



STRATEGIC BUSH FIRE STUDY

FOR
A PLANNING PROPOSAL
AT

**46 – 54 FERODALE ROAD AND 754
MEDOWIE ROAD,
MEDOWIE, NSW 2318**

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Executive Summary

A Strategic Bush Fire Study (SBFS) has been prepared by Firebird ecoSultants Pty Ltd at the request of VC Management for a planning proposal at Lots 3 - 8 – DP243518 also known as 46-54 Ferodale Road and 754 Medowie Road, Medowie NSW 2318. The report forms part of the supporting documentation for a Planning Proposal for rezoning to be submitted to Port Stephens Council (PSC).

The subject site is ~7.7 ha in size and is located in central Medowie. The site is currently zoned as RU2 Rural Landscape. The site consists of six lots. All lots contain an existing dwelling and some cleared areas interspersed with native vegetation. The site is surrounded by both low density and rural residential areas and is also connected to large areas of native vegetation. The site falls within Hunter Water's Grahamstown Dam Drinking Water Special Area. Wetlands have been mapped in part of the site (see Figure 1-1.2). A Flood Planning Area has been mapped through the site (see Figure 1-1.3). An ephemeral watercourse runs through the site, through this Flood Planning Area.

VC Management have undertaken a number of investigations to identify the constraints and opportunities for future development. This Strategic Bush Fire Study has been prepared to support the planning proposal which seeks to rezone the site from RU2 Rural Landscape to R3 Medium Density Residential and E1 Local Centre.

The development is defined as a planning proposal to amend the Port Stephens Local Environmental Plan 2013 (PSLEP 2013) under the Environmental Planning and Assessment Act 1979 (EP&A) (Division 3.2). This amendment will enable residential subdivision and subsequent the construction of dwelling houses, which will then need to demonstrate compliance with the National Construction Code (PS.7.5 – Buildings in Bushfire Prone Areas). Because of this, it is to be demonstrated that future houses can be sited to achieve 29KW/m² or less.

The development is required to satisfy EP&A Act 1979 (Section 9.1 – Ministerial Direction, 4.4 – Planning for Bushfire Protection) for the planning proposal and EP&A Act 1979 (Section 4.46 – What is Integrated Development) for the residential subdivision. Council will refer the BAR to the NSW RFS to satisfy the gateway determination for the proposal and then need to satisfy the Rural Fire Act 1997 (s100B) for the subdivision.

This Report demonstrates how the development conforms with the document titled 'Planning for Bushfire Protection' (PBP). The aim of PBP is to provide for the protection of human life and minimise the impacts on property from the threat of bush fire, while having due regard to development potential, site characteristics and protection of the environment (p.10).

Council and the NSW RFS must be satisfied that the development conforms to the Bushfire Protection Measures (BPM)s listed within PBP under the EP&A ACT 1979 (s4.14 – Consultation and development consent – certain bush fire prone land). The BPMs identified for the development are:



1. Asset Protection Zone (APZ) – The APZ provides space and reduced fuel loads to ensure radiant heat levels at the buildings are below critical limits and to prevent direct flame contact.

The APZ is the distance from the external wall of the habitable building or building envelope to the unmanaged vegetation line.

APZs for Residential Development

The shortest distance from the building envelope to the unmanaged vegetation line has been identified to be 24m to the Eastern elevation (inclusive of managed land on No. 56 Ferodale Road), 24m to the Western elevation across Medowie Road and 11m to the Northern elevation across Ferodale Road. The retained vegetation within the Southwestern portion of the subject site (directly South of proposed commercial development) identifies an 18m APZ to the Northeastern elevation and a 14m APZ to the Southeastern elevation that will encroach into the retained vegetation. The remaining area of wildlife corridor is proposed to be maintained through a Plan of Management (PoM) and under a suitably worded 88b instrument to ensure maintenance standard of an APZ. Refer to Figure 3-1.

APZs for the Childcare Centre

Development classified as Special Fire Protection Purposes is required to meet the minimum APZs in Table A1.12.1 in PBP 2019 so as to not be exposed to radiant heat level $>10\text{kW/m}^2$. The proposed location of the childcare centre is the most suitable within the site and will be able to implement the required APZs to comply with PBP 2019. Refer to Figure 3-2.

APZs for Commercial Development

The proposed commercial development within the site must meet the aims and objectives of Chapter 1 in PBP 2019 as stated in Section 8.3.10.

Management of APZs

In order to achieve the above Bushfire Attack Level (BALs) for future Buildings, an APZ is to be managed in accordance with 'Planning for Bushfire Protection (Appendix 4 – Asset Protection Zone Requirements)' and the document titled 'Standards for Asset Protection Zones'. The APZ is entirely within the boundaries of the site.

2. Property Access Roads – Access standards provide for emergency evacuation and firefighting operations.

An assessment of the Indicative Subdivision Plans (Appendix A) has identified no specific access requirements for the individual buildings as they will be located in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles.



3. Perimeter Roads - Access standards provide for emergency evacuation and firefighting operations.

No perimeter roads are required to the North as Ferodale Rd occurs, to the West as Meadowie Road occurs, managed land occurs to the East and an existing subdivision occurs to the South with a perimeter road to separate. It is noted that an 8m carriageway width is provided for the roads within the subject site however it is assumed that no parking is permitted within the carriageway. This will allow efficient access / egress to future buildings while having regard for the retention of koala habitat in the corridor, that will be managed as an APZ under an 88b instrument.

4. Non-Perimeter Roads - Access standards provide for emergency evacuation and firefighting operations.

The non-perimeter roads identified on the subdivision plan need to be consistent with the following requirements from PBP 2019:

- a. Traffic management devices are constructed to not prohibit access by emergency services vehicles;
- b. One way only public access roads are not less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression;
- c. Minimum 5.5m carriageway with kerb to kerb;
- d. Parking is provided outside of the carriageway width;
- e. Hydrants are located clear of parking areas;
- f. Are through roads, and these are linked to the internal road system at an interval of no greater than 500m;
- g. Dead end roads are not recommended, but if unavoidable, are not more than 200 metres in length, incorporated a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end;
- h. Curves of roads have a minimum inner radius of 6m;
- i. The maximum grade road is 15 degrees and average grade of not more than 10 degrees;
- j. The road crossfall does not exceed 3 degrees; and
- k. A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.
- l. Bridges and Causeways are designed sufficiently to carry a fully loaded firefighting vehicle (up to 23 tonnes) and signage is put in place to clearly indicate the maximum load rating of 23 tonnes,
- m. Hydrants are:
 - Located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression, and
 - Provided in accordance with the relevant clauses of AS 2419.1:2005.



5. Water Supplies – A water supply is required for firefighting operations.

An assessment of the Indicative Subdivision Plans (Appendix A) has identified reticulated water and an associated water hydrant will be provided within 70m of future buildings because of the construction of local roads. This reticulated water supply is to be designed and constructed to:

- a. Reticulated water is to be provided to the development where available;
- b. Fire hydrant, spacing, design and sizing complies with the relevant clauses of the Australian Standard AS 2419.1:2005;
- c. Hydrants are not located within any road carriageway; and
- d. Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads;
- e. Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.
- f. Above-ground water storage tanks shall be concrete or metal.

6. Electricity Services – The installation of new electricity seeks to limit the possibility of igniting the surrounding bushland.

Transmission lines are to be placed underground. If placing them underground is not practical, then overhead transmission lines are to:

- a. Be installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas, and
- b. No part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 – Guideline for Managing Vegetation Near Power Lines.

7. Gas Services – The location and design of gas services will not lead to the ignition of surrounding buildings or the fabric of buildings.

The provision of gas requires that:

- a. Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities,
- b. Metal piping is used,
- c. All fixed gas cylinders are kept clear of all flammable materials to 10m and shielded on the hazard side,
- d. Connections to and from gas cylinders are metal,
- e. Polymer-sheathed flexible gas supply lines are not used, and
- f. Above-gas service pipes are metal including and up to any outlets.

8. Construction Standards – Construction standards seek to increase the protection of the habitable buildings from bushfire.

Based on the APZs provided above, we understand that future dwellings may be sited to achieve > 29kW/m², which would result in BAL-29 or less and a future childcare centre has been sited to achieve <10kW/m², which would result in BAL-12.5. PBP Appendix B



Addendum November 2022 requires that a construction level of BAL-19 or greater is applied to certain class 9 buildings (i.e. childcare centres) when affected by bushfire. However, all future buildings will be subject to a separate Bushfire Assessment Report (BAR) at the DA stage for that development.



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Ecologist / Bushfire Planner



Terms & Abbreviations

Abbreviation	Meaning
APZ	Asset Protection Zone
AS2419 -2005	Australian Standard – Fire Hydrant Installations
AS3959-2018	Australian Standard – Construction of Buildings in Bush Fire Prone Areas
BCA	Building Code of Australia
BPA	Bush Fire Prone Area (Also Bushfire Prone Land)
BFPL Map	Bush Fire Prone Land Map
BPMs	Bush Fire Protection Measures
BFSA	Bush Fire Safety Authority
CC	Construction Certificate
PSC	Port Stephens Council
<i>EPA Act</i>	<i>NSW Environmental Planning and Assessment Act 1979</i>
FFDI	Forest Fire Danger Index
FMP	Fuel Management Plan
ha	hectare
IPA	Inner Protection Area
LGA	Local Government Area
OPA	Outer Protection Area
PBP	Planning for Bushfire Protection 2019
PoM	Plan of Management
RF Act	Rural Fires Act 1997
PTS	Port Stephens Council
RF Regulation	Rural Fires Regulation



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I INTRODUCTION

A Strategic Bush Fire Study (SBFS) has been prepared by Firebird ecoSultants Pty Ltd at the request of VC Management for a planning proposal at Lot 3 to Lot 8 – DP243518 also known as 46-54 Ferodale Road and 754 Medowie Road, Medowie NSW 2318, hereafter referred to as the “site” (refer to Figure 1-1 for site locality). Refer to Appendix A for Proposed Site Plans.

This SBFS is suitable for submission with a Planning Proposal (i.e., rezoning) and provides information on measures that will enable the development to comply with ‘Planning for Bushfire Protection’ (NSW RFS, 2019), AS3959-2018 Construction of Buildings in Bush Fire Prone Areas, the development is required to satisfy EP&A Act 1979 (Section 9.1 – Ministerial Direction, 4.4 – Planning for Bushfire Protection) for the planning proposal and EP&A Act 1979 (Section 4.46 – What is Integrated Development) for the residential subdivision.

This report aims to consider and assess the amendment of Port Stephens Local Environmental Plan 2013 (PSLEP 2013) to enable residential subdivision and subsequent the construction of dwelling houses, identify the bushfire hazard and associated potential threats relevant to such a proposal and to outline the minimum mitigative measures which would be required in accordance with the abovementioned provisions of legislation.

I.1 Site Particulars

Locality:	Lot 3 to Lot 8 – DP243518 Ferodale/Medowie Road, Medowie NSW 2318
LGA:	Port Stephens Council
Current Land Use:	Existing dwellings on lots
Forest Danger Index:	100 FFDI
Significant Features:	Medowie is characterised by detached dwellings that are located within a residential Urban Release Area (URA). The site has direct access via Ferodale Road and Macadamia Circuit.
Bushfire Prone Land Map:	The site is identified as BFPL, being Vegetation Category 1 and Vegetation Category 2.



1.2 Scope

The scope of this SBFS is to enable residential subdivision and subsequently, the construction of dwelling houses, commercial buildings and a childcare centre. This report is to identify the bushfire hazard and associated potential threats relevant to such a proposal and to outline the minimum mitigative measures which would be required for the land and development to comply with 'Planning for Bushfire Protection' (NSW RFS, 2019), AS3959-2018 Construction of Buildings in Bush Fire Prone Areas, the development is required to satisfy EP&A Act 1979 (Section 9.1 – Ministerial Direction, 4.4 – Planning for Bushfire Protection) for the planning proposal and EP&A Act 1979 (Section 4.46 – What is Integrated Development) for the residential subdivision.

1.3 Proposal

The proposal is for a planning rezoning to support a residential subdivision. Refer to Figure 1-1 for Site Map. Under the Environmental Planning and Assessment Act 1979, 'subdivision' is defined as 'the division of land into two or more parts that, after the division, would be adopted for separate occupation, use or disposition', which includes boundary adjustments (PBP, 2019, p.40).

The Planning Proposal seeks to enable subdivision of the subject land for the purpose of residential accommodation, commercial development and a childcare centre in accordance with the Medowie Strategy.

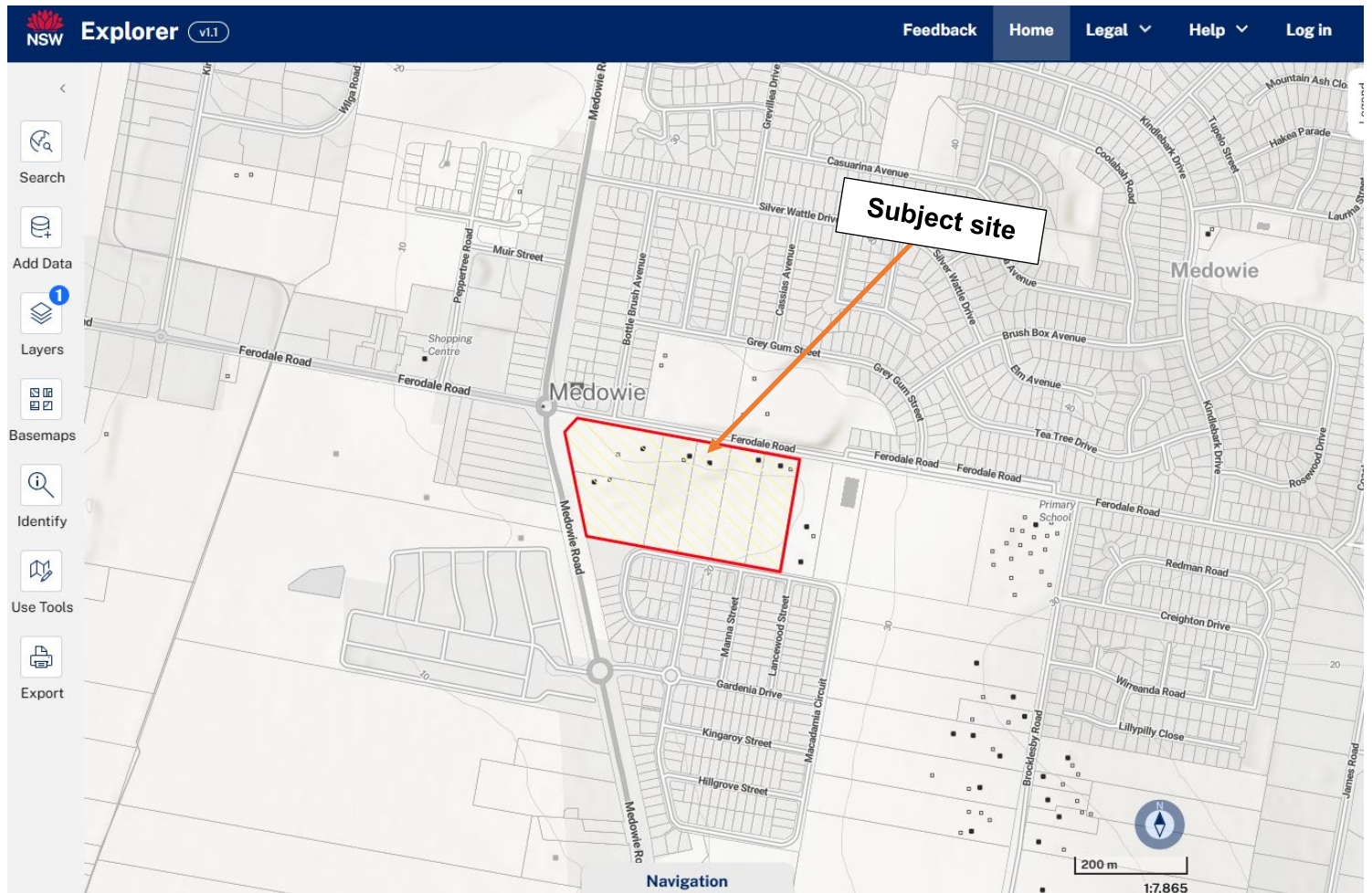
The Planning Proposal shall achieve this by:

- Amending the land-use zone from RU2 Rural Landscape to R3 Medium Density Residential and E1 Local Centre; and

The site is located on Ferodale Road and Medowie Road. The site has a combined area of ~7.7 ha and is within close proximity to the town centre, public transport and local schools. Under the Port Stephens Local Environmental Plan 2013 (the LEP), the site is currently zoned as RU2 Rural Landscape and has a minimum lot size requirement of 20 ha.

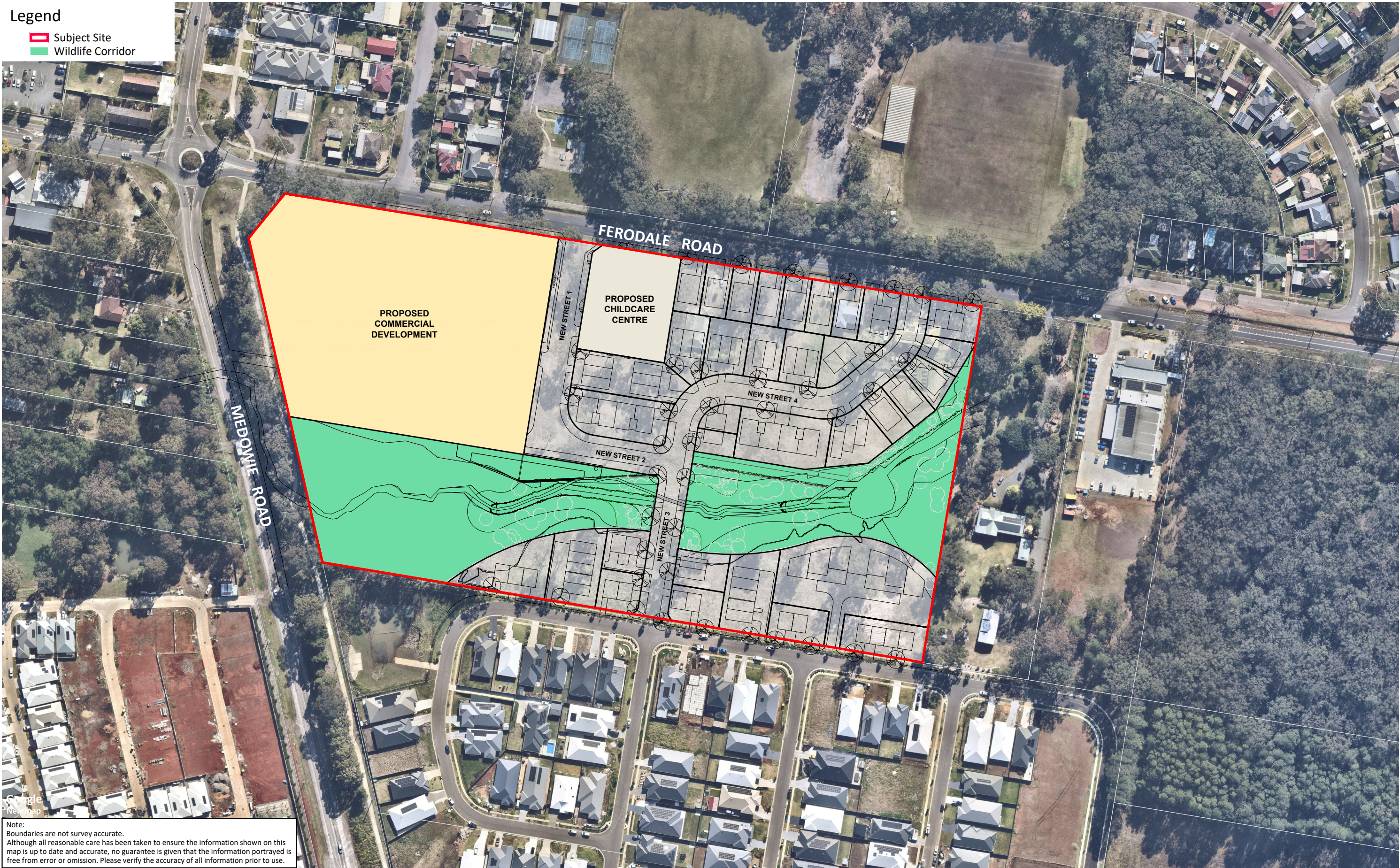
The site is identified as a 'rural residential release area' within the Medowie Strategy and earmarked for future rural residential development, extending on from the existing residential developments to the north, west and south of the site. Surrounding land uses are predominantly urban residential developments to the north, commercial and residential to the West, commercial and school to the East, with existing and future developments to the South.

Figure 1-1: Site Location



Legend

- Subject Site
- Wildlife Corridor

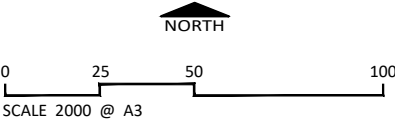


Note:
Boundaries are not survey accurate.
Although all reasonable care has been taken to ensure the information shown on this map is up to date and accurate, no guarantee is given that the information portrayed is free from error or omission. Please verify the accuracy of all information prior to use.

FIGURE 1-2: SITE MAP

CLIENT
SITE DETAILS
DATE

Client
Ferodale Road Medowie
7 January 2025



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2 SITE ASSESSMENT

The following assessment has been undertaken in accordance with the requirements of PBP (RFS, 2019). Vegetation surveys and vegetation mapping carried out on the site has been undertaken as follows:

- Aerial Photograph Interpretation to map vegetation cover and extent
- Confirmation of the vegetation assemblage typology present.

Slope assessment has been undertaken as follows:

- Aerial Photograph Interpretation in conjunction with analysis of electronic contour maps with a contour interval of 2m (Spatial Map Viewer).

2.1 Vegetation & Slope Assessment

In accordance with PBP (RFS 2019), an assessment of the vegetation over a distance of 140m in all directions from the site was undertaken. Vegetation that may be considered a bushfire hazard was identified in all directions from the site. This assessment is depicted in Table 2-1 and Figure 2-1 that shows the vegetation post development.

In accordance with PBP (RFS 2019), an assessment of the slope that the vegetation considered a bushfire hazard was undertaken and the results are presented in Table 2-1 below.

Table 2-1: Vegetation and slope Classification

Rezoning for a Residential Subdivision		
Direction	Vegetation Type	Slope
North	Remnant vegetation	Upslope
East	Managed Land within No. 56 and No. 58 Ferodale Road followed by Forest vegetation	Upslope
Southwest	Remnant vegetation within the site	Downslope (5-10°) to the Northeast elevation
		Downslope (0-5°) to the Southeast elevation
West	Forest vegetation	Downslope (0-5°)

Vegetation mapping provided by SEED Portal is provided as Figure 2-2 below.

Legend

- Subject Site
- 140m Buffer
- Open Forest
- Remnant Vegetation
- Managed Land

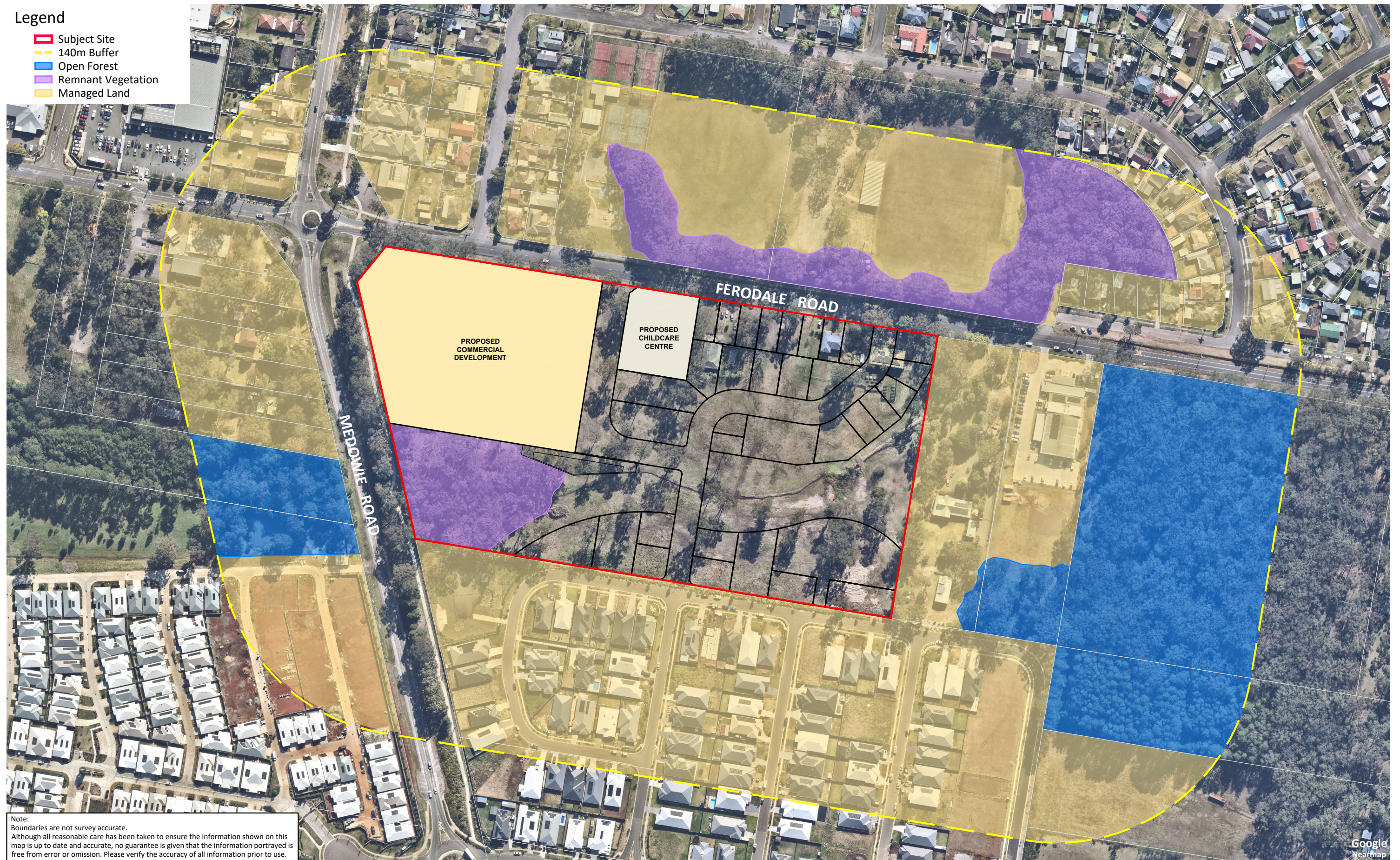
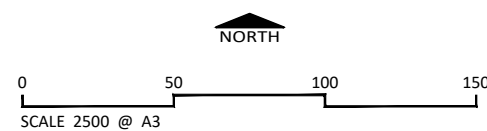


FIGURE 2-1: VEGETATION MAP

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SITE DETAILS
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Ferodale Road Medowie
7 January 2025

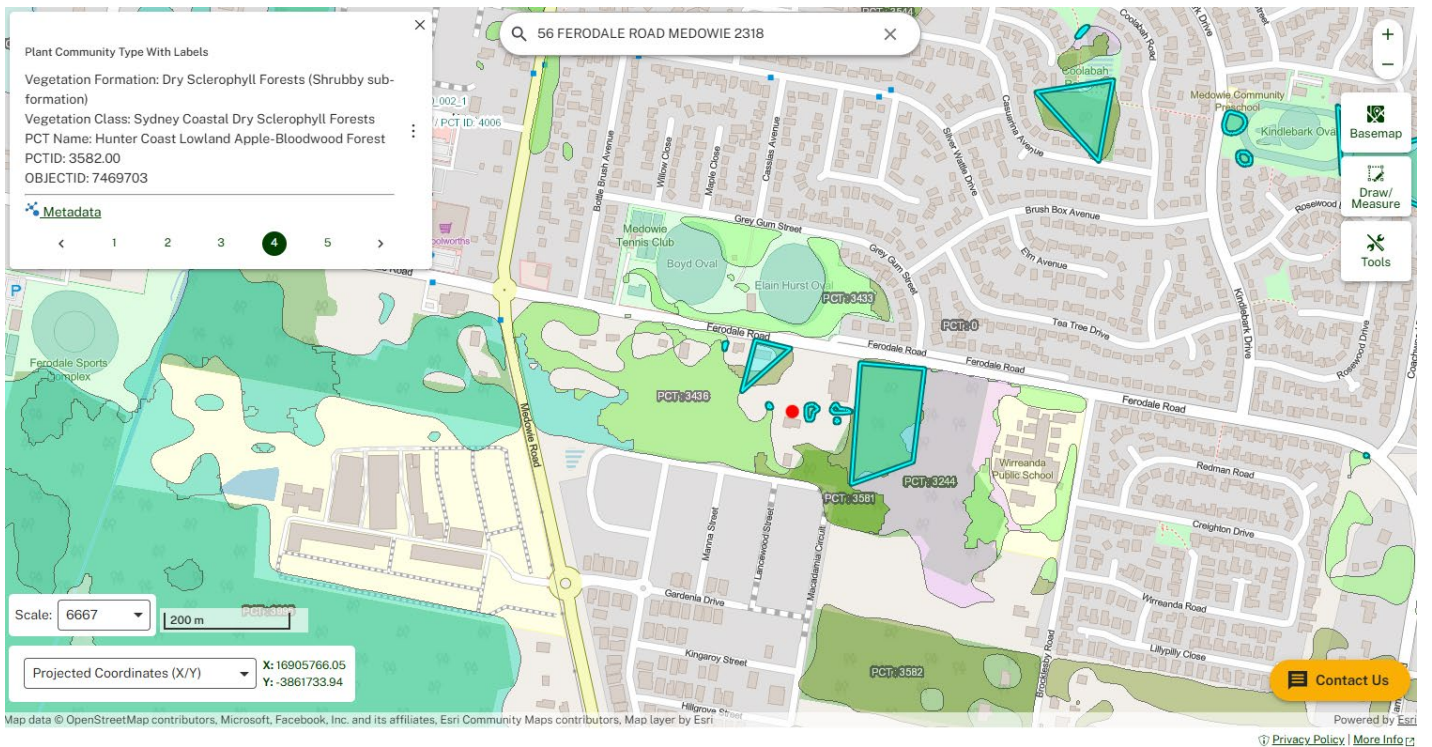


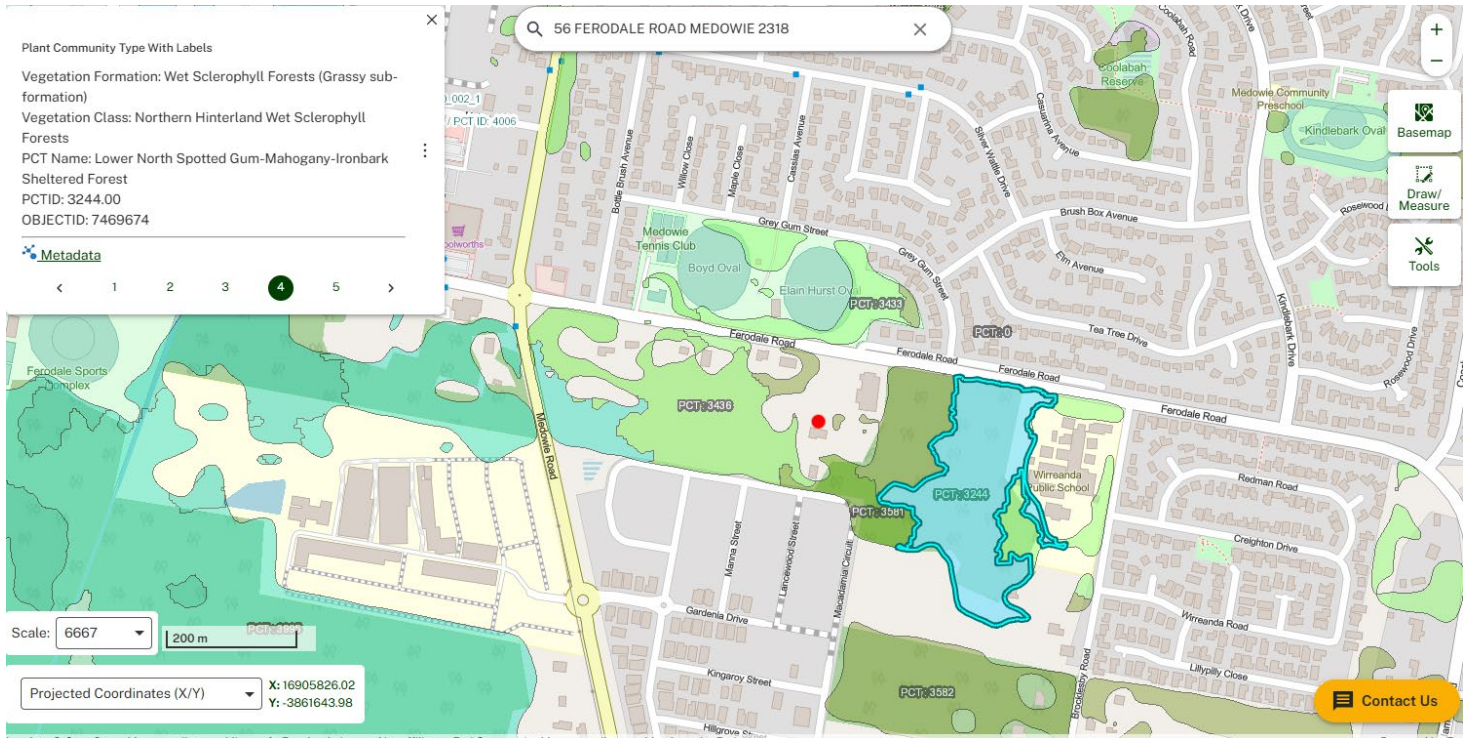
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Figure 2-2: Vegetation Maps from SEED Portal





2.2 Determination of Fire Danger Index (FDI)

The LGA is Port Stephens in accordance with the NSW Planning Portal, which was and therefore the FDI is Greater Hunter (100).

3 BUSHFIRE PROTECTION ASSESSMENT

3.1 Asset Protection Zones (APZ)

The PBP (RFS, 2019) guidelines has been used to determine the widths of the APZs required for habitable buildings within the site using the vegetation and slope data identified in Section 2-1 of this report.

The site lies within Port Stephens Local Government Area and therefore is assessed under a FDI rating of 100. Using the results from the Site Assessment (section 2-1 of this report) the deemed to satisfy APZ requirements for the proposed buildings within the site was determined using AS3959 (2009) Refer to Table 3-1 and Figure 3-1 for required APZs for future habitable buildings.

Table 3-1: Recommended APZs for future residential dwellings

Vegetation Type & Direction	Separation Distance from vegetation	Effective Slope (within 100m)	APZ required in accordance with PBP 2019 as per Table A1.12.2	APZ to be Provided	Width of allowable OPA	Comment
Remnant vegetation followed by managed parks	>20m	Upslope	11m	An APZ of 11m is established by Ferodale Road	N/A	Acceptable solution in accordance with PBP (RFS, 2019)
Managed land followed by Forest vegetation to the East	>48m	Upslope	24m	An APZ of >48m exists on the adjacent managed land.	10m	Acceptable solution in accordance with PBP (RFS, 2019)
Remnant vegetation within the site	>18m	Downslope (5-10°)	18m	An APZ of 18m is to be established	N/A	Acceptable solution in accordance with PBP (RFS, 2019)
Remnant vegetation within the site	>14m	Downslope (0-5°)	14m	An APZ of 14m is to be established within the retained vegetation	N/A	Acceptable solution in accordance with PBP (RFS, 2019)

Vegetation Type & Direction	Separation Distance from vegetation	Effective Slope (within 100m)	APZ required in accordance with PBP 2019 as per Table A1.12.2	APZ to be Provided	Width of allowable OPA	Comment
Managed Land – Future and Existing Residential Developments to the South	>140m	N/A	N/A	>140m of existing and future residential development occurs	N/A	Acceptable solution in accordance with PBP (RFS, 2019)
Forest to the West	>42m	Downslope (0-5°)	29m	An APZ of 29m is established by Medowie Road	10m	Acceptable solution in accordance with PBP (RFS, 2019)

Table 3-2: Recommended APZs for future SFPP buildings

Vegetation Type & Direction	Separation Distance from vegetation	Effective Slope (within 100m)	APZ required in accordance with PBP 2019 as per Table A1.12.1	APZ to be Provided	Width of allowable OPA	Comment
Remnant vegetation followed by managed parks	>20m	Upslope	38m	An APZ of 25.7m is partly established by Ferodale Road with the remaining to be maintained within the site.	N/A	Performance-based assessment using Detailed Method 2. Refer to Appendix B for Radiant Heat Calculations.
Managed land followed by Forest vegetation to the East	>48m	Upslope	67m	An APZ of >48m exists on the adjacent managed land. The remaining APZ can be implemented on site.	20m	Acceptable solution in accordance with PBP (RFS, 2019)
Remnant vegetation within the site	>57m	Downslope (5-10°)	57m	An APZ of 57m is to be established	N/A	Acceptable solution in accordance with

Vegetation Type & Direction	Separation Distance from vegetation	Effective Slope (within 100m)	APZ required in accordance with PBP 2019 as per Table A1.12.1	APZ to be Provided	Width of allowable OPA	Comment
						PBP (RFS, 2019)
Managed Land – Future and Existing Residential Developments to the South	>140m	N/A	N/A	>140m of existing and future residential development occurs	N/A	Acceptable solution in accordance with PBP (RFS, 2019)
Forest to the West	>42m	Downslope (0-5°)	79m	An APZ of 79m can be implemented inclusive of Meadowie Road. The remaining APZ can be implemented on site.	25m	Acceptable solution in accordance with PBP (RFS, 2019)

Legend

- Subject Site
- 29m APZ
- 18m APZ
- 14m APZ
- 11m APZ
- Open Forest
- Remnant Vegetation
- Managed Land

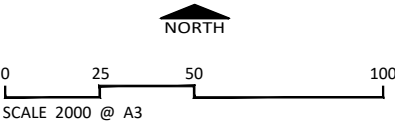


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FIGURE 3-1: ASSET PROTECTION ZONES

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7 January 2025



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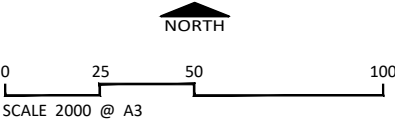
- Legend**
- Subject Site
 - 57m APZ
 - 25.7m APZ
 - Open Forest
 - Remnant Vegetation
 - Managed Land



FIGURE 3-2: ASSET PROTECTION ZONES - SFPP

CLIENT
SITE DETAILS
DATE

Client
Ferodale Road Medowie
7 January 2025



Firebird ecoSultants Pty Ltd
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4 COMPLIANCE

The proposal is for a rezoning to support a residential subdivision and therefore development standards apply. Table 4-1 details the proposed compliance with Development Standards for Residential and Rural Residential Subdivisions.

Table 4-1: Proposed Subdivision Compliance with Development Standards

Acceptable Solutions	Performance Criteria	Compliance
Asset Protection Zones		
> APZs are provided in accordance with Tables A1.12.2 and A1.12.3 based on the FFDI.	Potential building footprints must not be exposed to radiant heat levels exceeding 29 kW/m ² on each proposed lot.	Complies with Acceptable Solution – APZs are provided in accordance with Tables A1.12.2 to determine the minimum distances required for the building envelopes to the unmanaged vegetation for radiant heat levels to not exceed 29kW/m ² on each proposed lot. Complies with Performance Criteria - APZs for SFPP buildings are provided in accordance with A1.12.1 for the Eastern and Western elevations to achieve a radiant heat level <10kW/m ² . The APZ to the North is based on AS3959-2018 Detailed Method 2 using Rainforest fuel loads and an upslope of 9 degrees. Refer to Appendix B for Radiant Heat Calculations.
> APZs are managed in accordance with the requirements of Appendix 4.	APZs are managed and maintained to prevent the spread of a fire towards the building.	Complies with Acceptable Solution – APZs on site are to be managed in accordance with Appendix 4 of the PBP 2019.



› APZs are wholly within the boundaries of the development site	the APZs is provided in perpetuity	Complies with Performance Criteria – APZs are provided in perpetuity where established by an existing public road, otherwise will be maintained onsite.
› APZs are located on lands with a slope less than 18 degrees.	APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimised.	Complies with Acceptable Solution – APZs on site do not occur on slope > than 18 degrees.
Landscaping		
› landscaping is in accordance with Appendix 4; and fencing is constructed in accordance with section 7.6.	Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions.	Complies with Acceptable Solution – All landscaping within the site will meet the requirements of the acceptable solution.
Access (General Requirements)		
› property access roads are two-wheel drive, all-weather roads; › perimeter roads are provided for residential subdivisions of three or more allotments; › subdivisions of three or more allotments have more than one access in and out of the development; › traffic management devices are constructed to not prohibit access by emergency services vehicles; › maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient	Firefighting vehicles are provided with safe, all-weather access to structures.	Complies with Performance Criteria – A perimeter road is existing to the North of the site known as Ferodale Road, a perimeter road is existing to the West of the site known as Medowie Road, and a perimeter road is existing to the South of the site known as Macadamia Circuit. The Eastern elevation is not provided with a perimeter road but is consisted of managed land followed by the forest vegetation. Property access roads are two-wheel drive, all-weather roads appropriate for fire-fighting vehicles. An assessment of the Indicative Subdivision Plans (Appendix A) has identified no specific access requirements because future sites will be located in an urban area where an



<p>specified by road design standards, whichever is the lesser gradient;</p> <ul style="list-style-type: none"> › all roads are through roads; › dead end roads are not recommended, but if unavoidable, are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end; › where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road; › where access/egress can only be achieved through forest, woodland and heath vegetation, secondary access shall be provided to an alternate point on the existing public road system; and › one way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression. 		<p>unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles.</p>
<ul style="list-style-type: none"> › the capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); › bridges/causeways are to clearly indicate load rating. 	<p>the capacity of access roads is adequate for firefighting vehicles.</p>	<p>Complies with Acceptable Solution – The capacity of perimeter and non-perimeter roads is adequate for firefighting vehicles.</p>



<ul style="list-style-type: none"> › hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression; › hydrants are provided in accordance with the relevant clauses of AS 2419.1:2017 - Fire hydrant installations System design, installation and commissioning; and › there is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available. 	<p>there is appropriate access to water supply.</p>	<p>Complies with Acceptable Solution – Hydrants are to be positioned appropriately across the site.</p>
<p style="text-align: center;">Access PBP Addendum November 2022</p>		
<ul style="list-style-type: none"> › Vehicular access must be capable of providing continuous access for emergency service vehicles to enable travel in a forward direction from a public road around the entire building; and › Must have a minimum unobstructed width of 6m with no part of its furthest boundary more than 18m from the building and no part of the 6m width be built upon or used for any purpose other than vehicular or pedestrian movement; and › Must provide reasonable pedestrian access from the vehicular access to the building; and 	<ul style="list-style-type: none"> › Firefighting vehicles are provided with safe, all-weather access to structures and hazardous vegetation. 	<p>Can comply with Acceptable Solution – The requirements of Addendum November 2022 for access are able to comply with the future childcare centre proposed within the site. The childcare centre has been located and designed for direct access to the existing Ferodale Road and a proposed road within the site.</p>



<ul style="list-style-type: none">› Must have a load bearing capacity and unobstructed height to permit the operation and passage of firefighting vehicles; and› Must be wholly within the allotment except that a public road complying with the above may serve as the vehicular access or part thereof.		
Perimeter Roads		
<ul style="list-style-type: none">› are two-way sealed roads;› minimum 8m carriageway width kerb to kerb;› parking is provided outside of the carriageway width;› hydrants are located clear of parking areas;› are through roads, and these are linked to the internal road system at an interval of no greater than 500m;› curves of roads have a minimum inner radius of 6m;› the maximum grade road is 15 degrees and average grade of not more than 10 degrees;› the road crossfall does not exceed 3 degrees; and	access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	N/A



<ul style="list-style-type: none"> › a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided. 		
Non-Perimeter Roads		
<ul style="list-style-type: none"> › minimum 5.5m carriageway width kerb to kerb; › parking is provided outside of the carriageway width; › hydrants are located clear of parking areas; › roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m; › curves of roads have a minimum inner radius of 6m; › the road crossfall does not exceed 3 degrees; and › a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided. 	<p>access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating.</p>	<p>Complies with Acceptable Solution – this being:</p> <ul style="list-style-type: none"> › minimum 5.5m carriageway width kerb to kerb; › parking is provided outside of the carriageway width; › hydrants are located clear of parking areas; › roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m; › curves of roads have a minimum inner radius of 6m; › the road crossfall does not exceed 3 degrees; an › a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.
Property Access		
<ul style="list-style-type: none"> › There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided 	<p>firefighting vehicles can access the dwelling and exit the property safely.</p>	<p>Complies with Acceptable Solution –</p>



<p>between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles.</p> <p>In circumstances where this cannot occur, the following requirements apply:</p> <ul style="list-style-type: none"> › minimum 4m carriageway width; › in forest, woodland and heath situations, rural property access roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m at the passing bay; › a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; › provide a suitable turning area in accordance with Appendix 3; › curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress; › the minimum distance between inner and outer curves is 6m; › the crossfall is not more than 10 degrees; 		<ul style="list-style-type: none"> › If any future dwelling has unobstructed path (no greater than 70m) between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles. There will be no specific access requirements otherwise: › minimum 4m carriageway width; › a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches; › provide a suitable turning area in accordance with Appendix 3; › curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress; › the minimum distance between inner and outer curves is 6m; › the crossfall is not more than 10 degrees; › maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads; and › uses a ring main system for areas with perimeter roads.
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<ul style="list-style-type: none"> › maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads; and › a development comprising more than three dwellings has access by dedication of a road and not by right of way. <p>Note: Some short constrictions in the access may be accepted where they are not less than 3.5m wide, extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.</p>		
Water Supplies		
<ul style="list-style-type: none"> › reticulated water is to be provided to the development where available; › a static water and hydrant supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed; and › static water supplies shall comply with Table 5.3d. 	adequate water supplies are provided for firefighting purposes.	<p>Complies with Acceptable Solution – All lots are to be connected to reticulated water.</p>
<ul style="list-style-type: none"> › fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1:2017; 	Water supplies are located at regular intervals; and	<p>Can Comply with Acceptable Solution – Hydrants are to be position appropriately across the site.</p>



<ul style="list-style-type: none"> › hydrants are not located within any road carriageway; and › reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads. 	the water supply is accessible and reliable for firefighting operations.	
<ul style="list-style-type: none"> › fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2017. 	flows and pressure are appropriate.	Complies with Acceptable Solution – Flows and pressure assumed
<ul style="list-style-type: none"> › all above-ground water service pipes are metal, including and up to any taps; and › above-ground water storage tanks shall be of concrete or metal/ 	the integrity of the water supply is maintained.	Complies with Acceptable Solution – All above ground water service pipes will meet the requirements.
Electricity Services		
<ul style="list-style-type: none"> › where practicable, electrical transmission lines are underground; › where overhead, electrical transmission <ul style="list-style-type: none"> › lines are proposed as follows: lines are installed with short pole spacing of 30m, unless crossing gullies, gorges or riparian areas; and › no part of a tree is closer to a power line than the distance set out in ISSC3 Guideline for Managing Vegetation Near Power Lines. 	location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	Complies with Acceptable Solution – All future dwellings are to meet the requirements for electricity services.



Gas Services

<ul style="list-style-type: none">› reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 - The storage and handling of LP Gas, the requirements of relevant authorities, and metal piping is used;› all fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side;› connections to and from gas cylinders are metal;› polymer-sheathed flexible gas supply lines are not used; and› above-ground gas service pipes are metal, including and up to any outlets.	location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	Can Complies with Acceptable Solution – All future dwellings are to meet the requirements for gas service.
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5 STRATEGIC MATTERS

The following table lists the matters to be addressed by a Bush Fire Strategic Study under the NSW RFS, 2019, 'Planning for Bushfire Protection' (p.35) in order to demonstrate that strategic consideration has been provided to the site from a bushfire perspective. Table 10 – Compliance with PBP for Strategic Matters.

Table 5-1: Bushfire Strategic Study

Issue	Detail	Assessment Considerations	Assessment
Bush fire landscape assessment	A bush fire landscape assessment considers the likelihood of a bush fire, its potential severity and intensity and the potential impact on life and property in the context of the broader surrounding landscape.	<p>The bush fire hazard in the surrounding area, including:</p> <ul style="list-style-type: none">■ Vegetation■ Topography■ Weather	<p>The dot points below summarise the assessment of the bushfire hazard in the surrounding area;</p> <ul style="list-style-type: none">■ Vegetation: The entire site is predominantly mapped as Category 1, with pockets of Category 2 and buffers. The vegetation to the east of the site is classified as 'forest' and vegetation to the west has been classified as Forest in accordance with the Keith 2004 vegetation classification framework. Vegetation to the North has been classified as remnant in accordance with sA1.11 in PBP 2019 as it provides a fire run <50m wide. Vegetation within the site has been classified as remnant in accordance with sA1.11 in PBP 2019 as it is a parcel <1ha. Refer to Figure 2-1 and 3-1 of the SBFS for an aerial view of the vegetation within the site.■ Topography: Land occurs upslope to the North and east, downslope ground to the west and managed land to the south.■ Weather: The site lies within a geographical area with a Fire Danger Index (FDI) rating of 100. Extreme bushfire weather is therefore associated with long periods of drought, high temperatures, low humidity and gusty often north-westerly winds.



Issue	Detail	Assessment Considerations	Assessment
			<ul style="list-style-type: none"> The typical / average climate in the Lower Hunter Bush Fire Management Committee (BFMC) area is warm subtropical with the higher altitude areas tending toward warm temperate. The fire season is declared annually by the RFS and for the Study Area is generally declared from October to March however, is varied in some years. Prevailing weather conditions associated with the bush fire season in the Lower Hunter BFMC area are north-westerly winds accompanied by high day-time temperatures and low relative humidity.
		<p>The potential fire behaviour that might be generated based on the above.</p>	<p>Whilst each bushfire event is different, fire spreads by responding to changes in fuel, terrain, and weather conditions. Therefore, based on landscape conditions and fire history, potential fire behaviour can be determined. It is generally anticipated that a potential fire within the site and its surrounds, would spread more quickly and have the potential for higher intensities when:</p> <ul style="list-style-type: none"> burning under the influence of north-westerly winds, particularly during warmer summer months; and moving upslope in the steeper, vegetated areas to the north, north west, west, south and south-west in the opposite direction of the proposed development. <p>If fires were to occur under a Fire Danger Rating (FDR) of Very High or above, within steeper forested areas, such fires may have the potential to spread quickly through vegetated land. However, if a fire was to approach the development land, it is likely to become slower moving and much less intense, due</p>



Issue	Detail	Assessment Considerations	Assessment
			to the slope of the land where the hazard occurs being upslope.
		Any history of bush fire in the area	The Lower Hunter BFMC area has on average 200 bush fires per year, of which 3 on average can be considered to be major fires.
		Potential fire runs into the site and the intensity of such fire runs.	Fire runs may occur to the West of the site.
		The difficulty in accessing and suppressing a fire, the continuity of bush fire hazards or the fragmentation of landscape fuels and the complexity of the associated terrain.	There are advantages to fire mitigation in the landscape that can be achieved by the provision of appropriate bushfire protection measures, such as APZs, connected road network. These strategies have been factored into the proposed master plan.
Land use assessment	The land use assessment will identify the most appropriate locations within the masterplan area or site layout for the proposed land uses.	The risk profile of different areas of the development layout based on the above landscape study.	The negative impact of a fire within the 5 year life of the BFRMP using fire history data, was determined as being low and may even be of benefit to the asset and surrounding habitat.
		The proposed land use zones and permitted uses.	<p>The development footprint of the site will be zoned from current RU2 Rural Landscape to R3 Medium Density Residential and E1 Local Centre.</p> <p>Special Fire Protection Purposes development is proposed within the subject site. The proposed location has been chosen to allow the building exposure to radiant heat levels <10kW/m² with the implementation of APZs in accordance with A1.12.1</p>



Issue	Detail	Assessment Considerations	Assessment
			to be inclusive of surrounding managed land and development.
		The most appropriate siting of different land uses based on risk profiles within the site (i.e. not locating development on ridge tops, SFPP development to be located in lower risk areas of the site).	<p>The subdivision is located on relatively flat land, sloping upwards to the North and East.</p> <p>The childcare centre is located to give direct access from the existing public road network.</p>
		The impact of the siting of these uses on APZ provision.	<p>All APZs can be accommodated within individual allotments to the East and West (maximum 24m APZ to the east, 29m to the west of the site and 18m or 14m to the west within site depending on the effective slope). APZ to the North and West is established by Ferodale Road to the North and Medowie Road to the West. Managed land occurs directly to the East followed by Forest.</p> <p>The APZ widths are proposed to comply with PBP (RFS, 2019), which limits residential buildings to a maximum heat exposure of no more than 29 kW/m². The development is proposed to achieve best practice by meeting this standard through the proposed application of future development control plan clauses.</p> <p>Vegetation that is introduced through landscaping or restoration can avoid the need for further APZs if:</p> <ul style="list-style-type: none"> ■ individual patches of vegetation within 100m of properties are <0.25 ha per patch; ■ the perpendicular width of linear strips of vegetation is <20m when measured perpendicular to structures; ■ any vegetation within 100m of properties meets



Issue	Detail	Assessment Considerations	Assessment
			<p>the definition of managed vegetation under PBP (RFS, 2019).</p> <p>Figures 3-1 of the SBFS illustrate the proposed distribution of APZs Bushfire Attack Level (BAL) ratings throughout the site, consistent with PBP (RFS, 2019).</p>
Access and egress	A study of the existing and proposed road networks both within and external to the masterplan area or site layout.	The capacity for the proposed road network to deal with evacuating residents and responding emergency services, based on the existing and proposed community profile,	<p>The conclusion of the Traffic Impact Assessment by Seca Solutions dated the 22nd May 2025, stated that The main road through the locality is Ferodale Road that runs along the northern boundary of the site in a north orientation and Medowie Road which is a regional road (MR518) that runs along the western boundary of the site. Upon review of the proposal and associated plans against the requirements of the RMS Guide to Traffic Generating Developments and Austroads Guide to Traffic Management, it is considered that the proposed rezoning development should have no objections raised on traffic and access grounds.</p> <p>The potential for additional traffic movements generated by a future 108 lot residential development will have an acceptable impact on the surrounding road network and site access can operate with minimal delay or congestion. Access has been modelled via 4 way roundabout existing at the intersection of Ferodale road and Medowie road.</p> <p>The above SIDRA results show that the key intersection of Medowie Road and Ferodale road will continue to operate at LoS A for the 2031 horizon year including background growth and development traffic flows. The proposal can meet the requirements of the Development Control Plan in relation to traffic, parking and access as well as the overall planning for the subject site. Refer to Appendix C for Traffic Impact Assessment (SECA Solutions, May 2025).</p>



Issue	Detail	Assessment Considerations	Assessment
		The location of key access routes and direction of travel.	The proposed master plan provides four entry / egress points into the site. This includes from the existing Ferodale Road, existing Medowie Road and existing Macadamia Circuit. The proposed perimeter and non-perimeter roads within the site are to facilitate the movement of traffic throughout the site. Road design is to meet the requirements of the acceptable solution for residential subdivisions in PBP 2019. Refer to Appendix A for masterplan.
		The potential for development to be isolated in the event of a bush fire.	The development is located adjacent to the existing Ferodale Road and Medowie Road which provides immediate access / egress to the north and west and Macadamia Circuit providing access to the South. The proposed master plan road layout and hierarchy has been designed to comply with PBP (RFS, 2019), thereby ensuring that no area of the site would be isolated in the event of a bushfire.
Emergency services	An assessment of the future impact of new development on emergency services.	Consideration of the increase in demand for emergency services responding to a bush fire emergency including the need for new stations/brigades.	<p>In order to achieve the strategic land use planning objectives and strategic planning principles of PBP (RFS, 2019) relating to emergency management, strategic emergency management planning is recommended. It should be undertaken in collaboration with emergency service organisations within the strategic land use planning process to establish preferred future outcomes (i.e. emergency evacuation) that have implications for land use planning, including:</p> <ul style="list-style-type: none"> ■ emergency evacuation planning; and ■ evacuation adequacy assessment.



Issue	Detail	Assessment Considerations	Assessment
		Impact on the ability of emergency services to carry out fire suppression in a bush fire emergency.	<p>The master plan proposes four new entry / egress points into the site.</p> <p>The master plan has been designed around two major roads being Ferodale Road and Medowie Road and a minor road being Macadamia Circuit. Proposed perimeter and non-perimeter roads will be implemented that would facilitate the movement of traffic throughout the site. The ability of emergency services to carry out fire suppression in a bush fire emergency would not be hindered by the proposed master plan.</p>
Infrastructure	An assessment of the issues associated with infrastructure and utilities.	The ability of the reticulated water system to deal with a major bush fire event in terms of pressures, flows, and spacing of hydrants.	<p>The site will be connected to reticulated water and will have adequate water pressure, flow and fire hydrant spacing to deal with a major bushfire event, therefore complying with PBP (RFS, 2019).</p> <p>Future development will need to demonstrate that fire hydrant spacing, sizing and pressures complies with AS 2419.1 2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles. Fire hydrants should not be located within any road carriageway. All above ground water and gas service pipes external to the building are to be metal, including and up to any taps.</p>
		Life safety issues associated with fire and proximity to high voltage power lines, natural gas supply lines etc.	Electricity and Gas – Underground electricity supply to the site is compliant with PBP (RFS, 2019) requirements. If electrical transmission lines to the site are above ground, no part of a tree is to be closer than 0.5 m to the powerline conductors.



Issue	Detail	Assessment Considerations	Assessment
			<p>Reticulated or bottled gas to future residential lots (if proposed) would be required to be installed and maintained in accordance with Australian Standards Australia 2014) and the requirements of relevant authorities (for example, metal piping must be used).</p> <p>All high voltage power lines and natural gas lines would be located underground.</p>
Adjoining land	The impact of new development on adjoining landowners and their ability to undertake bush fire management.	Consideration of the implications of a change in land use on adjoining land including increased pressure on BPMs through the implementation of Bush Fire Management Plans.	Given the adherence to PBP (RFS, 2019) and other land use planning requirements, the proposed land uses should not increase bushfire management needs for retained and/or adjoining bushfire prone vegetation.

5.1 Ministerial Direction (4.4 – Planning For Bushfire)

The Environmental Planning and Assessment Act 1979 (Section 9.1, Ministerial Direction, 4.4 – Planning for Bush Fire Protection) identifies that a planning proposal must, where development is proposed, comply with the appropriate provisions. These provisions and an appropriate response are provided in the following table.

Table 5-2: Ministerial Direction (4.4 – Planning for Bushfire)

No	Assessment Considerations	Complies	Assessment
1	Provide an APZ incorporating: <ul style="list-style-type: none"> An Inner Protection Area (IPA) bounded by a perimeter road or reserve, which circumstances the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property. An Outer Protection Area (OPA) managed for hazard reduction and located on the bushland side of the perimeter road. 	Yes	Please refer to 3.1 – Assessment.
2	For infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the Rural Fires Act 1997), the APZ provisions must be complied with.	Yes	The proposal is not for infill development, rather it is for greenfield development.
3	Contain provisions for adequate water supply for firefighting purposes,	Yes	Please refer to 4-1 – Bushfire Protection Measures.
4	Minimise the perimeter of the area of land interfacing the hazard, which maybe developed, and	Yes	Please refer to 4-1 – Bushfire Protection Measures.
5	Introduce controls on the placement of combustible materials in the IPA.	Yes	Please refer to 4-1 – Bushfire Protection Measures.

6 CONCLUSION & RECOMMENDATIONS

In summary, a Strategic Bush Fire Study (SBFS) has been prepared by Firebird ecoSultants Pty Ltd at the request of VC Management for a planning proposal at Lot 3 to Lot 8 – DP243518 also known as 46-54 Ferodale Road and 754 Medowie Road, Medowie NSW 2318. The report forms part of the supporting documentation for a Planning Proposal to be submitted to Port Stephens Council (PSC).

The development is defined as a planning proposal to amend the Port Stephens Local Environmental Plan 2013 (PSLEP 2013) under the Environmental Planning and Assessment Act 1979 (EP&A) (Division 3.2). This amendment will enable residential subdivision and subsequent the construction of dwelling houses, which will then need to demonstrate compliance with the National Construction Code (PS.7.5 – Buildings in Bushfire Prone Areas).

Council and the NSW RFS must be satisfied that the development conforms to the Bushfire Protection Measures (BPM)s listed within PBP under the EP&A ACT 1979 (s4.14– Consultation and development consent – certain bush fire prone land). The BPMs identified for the development are:

- 1. Asset Protection Zone (APZ) – The APZ provides space and reduced fuel loads to ensure radiant heat levels at the buildings are below critical limits and to prevent direct flame contact.**

The APZ is the distance from the external wall of the habitable building or building envelope to the unmanaged vegetation line.

APZs for Residential Development

The shortest distance from the building envelope to the unmanaged vegetation line has been identified to be 24m to the Eastern elevation (inclusive of managed land on No. 56 Ferodale Road), 24m to the Western elevation across Medowie Road and 11m to the Northern elevation across Ferodale Road. The retained vegetation within the Southwestern portion of the subject site (directly South of proposed commercial development) identifies an 18m APZ to the Northeastern and a 14m APZ to the Southeastern elevation that will encroach into the retained vegetation. The remaining area of wildlife corridor is proposed to be maintained through a Plan of Management (PoM) and under a suitably worded 88b instrument to ensure maintenance standard of an APZ. Refer to Figure 3-1.

APZs for the Childcare Centre

Development classified as Special Fire Protection Purposes is required to meet the minimum APZs in Table A1.12.1 in PBP 2019 so as to not be exposed to radiant heat level $>10\text{kW/m}^2$. The proposed location of the childcare centre is the most suitable within the site and will be able to implement the required APZs to comply with PBP 2019. Refer to Figure 3-2.

APZs for Commercial Development

The proposed commercial development within the site must meet the aims and



objectives of Chapter 1 in PBP 2019 as stated in Section 8.3.10.

Management of APZs

In order to achieve the above Bushfire Attack Level (BALs) for future Buildings, an APZ is to be managed in accordance with 'Planning for Bushfire Protection (Appendix 4 – Asset Protection Zone Requirements)' and the document titled 'Standards for Asset Protection Zones'. The APZ is entirely within the boundaries of the site.

2. Property Access Roads – Access standards provide for emergency evacuation and firefighting operations.

An assessment of the Indicative Subdivision Plans (Appendix A) has identified no specific access requirements for the individual buildings as they will be located in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles.

3. Perimeter Roads - Access standards provide for emergency evacuation and firefighting operations.

No perimeter roads are required to the North as Ferodale Rd occurs, to the West as Medowie Road occurs, managed land occurs to the east and an existing subdivision occurs to the south with a perimeter road to separate. It is noted that an 8m carriageway width is provided for the roads within the subject site however it is assumed that no parking is permitted within the carriageway. This will allow efficient access / egress to future buildings while having regard for the retention of koala habitat in the corridor, that will be managed as an APZ under an 88b instrument.

4. Non-Perimeter Roads - Access standards provide for emergency evacuation and firefighting operations.

The non-perimeter roads identified on the subdivision plan need to be consistent with the following requirements from PBP 2019:

- a. Traffic management devices are constructed to not prohibit access by emergency services vehicles;
- b. One way only public access roads are not less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression;
- c. Minimum 5.5m carriageway with kerb to kerb;
- d. Parking is provided outside of the carriageway width;
- e. Hydrants are located clear of parking areas;
- f. Are through roads, and these are linked to the internal road system at an interval of no greater than 500m;
- g. Dead end roads are not recommended, but if unavoidable, are not more than 200 metres in length, incorporated a minimum 12 metres outer radius turning



- circle, and are clearly sign posted as a dead end;
- h. Curves of roads have a minimum inner radius of 6m;
 - i. The maximum grade road is 15 degrees and average grade of not more than 10 degrees;
 - j. The road crossfall does not exceed 3 degrees; and
 - k. A minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.
 - l. Bridges and Causeways are designed sufficiently to carry a fully loaded firefighting vehicle (up to 23 tonnes) and signage is put in place to clearly indicate the maximum load rating of 23 tonnes,
 - m. Hydrants are:
 - Located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression, and
 - Provided in accordance with the relevant clauses of AS 2419.1:2005.

5. Water Supplies – A water supply is required for firefighting operations.

An assessment of the Indicative Subdivision Plans (Appendix A) has identified reticulated water and an associated water hydrant will be provided within 70m of future buildings because of the construction of local roads. This reticulated water supply is to be designed and constructed to:

- a. Reticulated water is to be provided to the development where available;
- b. Fire hydrant, spacing, design and sizing complies with the relevant clauses of the Australian Standard AS 2419.1:2005;
- c. Hydrants are not located within any road carriageway; and
- d. Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads;
- e. Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.
- f. Above-ground water storage tanks shall be concrete or metal.

6. Electricity Services – The installation of new electricity seeks to limit the possibility of igniting the surrounding bushland.

Transmission lines are to be placed underground. If placing them underground is not practical, then overhead transmission lines are to:

- a. Be installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas, and
- b. No part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 – Guideline for Managing Vegetation Near Power Lines.

7. Gas Services – The location and design of gas services will not lead to the ignition of surrounding buildings or the fabric of buildings.

The provision of gas requires that:

- a. Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities,
- b. Metal piping is used,
- c. All fixed gas cylinders are kept clear of all flammable materials to 10m and shielded on the hazard side,
- d. Connections to and from gas cylinders are metal,
- e. Polymer-sheathed flexible gas supply lines are not used, and
- f. Above-gas service pipes are metal including and up to any outlets.

8. Construction Standards – Construction standards seek to increase the protection of the habitable buildings from bushfire.

Based on the APZs provided above, we understand that future dwellings may be sited to achieve > 29kW/m², which would result in BAL-29 or less and a future childcare centre has been sited to achieve <10kW/m², which would result in BAL-12.5. PBP Appendix B Addendum November 2022 requires that a construction level of BAL-19 or greater is applied to certain class 9 buildings (i.e. childcare centres) when affected by bushfire. However, all future buildings will be subject to a separate Bushfire Assessment Report (BAR) at the DA stage for that development.



Sarah Jones

B.Env.Sc., G.Dip.DBPA (Design for Bushfire Prone Areas)

FPA BPAD-A Certified Practitioner (Certification Number BPD-PA-26512)

Ecologist / Bushfire Planner



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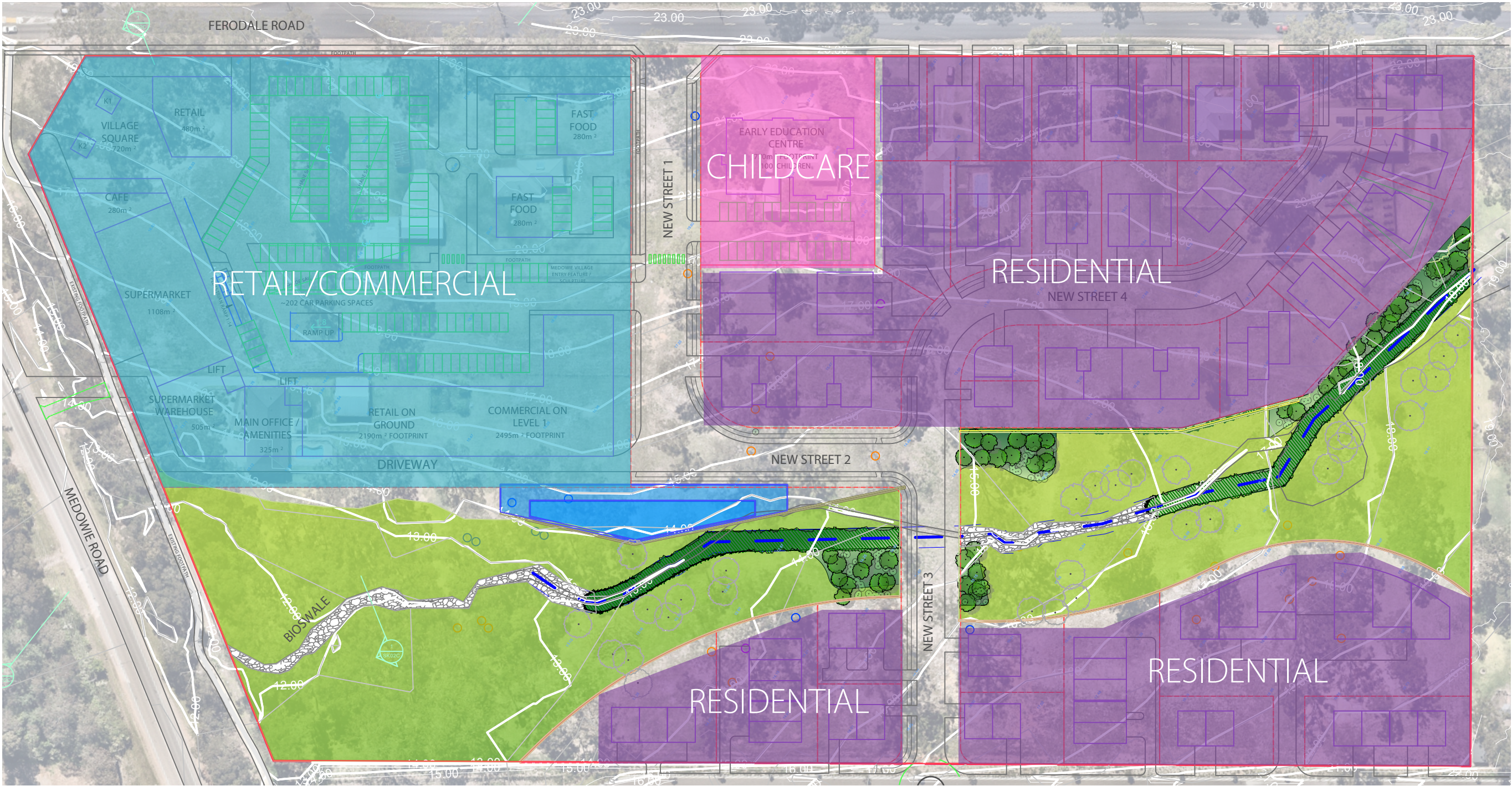
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APPENDIX A PROPOSED SITE PLANS

GENERAL ARRANGEMENT | L101

MEDOWIE RESIDENTIAL & MIXED USE DEVELOPMENT



- REZONING BOUNDARY
- MEDOWIE VILLAGE BOUNDARY
- EXISTING TREES TO BE REMOVED
- EXISTING TREES TO BE RETAINED
- PROPOSED TREE PLANTINGS AS SPECIFIED
- MASS PLANTING OF GRASSES AND GROUNDCOVERS
- SHRUBS
- TURF AREA AS SPECIFIED
- RIP RAP ROCK
- MAINTENANCE VEHICLE ACCESS GATE

L	16/5/25	REVISED DRAFT ISSUE
K	14/1/25	AMENDED LINWORK
J	14/1/25	ISSUE FOR REVIEW
I	14/1/25	NO ISSUE
H	17/12/24	AMENDED ROAD LAYOUT
G	12/11/24	REVISED ARCHITECTURAL
F	5/11/24	AMENDED FOR DISCUSSION
E	4/11/24	PRELIM. FOR DISCUSSION
D	10/10/24	EMM updates
C	4/10/24	FOR DISCUSSION
B	2/10/24	FOR REVIEW
A	20/9/24	WIP FOR DISCUSSION
REV	DATE	COMMENTS

PROJECT:
**MEDOWIE RESIDENTIAL & MIXED
USE DEVELOPMENT**

SITE:
**46-54 FERODALE ROAD, 754
MEDOWIE ROAD, LOTS 3-8 IN
D.P. 243518, MEDOWIE.**

CLIENT:
VC MANAGEMENT

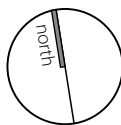
15258.5 - Medowie Rezoning2025-02-05.vwx 19/5/25

DRAWN:
OS / KH SCALE:
@A3

JOB NUMBER: PHASE: DWG No: REV:
15258.5 DA L101 L

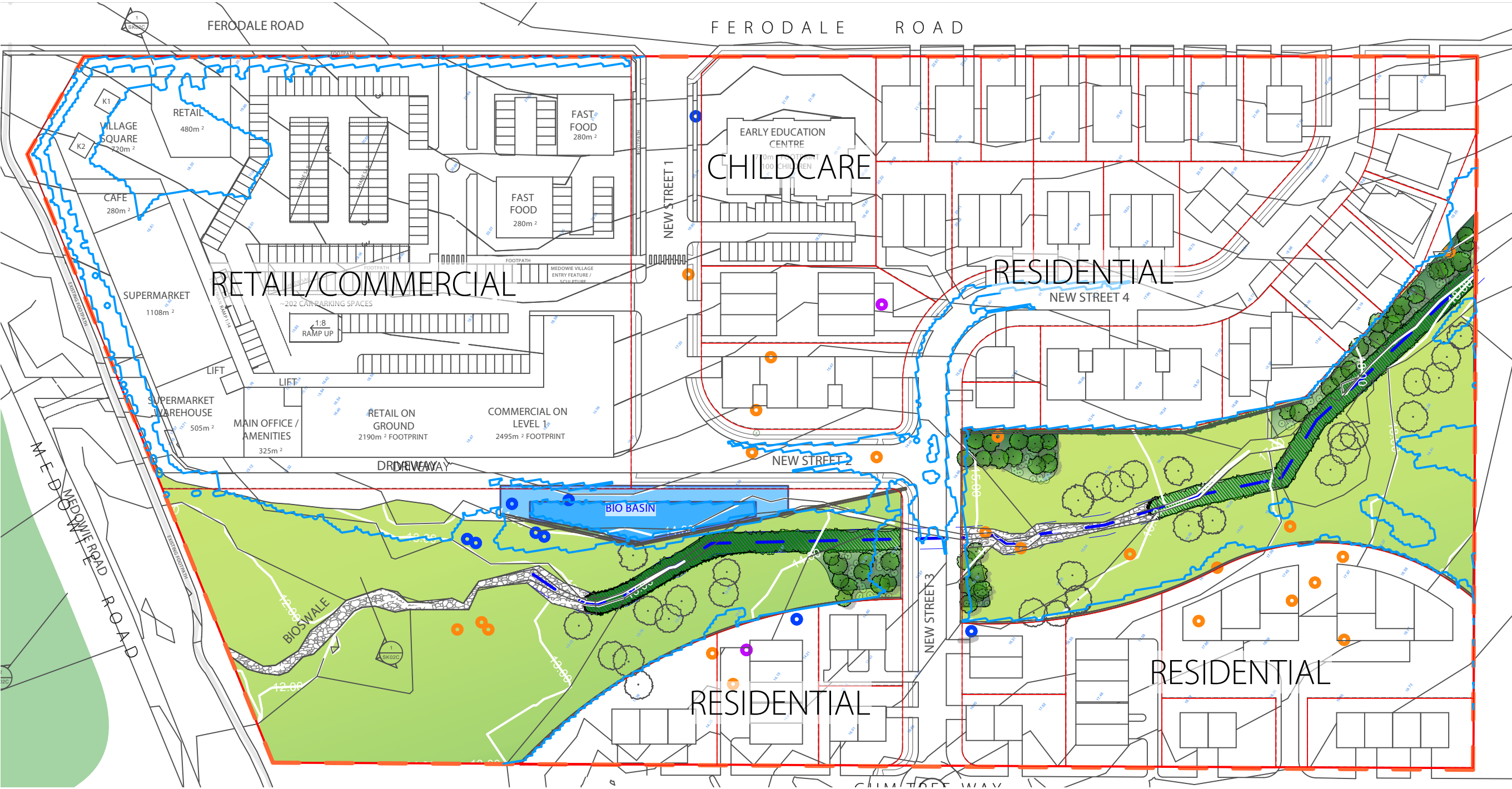
PRELIMINARY - 16/5/25

1 DRAFT SITE DIAGRAM
L101 Scale: 1:1200



GENERAL ARRANGEMENT | L102

MEDOWIE RESIDENTIAL & MIXED USE DEVELOPMENT



1 DRAFT SITE DIAGRAM
L102 Scale: 1:1200

PRELIMINARY - 16/5/25

L	16/5/25	REVISED DRAFT ISSUE
K	14/1/25	AMENDED LINEWORK
J	14/1/25	ISSUE FOR REVIEW
I	14/1/25	NO ISSUE
H	17/12/24	AMENDED ROAD LAYOUT
G	12/11/24	REVISED ARCHITECTURAL
F	5/11/24	AMENDED FOR DISCUSSION
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C	4/10/24	FOR DISCUSSION
B	2/10/24	FOR REVIEW
A	20/9/24	WIP FOR DISCUSSION
REV	DATE	COMMENTS

PROJECT:
**MEDOWIE RESIDENTIAL & MIXED
USE DEVELOPMENT**

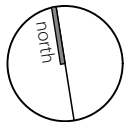
SITE:
**46-54 FERODALE ROAD, 754
MEDOWIE ROAD, LOTS 3-8 IN
D.P. 243518, MEDOWIE.**

CLIENT:
VC MANAGEMENT

15258.5 - Medowie Rezoning2025-02-05.vwx 19/5/25

DRAWN:
OS / KH SCALE:
@A3

JOB NUMBER: PHASE: DWG No: REV:
15258.5 DA L102 L



APPENDIX B RADIANT HEAT CALCULATIONS



NBC Bushfire Attack Assessment Report V4.0

AS3959 (2018) Appendix B - Detailed Method 2

Print Date: 17/01/2025

Assessment Date: 17/01/2025

Site Street Address: Medowie Village PP, Medowie

Assessor: Sarah Jones; Firebird Eco

Local Government Area: Port Stephens

Alpine Area: No

Equations Used

Transmissivity: Fuss and Hammins, 2002

Flame Length: RFS PBP, 2001/Vesta/Catchpole

Rate of Fire Spread: Noble et al., 1980

Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005

Peak Elevation of Receiver: Tan et al., 2005

Peak Flame Angle: Tan et al., 2005

Run Description: veg to the north of Childcare

Vegetation Information

Vegetation Type: Rainforest

Vegetation Group: Forest and Woodland

Vegetation Slope: 9 Degrees

Vegetation Slope Type: Upslope

Surface Fuel Load(t/ha): 10

Overall Fuel Load(t/ha): 13.2

Vegetation Height(m): 2

Only Applicable to Shrub/Scrub and Vesta

Site Information

Site Slope: 0 Degrees

Site Slope Type: Downslope

Elevation of Receiver(m): Default

APZ/Separation(m): 25.7

Fire Inputs

Veg./Flame Width(m): 100

Flame Temp(K): 1200

Calculation Parameters

Flame Emissivity: 95

Relative Humidity(%): 25

Heat of Combustion(kJ/kg): 18600

Ambient Temp(K): 308

Moisture Factor: 5

FDI: 100

Program Outputs

Level of Construction: BAL 12.5

Peak Elevation of Receiver(m): 2.87

Radiant Heat(kW/m²): 9.92

Flame Angle (degrees): 83

Flame Length(m): 5.78

Maximum View Factor: 0.108

Rate Of Spread (km/h): 0.64

Inner Protection Area(m): 26

Transmissivity: 0.825

Outer Protection Area(m): 0

Fire Intensity(kW/m): 4398

APPENDIX C TRAFFIC REPORT

22 May 2025

P1644 Ferodale Road Subdivision Rezoning May25

VC Management
C/- Interface Planning
Po Box 192
Terrigal NSW 2260**Attn: Chris Smith**

Dear Chris,

Re: Traffic Impact Assessment for a rezoning to enable mixed use (E1 Local Centre) and residential development, Ferodale Road, Medowie, NSW

Further to our site work and a review of the provided documentation for the proposed rezoning of land to provide for a residential and commercial subdivision on Ferodale Road, Medowie we provide the following traffic impact assessment. This assessment has been prepared in accordance with the Austroads Guidelines and Section 2.3 of the Guide to Transport Impact Assessment (GTIA), published by Transport for NSW, which provides the structure for the reporting of key issues to be addressed when determining the impacts of traffic associated with a development. This guide indicates that the use of this format and checklist ensures that the most significant matters are considered by the relevant road authority.

The report has also taken into consideration the planning requirements outlined in the Port Stephens Council Development Control Plan 2014. Reference has also been made to the Medowie Traffic and Transport Study (URaP 2017), as well as the Medowie Planning Strategy (2016). The location of the proposed development is shown in Figure 2 below.

Port Stephens Council is the road authority however given the size of the development, with more than 200 parking spaces anticipated as part of the commercial element, the project will trigger ISEPP Schedule 3 as a traffic generating development and so shall be subject to review or concurrence by Transport for NSW (TfNSW). The potential for an access off Medowie Road would also trigger this given it is a classified regional road.

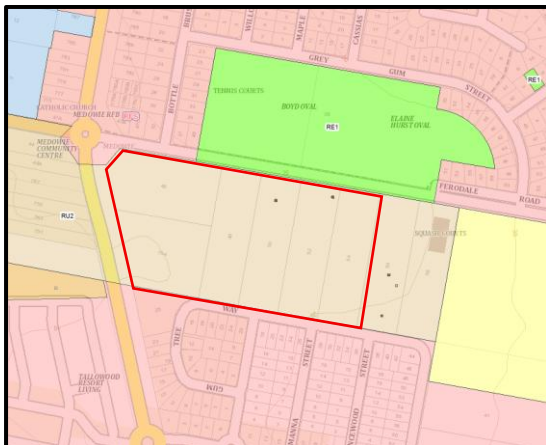


Figure 1 – Subject site proposed for rezoning

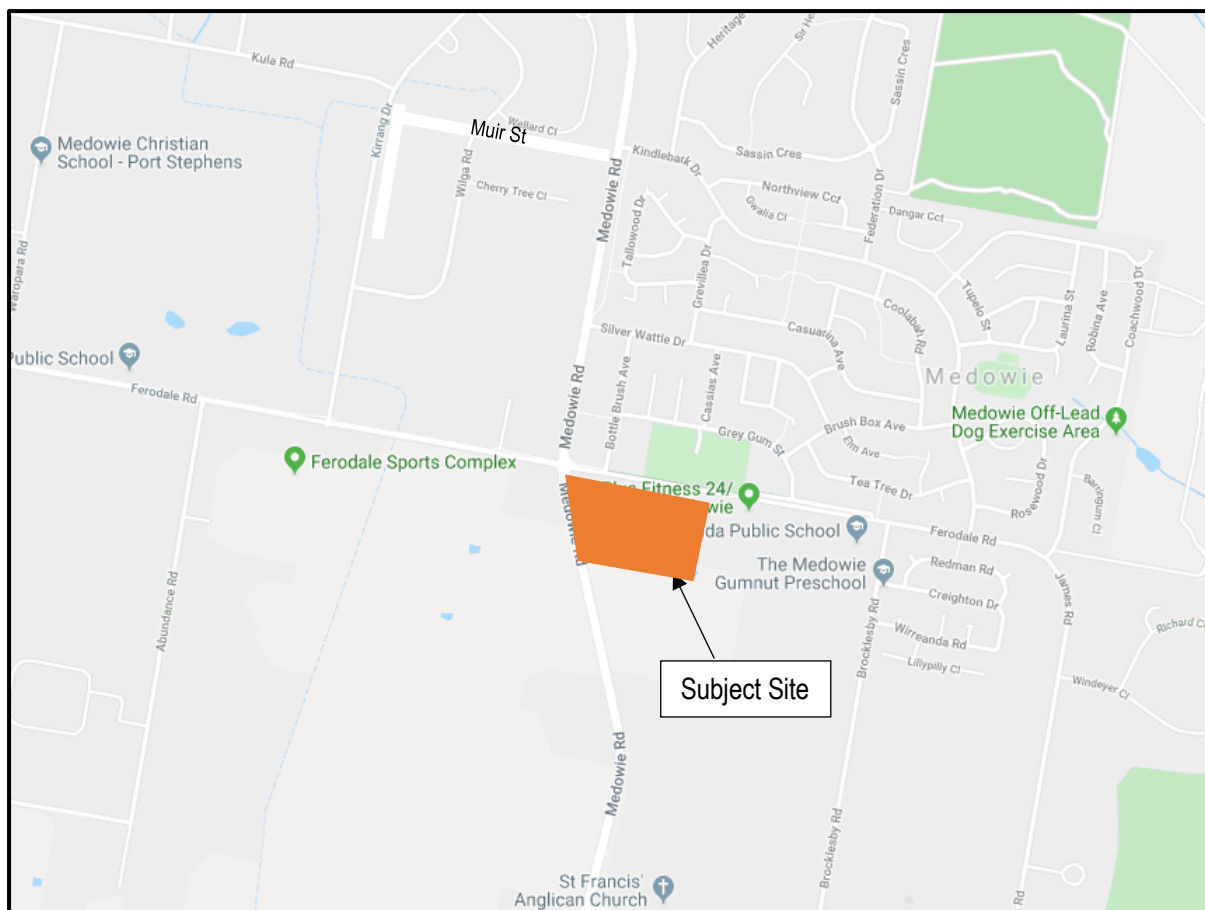


Figure 2 – Subject site in the context of the local road network

Response to Council Request for Further Information

Following their review of this assessment in early 2025, Port Stephens Council has requested the following be considered. Where applicable the report has been updated to reflect these items.

	RFI-April 2025	Initial Response
a	The planning proposal shows a new 4-way intersection is being created. Council requires all 4-way intersections to be controlled with a roundabout or signalised intersection. Please provide amended plans to demonstrate a roundabout, compliant with Austroads requirements, can be achieved.	The intersection referred to, being the connection to the subdivision to the south of the site at Gum Tree Way has been modified to allow a traversable roundabout, to accommodate service and heavy vehicles in this location. This shall be developed as part of the detailed design stage following approval of the rezoning. Refer Appendix A – Site Plan
b	The planning proposal should consider how bus routes and associated bus stops can be incorporated to ensure each future dwelling would be located within 400m walk of the bus stops.	There are no bus routes currently provided within close proximity to the site ie Ferodale Road or along Medow Road. A future bus service, if provided along Ferodale Road would be within 400m of the various lots within the site. Similarly, a proposed bus stop on Medow Road (BS10 contributions plan) could be located to service both this site and the dwelling to the south. Refer Section 2.7.2 Bus Stops

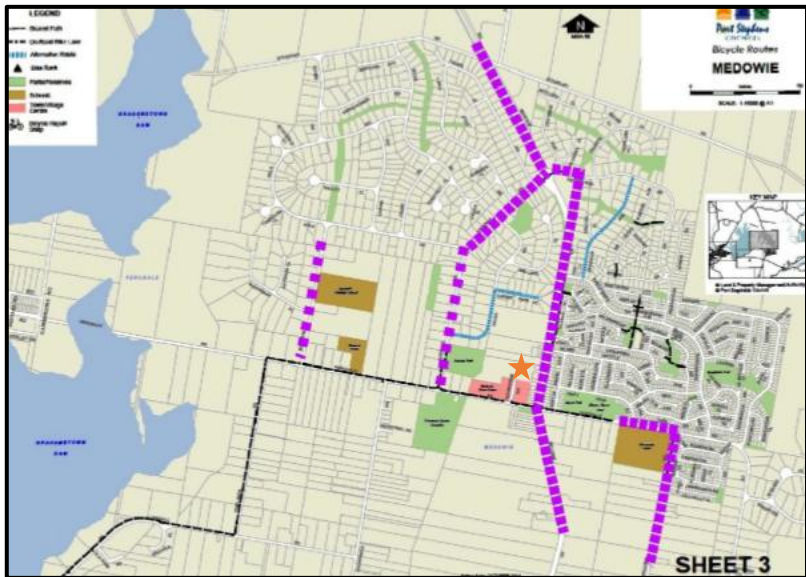
		<p>Roads in the subdivision to the south of the site have a width of around 8 metres and so are unlikely to provide for a route to connect between the two sites through to Ferodale Road.</p>
c	<p>Consideration needs to be given to the upgrade of Ferodale and Medowie Road intersection to support the increasing population of Medowie and to provide safe pedestrian and cyclist connections to the existing town centre.</p>	<p>The SIDRA modelling undertaken for the project demonstrates that with the rezoning the roundabout intersection will continue to operate to its current standard with no change to the level of service (LoS) on any approach and minor increases in the average delays and queuing. Whilst the future design year, allowing for 20% background growth over 10 years, will continue to operate within its capacity providing an overall level of service A, background growth will see some approaches experience increases in the average delays and additional queuing however these remain within acceptable limits, with the Ferodale Road (Eastbound) approach seeing operation at LoS B.</p> <p>The current layout shall start to create unacceptable delays and congestion allowing for development flows as well as background growth to 2034.</p> <p>However, as part of the overall masterplan development for Medowie this intersection has been identified for upgrade to either a 2-lane circulation roundabout with associated upgrades to the approaches or traffic signal control. Either of these upgrades shall allow for the subject site traffic demands as well as the background growth in traffic associated with the overall development identified in the Medowie Masterplan, of which the subject site forms part.</p> <p>Council has previously identified this intersection could be upgraded to signal control but there is no definitive statement or timeframe for this upgrade currently available. It is noted however that Council's strategies have recommend that the Medowie Traffic and Transport Study be updated and that a RFQ was released for this in May 2025. It is therefore expected that this intersection shall be assessed as part of this study given the importance of it within the overall road network.</p> <p>If the roundabout is upgraded to provide 2 circulating lanes or traffic signals are installed, any design upgrade shall incorporate the appropriate pedestrian and cycling facilities as per Austroads Design Guide and Council requirements. Any upgrade works shall be designed and constructed in consultation with Council as part of the approval process.</p>
d	<p>All lots should be accessed from the minor local road network and where this is not able to be achieved, a Local Area Traffic Management plan should be provided with future development to support direct access onto collector roads. Please note direct access onto sub-arterial roads is generally not supported.</p>	<ul style="list-style-type: none"> -There are already 5 dwellings/driveways fronting Ferodale Rd (#46-#54), plus 1 off Medowie Rd (#754). The proposed layout increases driveways from 6 to 9; -Houses east of Brocklesby (from #87 Ferodale Rd) have direct access to Ferodale Rd; -Ferodale Rd in front of the site is within a 50km/h speed zone, with a 40 km/h school zone applicable just east of 58 Ferodale Rd; -Ferodale Rd in front of the site has good site lines and visibility for the limited number of houses/driveways with direct access to Ferodale Rd; -To amend the proposed concept plan so that lots fronting Ferodale Rd gained access from internal roads would likely result in greater land lost for roads, thus reducing residential yield. This may also result in rear fences along Ferodale Rd, which would be inconsistent with the general streetscape along Ferodale Rd to the east;

		-The current concept layout seeks to balance a number of competing priorities (residential yield targets of 30 dwellings per hectare, flood and stormwater flows, biodiversity corridors, bushfire risk management etc). the project team is of the view that the current layout balances all priorities efficiently.
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Traffic Impact Assessment

A summary of the key issues and their comments are provided below:

Item	Comment
Existing Situation	
2.1 Site Location and Access	<p>The subject site, known as 46 to 54 Ferodale Road & 754 Medowie Road, Medowie NSW 2318 Lots 3, 4, 5, 6, 7 & 8 DP 243518, is located on the corner of Ferodale Road and Medowie Road, Medowie with frontage to both Medowie Road and Ferodale Road.</p> <p>The land is RU2 Rural Landscape with the objective of this proposal to have it rezoned R3 Medium Density Residential and E1 Local Centre.</p> <p>Made up of six individual lots, each currently has vehicle access to either Ferodale Road or Medowie Road.</p> <p>The site is located adjacent to the Medowie town centre. To the immediate south of the site is residential lots while to the north is low density residential and playing fields. To the northwest is the Medowie commercial centre including Coles and Woolworths supermarkets, with further retail and commercial uses.</p>
2.2.1 Road Hierarchy	<p>The main road through the locality is Medowie Road, which is a regional road (MR518) that runs in a north / south orientation to the west of the subject site. It provides the primary connection between Medowie and the external road network including the Pacific Highway (to the north), Richardson Road (to the south), and Nelson Bay Road (to the south) for connection to Newcastle Airport.</p> <p>In the vicinity of the subject site, it provides one lane of travel in each direction, with a sealed shoulder and unformed verge. It has a pavement width in the order of 11.5 metres, allowing vehicles to pull over on both sides of the road with a 2.0m sealed shoulder. There are no footpaths nor street lighting in the vicinity of the subject site except at the roundabout intersection of Ferodale Road. There is a footpath along the western roadside from Ferodale Road north towards Silver Wattle Drive. The posted speed limit in the locality of the subject site is 50km/hr with the speed changing to 80km/hr to the south of the site.</p> <p>Ferodale Road is a major collector road through Medowie, providing connection to the town centre, as well as two primary schools. There is a shared pathway provided along its length on the northern roadside, with street lighting in the proximity of the Medowie Town Centre.</p> <p>At the intersection with Medowie Road, it provides one lane of travel in each direction on both the eastbound and westbound approaches to the</p>

	<p>roundabout. To the east of the roundabout, Ferodale Road provides access to a number of residential lots including the subject site and has a pavement width in the order of 9 metres. Kerb and guttering is intermittent in its built form with an unformed verge. To the east of the site, there is a Local Area Traffic Management Scheme with vertical speed control devices to manage speed along this straight length of road.</p>
<p>2.2.2 Current and Proposed Roadworks, Management Works and Traffic Works and Bikeways</p>	<p>A review of the Port Stephens Council and the TfNSW websites shows there are currently no road works occurring in the immediate vicinity of the subject site.</p> <p>A map of the existing shared paths has been provided in Attachment C. Proposed bike paths have also been identified in the Medowie Traffic and Transport Study, with an excerpt from this report shown in Figure 3 below.</p>  <p>Figure 3 – Proposed bike paths in Medowie surrounding the subject site★ (Source: URaP 2017 Figure 4.3)</p> <p>A shared pathway has been constructed on the eastern side of Medowie Road between Ferodale Road and South Street. There is also a shared path on the northern side of Ferodale Road, opposite the site.</p>
<p>2.3 Traffic Flows</p>	<p>Seca Solution collected traffic data at the intersection of Medowie Road and Ferodale Road to determine the current road operation and peak flows.</p> <p>This survey was completed during the morning and afternoon on Wednesday 2nd March 2022. The AM peak hour was determined as 8:15am to 9:15am, whilst the PM peak was 4:00pm to 5:00pm. The survey data is provided in Attachment E.</p> <p>A summary of the current distribution of traffic during the peak hour is provided below in Table 1.</p>

	<i>Table 1 –Peak traffic flows in the vicinity of the subject site</i>			
	Location	Distribution	AM Peak	PM Peak
	Medowie Road (South of Ferodale Road)	Northbound	419	594
		Southbound	493	393
	Medowie Road (North of Ferodale Road)	Northbound	215	394
		Southbound	290	227
	Ferodale Road (East of Medowie Road)	Eastbound	197	271
		Westbound	291	168
	Ferodale Road (West of Medowie Road)	Eastbound	374	484
		Westbound	469	415
	<p>Austrroads Guidelines provides typical mid-block capacities for urban roads, with a capacity of 900 vehicles per hour per direction. The traffic flows along Medowie Road to the south of Ferodale Road are well within this capacity with critical flows of around 500 vehicles southbound (AM) and 600 vehicles northbound (PM). These flows represent a Level of Service C with northbound at the upper limit between this and D per the GtTIA for urban road peak hour flows per direction.</p> <p>Ferodale Road is a major collector road for the area, providing the main access to Medowie Town Centre. Given this classification Ferodale Road has been assessed as per the rate for urban roads above. Traffic flows on Ferodale Road to the east of Medowie Road are within the mid-block capacity for Level of Service B with 291 vehicles westbound (AM) and 271 vehicles eastbound in the critical PM peak.</p>			
2.3.1 Daily Traffic Flows	<p>Peak hour flows typically represent around 10% of the daily traffic flows. This would indicate daily traffic flows in the locality in the order of:</p> <ul style="list-style-type: none"> • 9,500 vehicles per day (vpd) along Medowie Road (south of Ferodale Road) • 4,700 vpd along Ferodale Road (east of Medowie Road) 			
2.3.2 AADT	There is no AADT data available in the locality.			
2.3.3 Daily Traffic Flow Distribution	<p>It can be seen from Section 2.3.1 above that there is a high demand for travel to the south along Medowie Road in the AM, representing commuters travelling to employment opportunities including Williamstown RAAF base, Newcastle airport and the City of Newcastle. These flows are tidal with the reverse occurring during the PM.</p> <p>This pattern is also reflected in the flows along Ferodale Road along the site frontage.</p>			

	There are ongoing demands throughout the day west of the roundabout associated with the local shopping centre.
2.3.4 Vehicle Speeds	No speed surveys were completed as part of the study work, however the volume of traffic in the peak periods along Ferodale Road and Medowie Road, to the south of the roundabout does not encourage drivers to speed. The interaction between driveways in the locality also sees drivers travelling at or below the posted speed limit.
2.3.5 Existing Site Flows	The site currently has six individual lots with single dwellings on each. Traffic flows based on the GtTIA would be in the order of 7 trips in the peak hour and 72 trips daily.
2.3.6 Heavy Vehicle Flows	Data recorded during the traffic survey found higher proportion of heavy vehicles in the AM peak, with 60 heavy vehicle movements at the intersection of Medowie Road and Ferodale Road representing 4.4% of the total traffic flows. From observation a number of these related to public and school buses in the locality. Afternoon flows were much lower being 1.4%.
2.3.7 Current Road Network Operation	Observations on site during the peak periods showed that the roundabout controlled intersection of Medowie Road and Ferodale Road operates very well with minimal delays and congestion
2.4 Traffic Safety and Accident History	A review of Crash Statistics (Centre for Road Safety) (Attachment B) during the past five years (2019-2023) indicates that 9 accidents have been recorded within the vicinity of the subject site. Of these eight accidents were recorded at the intersection of Medowie Road and Ferodale Road. One resulted in a serious injury being off road on bend. There are no repeat causes for accidents in the area, with a low number of accidents recorded relative to the traffic volumes. Given the good road alignment it is considered that Medowie Road and Ferodale Road in the vicinity of the subject site operate in a safe and appropriate manner.
2.5 Parking Supply and Demand	
2.5.1 On-street Parking Provision	As there are no sealed shoulders or verges along Ferodale Road there is little opportunity for on-street parking along the site frontage. Similarly, while Medowie Road provides for a vehicle to stop if necessary, there is no facilities to encourage parking in this area.
2.5.2 Off-street Parking Provision	Given the size of the residential lots parking is able to be provided within individual lots.
2.5.3 Current Parking Demand and Utilisation	There was no demand observed for on-street parking along either Medowie or Ferodale roads in the vicinity of the site.
2.5.4 Short term set down or pick up areas	There are no set down or pick up areas in the vicinity of the site.
2.6 Modal Split	Given the proximity of the subject site to surrounding commercial facilities and schools, it is considered there is good walkability for local residents to access these from the subject site as well as residents from surrounding dwellings being able to walk to the new commercial elements. Given the

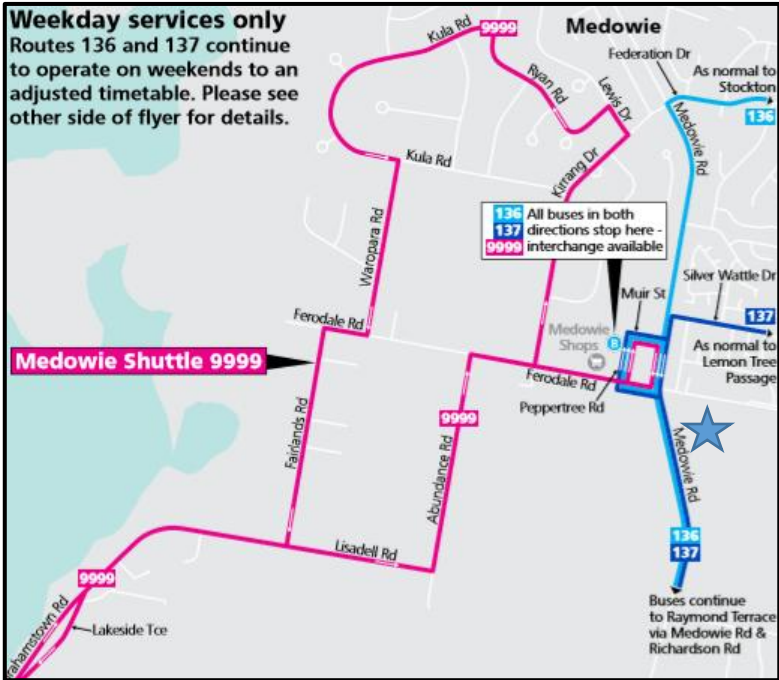
	<p>semi-rural nature of the area it is considered the majority of longer trips in Medowie are undertaken by private vehicle with a number of trips being detours as commuters travel to or from work or from taking or picking up children from school</p>
2.7 Public Transport	
2.7.1 Rail Station Locations	<p>There are no train services in the locality, with the nearest rail station located in Hexham, 20 kilometres to the south of the site.</p>
2.7.2 Bus Stops and Associated Facilities	<p>There is a bus stop located on Ferodale Road 100m west of the roundabout and 200-300m from the subject site.</p> <p>The depth of the site (approximately 200m north to south) means that the majority would be within walking distance of this existing bus stop or all lots could be within a 400m walk to an additional bus stop on Ferodale Road, depending upon the future availability of bus services in this location.</p> <p>There is also a bus stop included in the Contributions Plan to be located on Medowie Road which could also service the needs of this site as well as the dwellings to the south.</p>
2.7.3 Transport Services	<p>Bus services in the locality are provided by Hunter Valley Buses and shown below in Figure 4. There are three routes that run through Medowie Road in the vicinity of the subject site.</p> <ul style="list-style-type: none"> • 136 – Raymond Terrace to Stockton: Operates 7 days a week with frequent trips throughout the day. • 137 – Raymond Terrace to Lemon Tree Passage: Operates daily, with frequent trips Monday-Friday and limited trips on weekends and public holidays. • 9999 – Medowie Shuttle: Operates Monday to Friday at regular intervals. 

Figure 4 – Bus services through Medowie (★ Subject site)

	The Medowie Traffic and Transport Study (2017) stated there were five school buses which service the area however this may have increased along with the growth of local schools and the opening of Catherine McCauley Catholic College.
2.8 Pedestrian Network	To the north of the site along Ferodale Road and in the vicinity of the commercial centre there are pedestrian paths providing connection from the subject site through to the Medowie Town Centre and bus stops. A pedestrian refuge has been incorporated into the splitter island on Ferodale Road on the eastern leg of the roundabout.
2.9 Other Proposed Developments	<p>Medowie is subject to ongoing growth in conjunction with the Medowie Planning Strategy.</p> <p>A number of developments have been proposed or approved within the Medowie town and its environs.</p>
The Development	
3.1.1 Nature of Development	<p>The development is located on the corner of Ferodale Road and Medowie Road, incorporating lots 46 to 54 Ferodale Road & 754 Medowie Road lots 3, 4, 5, 6, 7 & 8 DP 243518. It has frontage to both Medowie Road and Ferodale Road.</p> <p>The land is currently RU2 Rural Landscape with the objective of this proposal for it to be rezoned R3 Medium Density Residential and E1 Local Centre.</p> <p>The subject site is made up of six individual lots with the potential for the following yield:</p> <p>108 residential dwellings, including detached dwellings, dual occupancy, townhouses and apartments;</p> <ul style="list-style-type: none"> • Supermarket; • General retail • Café / Fast Food; • Commercial; • Early Learning Centre; and • Office space <p>The commercial element is proposed on the corner of Ferodale Road and Medowie Road with the residential element east of the site.</p>
3.1.2 Access and Circulation Requirements	The layout of the subdivision shall be designed in accordance with Council's design requirements.
3.2 Access	<p>Two access points for the internal roadway are proposed onto Ferodale Road along with a direct access to the commercial lot and secondary access to Macadamia Circuit (noted as Gum Tree Way on the plan).</p> <p>Some lots shall have direct access onto Ferodale Roads in a manner consistent with other residential lots in the area.</p> <p>The most westerly access into the residential subdivision is located approximately 160m east of the intersection of Ferodale Road with the</p>

	<p>concept plan indicating a location east of Bottlebrush Avenue, opposite the driveway into the skate park.</p> <p>The access into the commercial site is proposed to the west of Bottlebrush Avenue, in the order of 80 metres from Medowie Road. A secondary access from Medowie Road has been provided offering a left in only option.</p>
3.2.1 Driveway Location	<p>Individual driveways would be subject to future DAs for each future dwelling or proposed development.</p> <p>Lots accessing directly to Ferodale Road, a collector road, would require driveways with vehicles able to reverse onto the local roads.</p>
3.2.2 Sight Distances	<p>Sight distances at the proposed intersections are to be provided in accordance with Austroads Guidelines. Ferodale Road and Medowie Road have posted speed limits of 50km/hr and offer straight and relatively level alignments. The necessary sight distance of 97 metres can be achieved in both directions along Ferodale Road or Medowie Road.</p> <p>Sight distance for the individual driveways within the subdivision will be provided in accordance with AS2890.</p> <p>For the speed limit of 50km/hr along Ferodale Road AS2890 states a desirable sight distance of 69 metres, with a minimum of 45 metres for driveways. Ferodale Road provide straight horizontal alignment along their lengths with sight distances at any future driveways achievable.</p>
3.2.3 Service Vehicle Access	<p>There will be occasional demands for delivery vehicles within the residential site as well as regular waste collection. The design of the internal roads will be in accordance with the Council DCP which will cater for the swept path requirements for the largest design vehicle.</p> <p>The commercial lot shall require large vehicles including 19m semi trailers to access the site as well as waste collection by commercial providers. This access will be via the left in off Medowie Road to allow for one-way circulation of these vehicles and access to the loading docks.</p>
3.2.4 Queuing at entrance to site	<p>Given the low flows passing the site access points there are minimal vehicle queues expected for vehicles entering the site at the new intersections. Allowing for traffic to be distributed across the various intersections, as motorists will use whichever intersection is closest to their destination, traffic flows will be generally equally split.</p> <p>Peak traffic entering the site will typically be of a morning associated with the commercial site which shall be after the local road peak.</p> <p>Of an evening, when 80% of the residential flows are inbound, the main traffic flows along Ferodale Road are eastbound.</p> <p>Any queues associated with vehicles turning right out of the site will be minimal and shall be contained within the site so shan't impact on through traffic.</p>
3.2.5 Comparison with existing site access	<p>There are currently driveways on both Ferodale Road and Medowie Road associated with the six individual lots. The future subdivision may see in the</p>

	order of nine driveways accessing Ferodale Road. There will be no driveways with egress to Medowie Road from the site.
3.2.6 Access to Public Transport	<p>The development is well located with regard to public bus services through the locality. Bus stops are provided along both Ferodale Road and Medowie Road in the vicinity of the town centre.</p> <p>There is a bus stop located on Ferodale Road 100m west of the roundabout and 200-300m from the subject site.</p> <p>The depth of the site (approximately 200m north to south) means that the majority of lots would be within walking distance of this existing bus stop or all lots could be within a 400m walk to an additional bus stop on Ferodale Road, depending upon the future availability of bus services in this location.</p> <p>There is also a bus stop included in the Contributions Plan to be located on Medowie Road which could also service the needs of this site as well as the dwellings to the south.</p>
3.3 Circulation	
3.3.1 Pattern of circulation	The internal road layout allows for two-way movements. The driveway access of Medowie Road allows for entry movement only.
3.3.2 Internal Road width	All internal roads will be designed in accordance with the DCP requirements.
3.3.3 Internal Bus Movements	There are no internal bus movements anticipated for the development.
3.3.4 Service Area Layout	<p>Generally, no service area required for the residential lots.</p> <p>The commercial / retail element shall be subject to a separate DA that shall assess the requirements for the end users however it is expected there shall be requirements for service areas associated with loading bays and waste collection.</p>
3.4 Parking	
3.4.1 Proposed Supply	Individual lots shall provide parking in accordance with the DCP.
3.4.2 Authority Parking	<p>Port Stephens Council DCP provides parking rates relevant to various end uses for the development.</p> <p>Individual lots shall be subject to individual DAs.</p>
3.4.3 Parking Layout	Parking will be designed in accordance with AS2890.
3.4.5 Service Vehicle Parking	<p>Service vehicle parking shall typically be minimal with suitable areas provided within the Commercial element.</p> <p>Waste collection shall occur on street or by waste contractor for the commercial lot.</p>
3.4.6 Pedestrian and Bicycle Facilities	<p>Internal footpaths shall be provided in accordance with the DCP.</p> <p>Connection to the shared footpath on Medowie Road should be considered as part of the detailed design for the subject site.</p>

Traffic Assessment

4.1 Traffic Generation

Traffic generation for the proposed uses has been determined using rates provided in the GtTIA. The following rates have been applied to the project:

0.83 trips per low density dwelling AM peak and 0.84 trips PM

0.41 trips per medium density dwelling AM peak and 0.60 trips PM

0.066A+126 AM peak small suburban shopping centre and 0.089A+170 PM peak

206 vehicles AM peak fast food and 201 PM peak

0.86 trips AM peak per licenced space ELC and 0.76 PM peak

2 trips per 100 m2 GFA AM and PM peak for office and commercial

Combined Development

Use		AM Peak (Inbound/Outbound)	PM Peak (Inbound/Outbound)
Low Density Residential	11	9 trips (1 / 8)	9 trips (8 / 1)
Medium density residential	97	40 (8 / 32)	58 (46 / 12)
Retail	4283 m2	Assumed to be 100 trips during road peak (50 / 50)	551 (275 / 275)
Allowing for 20% cross use		100 trips	440 trips (220 / 220)
Commercial	2820m2	56 trips (42 / 14)	56 trips (14 / 42)
100 place ELC	100 place	86 (43 / 43)	76 (38 / 38)
Fastfood	840m	188 (94 / 94)	183 (91 / 91)
Total with cross use		479 trips (238 / 241)	822 trips (417 / 405)

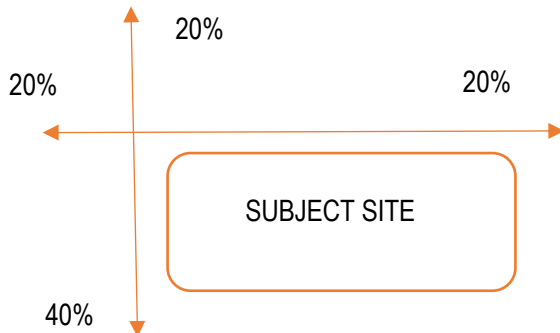
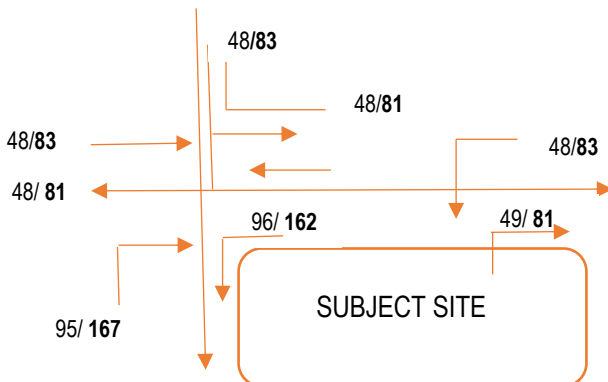
No reduction has been allowed for the existing dwellings and their current traffic generation.

The following points are made for the above development flows:

For the ELC, the vast majority of traffic shall be passing trips and not additional traffic movements. A value of 80% passing trips has been assumed

For the retail element, for the AM peak the demands shall be low, generally associated with staff and some customers only. The peak morning demand shall occur after the peak on the road network.

For the fast-food element 50% is considered to be passing trade and 50% additional traffic

	Assume cross use of 20% between the retail / fast-food outlet
4.1.1 Daily and Seasonal Factors	Limited daily and seasonal variation in traffic movements are anticipated. For residential developments weekend flows are typically less than weekend flows whilst depending upon the commercial end user there may be some seasonal reduction over Christmas.
4.1.2 Pedestrian Movements	The site is located within easy walking distance of the Medowie Town Centre, as such it is considered there will be considerable demand for pedestrian movements to the north/west of the subject site. There are footpaths provided along the north side of Ferodale Road to cater for these movements.
4.2 Hourly distribution of trips	
4.2.1 Origin / destinations assignment	<p>Traffic demands are anticipated to replicate the existing patterns on the adjoining road network .</p> <ul style="list-style-type: none"> • 20% with an origin / destination to the east of the site along Ferodale Road • 20% with an origin / destination to the west of the site along Ferodale Road • 20% with an origin / destination north of the site along Medowie Road • 40% with an origin / destination south of the site along Medowie Road  <p>Figure 5 – Traffic distribution</p>  <p>Figure 6 – Traffic distribution (AM/PM)</p>

4.3 Impact on Road Safety	<p>Sight distances at the new intersections can be provided in accordance with the Austroads Guidelines allowing good visibility for drivers entering and exiting the site. The local roads operate in a safe and appropriate manner with good visibility and road alignment at the key intersection of Medowie Road/Ferodale Road.</p> <p>A review of the accident data provided by TfNSW found no repeating pattern for crash types at this intersection, indicating there are no identifiable safety concerns.</p> <p>The intersection of Ferodale Road and Peppertree Road west of the site has been identified in the Medowie Traffic and Transport Study for upgrade to a roundabout, to improve the efficiency and safety of turning movements at this intersection.</p> <p>The intersection of Medowie Road and Ferodale Road has also been identified for potential future upgrade to a 2-lane roundabout or traffic signals to cater for overall growth in Medowie and resulting increases in vehicle and pedestrian volumes. Observations indicate the existing roundabout operates in a safe and efficient manner, with the traffic flows associated with the development to have minimal impact upon the existing operation as shown in the Sidra Assessment to follow.</p>
4.4 Impact of Generated Traffic	
4.4.1 Impact on Daily Traffic Flows	<p>The development could generate an additional 3,500 trips per day with vehicles split across the various access points depending upon the location of their dwelling/commercial element within the subdivision.</p> <p>These trips would however have an origin/destination primarily from Medowie or be traffic travelling into or out of the town and thus being passing trade and contained trips. The majority of the residential trips are expected to travel south along Medowie Road to leave the township for employment. As such the extent of additional traffic movements is relatively low and primarily only associated with the residential element of the project.</p> <p>It can be seen that the retail and commercial centre will not be of a large enough size to act as a major attractor for external demands from other centres e.g. Raymond Terrace.</p> <p>Medowie Road and Ferodale Road are both major collector roads in the area, with spare capacity during the peak periods (as outlined in Section 2.3.1) to cater for the movements generated by this development. There is no specific guidelines with regards to daily capacity of roads, however it is considered that as the roads have adequate capacity in the peak periods it follows that they have capacity across the day too.</p> <p>Other local roads within the vicinity of the local shopping centre have been assessed in the Medowie Traffic and Transport Study to accommodate future local demands. Road upgrades have been identified as part of the overall development of Medowie and shall cater for the additional traffic movements associated with this project.</p>

	The impact of this traffic can therefore be accommodated within the local road network.
4.4.2 Peak Hour Impacts on Intersections	<p>The Medowie Traffic and Transport Study nominates the intersection of Medowie Road and Ferodale Road for potential future upgrade to a 2-lane roundabout or signals. Sidra Intersection modelling has been used to analyse the impact of the development on this intersection to assess the capacity of the existing layout. The results for this assessment detailed following this table, with the outputs provided in Attachment F. The scenarios modelled are detailed below and included:</p> <ul style="list-style-type: none"> • 2024 Existing Situation • 2034 with Background Growth (2% per annum) • 2024 with Proposed Rezoning • 2034 with Proposed Rezoning plus Background Growth (2% per annum)
4.4.3 Impact of Construction Traffic	<p>While no construction is required to support the rezoning there will be a requirement for construction vehicles (light and heavy) to access the site for infrastructure works associated with the future DA including roads, stormwater etc. The majority of the construction work shall be located on the site. Construction of the new intersections shall require a Construction Traffic Management Plan outlining appropriate controls which shall be prepared by the contractor in conjunction with the CC for the project.</p> <p>The construction traffic will be less than the traffic associated with the completed development and as such is considered to have an acceptable impact upon the local road network.</p>
4.4.4 Other Developments	Ongoing expansion of Medowie sees future developments including residential, commercial and education.
4.5 Public Transport	
4.5.1 Options for improving services	No requirement to improve services. There is capacity within the existing services with any upgrades completed as part of the overall development across Medowie.
4.5.2 Pedestrian Access to Bus Stops	Pedestrian movements for the development shall be accommodated by internal pathways that will provide connection to existing footpaths along Ferodale Road to access the bus stop west of the subject site.
4.6 Recommended Works	
4.6.1 Improvements to Access and Circulation	Ensure access and internal roads are designed and constructed in accordance with Council requirements.
4.6.2 Improvements to External Road Network	<p>No road upgrades required in conjunction with the proposed development.</p> <p>The development shall provide the new access roads for the project site together with kerb and guttering along the site boundary to both Medowie Road and Ferodale Road in accordance with Council requirements.</p>

4.6.3 Improvements to Pedestrian Facilities	<p>The site shall connect to pedestrian facilities in the area.</p> <p>Ensure the site connects with the new shared pathway on Medowie Road.</p>
4.6.4 Effect of Recommended Works on Adjacent Developments	Nil.
4.6.5 Effect of Recommended Works on Public Transport Services	None.
4.6.6 Provision of LATM Measures	None Required.
4.6.7 Funding	All internal site work will be funded by the developer.

Sidra Modelling

Sidra modelling has been completed for the intersection of Medowie Road / Ferodale Road to determine the capacity to support the additional traffic demands associated with the proposed development. The following scenarios were considered in the modelling:

- 2024 Existing Situation
- 2034 with Background Growth (2% per annum, consistent with the high growth rate URaP 2017)
- 2024 with Proposed Rezoning
- 2034 with Proposed Rezoning plus Background Growth (2% per annum)

The results of this modelling are provided below.

Medowie Road / Ferodale Road

Table 2 - Sidra Results - Existing Situation 2024 (AM/PM)

Approach	Degree of saturation	Level of Service	Average Delay (s)	95% Queue (m)
Medowie Road (Northbound)	0.434 / 0.531	A / A	5.5 / 4.9	19.7 / 26.9
Ferodale Road (Westbound)	0.360 / 0.190	A / A	6.8 / 5.5	15.0 / 6.8
Medowie Road (Southbound)	0.342 / 0.276	A / A	6.6 / 6.3	14.4 / 11.2
Ferodale Road (Eastbound)	0.387 / 0.529	A / A	6.8 / 7.4	16.8 / 27.0
Overall	0.434 / 0.531	A / A	6.4 / 6.0	19.7 / 27.0

The results in Table 3 show that the roundabout intersection currently operates well with very minimal delays and queuing on all approaches during the peak hours, consistent with observations on site. Each approach operates well within its capacity providing an overall level of service A.

Table 3 - Sidra Results - Existing Situation 2024 with proposed rezoning (AM/PM)

Approach	Degree of saturation	Level of Service	Average Delay (s)	95% Queue (m)
Medowie Road (Northbound)	0.586 / 0.808	A / A	8.2 / 11.7	35.5 / 82.5
Ferodale Road (Westbound)	0.601 / 0.560	A / A	9.7 / 4.4	37.2 / 31.0
Medowie Road (Southbound)	0.456 / 0.497	A / A	8.4 / 3.9	22.8 / 28.0
Ferodale Road (Eastbound)	0.503 / 0.831	A / B	8.1 / 12.4	25.4 / 87.2
Overall	0.601 / 0.831	A / A	8.6 / 12.4	37.2 / 87.2

Allowing for the increase in traffic demands associated with the proposed development (Section 4.2.1), the roundabout intersection will continue to operate to its current standard with no change to the level of service (LoS) on any approach and minor increases in the average delays and queuing.

Table 4 - Sidra Results - 2034 design year with 20% background growth (AM/PM)

Approach	Degree of saturation	Level of Service	Average Delay (s)	95% Queue (m)
Medowie Road (Northbound)	0.545 / 0.652	A / A	6.4 / 5.6	29.6 / 40.5
Ferodale Road (Westbound)	0.473 / 0.242	A / A	8.6 / 6.1	24.1 / 9.3
Medowie Road (Southbound)	0.442 / 0.364	A / A	7.6 / 7.1	21.1 / 16.6
Ferodale Road (Eastbound)	0.482 / 0.677	A / B	7.2 / 10.0	23.4 / 49.0
Overall	0.545 / 0.677	A / A	7.3 / 7.4	29.6 / 49.0

Table 5 shows for the future design year, allowing for 20% background growth over 10 years, the intersection will continue to operate within its capacity providing an overall level of service A. Background growth will see some approaches experience increases in the average delays and additional queuing however these remain within acceptable limits, with the Ferodale Road (Eastbound) approach seeing operation at LoS B.

Table 5 - Sidra Results – 2034 design year with 20% growth and Proposed Rezoning

Approach	Degree of saturation	Level of Service	Average Delay (s)	95% Queue (m)
Medowie Road (Northbound)	0.763 / 0.941	A / B	12.2 / 21.6	69.0 / 171.8
Ferodale Road (Westbound)	0.798 / 0.624	B / A	16.6 / 9.8	77.4 / 40.1
Medowie Road (Southbound)	0.623 / 0.601	A / A	12.3 / 13.1	42.7 / 39.2
Ferodale Road (Eastbound)	0.653 / 1.050	A / F	10.6 / 82.8	46.0 / 321.6
Overall	0.798 / 1.050	A / C	13.0 / 34.6	77.4 / 321.6

It can be seen in that allowing for development flows as well as background growth to 2034, the current layout of the intersection of Medowie Road and Ferodale Road shall start to create unacceptable delays and congestion. However, as part of the overall masterplan development for Medowie this intersection has been identified for upgrade to either a 2-lane circulation roundabout with associated upgrades to the approaches or traffic signal control. Either of these upgrades shall allow for the subject site traffic demands as well as the background growth in traffic associated with the overall development identified in the Medowie Masterplan, of which the subject site forms part.



Figure 7 – Layout of roundabout at Ferodale Road and Medowie Road (source: nearmap)

Site Photos



Photo 1 – Cross section of Ferodale Road looking east in vicinity of the eastern access, with the subject site on the right



Photo 2 – View to left for driver exiting the proposed eastern access point on Ferodale Road



Photo 3 - View to right for driver exiting the proposed eastern access point on Ferodale Road



Photo 4 – Existing footway / cycleway on Ferodale Road on opposite side to the subject site



Photo 5 – View to left for driver exiting the western access point on Ferodale Road



Photo 6 – View to right for driver exiting the western access point on Ferodale Road

Conclusion

From the above assessment and the review of the proposed rezoning and lot yield against the requirements of the Guide to Transport Impact Assessment published by TfNSW and Austroads Guide to Traffic Management, it is considered that the rezoning is acceptable on traffic and access grounds.

The potential for additional traffic movements generated by the development will have an acceptable impact on the surrounding road network. The SIDRA results show that the key intersection of Medowie Road and Ferodale Road will continue to operate at an acceptable Level of Service for the current design year 2024 and shall have capacity for a number of years. However, as per the Medowie Masterplan, this intersection will need to be upgraded to accommodate the on-going development in the Medowie area, which includes the subject site prior to 2034, assuming the rate of development continues over the planning horizon of 10 years.

The intersection of Ferodale Road and Peppertree Road has been identified as part of Council's Contributions Plan for upgrade to a roundabout or traffic signals in order to accommodate future development in Medowie.

It is considered the proposal can meet the requirements of the Development Control Plan in relation to traffic, and access as well as the overall planning for the subject site. Parking and site servicing shall be the subject of future DAs for the site and individual lots.

Please feel free to contact our office on 4032 7979, should you have any queries.

Yours sincerely



Sean Morgan
Senior Traffic Engineer

Attached: A – Site Plan
 B – Accident Data
 C – Shared Paths
 D – Medowie Town Centre Master plan
 E – Survey Data
 F – Sidra Analysis

Attachment A Site Plan



MEDOWIE COMMERCIAL VILLAGE DEVELOPMENT

GROUND FLOOR

LEGEND

- | | | | |
|------------------------------|-------------------------------------|--------------------------|------------------------|
| RETAIL AND COMMERCIAL | EARLY EDUCATION CENTRE | DEEP SOIL AND LANDSCAPE | WALKWAYS AND FOOTPATHS |
| SUPERMARKET AND WAREHOUSE | RESIDENTIAL 450 sqm ² | ROADS | POTENTIAL LANDSCAPE |
| AMENITIES AND VILLAGE OFFICE | DUAL OCCUPANCY 600 sqm ² | STAIRS, RAMPS, AND LIFTS | BATTER ZONE |
| FAST FOOD OUTLET | TOWNHOUSES / VILLA sqm varies | LOADING DOCK | PROPOSED TREE |
| CAFE | APARTMENT BLOCK sqm varies | GARDEN BEDS | FEATURE SCULPTURE |



1 GROUND FLOOR

COMPETENCE OF THE CONSULTANT IS ASSURED THAT THE DOCUMENT COMPLIES WITH THE REQUIREMENTS OF THE QUALITY MANAGEMENT SYSTEM WHERE THE QUALITY MANAGEMENT SYSTEM IS ASSIGNED TO THE CONSULTANT'S PROJECTS. THE QUALITY MANAGEMENT SYSTEM IS ASSIGNED TO THE CONSULTANT'S PROJECTS. THE QUALITY MANAGEMENT SYSTEM IS ASSIGNED TO THE CONSULTANT'S PROJECTS.



REV	DATE	COMMENTS	BY	CHKD	ISSD
A	08/10/2021	WATERPLAN, OFFICIAL	UN	KJ	
B	02/10/2021	WATERPLAN, OFFICIAL	UN	KJ	
C	01/10/2021	FINAL EXISTING DESIGN	UN	KJ	
D	01/10/2021	FINAL EXISTING DESIGN	UN	KJ	
E	01/10/2021	RESPONSE TO CONSULTANT'S COMMENTS	UN	KJ	

PROJECT: MEDOWIE VILLAGE DEVELOPMENT
 45 TO 54 FERODALE ROAD,
 MEDOWIE
 WORME COUNTRY
 VC MANAGEMENT

DATE: 08/10/2021
 SCALE: As Indicated @ A1
 1:200 @ A3
 PROJECT NO: 45562
 DRAWING NO: SW02A
 REV: F



Attachment B TfNSW Accident Data

LGA view - crashes map

All ▾

Degree of crash

All ▾

Type of crash

All ▾

Speed limit

All ▾

RUM code group

All ▾

Type of location group

All ▾

Speeding involved in crash

All ▾

Fatigue involved in crash

All ▾

Road classification

All ▾

DATA AVAILABILITY

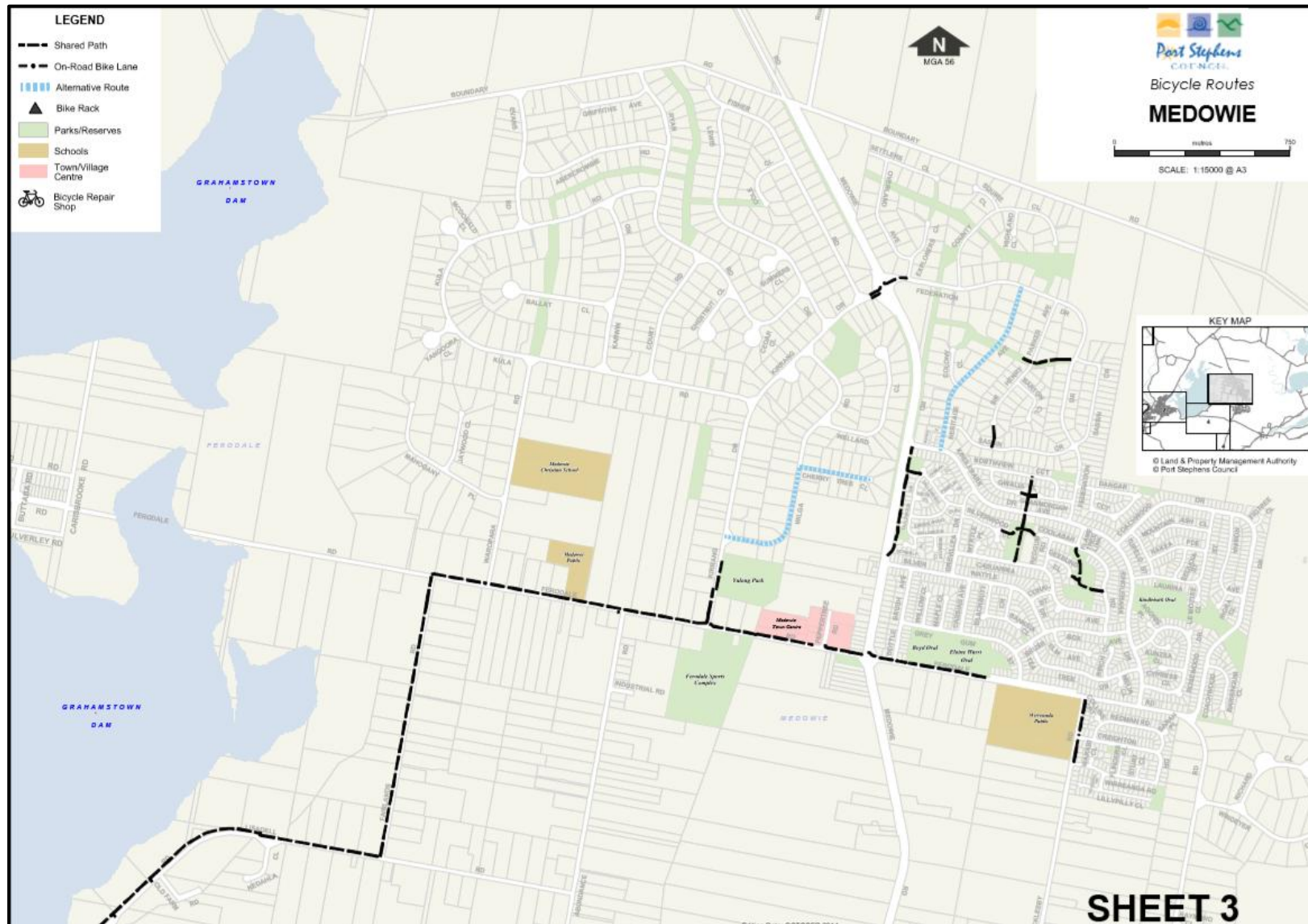
Finalised data is available for
the 5 year period 2019 to 2023



Esri, Geoscience Australia, NASA, NGA, USGS | Esri Community Maps Contributors, Spatial Services, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, Foursquare, METI/NASA, U... Powered by Esri

Reporting year	Crash Id	Degree of crash	RUM - code	RUM - description	Type of location	Natural lighting	Longitude	Latitude	Number killed	Number injured
2019	1205175	Non-casualty (towaway)	71	Off rd left => obj	2-way undivided	Daylight	151.871433	-32.742047		
2019	1206069	Moderate Injury	10	Cross traffic	Roundabout	Daylight	151.867701	-32.741493		1
2020	1224535	Non-casualty (towaway)	10	Cross traffic	Roundabout	Darkness	151.867701	-32.741493		
2020	1232213	Moderate Injury	10	Cross traffic	Roundabout	Darkness	151.867557	-32.741596		2
2020	1235764	Non-casualty (towaway)	33	Lane sideswipe	Roundabout	Daylight	151.867397	-32.741447		
2020	1239271	Serious Injury	88	Out of cont on bend	Roundabout	Daylight	151.867546	-32.741335		1
2021	1256972	Non-casualty (towaway)	19	Other adjacent	Roundabout	Daylight	151.867557	-32.741596		
2021	1278235	Non-casualty (towaway)	10	Cross traffic	Roundabout	Darkness	151.867701	-32.741493		
2022	1316139	Minor/Other Injury	10	Cross traffic	Roundabout	Darkness	151.867557	-32.741596		1

Attachment C Shared Paths

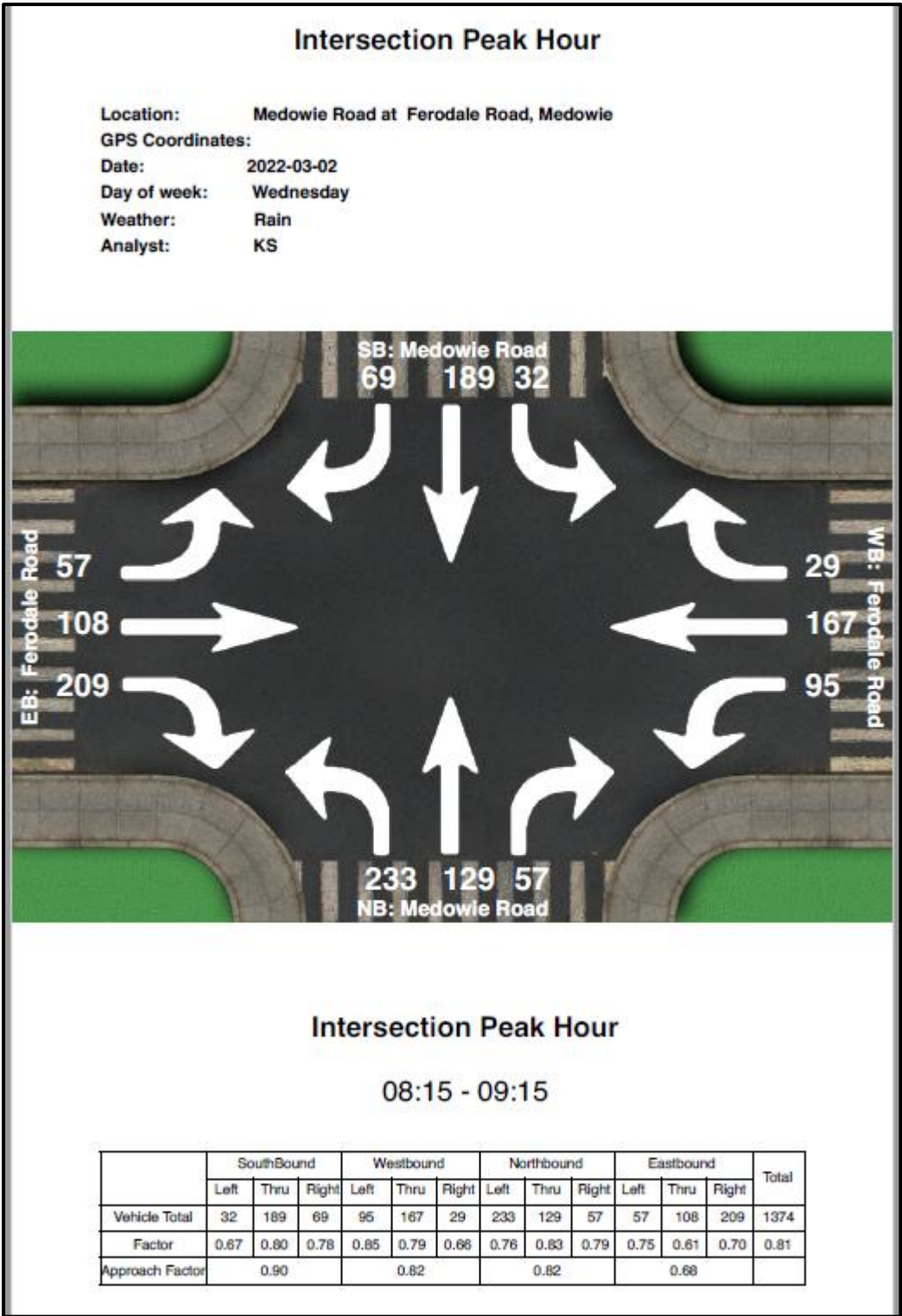


Attachment D Medowie Town Centre Masterplan



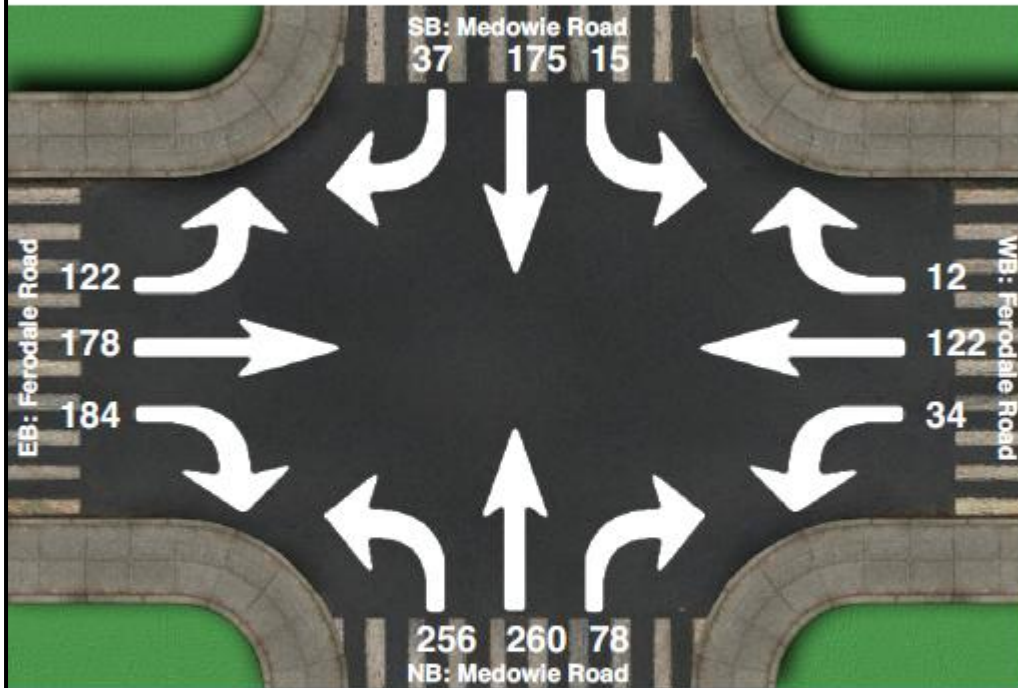
Attachment E Survey Data

Medowie Road / Ferodale Road AM/PM



Intersection Peak Hour

Location: Medowle Road at Ferodale Road, Medowle
 GPS Coordinates:
 Date: 2022-03-02
 Day of week: Wednesday
 Weather: Cloudy
 Analyst: CT



Intersection Peak Hour

16:00 - 17:00

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	15	175	37	34	122	12	256	260	78	122	178	184	1473
Factor	0.75	0.80	0.58	0.85	0.82	0.60	0.89	0.94	0.89	0.85	0.81	0.98	0.94
Approach Factor	0.92			0.88			0.94			0.88			

Attachment F Sidra Analysis

Criteria for Interpreting Results of Sidra

1-Level of Service (LoS)

LoS	Traffic Signals and Roundabouts	Give Way and Stop Signs
A	Good	Good
B	Good, with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	Satisfactory	Satisfactory, but requires accident study
D	Operating near capacity	Near capacity and requires accident study
E	At capacity, excessive delay: roundabout requires other control method	At capacity, requires other control mode
F	Unsatisfactory, requires other control mode or additional capacity	Unsatisfactory, requires other control mode

2-Average Vehicle Delay (AVD)

The AVD is a measure of operational performance of an intersection relating to its LoS. The average delay should be taken as a guide only for an average intersection. Longer delays may be tolerated at some intersections where delays are expected by motorists (e.g. those in inner city areas or major arterial roads).

LoS	Average Delay / Vehicle (secs)	Traffic Signals and Roundabouts	Give Way and Stop Signs
A	Less than 15	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	28 to 42	Satisfactory	Satisfactory but accident study required
D	42 to 56	Operating near capacity	Near capacity, accident study required
E	56 to 70	At capacity, excessive delays: roundabout requires other control mode	At capacity; requires other control mode
F	Exceeding 70	Unsatisfactory, requires additional capacity	Unsatisfactory, requires other control mode

3-Degree of Saturation (D/S)

The D/S of an intersection is usually taken as the highest ratio of traffic volumes on an approach to an intersection compared with the theoretical capacity, and is a measure of the utilisation of available green time. For intersections controlled by traffic signals, both queues and delays increase rapidly as DS approaches 1.0. An intersection operates satisfactorily when its D/S is kept below 0.75. When D/S exceeds 0.9, queues are expected.

MOVEMENT SUMMARY

 **Site: 101 [2024 AM Medowie Road / Ferodale Road (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Medowie Road / Ferodale Road

Site Category: (None)

Roundabout

Design Life Analysis (Final Year): Results for 2 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%				v/c	sec				
South: Medowie Road															
1	L2	All MCs	255	2.6	255	2.6	0.434	5.0	LOS A	2.7	19.7	0.54	0.57	0.54	45.4
2	T1	All MCs	141	7.8	141	7.8	0.434	5.1	LOS A	2.7	19.7	0.54	0.57	0.54	45.6
3	R2	All MCs	62	3.5	62	3.5	0.434	8.8	LOS A	2.7	19.7	0.54	0.57	0.54	45.1
Approach			459	4.3	459	4.3	0.434	5.5	LOS A	2.7	19.7	0.54	0.57	0.54	45.4
East: Ferodale Road															
4	L2	All MCs	104	3.2	104	3.2	0.360	6.4	LOS A	2.1	15.0	0.65	0.65	0.65	44.8
5	T1	All MCs	183	3.6	183	3.6	0.360	6.4	LOS A	2.1	15.0	0.65	0.65	0.65	45.1
6	R2	All MCs	32	0.0	32	0.0	0.360	10.1	LOS A	2.1	15.0	0.65	0.65	0.65	44.6
Approach			319	3.1	319	3.1	0.360	6.8	LOS A	2.1	15.0	0.65	0.65	0.65	45.0
North: Medowie Road															
7	L2	All MCs	35	0.0	35	0.0	0.342	5.6	LOS A	1.9	14.4	0.59	0.62	0.59	44.8
8	T1	All MCs	207	8.5	207	8.5	0.342	5.8	LOS A	1.9	14.4	0.59	0.62	0.59	45.0
9	R2	All MCs	76	4.3	76	4.3	0.342	9.5	LOS A	1.9	14.4	0.59	0.62	0.59	44.5
Approach			317	6.6	317	6.6	0.342	6.6	LOS A	1.9	14.4	0.59	0.62	0.59	44.9
West: Ferodale Road															
10	L2	All MCs	62	5.3	62	5.3	0.387	4.7	LOS A	2.3	16.8	0.48	0.59	0.48	44.7
11	T1	All MCs	118	1.9	118	1.9	0.387	4.5	LOS A	2.3	16.8	0.48	0.59	0.48	45.0
12	R2	All MCs	251	3.9	251	3.9	0.387	8.4	LOS A	2.3	16.8	0.48	0.59	0.48	44.4
Approach			431	3.6	431	3.6	0.387	6.8	LOS A	2.3	16.8	0.48	0.59	0.48	44.6
All Vehicles			1526	4.3	1526	4.3	0.434	6.4	LOS A	2.7	19.7	0.56	0.60	0.56	45.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [2024 PM Medowie Road / Ferodale Road (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Medowie Road / Ferodale Road, allowing 2.4% background growth all legs to 2029

Site Category: (None)

Roundabout

Design Life Analysis (Final Year): Results for 2 years

Vehicle Movement Performance																
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Stop Rate	Eff. Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]					
			veh/h	%	veh/h	%	v/c	sec		veh	m					km/h
South: Medowie Road																
1	L2	All MCs	280	1.2	280	1.2	0.531	4.5	LOS A	3.8	26.9	0.49	0.52	0.49	45.5	
2	T1	All MCs	285	1.2	285	1.2	0.531	4.4	LOS A	3.8	26.9	0.49	0.52	0.49	45.7	
3	R2	All MCs	84	2.6	84	2.6	0.531	8.3	LOS A	3.8	26.9	0.49	0.52	0.49	45.2	
Approach			649	1.3	649	1.3	0.531	4.9	LOS A	3.8	26.9	0.49	0.52	0.49	45.6	
East: Ferodale Road																
4	L2	All MCs	37	2.9	37	2.9	0.190	5.3	LOS A	1.0	6.8	0.52	0.57	0.52	45.3	
5	T1	All MCs	134	0.0	134	0.0	0.190	5.2	LOS A	1.0	6.8	0.52	0.57	0.52	45.6	
6	R2	All MCs	13	8.3	13	8.3	0.190	9.3	LOS A	1.0	6.8	0.52	0.57	0.52	45.0	
Approach			184	1.2	184	1.2	0.190	5.5	LOS A	1.0	6.8	0.52	0.57	0.52	45.5	
North: Medowie Road																
7	L2	All MCs	16	6.7	16	6.7	0.276	5.9	LOS A	1.6	11.2	0.61	0.61	0.61	44.8	
8	T1	All MCs	192	2.9	192	2.9	0.276	5.7	LOS A	1.6	11.2	0.61	0.61	0.61	45.2	
9	R2	All MCs	41	2.7	41	2.7	0.276	9.5	LOS A	1.6	11.2	0.61	0.61	0.61	44.6	
Approach			249	3.1	249	3.1	0.276	6.3	LOS A	1.6	11.2	0.61	0.61	0.61	45.0	
West: Ferodale Road																
10	L2	All MCs	134	2.5	134	2.5	0.529	6.1	LOS A	3.8	27.0	0.66	0.66	0.69	44.5	
11	T1	All MCs	195	0.6	195	0.6	0.529	6.0	LOS A	3.8	27.0	0.66	0.66	0.69	44.8	
12	R2	All MCs	201	0.0	201	0.0	0.529	9.7	LOS A	3.8	27.0	0.66	0.66	0.69	44.2	
Approach			530	0.8	530	0.8	0.529	7.4	LOS A	3.8	27.0	0.66	0.66	0.69	44.5	
All Vehicles			1611	1.4	1611	1.4	0.531	6.0	LOS A	3.8	27.0	0.57	0.59	0.58	45.1	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

 **Site: 101 [2024 AM Medowie Road / Ferodale Road+dev (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Medowie Road / Ferodale Road

Site Category: (None)

Roundabout

Design Life Analysis (Final Year): Results for 2 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Medowie Road															
1	L2	All MCs	255	2.6	255	2.6	0.586	6.8	LOS A	4.9	35.5	0.73	0.71	0.81	44.9
2	T1	All MCs	141	7.8	141	7.8	0.586	6.9	LOS A	4.9	35.5	0.73	0.71	0.81	45.1
3	R2	All MCs	166	1.3	166	1.3	0.586	11.3	LOS A	4.9	35.5	0.73	0.71	0.81	46.6
Approach			563	3.5	563	3.5	0.586	8.2	LOS A	4.9	35.5	0.73	0.71	0.81	45.4
East: Ferodale Road															
4	L2	All MCs	209	1.6	209	1.6	0.601	9.2	LOS A	5.2	37.2	0.79	0.80	0.95	46.5
5	T1	All MCs	235	2.8	235	2.8	0.601	9.0	LOS A	5.2	37.2	0.79	0.80	0.95	45.9
6	R2	All MCs	84	0.0	84	0.0	0.601	13.2	LOS A	5.2	37.2	0.79	0.80	0.95	46.6
Approach			529	1.9	529	1.9	0.601	9.7	LOS A	5.2	37.2	0.79	0.80	0.95	46.3
North: Medowie Road															
7	L2	All MCs	88	0.0	88	0.0	0.456	7.9	LOS A	3.1	22.8	0.74	0.73	0.79	46.6
8	T1	All MCs	207	8.5	207	8.5	0.456	7.6	LOS A	3.1	22.8	0.74	0.73	0.79	44.9
9	R2	All MCs	76	4.3	76	4.3	0.456	11.2	LOS A	3.1	22.8	0.74	0.73	0.79	44.4
Approach			370	5.6	370	5.6	0.456	8.4	LOS A	3.1	22.8	0.74	0.73	0.79	45.2
West: Ferodale Road															
10	L2	All MCs	62	5.3	62	5.3	0.503	6.1	LOS A	3.5	25.4	0.67	0.68	0.69	44.6
11	T1	All MCs	171	1.3	171	1.3	0.503	6.3	LOS A	3.5	25.4	0.67	0.68	0.69	45.9
12	R2	All MCs	251	3.9	251	3.9	0.503	9.8	LOS A	3.5	25.4	0.67	0.68	0.69	44.3
Approach			484	3.2	484	3.2	0.503	8.1	LOS A	3.5	25.4	0.67	0.68	0.69	44.9
All Vehicles			1945	3.4	1945	3.4	0.601	8.6	LOS A	5.2	37.2	0.73	0.73	0.81	45.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

 **Site: 101 [2024 PM Medowie Road / Ferodale Road+dev (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Medowie Road / Ferodale Road, allowing 2.4% background growth all legs to 2029

Site Category: (None)

Roundabout

Design Life Analysis (Final Year): Results for 2 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%				veh	m				
South: Medowie Road															
1	L2	All MCs	280	1.2	280	1.2	0.808	10.0	LOS A	11.7	82.5	0.92	0.87	1.19	43.3
2	T1	All MCs	285	1.2	285	1.2	0.808	10.0	LOS A	11.7	82.5	0.92	0.87	1.19	43.6
3	R2	All MCs	267	0.8	267	0.8	0.808	14.6	LOS B	11.7	82.5	0.92	0.87	1.19	45.1
Approach			832	1.1	832	1.1	0.808	11.5	LOS A	11.7	82.5	0.92	0.87	1.19	43.9
East: Ferodale Road															
4	L2	All MCs	215	0.5	215	0.5	0.560	7.7	LOS A	4.4	31.0	0.71	0.71	0.79	49.3
5	T1	All MCs	222	0.0	222	0.0	0.560	7.3	LOS A	4.4	31.0	0.71	0.71	0.79	48.3
6	R2	All MCs	102	1.1	102	1.1	0.560	11.7	LOS A	4.4	31.0	0.71	0.71	0.79	49.1
Approach			539	0.4	539	0.4	0.560	8.3	LOS A	4.4	31.0	0.71	0.71	0.79	48.9
North: Medowie Road															
7	L2	All MCs	107	1.0	107	1.0	0.497	10.4	LOS A	3.9	28.0	0.86	0.82	0.99	46.6
8	T1	All MCs	192	2.9	192	2.9	0.497	9.6	LOS A	3.9	28.0	0.86	0.82	0.99	44.3
9	R2	All MCs	41	2.7	41	2.7	0.497	13.4	LOS A	3.9	28.0	0.86	0.82	0.99	43.7
Approach			339	2.3	339	2.3	0.497	10.3	LOS A	3.9	28.0	0.86	0.82	0.99	44.9
West: Ferodale Road															
10	L2	All MCs	134	2.5	134	2.5	0.831	17.4	LOS B	12.4	87.2	1.00	1.15	1.66	39.7
11	T1	All MCs	284	0.4	284	0.4	0.831	17.7	LOS B	12.4	87.2	1.00	1.15	1.66	40.8
12	R2	All MCs	201	0.0	201	0.0	0.831	21.0	LOS B	12.4	87.2	1.00	1.15	1.66	39.5
Approach			619	0.7	619	0.7	0.831	18.7	LOS B	12.4	87.2	1.00	1.15	1.66	40.1
All Vehicles			2329	1.0	2329	1.0	0.831	12.5	LOS A	12.4	87.2	0.88	0.90	1.19	44.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

 **Site: 101 [2034 AM Medowie Road / Ferodale Road (Site Folder: General)]**

Output produced by **SIDRA INTERSECTION Version: 9.1.6.228**

Medowie Road / Ferodale Road

Site Category: (None)

Roundabout

Design Life Analysis (Final Year): Results for 12 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%				v/c	sec				
South: Medowie Road															
1	L2	All MCs	304	2.6	304	2.6	0.545	5.9	LOS A	4.1	29.6	0.66	0.64	0.69	45.0
2	T1	All MCs	168	7.8	168	7.8	0.545	6.0	LOS A	4.1	29.6	0.66	0.64	0.69	45.3
3	R2	All MCs	74	3.5	74	3.5	0.545	9.7	LOS A	4.1	29.6	0.66	0.64	0.69	44.7
Approach			547	4.3	547	4.3	0.545	6.4	LOS A	4.1	29.6	0.66	0.64	0.69	45.0
East: Ferodale Road															
4	L2	All MCs	124	3.2	124	3.2	0.473	8.2	LOS A	3.4	24.1	0.76	0.75	0.85	44.0
5	T1	All MCs	218	3.6	218	3.6	0.473	8.2	LOS A	3.4	24.1	0.76	0.75	0.85	44.3
6	R2	All MCs	38	0.0	38	0.0	0.473	11.9	LOS A	3.4	24.1	0.76	0.75	0.85	43.8
Approach			380	3.1	380	3.1	0.473	8.6	LOS A	3.4	24.1	0.76	0.75	0.85	44.1
North: Medowie Road															
7	L2	All MCs	42	0.0	42	0.0	0.442	6.5	LOS A	2.9	21.1	0.70	0.68	0.72	44.5
8	T1	All MCs	247	8.5	247	8.5	0.442	6.7	LOS A	2.9	21.1	0.70	0.68	0.72	44.7
9	R2	All MCs	90	4.3	90	4.3	0.442	10.4	LOS A	2.9	21.1	0.70	0.68	0.72	44.1
Approach			379	6.6	379	6.6	0.442	7.6	LOS A	2.9	21.1	0.70	0.68	0.72	44.5
West: Ferodale Road															
10	L2	All MCs	74	5.3	74	5.3	0.482	5.1	LOS A	3.2	23.4	0.58	0.62	0.58	44.5
11	T1	All MCs	141	1.9	141	1.9	0.482	5.0	LOS A	3.2	23.4	0.58	0.62	0.58	44.8
12	R2	All MCs	299	3.9	299	3.9	0.482	8.8	LOS A	3.2	23.4	0.58	0.62	0.58	44.2
Approach			514	3.6	514	3.6	0.482	7.2	LOS A	3.2	23.4	0.58	0.62	0.58	44.4
All Vehicles			1820	4.3	1820	4.3	0.545	7.3	LOS A	4.1	29.6	0.67	0.66	0.70	44.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

 **Site: 101 [2034 PM Medowie Road / Ferodale Road (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Medowie Road / Ferodale Road, allowing 2.4% background growth all legs to 2029

Site Category: (None)

Roundabout

Design Life Analysis (Final Year): Results for 12 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Stop Rate	Eff. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Medowie Road															
1	L2	All MCs	334	1.2	334	1.2	0.652	5.1	LOS A	5.7	40.5	0.62	0.57	0.63	45.1
2	T1	All MCs	339	1.2	339	1.2	0.652	5.1	LOS A	5.7	40.5	0.62	0.57	0.63	45.4
3	R2	All MCs	101	2.6	101	2.6	0.652	8.9	LOS A	5.7	40.5	0.62	0.57	0.63	44.8
Approach			774	1.3	774	1.3	0.652	5.6	LOS A	5.7	40.5	0.62	0.57	0.63	45.2
East: Ferodale Road															
4	L2	All MCs	44	2.9	44	2.9	0.242	5.9	LOS A	1.3	9.3	0.59	0.61	0.59	45.1
5	T1	All MCs	159	0.0	159	0.0	0.242	5.8	LOS A	1.3	9.3	0.59	0.61	0.59	45.4
6	R2	All MCs	16	8.3	16	8.3	0.242	9.9	LOS A	1.3	9.3	0.59	0.61	0.59	44.7
Approach			219	1.2	219	1.2	0.242	6.1	LOS A	1.3	9.3	0.59	0.61	0.59	45.3
North: Medowie Road															
7	L2	All MCs	20	6.7	20	6.7	0.364	6.7	LOS A	2.3	16.6	0.72	0.67	0.72	44.5
8	T1	All MCs	228	2.9	228	2.9	0.364	6.5	LOS A	2.3	16.6	0.72	0.67	0.72	44.8
9	R2	All MCs	48	2.7	48	2.7	0.364	10.3	LOS A	2.3	16.6	0.72	0.67	0.72	44.3
Approach			296	3.1	296	3.1	0.364	7.1	LOS A	2.3	16.6	0.72	0.67	0.72	44.7
West: Ferodale Road															
10	L2	All MCs	159	2.5	159	2.5	0.677	8.7	LOS A	6.9	49.0	0.82	0.81	1.01	43.3
11	T1	All MCs	232	0.6	232	0.6	0.677	8.6	LOS A	6.9	49.0	0.82	0.81	1.01	43.5
12	R2	All MCs	240	0.0	240	0.0	0.677	12.4	LOS A	6.9	49.0	0.82	0.81	1.01	43.1
Approach			632	0.8	632	0.8	0.677	10.0	LOS A	6.9	49.0	0.82	0.81	1.01	43.3
All Vehicles			1921	1.4	1921	1.4	0.677	7.4	LOS A	6.9	49.0	0.70	0.67	0.77	44.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

 **Site: 101 [2024 PM Medowie Road / Ferodale Road+dev (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Medowie Road / Ferodale Road, allowing 2.4% background growth all legs to 2029

Site Category: (None)

Roundabout

Design Life Analysis (Final Year): Results for 2 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Medowie Road															
1	L2	All MCs	280	1.2	280	1.2	0.808	10.0	LOS A	11.7	82.5	0.92	0.87	1.19	43.3
2	T1	All MCs	285	1.2	285	1.2	0.808	10.0	LOS A	11.7	82.5	0.92	0.87	1.19	43.6
3	R2	All MCs	267	0.8	267	0.8	0.808	14.6	LOS B	11.7	82.5	0.92	0.87	1.19	45.1
Approach			832	1.1	832	1.1	0.808	11.5	LOS A	11.7	82.5	0.92	0.87	1.19	43.9
East: Ferodale Road															
4	L2	All MCs	215	0.5	215	0.5	0.560	7.7	LOS A	4.4	31.0	0.71	0.71	0.79	49.3
5	T1	All MCs	222	0.0	222	0.0	0.560	7.3	LOS A	4.4	31.0	0.71	0.71	0.79	48.3
6	R2	All MCs	102	1.1	102	1.1	0.560	11.7	LOS A	4.4	31.0	0.71	0.71	0.79	49.1
Approach			539	0.4	539	0.4	0.560	8.3	LOS A	4.4	31.0	0.71	0.71	0.79	48.9
North: Medowie Road															
7	L2	All MCs	107	1.0	107	1.0	0.497	10.4	LOS A	3.9	28.0	0.86	0.82	0.99	46.6
8	T1	All MCs	192	2.9	192	2.9	0.497	9.6	LOS A	3.9	28.0	0.86	0.82	0.99	44.3
9	R2	All MCs	41	2.7	41	2.7	0.497	13.4	LOS A	3.9	28.0	0.86	0.82	0.99	43.7
Approach			339	2.3	339	2.3	0.497	10.3	LOS A	3.9	28.0	0.86	0.82	0.99	44.9
West: Ferodale Road															
10	L2	All MCs	134	2.5	134	2.5	0.831	17.4	LOS B	12.4	87.2	1.00	1.15	1.66	39.7
11	T1	All MCs	284	0.4	284	0.4	0.831	17.7	LOS B	12.4	87.2	1.00	1.15	1.66	40.8
12	R2	All MCs	201	0.0	201	0.0	0.831	21.0	LOS B	12.4	87.2	1.00	1.15	1.66	39.5
Approach			619	0.7	619	0.7	0.831	18.7	LOS B	12.4	87.2	1.00	1.15	1.66	40.1
All Vehicles			2329	1.0	2329	1.0	0.831	12.5	LOS A	12.4	87.2	0.88	0.90	1.19	44.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

 **Site: 101 [2034 PM Medowie Road / Ferodale Road+dev (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Medowie Road / Ferodale Road, allowing 2.4% background growth all legs to 2029

Site Category: (None)

Roundabout

Design Life Analysis (Final Year): Results for 12 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Medowie Road															
1	L2	All MCs	334	0.9	334	0.9	0.941	20.3	LOS B	24.4	171.8	1.00	1.35	1.90	38.6
2	T1	All MCs	339	0.9	339	0.9	0.941	20.2	LOS B	24.4	171.8	1.00	1.35	1.90	38.8
3	R2	All MCs	271	0.8	271	0.8	0.941	24.8	LOS B	24.4	171.8	1.00	1.35	1.90	39.9
Approach			943	0.9	943	0.9	0.941	21.6	LOS B	24.4	171.8	1.00	1.35	1.90	39.1
East: Ferodale Road															
4	L2	All MCs	215	0.5	215	0.5	0.624	9.2	LOS A	5.7	40.1	0.80	0.79	0.96	48.2
5	T1	All MCs	244	0.0	244	0.0	0.624	8.8	LOS A	5.7	40.1	0.80	0.79	0.96	47.1
6	R2	All MCs	101	1.0	101	1.0	0.624	13.3	LOS A	5.7	40.1	0.80	0.79	0.96	48.0
Approach			560	0.4	560	0.4	0.624	9.8	LOS A	5.7	40.1	0.80	0.79	0.96	47.6
North: Medowie Road															
7	L2	All MCs	104	1.0	104	1.0	0.601	13.1	LOS A	5.5	39.2	0.93	0.92	1.20	44.8
8	T1	All MCs	227	2.3	227	2.3	0.601	12.4	LOS A	5.5	39.2	0.93	0.92	1.20	42.7
9	R2	All MCs	48	2.2	48	2.2	0.601	16.2	LOS B	5.5	39.2	0.93	0.92	1.20	42.2
Approach			380	1.9	380	1.9	0.601	13.1	LOS A	5.5	39.2	0.93	0.92	1.20	43.2
West: Ferodale Road															
10	L2	All MCs	158	2.0	158	2.0	1.050	81.5	LOS F ¹¹	45.7	321.6	1.00	2.70	4.79	23.5
11	T1	All MCs	317	0.3	317	0.3	1.050	81.7	LOS F ¹¹	45.7	321.6	1.00	2.70	4.79	23.8
12	R2	All MCs	240	0.0	240	0.0	1.050	85.2	LOS F ¹¹	45.7	321.6	1.00	2.70	4.79	23.4
Approach			715	0.6	715	0.6	1.050	82.8	LOS F ¹¹	45.7	321.6	1.00	2.70	4.79	23.6
All Vehicles			2598	0.9	2598	0.9	1.050	34.6	LOS C	45.7	321.6	0.95	1.54	2.39	34.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

¹¹ Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

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