the Riparian Street in the recent MVRS URA sub-division approvals.

It is also noted that these profiles do not account for additional widening adjacent to bushfire prone land, which requires additional carriageway widening and, in some instances, additional road reserve width to provide appropriate APZs. This issue is discussed further in Section 5.6.

5.4.4 Laneways

2 types of laneway have been identified in the Concept Plans, including:

- An 11.0m Laneway, which is anticipated to be used in the Retail Centre and in some locations with medium density residential development; and
- A 6.0m Rear Laneway, which is anticipated to be used in some locations with medium and high density residential development.

While the 11.0m Laneway profile is in accordance with the MVRN Draft DCP, the MVRN DCP does not provide guidance in regard to the width of a Rear Laneway, which as discussed are anticipated to operate more akin to Shared Driveways, which the MNRS DCP states should have a maximum width of 6.0m.

5.5 National Road Profile Guidelines

While the road profiles developed by DPIE for new residential growth centres (as detailed in Section 5.4) would generally be considered to represent current NSW road profile guidelines, similar information in regard to road profiles in new residential areas is provided in design guidelines prepared by the Queensland, Victorian, South Australian and West Australian State Governments. These profiles are discussed in sections below.

5.5.1 Victorian Engineering Design & Construction Manual

The VEDCM details a set of best practice design standards and specifications for application in new residential subdivisions; the VEDCM was developed by the Office of Local Government and Victorian Growth Areas Authority in coalition with numerous Councils in Melbourne's growth areas and industry representatives.

The VEDCM provides a consistent approach to design standards so as to ensure that Councils, landowners, developers and consultants clearly understand the expectations and commitments that are outlined in the VEDCM, and in turn results in a more efficient process of approval, implementation and certification that avoids the delays that can arise from interpreting and responding to different standards across the growth areas.

Table 4 of the VEDCM provides guidance in regard to the road profiles to be adopted in the Melbourne growth areas, which summarised in Table 16.

Table 16: Victoria EDCM Road Profiles

VEDCM Road Profiles	Traffic (vpd)	Verge (m)	Carriageway (m)			Verge (m)	Reserve (Minimum)
			Parking	Lane	Parking		
Trunk Connector	12,000	5.25	2.3	7.0	2.3	5.25	22.1
Collector	7,000	5.0	2.3	7.0	2.3	5.0	21.6
Access Place	1,000	4.5		5.5		4.2	14.2
Access 1	2,000	4.5		7.3		4.2	16.0
Access 2	3,000	4.7	2.3	6.0	2.3	4.7	20.0
Access Lane	300			6.0			6.0

Source: VEDCM

5.5.2 Queensland Street Design Manual

The QSDM focuses on *greenfield development with a predominately residential land use focus*, and was prepared to reflect the key principles and objectives determined by State Government policies and sources of best design practice.

Table 2.1 of the QSDM provides guidance in regard to road classifications and profiles to be adopted in new residential developments in Queensland, and are summarised in Table 17.

Table 17: QSDM Road Profiles

QSDM Road Profiles	Traffic (vpd)	Pedestrian Path	Shared Path	Road Reserve (m)
Major Collector	10,000	Both sides	Yes	20.0 - 25.0
Collector	6,000	Both sides	Yes	18.0 - 20.0
Access	3,000	One side	One side	15.5 - 16.5
Local Access	1,000	One side	No	13.5 - 15.5
Access Lane	400	No	No	6.5 - 8.0

Source: QSDM

5.5.3 Western Australia Guidelines for Subdivisional Development

The WAGSD provides standards for the geometric elements of road design in residential developments, and generally provides higher than minimum standards *to provide a functional and aesthetically pleasing streetscape* along with appropriate traffic carrying capacity.

Table 3.2 of the WAGSD provides guidance in regard to the road classifications and profiles to be adopted in new residential developments in Western Australia, and are summarised in Table 18.

Table 18: WAGSD Road Classification and Profiles

WA GSD Road Profiles	Traffic (vpd)	Carriageway (m)	Pedestrian Path	Shared Path	Road Reserve (m)
Integrator B	8,000	7.4 - 10.0	One Side	No	20.0
Connector	3,000	6.0 - 10	Once Side	No	15.0 - 23.0
Access Way	600	5.5 - 6.0	One side	One side	11.5 - 15.0
Access Place	200	4.0 - 5.5	No	On-Street	10.0 - 14.5
Access Lane	100	4.0 - 5.5	No	On-Street	6.0 - 13.5

Source: WAGSD

5.5.4 South Australia Residential Design Manual

The SARDM provides a framework of a performance-based approach to residential development as a more responsive alternative to prescriptive regulation. With regard to new residential road networks, the SARDM recognises that the best local road networks will result from a balanced assessment considering road network efficiency, cost effectiveness, urban design and residential amenity.

Table 1 of the SARDM provides guidance in regard to the road classifications and profiles to be adopted in new residential developments in South Australia, and are summarised in Table 19, noting that additional guidance in regard to verge widths is not provided in the SARDM, arc traffic + transport has included the verge widths identified in the other national guidelines based on carriageway width identified in the SARDM.

Table 19: SARDM Road Classification and Profiles

SAGDSG Road Profiles	Traffic (vpd)	Verge (m)	Carriageway (m)			Verge (m)	Road Reserve (m)
			Parking	Lane	Parking		
Major Collector	6,000	4.50	2.3	7.5	2.3	4.50	21.1
Minor Collector	3,000	4.0	2.3	6.5	2.3	4.0	19.1
Local Street	2,000	4.0		7.0		4.0	15.0
Access Place	1,000	4.0		5.0		4.0	13.0
Access Lane	100	2.5		3.0		2.5	8.0

Source: SAGDSG and arc traffic + transport

5.5.5 AMCORD

Along with AUS-SPEC, AMCORD remains a significant reference for the development of new residential subdivisions.

Table 1 of Section 2.5 of AMCORD provides a detailed overview of road profiles for all tiers of new roads in and adjacent to residential subdivisions, and also establishes recommended traffic volumes caps for each type of road, and is reproduced below.

Table 20: AMCORD Road Hierarchy

Street type	Indicative maximum traffic volume range (vpd) (1)	Target speed & design speed (km/h) (2)	Street reserve width minimum (m) (3)	Carriageway width (m) (4)	Verge width minimum (m) each side (5)	Parking provision within street reserve	Kerb type (20)	Entrance kerb return minimum (m)	Property access	Street longitudinal gradient maximum s%	Footpath	Cycles
ACCESS STREETS												
Access lane	100	15	varies	See note (6)	Not specified	No	Not required	NA	Rear	NA	No	Share with vehicles
Access place (7)	0–300	15	10.0	Single-lane 3.5–3.7(8)	See note (9)	1 Hard standing verge space per 2 dw. with scope for extra space	Layout flush	5 (10)	Access to all sites (21)	17 (11)	No	Share with vehicles
Access street	0–300 (1)	40	12.0	5.0 only	3.5	Carriageway	Layback	4	Access to all sites (21)	15 (11)	No (12)	Share with vehicles
Access street	300–1000	40	13.0	5.0–5.5 only (14)	4.0	Carriageway	Layback	5	Access to all sites (21)	12	No	Share with vehicles
Access street	1000–2000	40	13.5	5.5 or 7.0	4.0	Carriageway	Layback	5	Access to all sites (21)	10	1.2m wide one side (13)	Share with vehicles
COLLECTOR STREET												
Minor collector	1000–3000	50 (20 at designated ped-cyc. crossing)	16.50	7.0–7.5 or 6.0–6.5 plus indented parking	4.5	Carriageway or indented	Layback (15)	6	Access to all sites (17)	8 (16)	1.2m wide both sides located away from kerb	Provide within street pavement (22)
Major collector	3000–6000					Design using the performance criteria					located away from kerb (18)	1.2m wide within street pavement (22)

Source: AMCORD

With reference to [Table 20](#), the road profiles adopted in the Concept Plans are entirely consistent with AMCORD, and moreover again indicate that lower order roads (than proposed) would be more than appropriate given the low traffic volumes in residential streets; indeed, AMCORD provides for a Access Street with a road reserve width of only 13.5m to accommodate up to 2,000vpd, many times the traffic volumes that will be generated in the majority of local roads across the MVRN URA.

5.5.6 National Road Profile Guidelines Summary

With reference to sections above, National road design guidelines provides very significant support for the road profiles adopted in the Concept Plans for MVRN, including:

- Collector Roads with a road reserve of 19.9m carrying traffic volumes of over 6,000vpd;
- Local Streets with a road reserve of 16.0m carrying traffic volumes of up to 3,000vpd; and
- Narrower verge widths for Riparian Streets.

5.6 Bushfire Planning

At this time, the MVRN Draft DCP does not provide the details of measures that Council might undertake to reduce the proximity of bushland (in the riparian corridors) and in turn reduce the extent of the APZ required to be provided within adjacent lots (to the building line) and/or road reserve.

Notwithstanding, it is our understanding that Council is currently reviewing the information provided in the MVRN Bushfire Report, and that some level of clearing (such as to provide part of the APZ) will be included in the final MVRN DCP.

Importantly, the design Riparian Streets include provisions for the movement of emergency vehicles in accordance with PBP 2019, including 8.0m trafficable carriageways.

5.7 Road Profile Recommendations

With reference to sections above, it is opinion of [arc traffic + transport](#) that there is significant justification for the road profiles adopted in the Concept Plans, including:

- Forecast traffic volumes that indicate that all roads will accommodate significant lower traffic volumes than the control volumes determined in the MVRN ITS;
- The road profiles adopted in the Concept Plans align with Council's own guidelines, including sections of the Shoalhaven DCP, the Shoalhaven EDS, AUS-SPEC D1 and recent subdivision approvals in the MVRN URA
- The road profiles adopted in the Concept Plans align with those adopted in dozens of DCPs for new residential growth centres across NSW, including DCPs prepared by local Councils and DPIE;
- The road profiles adopted in the Concept Plans align with those adopted in key State Government residential planning guidelines, and with National guidelines such as AMCORD; and
- The road profiles adopted in the Concept Plans are compliant with the requirements of PBP 2019.

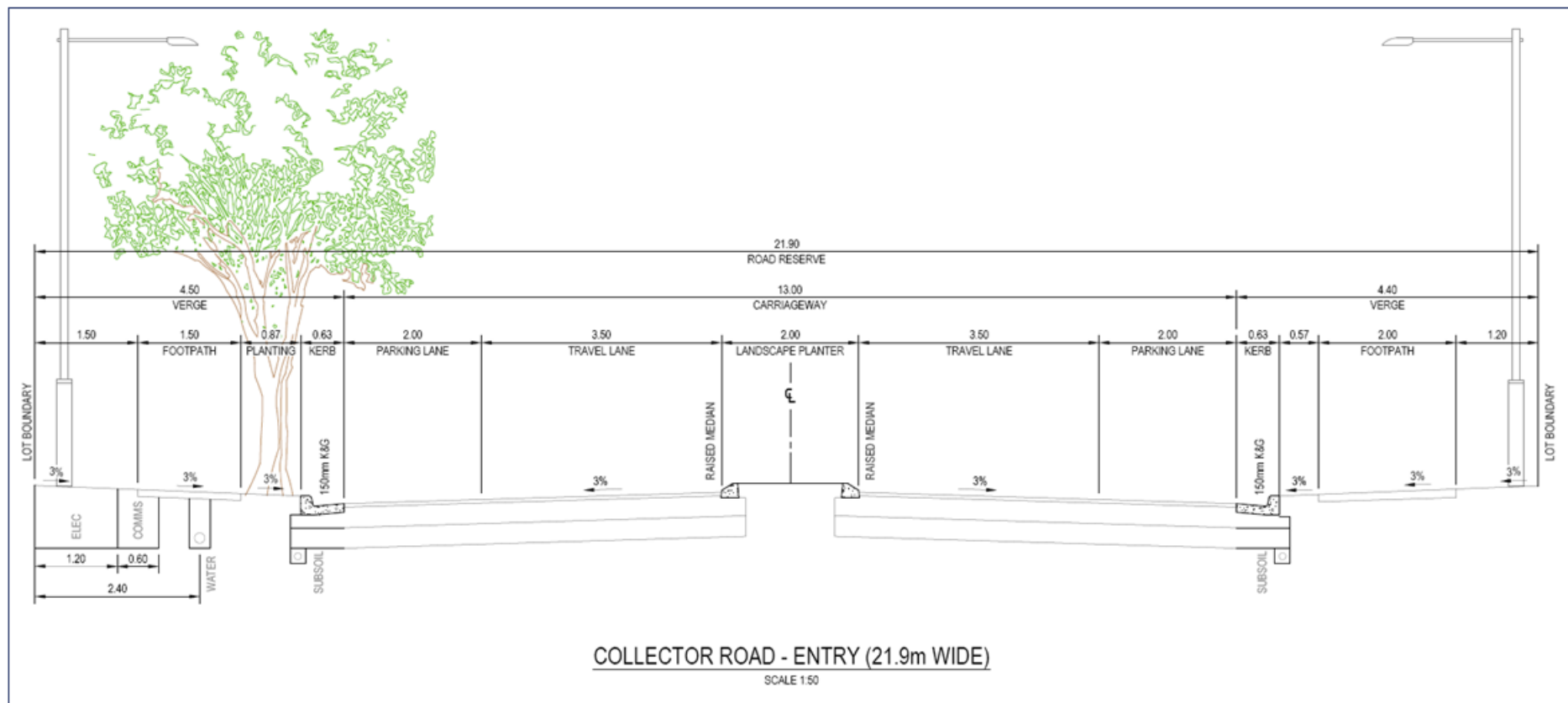
In summary, arc traffic + transport strongly recommends the adoption of the road profiles shown in the Concept Plans, which are summarised in Table 21, and illustrated in the figures below.

Table 21: Recommended Road Profiles

Recommended Road Profiles	Verge (m)	Carriageway (m)			Verge (m)	Road Reserve (m)
		Lane	Median	Lane		
Collector (Entry)	4.5	5.5	2.0	5.5	4.4	21.9
Collector	4.5	5.5		5.5	4.4	19.9
Riparian Collector	5.0	5.5		5.5	1.5 ¹	17.5 ¹
Retail	4.5	5.0		5.0	4.5	19.0
Local	4.5	3.5		3.5	4.5	16.0
Riparian	4.5	5.0		5.0	1.5 ¹	16.0 ¹
Laneway	2.5	3.0		3.0	2.5	11.0
Rear Laneway	0.5	2.5		2.5	0.5	6.0

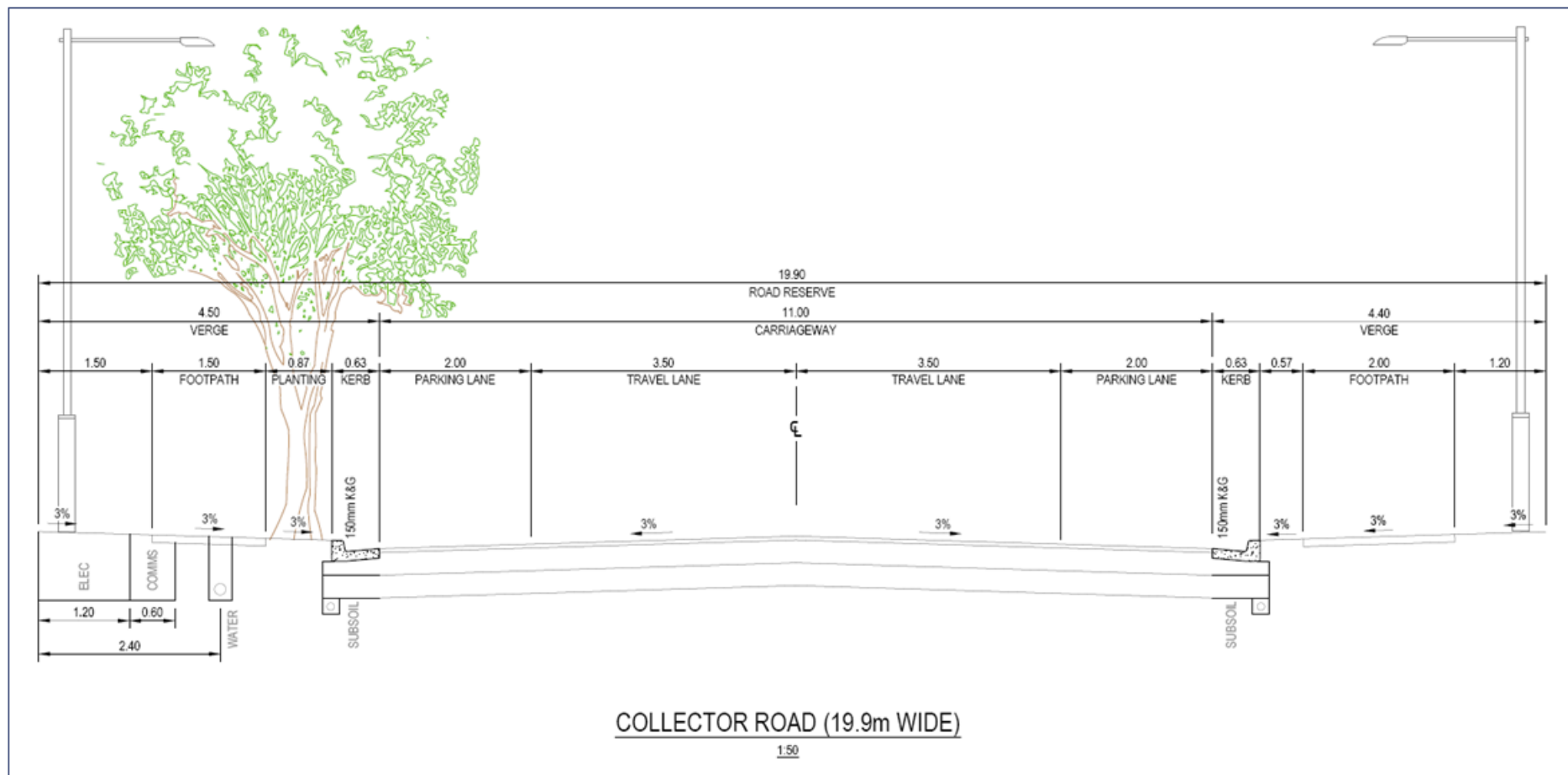
Note 1: In Riparian Collector Roads and Riparian Streets, the width of the verge adjacent to the riparian corridor, and in turn the total road reserve, will be dependent on the creation of an appropriate APZ width.

Figure 24: Recommended Collector Road (Entry) Profile



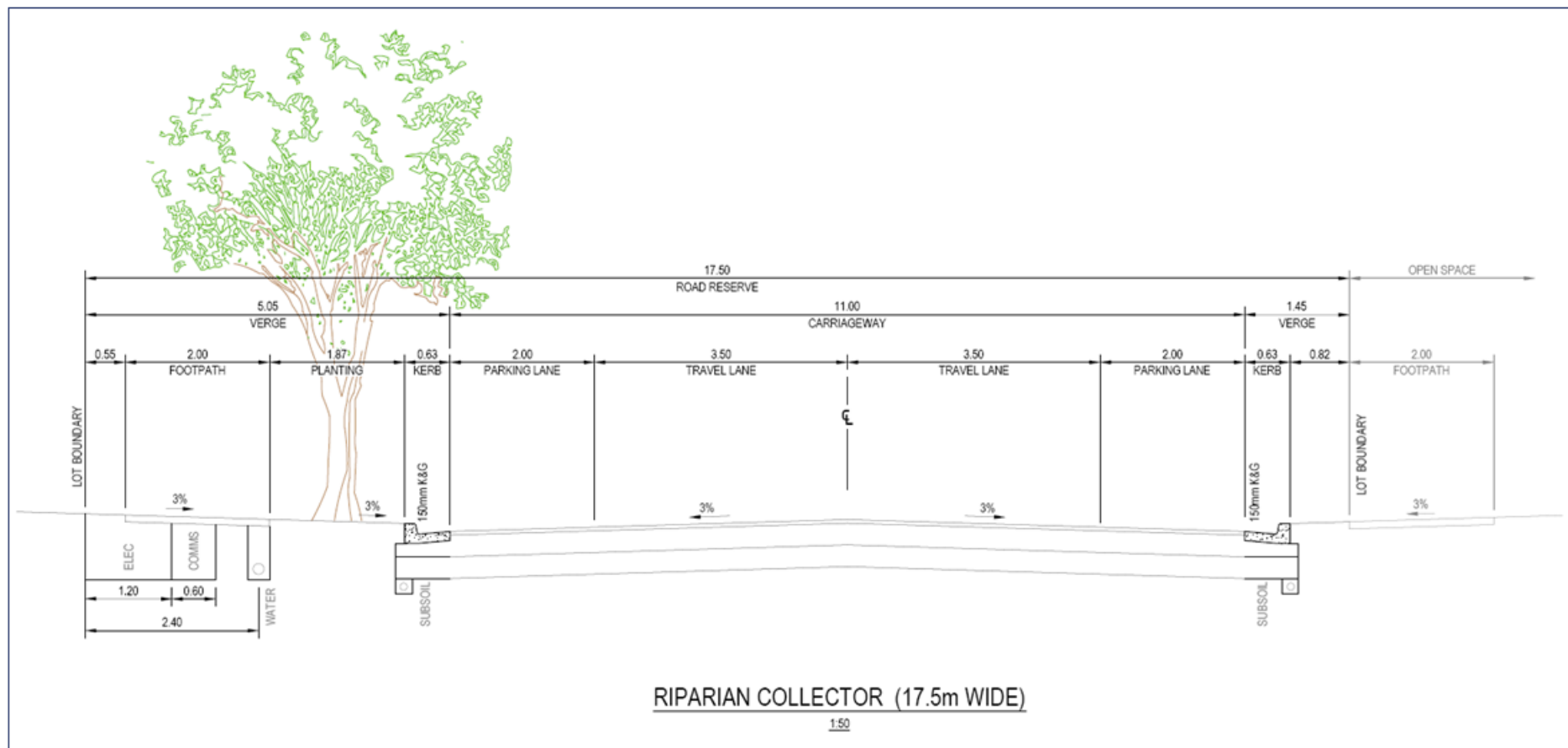
Source: Newquest

Figure 25: Recommended Collector Road Profile



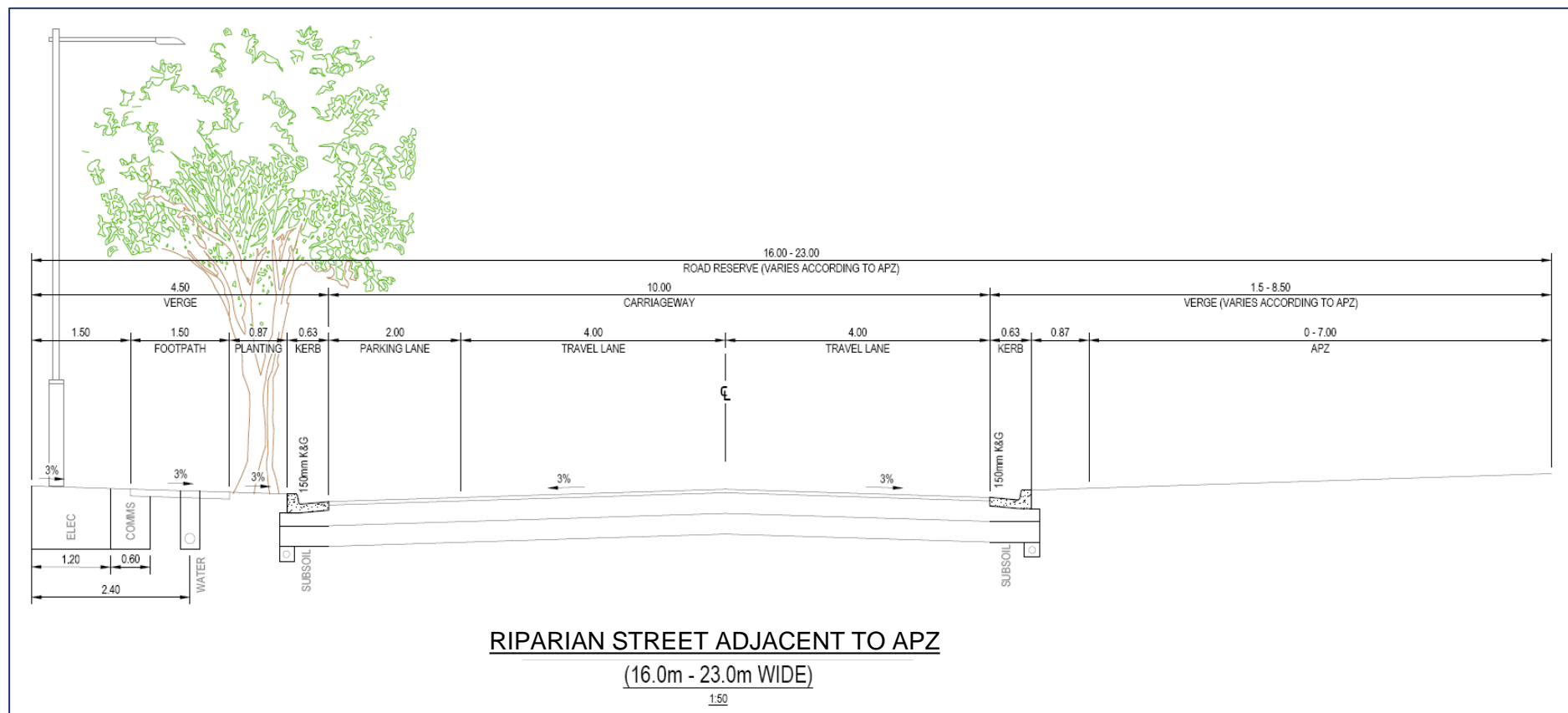
Source: Newquest

Figure 26: Recommended Riparian Collector Road Profile



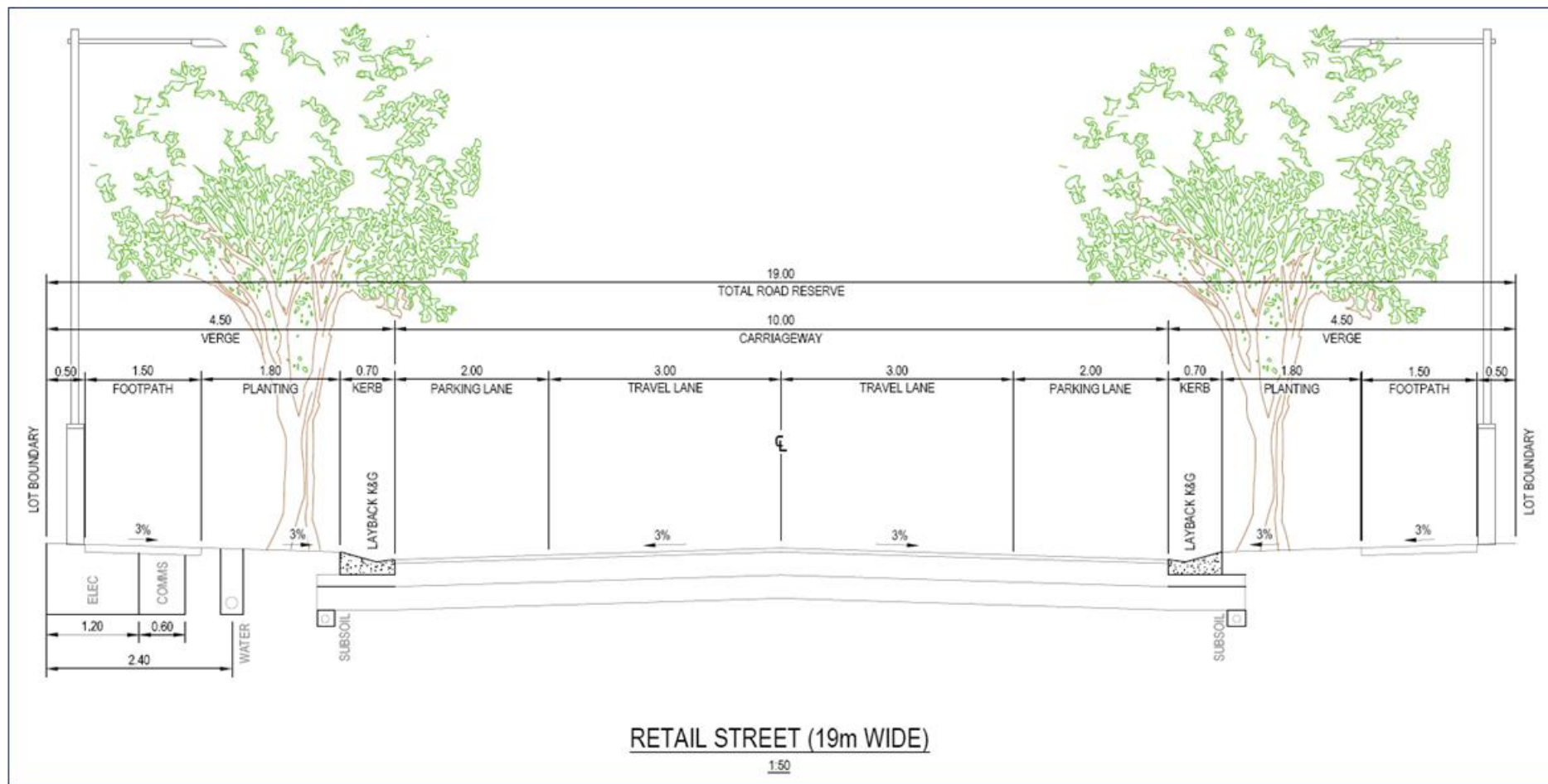
Source: Newquest

Figure 27: Recommended Riparian Street Adjacent to Asset Protection Zone



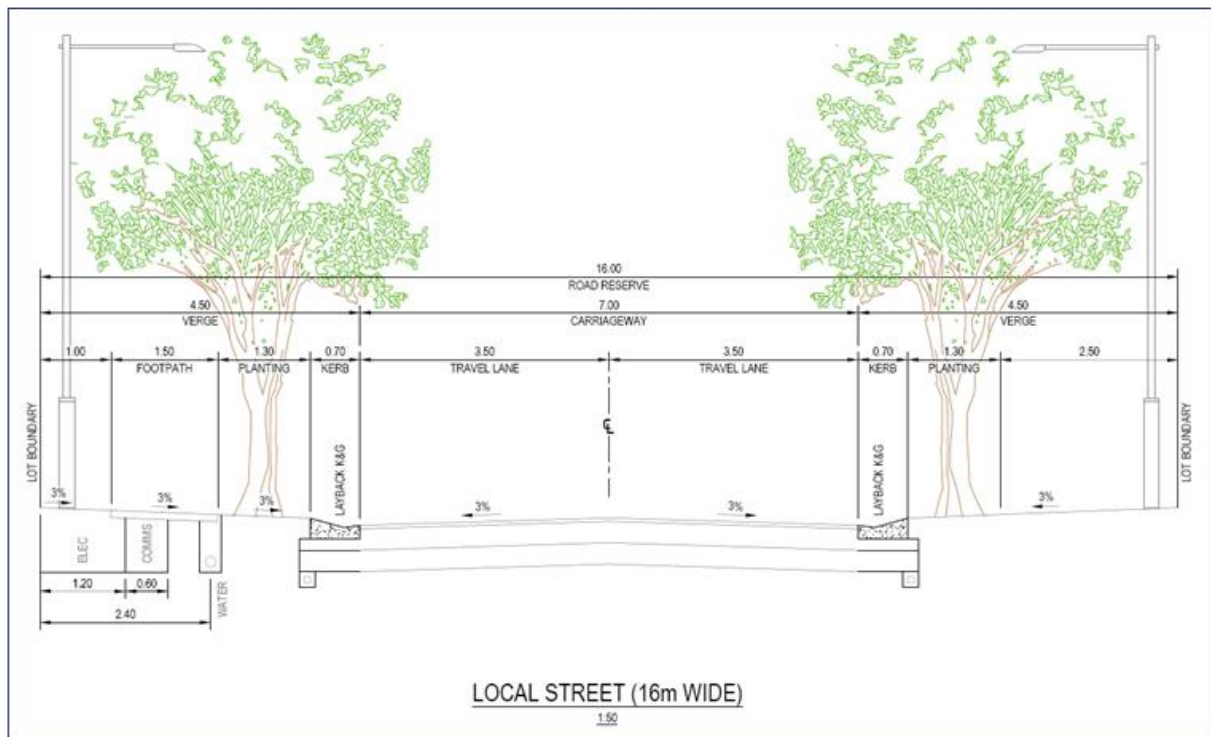
Source: Newquest

Figure 28: Recommended Retail Street Profile



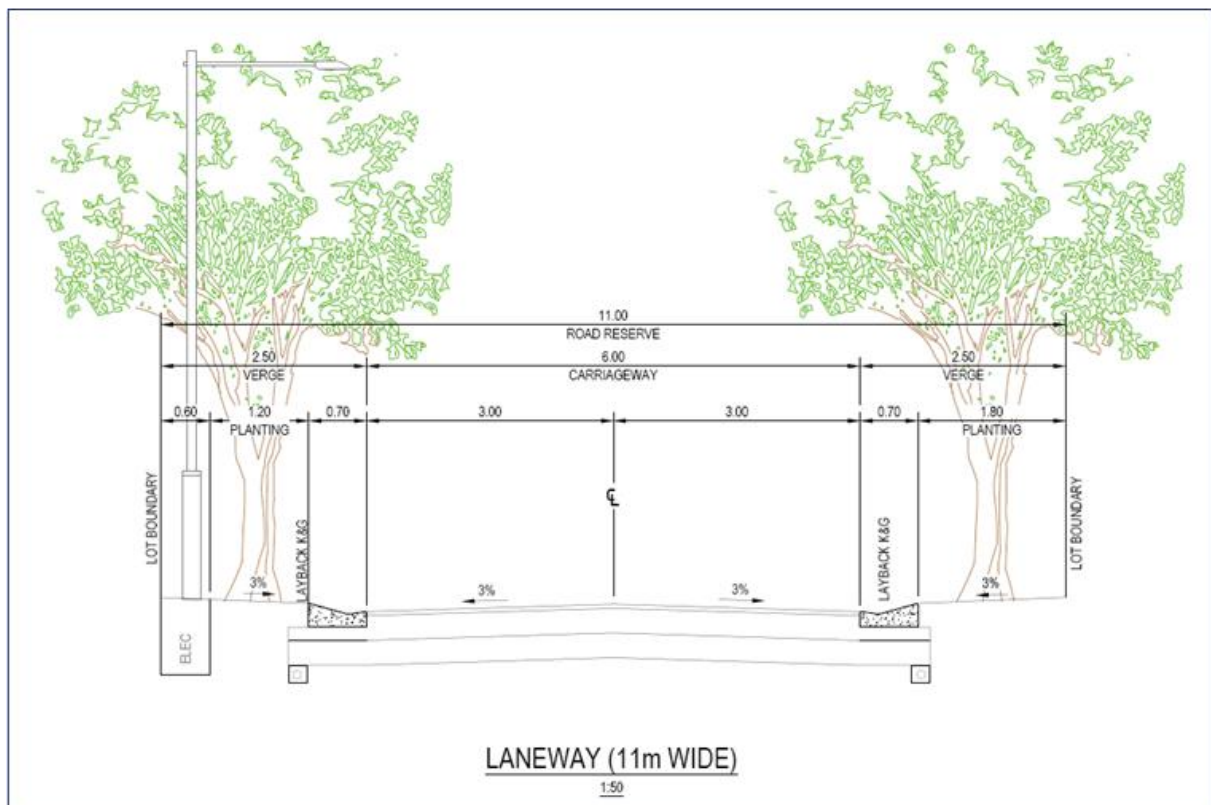
Source: Newquest

Figure 29: Recommended Local Street Profile



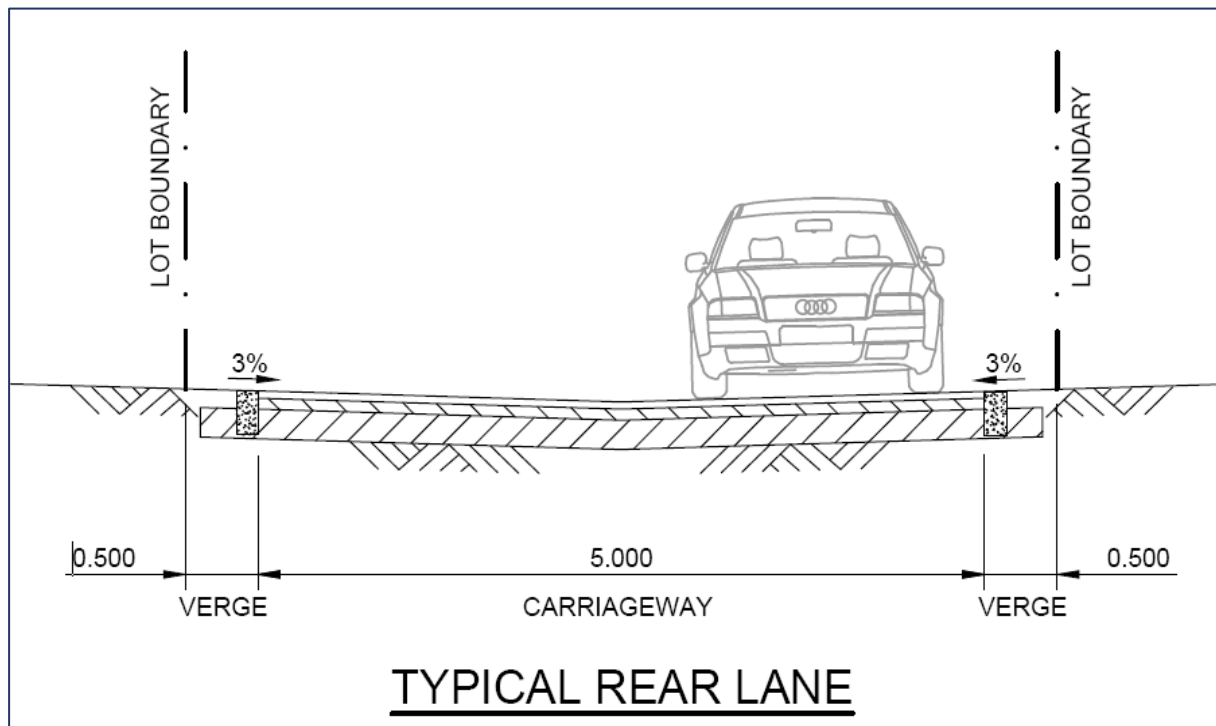
Source: Newquest

Figure 30: Recommended Laneway Profile



Source: Newquest

Figure 31: Recommended Rear Laneway Profile



Source: Haverton Homes

5.8 Temporary Vehicle Access

arc traffic + transport has not been able to find a reference in the Shoalhaven DCP in regard to the provision of temporary vehicle access as different sites within the MVRN URA are developed at different times. While this issue can be further discussed with Council, it is anticipated that temporary turning heads and half-width roads will be required to be constructed by developers where adjacent sites are not yet developed.

With reference to numerous Growth Area DCPs, the design of half-width roads are anticipated to have the following general characteristics:

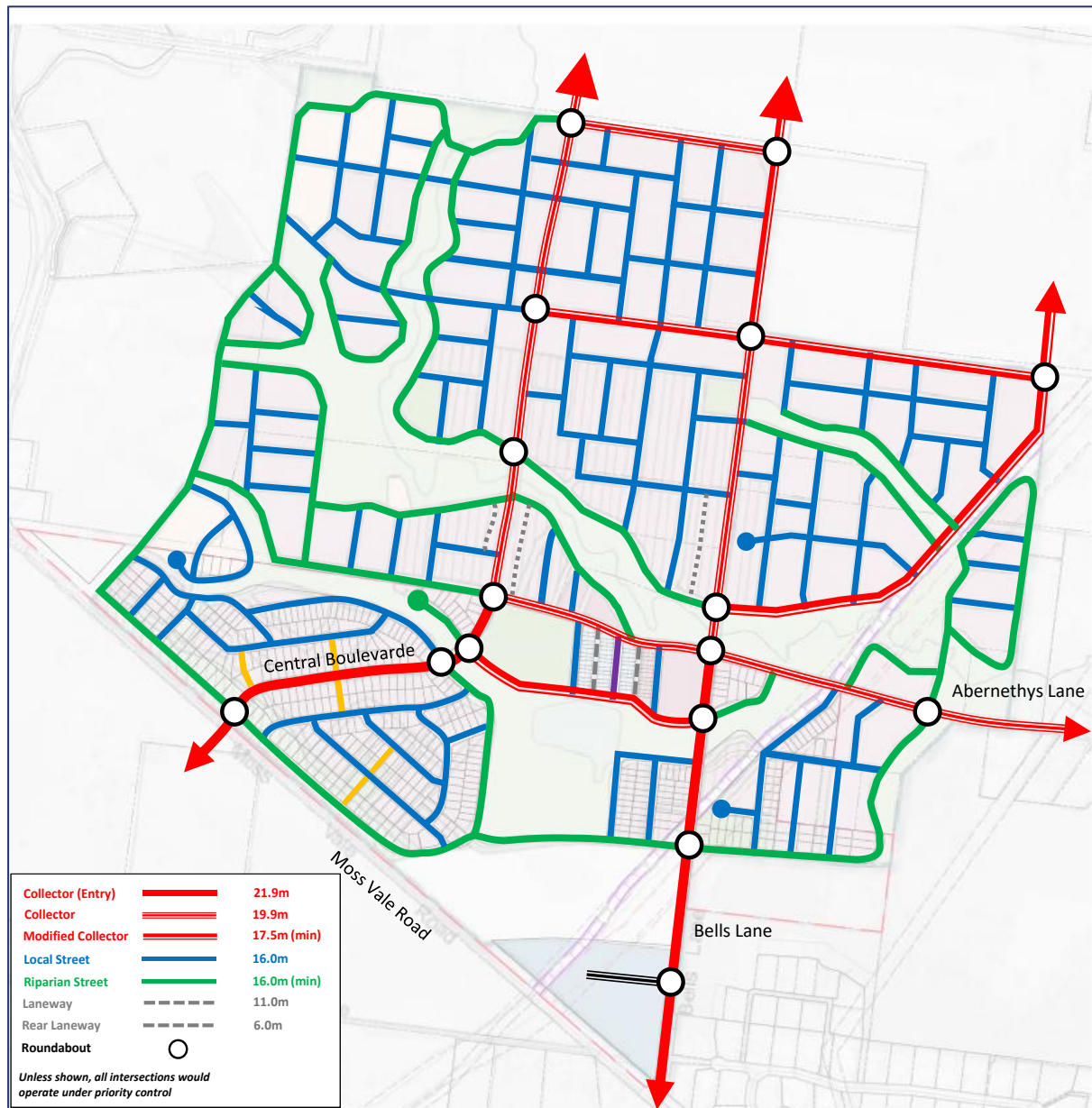
- Half-width roads would only be permitted where the road is located on the side boundary of the land to be developed;
- The centreline (of the full-width road) would be located on the site's boundary; and
- A minimum carriageway width of 5.5 metres is anticipated to be required for all half-width roads to provide for two-way traffic flow.

As discussed, full details of the requirements for the construction of half-width roads can be determined further to consultation with Council, and ideally would be included in the final MVRN DCP.

6 Recommended MVRN URA Road Network

With reference to the assessment of intersection treatments provided in Section 4.4, and the assessment of road profiles provided in Section 5, Figure 32 provides a summary of the recommended road hierarchy and network, which would effectively update the MVRN SHNP provided as Figure 7 of the MVRN Draft DCP.

Figure 32: Recommended Street Hierarchy and Network Plan



7 Conclusions

Further to our assessment of the MVRN URA documentation, and the Concept Plans prepared by the Proponents, arc traffic + transport provides the following Conclusions.

7.1 Road Profiles

- AADT volumes across most roads in the MVRN URA, and particularly local roads, are minimal.
- These volumes align with the control volumes adopted in the **MVRN ITS** for Access Streets with an AADT volume of less than 750vpd, and as such the traffic carrying capacity of higher order roads identified in the MVRN ITS – and specifically the Local Street, Retail Street and Riparian Street profiles – is not required.
- There is substantial justification for the adoption of the road profiles proposed in the Concept Plans, which include:
 - A **Collector Road (Entry)** with a road reserve of 21.9m;
 - A **Collector Road** with a road reserve of 19.9m;
 - A **Riparian Collector Road** (adjacent to riparian, watercourse or gas line corridors, or land not included in the MVRN URA) with a minimum road reserve of 17.5m, to be widened where necessary to meet APZ requirements;
 - A **Retail Street** with a road reserve of 19.9m;
 - A **Local Street** with a road reserve of 16.0m;
 - A **Riparian Street** (adjacent to riparian, watercourse or gas line corridors, or land not included in the MVRN URA) with a minimum road reserve of 16.0m to be widened where necessary to meet APZ requirements;
 - A **Laneway** with a road reserve of 11.0m; and
 - A **Rear Laneway** with a road reserve of 6.0m.
- The primary justification for these road profiles is simple reference to the broader Shoalhaven DCP and other Council guidelines. In this regard:
 - The road profiles adopted in the Concept Plans are generally the same as those recently adopted in the MVRN DCP, which provides for identical low density residential development as that proposed for the MVRN URA;
 - The road profiles adopted in the Concept Plans are generally the same as those approved in low density residential developments across the Shoalhaven LGA;
 - The road profiles adopted in the Concept Plans are generally the same those recently approved by Council for several new residential subdivisions within the MVRN URA; and
 - The road profiles adopted in the Concept Plan are entirely consistent with the road profiles identified in AUS-SPEC D1, which are Council's own adopted engineering specifications.

- Justification for the road profiles adopted in the Concept Plans is also demonstrated by referencing NSW and national road design guidelines; in this regard:
 - The road profiles adopted in the Concept Plans have similarly been adopted in DCPs prepared by local Councils and DPIE for new residential areas in the Sydney North-West and South-West Growth centres;
 - The road profiles adopted in the Concept Plans are entirely consistent with road design specifications for new residential precincts prepared by the planning departments of the Victorian, Queensland, South Australian and West Australian State Governments; and
 - The road profiles adopted in the Concept Plans are entirely consistent with the AMCORD residential design guidelines prepared by the Commonwealth Government.
 - The road profiles adopted in the Concept Plans are compliant with the requirements of PBP 2019.

In summary, it is the opinion of arc traffic + transport that the road profiles adopted in the Concept Plans are not only supportable, but are entirely consistent with existing Council, NSW and National design guidelines.

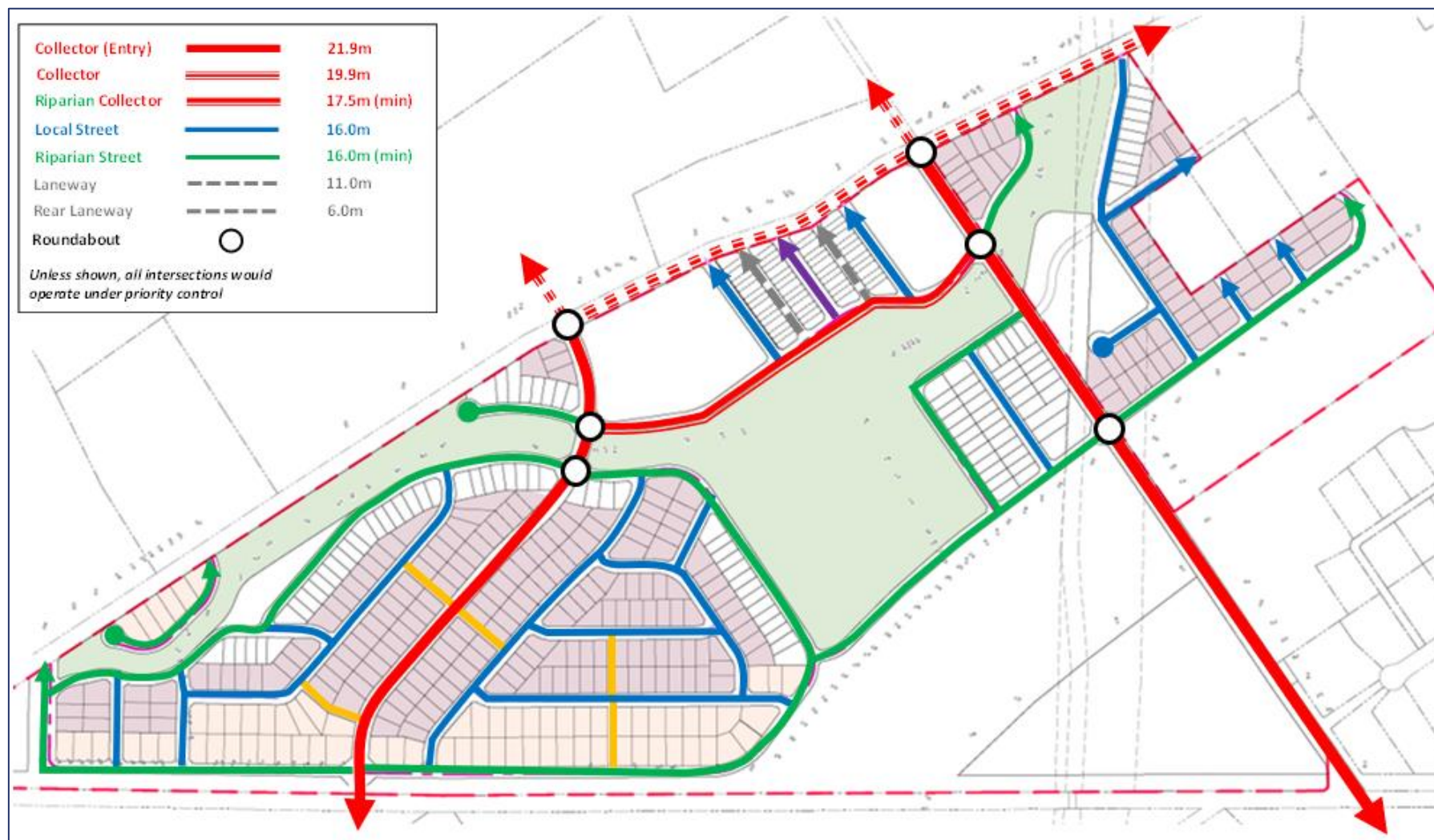
7.2 Intersections

- The MVRN Draft DCP provides a road network with a significant number of intersections operating under roundabout control. There is substantial justification for a reduction in the number of roundabouts; in this regard:
 - Other than a small number of intersections of Collector Road, the majority of intersections operate with total traffic volumes of less than 350vpd, or with minor approach volumes of less than 30vph, representing an average of less than 2vph in the minor approaches.
 - Based on a review of other new residential road networks across NSW, there is no evidence that or examples of roundabouts being required in close proximity to each other at intersections of Collector Roads & Local Streets as identified in the MVRN DCP;
 - Based on a review of other new residential road networks across NSW, there is no evidence that or examples of roundabouts being required at the intersections of Local Streets;
 - Roundabouts provide poor outcomes for pedestrians and cyclists, as they are forced to divert from the optimum desire line to cross roundabout approaches; and
 - Roundabouts provide extremely poor outcomes further to consideration of sustainable planning outcomes; the conversion of low volume roundabouts to priority intersections would reduce the road surface area across the MVRN URA by some 35,000m², the equivalent of approximately 7 football fields of road surface.

In summary, it is the opinion of arc traffic + transport that a reduction in the number of roundabouts across the MVRN URA is not only supportable, but is entirely consistent with existing Council, NSW and National road network design guidelines, and responsible and sustainable planning practice.

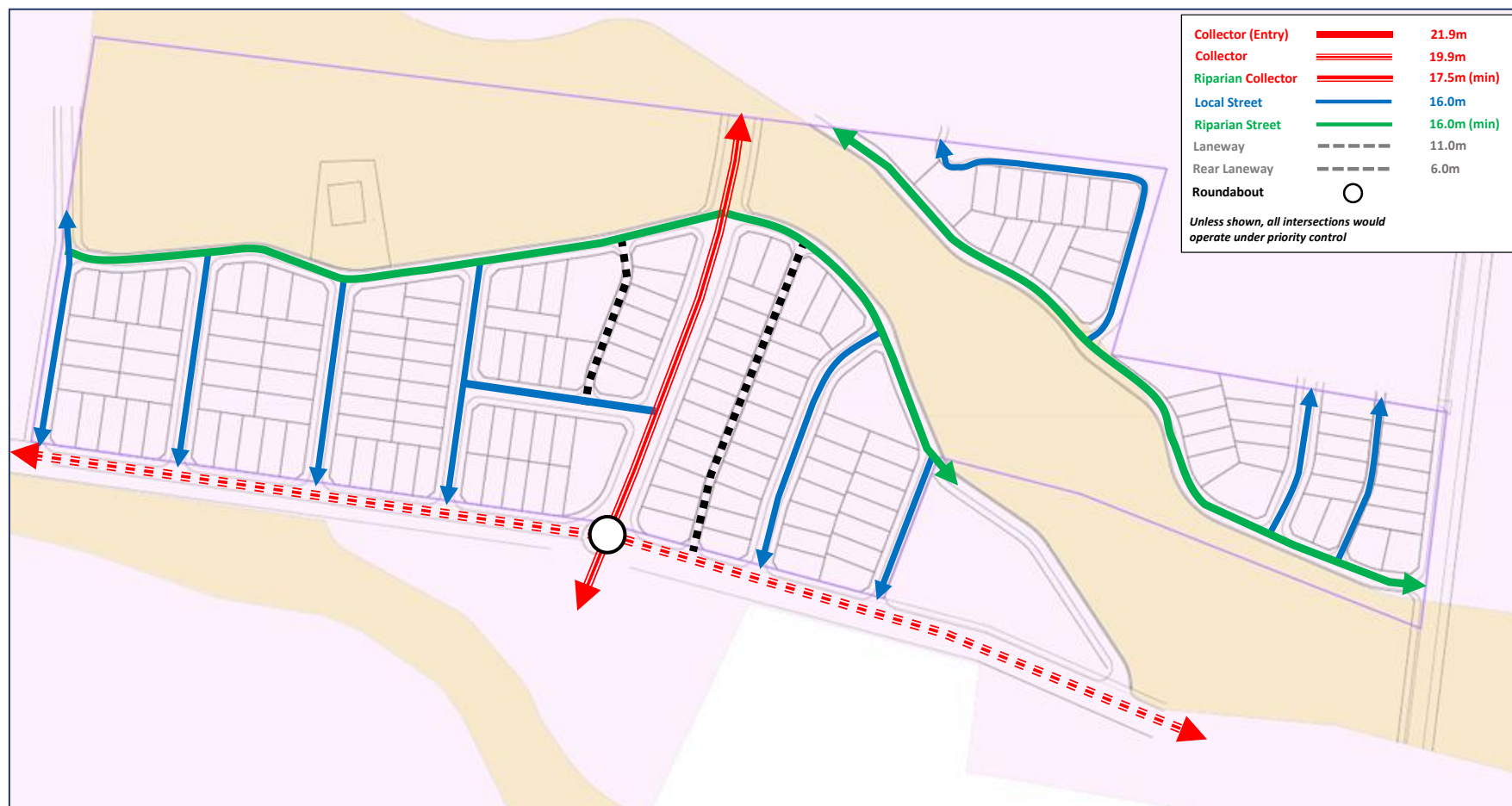
Appendix A: Proponent MVRN URA Concept Plans

Newquest Property MVRN URA Concept Plan



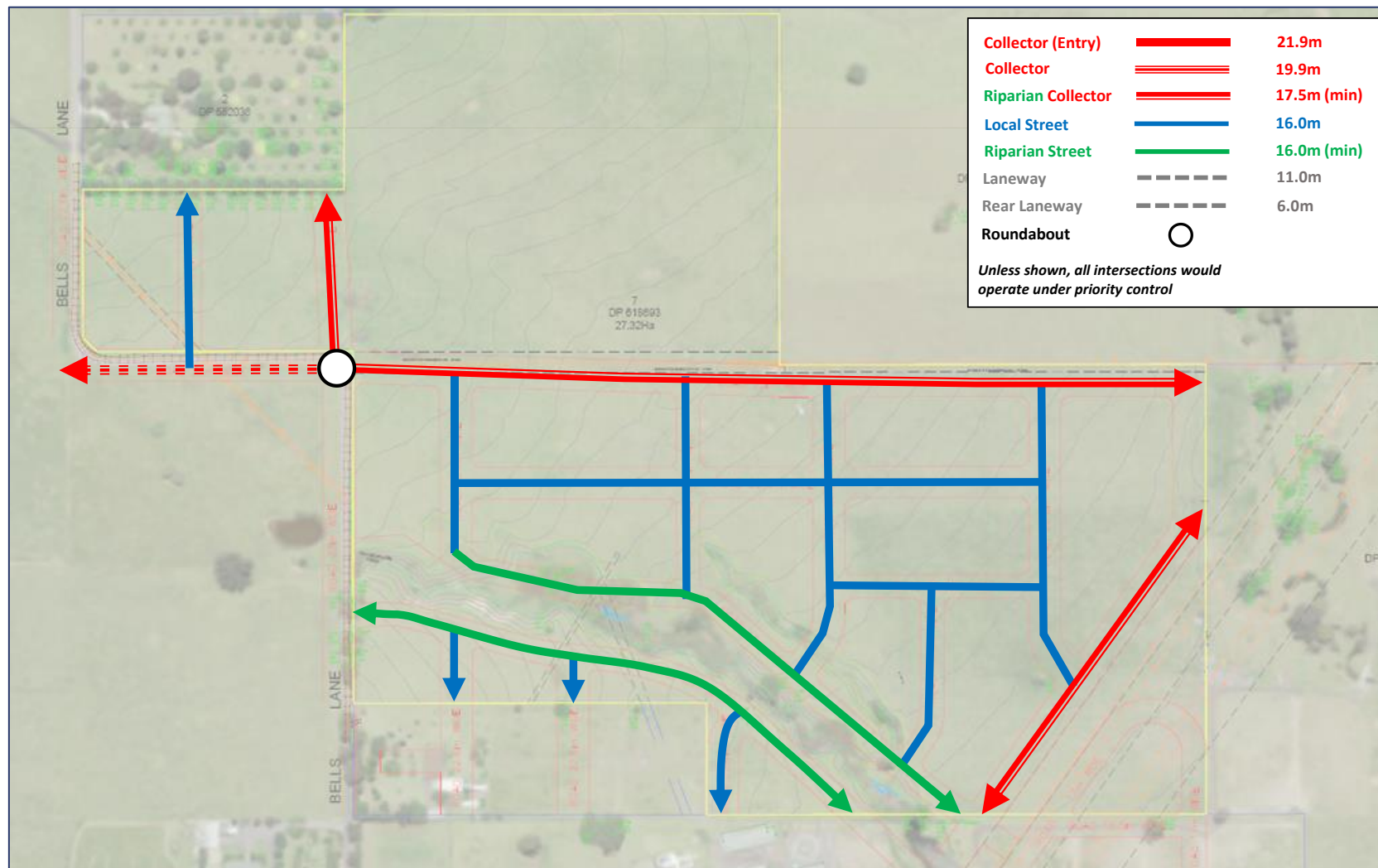
Source: Newquest

McDonald Jones Homes MVRN URA Concept Plan



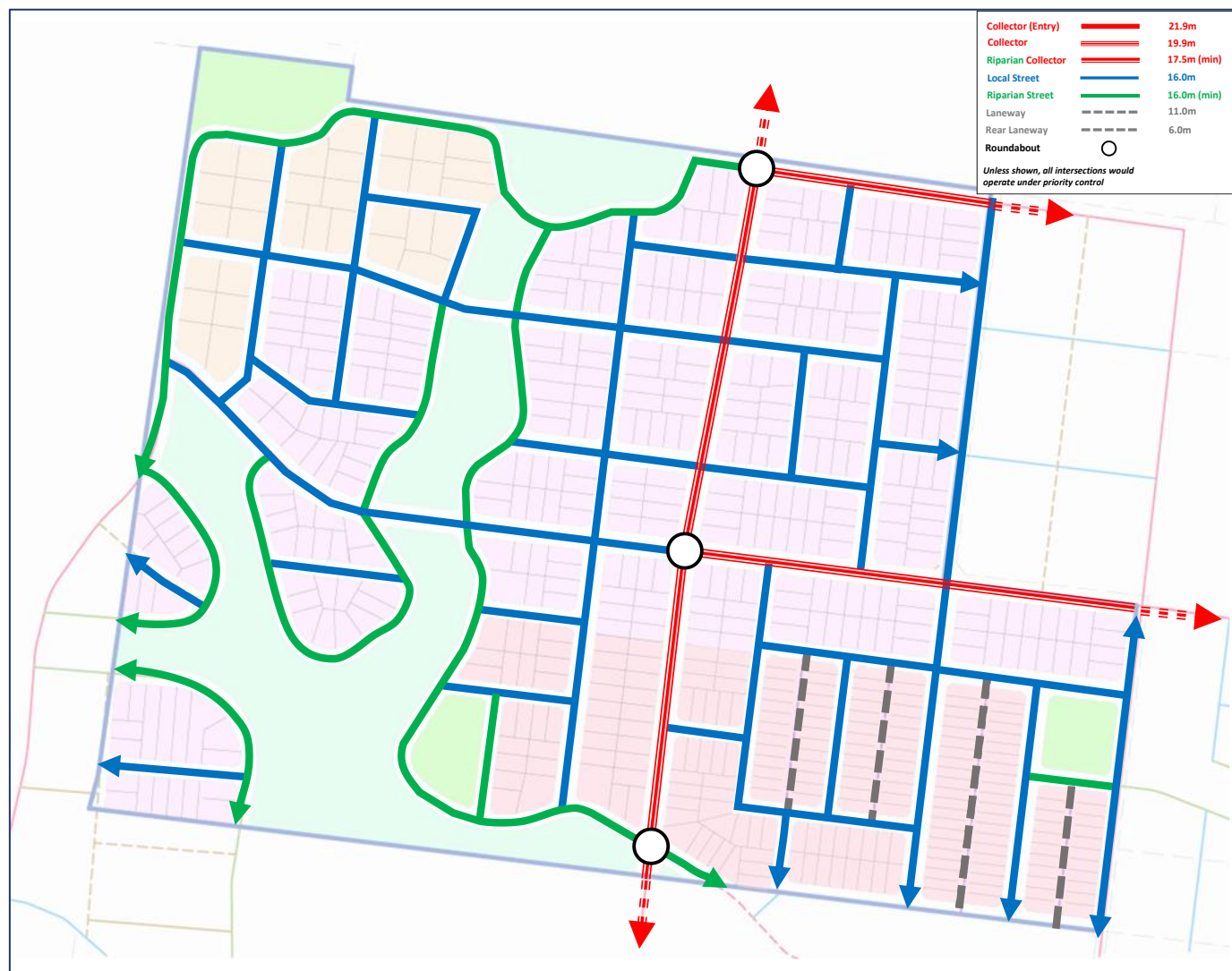
Source: McDonald Jones

Haverton Homes MVRN URA Concept Plan



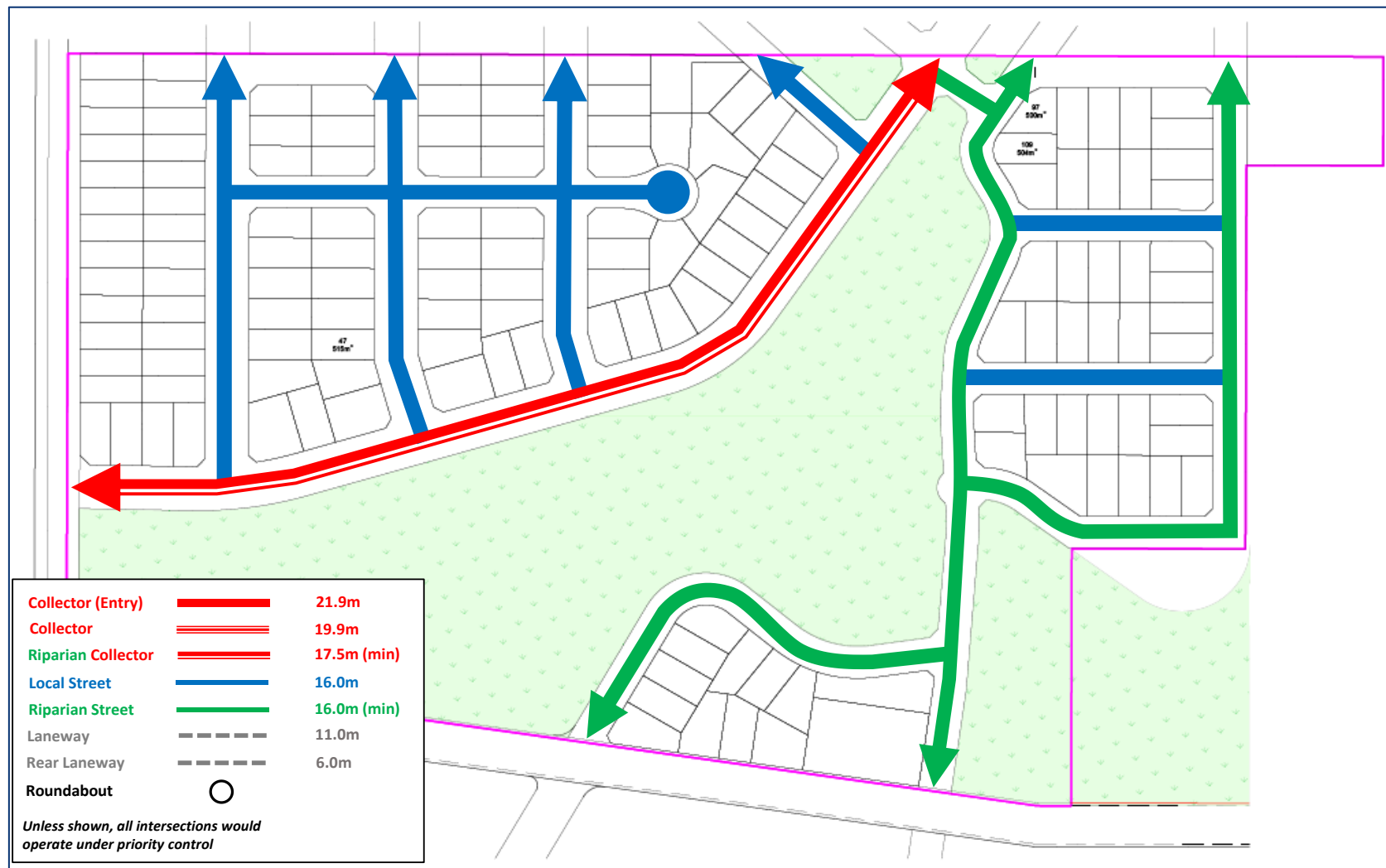
Source: Haverton Homes

Mayrin Group Concept Plan



Source: Mayrin Group

Arissa Property Group MVRN URA Concept Plan



Source: Arissa Property Group