

Gisborne Area 1 Development Plan

89 Ross Watt Road, Gisborne

Transport Impact Assessment



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1 INTRODUCTION

onemilegrid has been requested by ID Ross Watt Pty Ltd to undertake a Transport Impact Assessment of the approved Gisborne Area 1 Development Plan at 89 Ross Watt Road, Gisborne.

This report has been updated in response to Macedon Ranges Shire Council's Request for Further Information received on the 5th February 2025. A response to each of Council's queries is provided in Section 9.

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

2 BACKGROUND

A Development Plan application DP/2021/1 for Gisborne Area 1 Development Plan (GA1DP) was submitted to Macedon Ranges Shire Council on 19 November 2021 for a 750 lot residential subdivision with complimentary community uses proposed on-site. **onemilegrid** prepared a Transport Impact Assessment (ref: 210473TIA001F-F) for the Development Plan application which considered the traffic impacts of the proposal. The traffic report concluded that the external road network (following the upgrade of the Station Road / Ross Watt Road and Station Road / Cherry Lane intersections to roundabouts and an upgrade to Cherry Lane) can comfortably accommodate the development and 5-years of background traffic growth.

Following submission of the original report, several comments were received from Macedon Ranges Shire Council and the Department of Transport and Planning (DTP), who requested the following changes to the report:

- Updated traffic surveys to be undertaken which weren't influenced by COVID-19 restrictions;
- Modify the traffic distribution adopted for the site generated traffic;
- Analyse the development with 10 years of growth under ultimate conditions; and
- Analyse the Station Road / Ross Watt Road and Station Road / Cherry Lane intersections under four scenarios including roundabouts at both intersection, signals at both intersections, or a combination of roundabouts and signals.

onemilegrid prepared several updates to the Transport Impact Assessment which were distributed to both Council and DTP.

Following the updates to the Transport Impact Assessment, the applicant lodged an application with VCAT due to the failure to reach a decision within the required timeframe.

During the intervening period, several meetings were held with Council and DTP to determine the appropriate infrastructure requirements to be delivered by the development. It was requested that the Transport Impact Assessment be updated with the following information provided to help determine the correct infrastructure:

- Analyse the development with 15 years of growth under ultimate conditions;
- Undertake a Safe System Assessment of the four intersection scenarios previously contemplated for Station Road;
- Assess the feasibility of closing Cherry Lane or Ross Watt Road;
- Evaluate the impact to existing vegetation from constructing each intersection scenario; and
- Identify any constructability issues due to existing slope and services in the area.

An updated Transport Impact Assessment was prepared (ref: 210473001R-F) which discussed the above impacts.

The above Transport Impact Assessment and expert traffic evidence prepared by Traffix was discussed at the VCAT proceedings, with VCAT determining that the signals at the Station Road /

Ross Watt Road and Station Road / Cherry Lane intersections was the most appropriate intersection upgrade.

Gisborne Area 1 Development Plan was approved on 18th July 2023 by Council in response to a VCAT order.

Noting the above, this report has been updated to only consider the signals at the Station Road / Ross Watt Road and Station Road / Cherry Lane intersections, as approved within the Development Plan.

It's noted that a planning permit PLN/2021/616 for Permit Area 1, which forms part of the GA1DP area, was approved on 20 August 2024 by Council in response to a VCAT order. This permit allows for "the subdivision of land, construct a dwelling on a lot less than 300 square metres and to remove native vegetation".

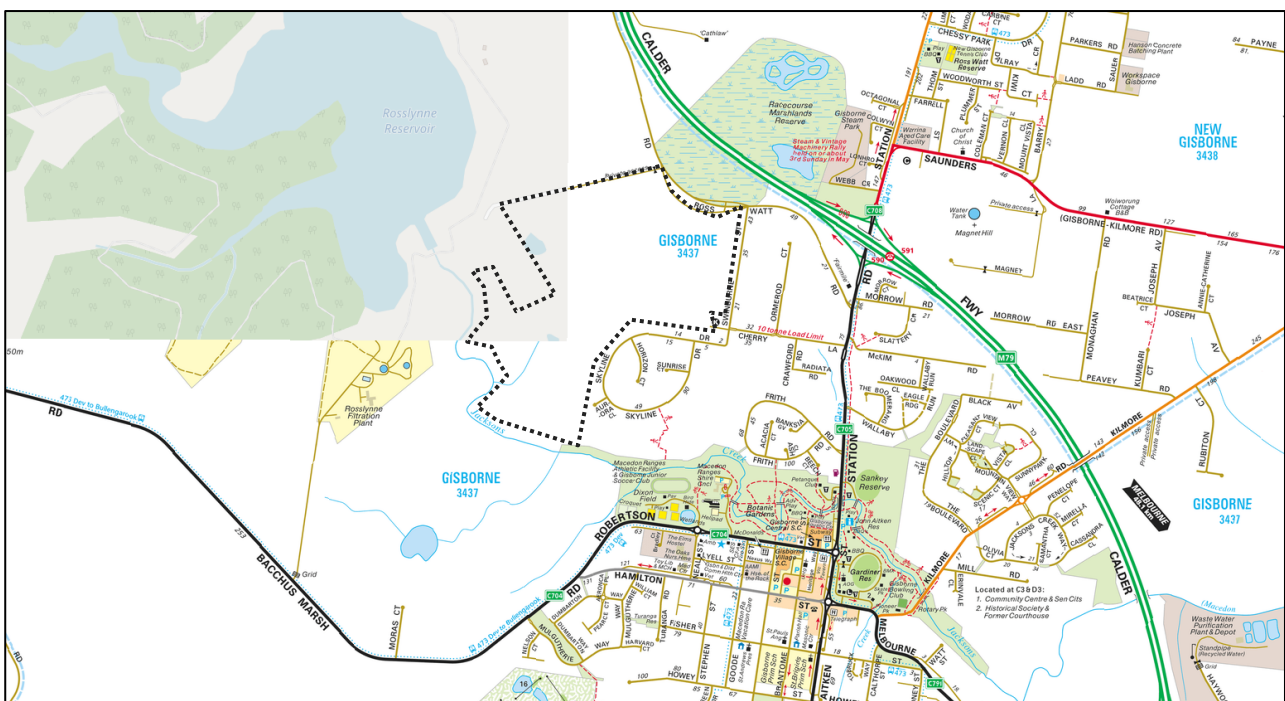
3 EXISTING CONDITIONS

3.1 Site Location

The subject site is located on the southern side of Ross Watt Road and is irregularly shaped with abutments to Swinburne Avenue to the east, existing residential dwellings to the southeast, Jacksons Creek to the south and southwest, and rural land to the west and northwest.

A view of the site location is shown in Figure 1.

Figure 1 Site Location



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The site has a frontage to Ross Watt Road for approximately 529 metres, and a frontage to Swinburne Avenue for approximately 466 metres, with a total site area of 85.57 Ha.

The site has a dwelling located along the site's northern boundary, with the remainder of the site generally rural.

Vehicular access to the site is currently provided along the Ross Watt Road gravel service road, as summarised below:

- A gravel crossover located centrally along the service road providing access to the dwelling; and
- A gravel crossover located in the northern corner providing access to an internal gravel road which runs along the site's north-western boundary.

No vehicular access is provided along the site's frontage to Swinburne Avenue.

The site abuts residential land uses, with the east being occupied by standard density residential lots and the west being occupied by rural residential lots. In addition, a child care centre is located in the southeast corner of the site, at the intersection of Swinburne Avenue and Cherry Lane.

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

Figure 2 Site Context (23 June 2024)



Copyright Nearmap

3.2 Planning Zones and Overlays

It is shown in Figure 3 that the site is located within a General Residential Zone – Schedule 1 (GRZ1). In addition, the site is subject to the following Planning Overlays:

- Development Plan Overlay – Schedule 4;
- Design and Development Overlay – Schedule 13;
- Land Subject to Inundation Overlay; and
- Development Contributions Plan Overlay – Schedule 2.

It is noted that DPO4 which applies to the subject site is required to provide the following for any proposed Development Plan's:

"A detailed traffic assessment and management plan addressing the impact of the development on the arterial and local road network, including mitigation works required on the road network in addition to funding responsibilities. The plan must show typical road cross sections and integration with the existing and proposed road, bicycle and pedestrian networks and public transport."

Additionally, the site abuts Ross Watt Road which is within a Road Zone – Category 2 (RDZ2).

Figure 3 Planning Scheme Zones



3.3 Road Network

3.3.1 Ross Watt Road

Ross Watt Road is a local Council road aligned northwest to east from Mount Macedon Road through to Station Road. Ross Watt Road currently provides a single traffic lane with grassed / gravel shoulders in each direction adjacent the site. In addition, a gravel service road is provided on the southern side of Ross Watt Road (along the site's frontage), which connects informally to the main carriageway in the northwest and east.

A signed 80km/h speed limit applies to Ross Watt Road in the vicinity of the site.

The intersection with Station Road is arranged as a T-intersection with priority provided to Station Road with fully directional movements permitted. A short right turn lane is provided for southbound motorists from Station Road into Ross Watt Road.

3.3.2 Swinburne Avenue

Swinburne Avenue is a local Council road aligned north to south from Ross Watt Road through to Cherry Lane where it continues as Skyline Drive. Swinburne Avenue currently provides a 6m wide pavement width which accommodates traffic in both directions, with the eastern side urbanised with kerb and channel, whilst the western side includes a gravel shoulder only.

The default 50km/h speed limit applies to Swinburne Avenue in the vicinity of the site.

The intersection with Ross Watt Road is arranged as a T-intersection with priority provided to Ross Watt Road.

3.3.3 Cherry Lane

Cherry Lane is a local Council road aligned east to west from Swinburne Avenue through to Station Road. Cherry Lane operates with a 6.7 metre wide pavement which offers a single traffic lane in each direction with gravel / grassed shoulders on each side. A 1.5 metre wide footpath is provided along the length of Cherry Lane on the southern side which links to a bus stop to the south of the intersection with Station Road.

The default 50km/h speed limit applies to Cherry Lane in the vicinity of the site.

The intersection with Station Road is arranged as a T-intersection with priority provided to Station Road. A short right turn lane is provided for southbound motorists and a short left turn lane is provided for northbound motorists from Station Road into Cherry Lane.

3.4 Traffic Volumes

3.4.1 Mid-Block Traffic Volumes

Traffic volume surveys were undertaken by Trans Traffic Survey on behalf of **onemilegrid** at several locations in the vicinity of the site, for a one-week period from Wednesday 23rd February 2022 to Tuesday 1st March 2022 inclusive.

A summary of the existing traffic volumes surveyed along the road's surveyed are shown in Table 1.

Table 1 Existing Traffic Volumes

Direction	AM Peak	PM Peak	Weekday Average
Station Road (north of McKim Road)			
Northbound	605 vph	686 vph	8,155 vpd
Southbound	735 vph	763 vph	8,070 vpd
Total	1,340 vph	1,449 vph	16,225 vpd
Ross Watt Road			
North-westbound	68 vph	96 vph	953 vpd
South-eastbound	57 vph	68 vph	754 vpd
Total	125 vph	164 vph	1,707 vpd
Cherry Lane			
Westbound	53 vph	61 vph	591 vpd
Eastbound	64 vph	48 vph	570 vpd
Total	117 vph	109 vph	1,161 vpd
Swinburne Avenue			
Northbound	33 vph	17 vph	140 vpd
Southbound	13 vph	16 vph	113 vpd
Total	46 vph	33 vph	253 vpd

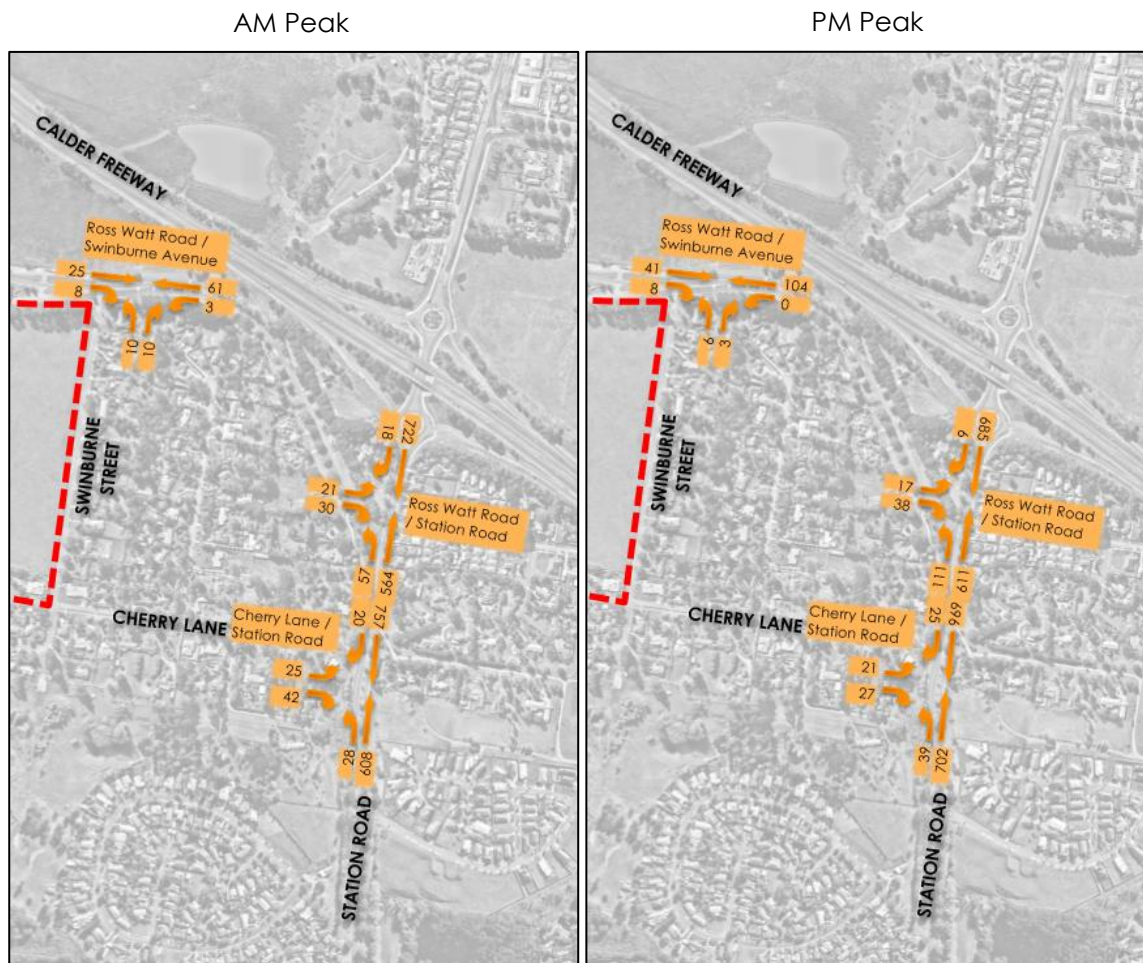
3.4.2 Turning Movement Counts

Traffic volume surveys were undertaken by Trans Traffic Survey on behalf of **onemilegrid** on Wednesday 9th February 2022, between 7:00am and 9:30am, and between 3:00pm and 7:00pm, at the following intersections in Gisborne:

- Ross Watt Road / Swinburne Avenue;
- Ross Watt Road / Station Road; and
- Station Road / Cherry Lane.

The results of the above surveys are shown in Figure 4.

Figure 4 Existing Traffic Volumes – 9th February 2022

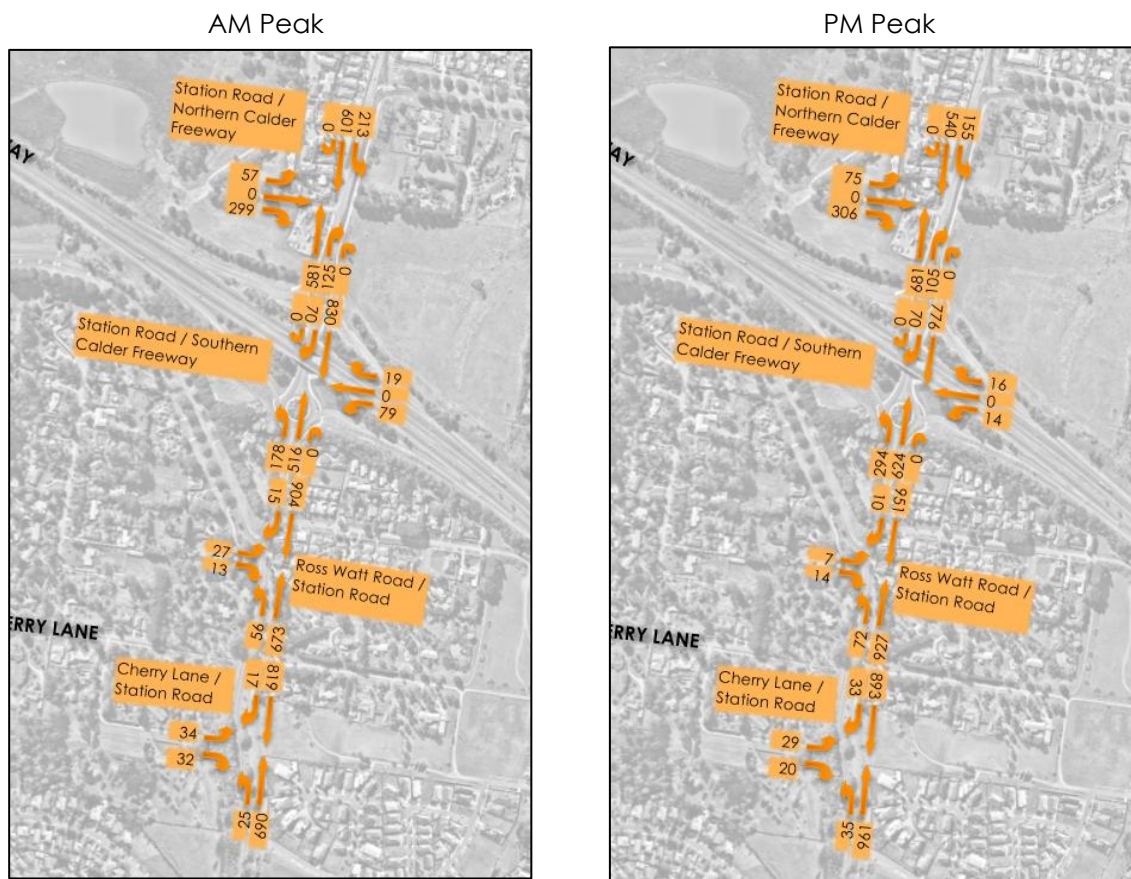


In addition, traffic volume surveys were undertaken by Trans Traffic Survey on Wednesday 9th March 2022, between 7:00am and 9:30am, and between 2:00pm and 6:30pm, at the following intersections in Gisborne:

- Station Road / Ross Watt Road;
- Station Road / Cherry Lane;
- Station Road / Calder Freeway Eastbound Lane On/Off Ramp; and
- Station Road / Calder Freeway Westbound Lane On/Off Ramp.

The results of the above surveys are shown in Figure 4.

Figure 5 Existing Traffic Volumes – 9th March 2022



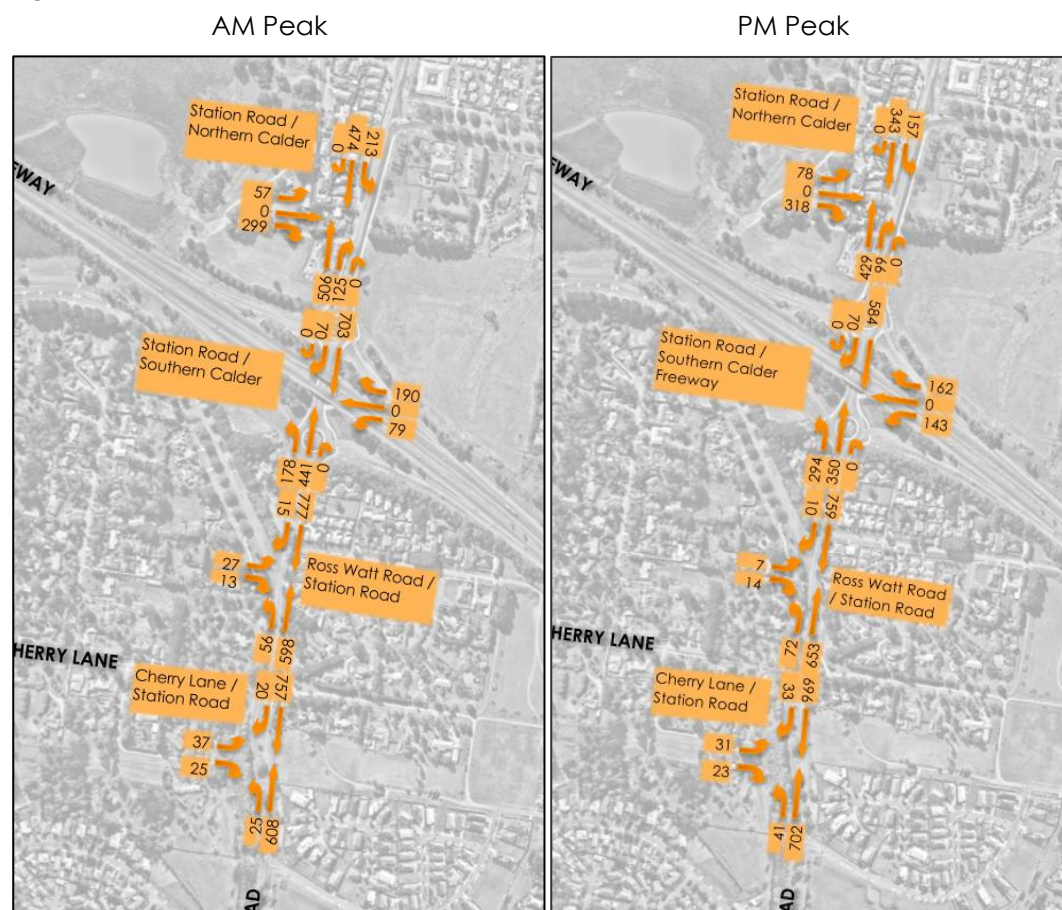
An analysis of the February and March traffic volumes shows that there was significantly more through traffic along Station Road during both the AM and PM peak period. It was later identified that upgrade works were occurring at the intersection of Melbourne Road / Kilmore Road which involved the Kilmore Road leg being closed with a significant amount of traffic from the Gisborne township and Riddells Creek (and beyond) being diverted along Station Road as shown in Figure 6. It is understood that these works began on the 6th of March and are expected to continue until late 2022.

Figure 6 Traffic Diversion



A comparison between the Station Road traffic volumes showed that the March traffic volumes had 202 additional movements during the AM peak period and 466 additional movements during the PM peak period compared to the February volumes. Therefore, it is expected that the north-south through movements are over-represented in the March surveys, and therefore the difference between the two survey periods have been removed from the Station Road traffic volumes obtained in March. The modified traffic volumes are shown below in Figure 7.

Figure 7 Modified Traffic Volumes – 2022



To confirm the validity of the above traffic volumes, **onemilegrid** has reviewed the above Station Road traffic volumes against the tube count volumes undertaken between Wednesday 23rd February 2022 to Tuesday 1st March 2022 inclusive (previously shown in Table 1). A comparison of the Station Road traffic volumes to the north of Ross Watt Road is shown in Table 2.

Table 2 Traffic Volume Comparison – Station Road

Source	AM Peak	PM Peak
Modified Turning Movement Surveys	1,422 vph	1,462 vph
Tube Count – Weekday Average	1,340 vph	1,449 vph
Difference	+6%	+1%

As shown above, the modified turning movement volumes are marginally higher than the tube count volumes and therefore expected to be representative of typical traffic volumes in the vicinity.

3.5 Sustainable Transport

Gisborne is serviced by a loop bus route which is split into two sections, with the 73 bus service covering the western portion of Gisborne and then continuing as the 74 bus service which covers the eastern portion of Gisborne.

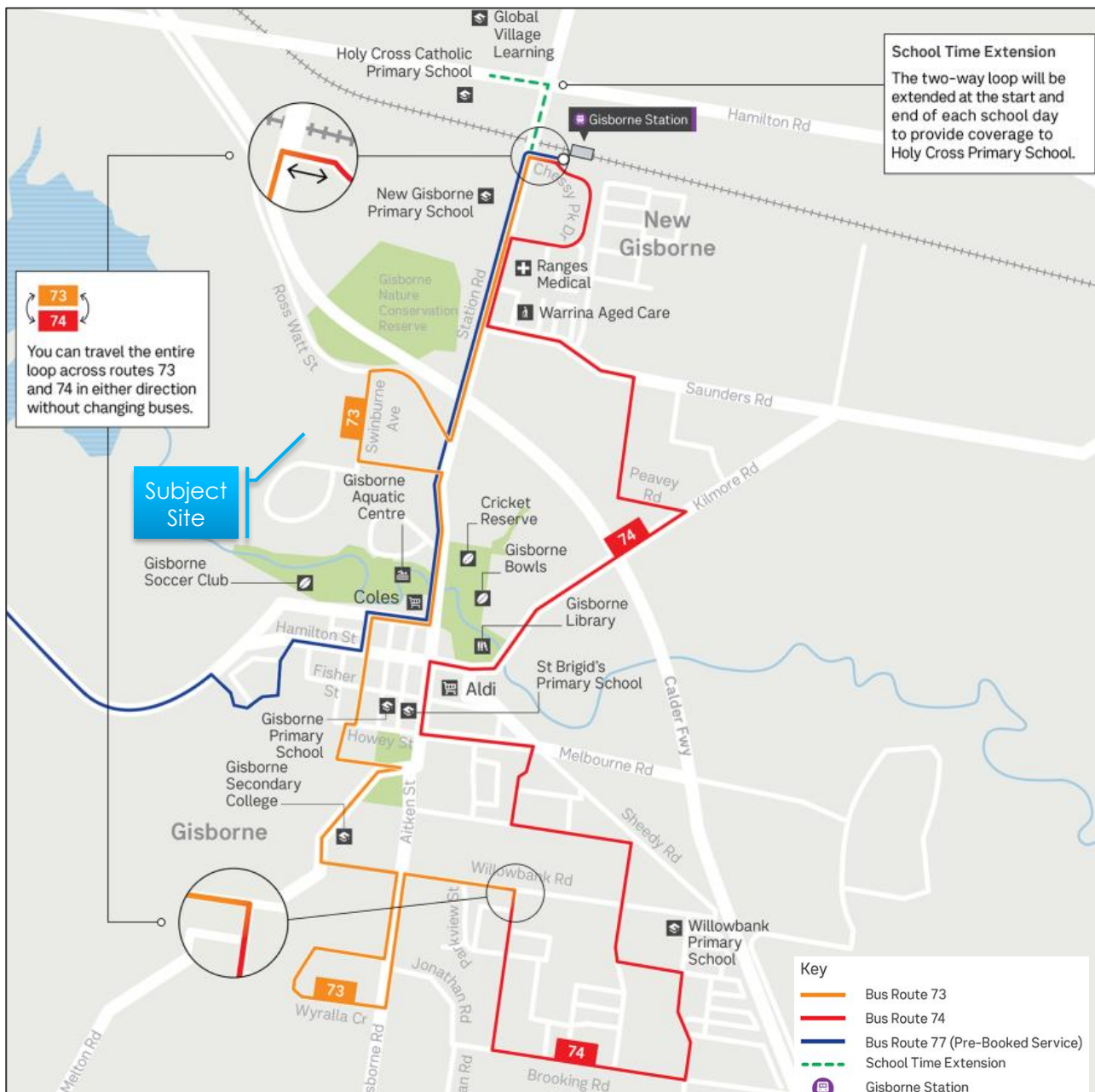
The 73 Gisborne Station – Willowbank Road bus service operates along the site's frontage to Swinburne Avenue and provides access to Gisborne Train Station and to the Gisborne township.

Gisborne Train Station is located in 'New Gisborne', approximately 2km north of the subject site, and provides access to the Melbourne CBD, as well as other regional areas by train.

The Gisborne bus network map has been provided in Figure 8, which is correct at the time of writing of this report.

An off-road shared path runs along Station Road, to connect the Gisborne Township with New Gisborne.

Figure 8 Gisborne Bus Network



4 PLANNING BACKGROUND

4.1 Gisborne Outline Development Plan

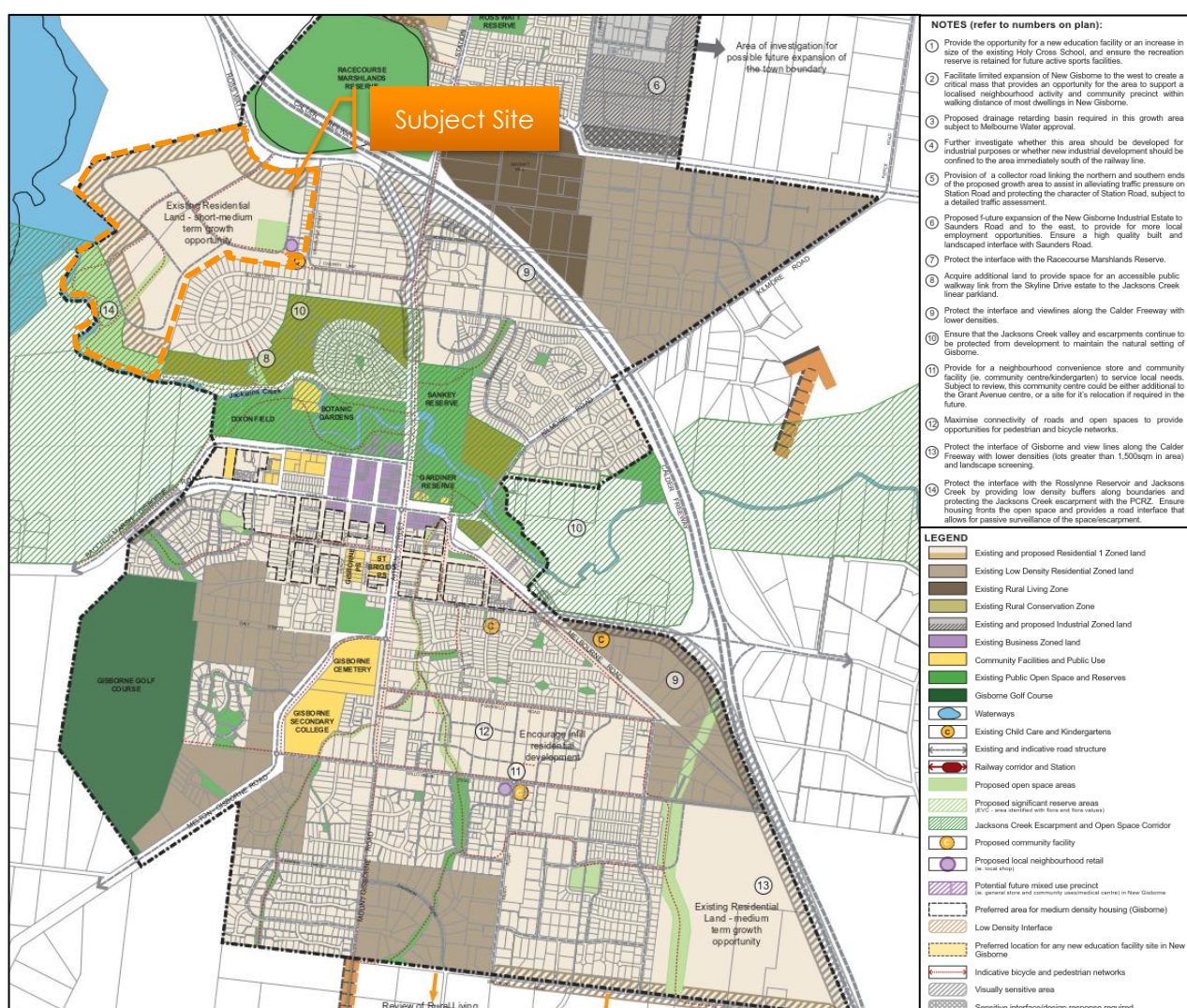
4.1.1 Overview

The site is located within the Gisborne Outline Development Plan (Amendment C67 Part 1 – September 2012) for which an extract is shown in Figure 9.

The outline development plan provides a framework for future growth and development of Gisborne, including future land uses, transport networks, open space and environmental features. As shown in the below figure, the site is located in the north-western corner of the site.

The site is nominated in the structure plan largely as residential land, with a local neighbourhood retail centre proposed in the south-eastern corner of the site.

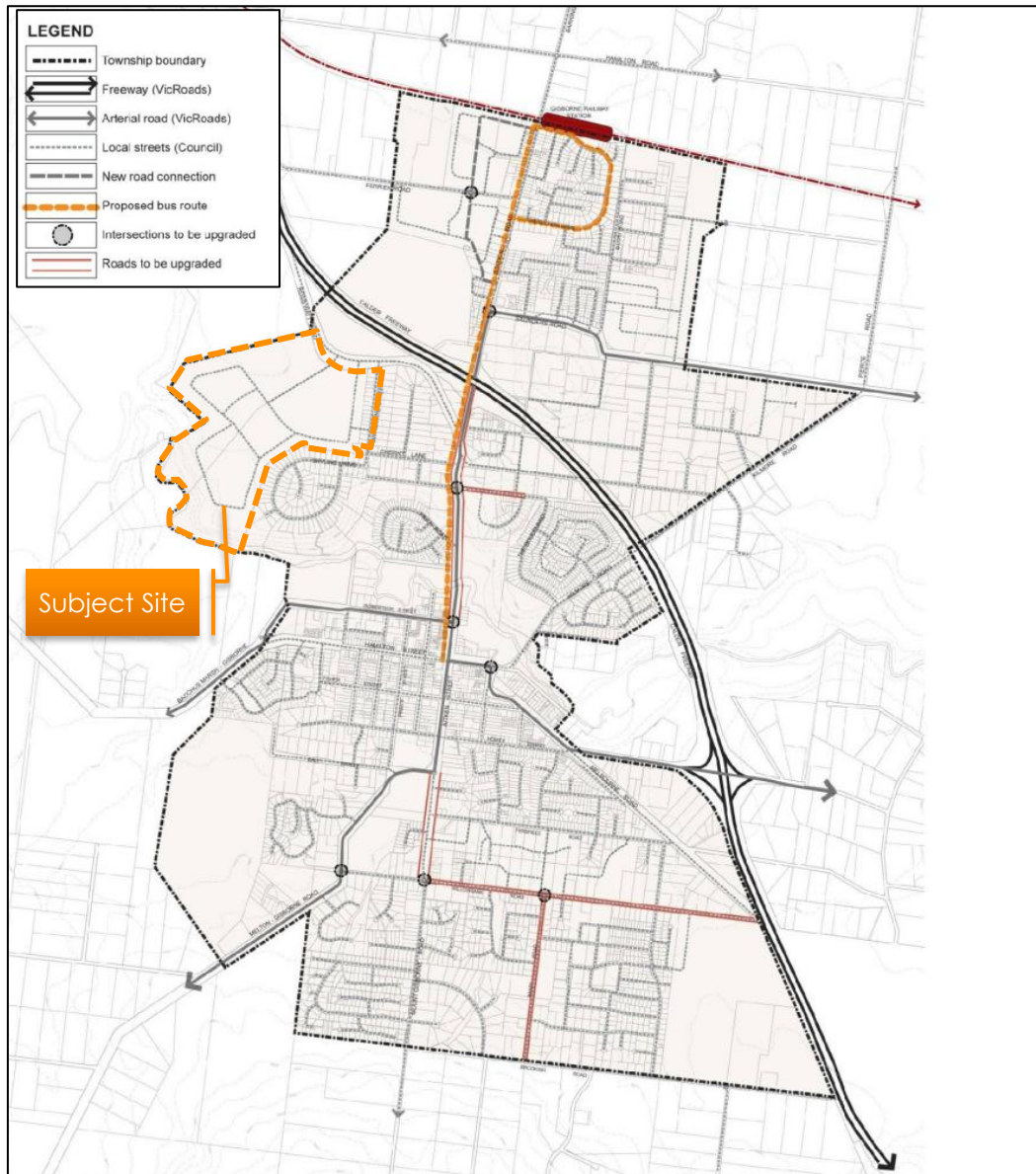
Figure 9 Gisborne / New Gisborne Structure Plan



The ODP had recommended to realign Ross Watt Road so that it aligns with Morrow Road and it becomes a major four-leg intersection with Station Road.

A view of the ODP road network is shown in Figure 10.

Figure 10 Structure Plan Road Network



4.1.2 Gisborne Movement Network Study

In 2016 a traffic study was prepared for Macedon Ranges Shire Council for the township of Gisborne. This study was to replace the 2009 traffic study which was adopted in the above Gisborne Outline Development Plan. The updated study is based on new information regarding yields for new developments within Gisborne.

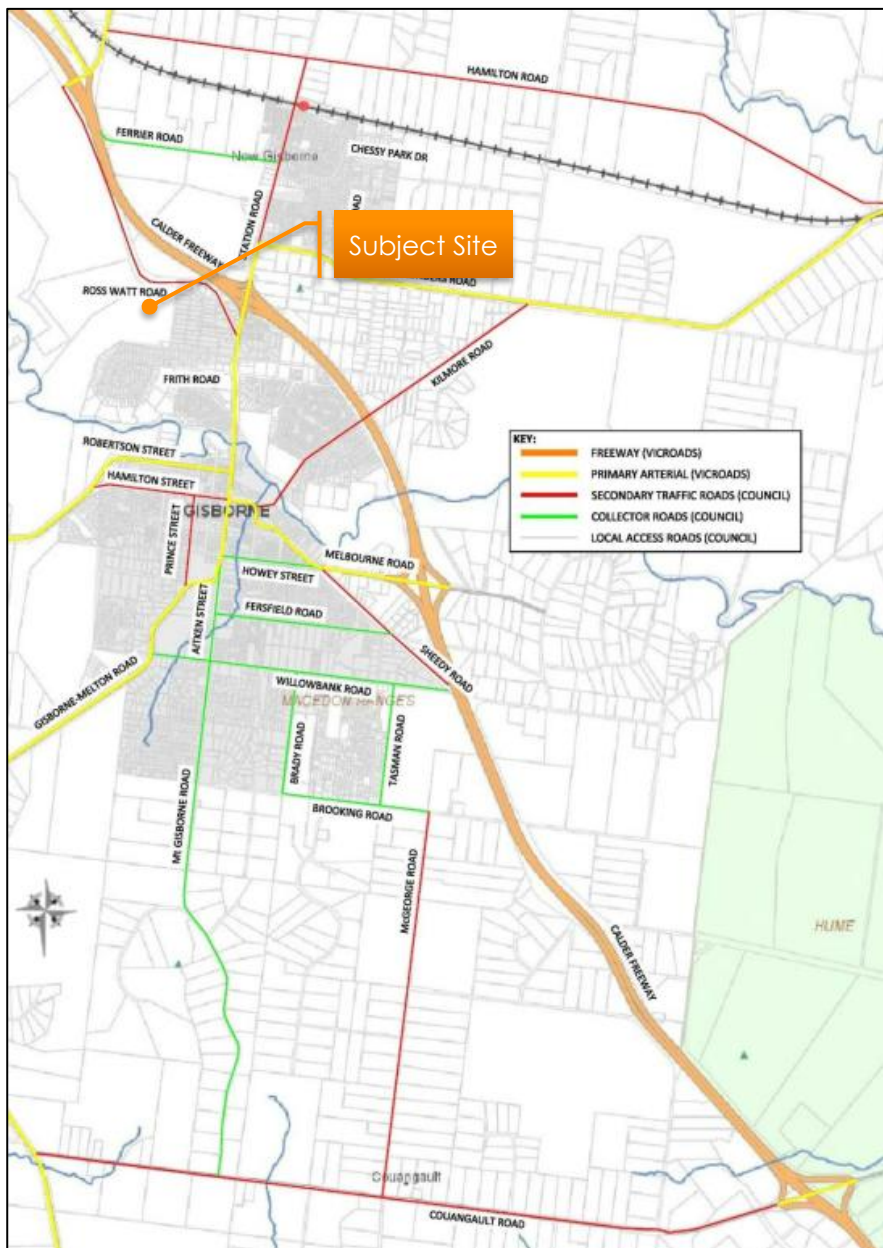
Extracts of the network study are shown below, indicating the road network, walking and cycling network proposed in the vicinity of the site.

Figure 11 Recommended Road Infrastructure Upgrades



As shown above, a major road upgrade is proposed along Station Road which is to duplicate Station Road between Robertson Street and Saunders Road.

Figure 12 Recommended Future Road Hierarchy



The recommended future road hierarchy above identifies Ross Watt Road at the frontage of the site as a 'Council Secondary Traffic Road'.

4.2 Traffic and Transport Recommendations Report

Council engaged Cardno to prepare a 'Traffic and Transport Recommendations Report' which assessed the Gisborne development area. Of relevance to the subject site, the following was noted / recommended:

Station Road does not have the capacity to manage future traffic volumes without either significantly increasing the capacity through duplication, or providing alternative routes for traffic to relieve pressure on that link. In order to operate at an acceptable level of service without full duplication, a number of additional improvements are recommended:

- Local widening to two lanes at key intersections to increase capacity, particularly on the approach to Robertson Street, including the widening of the bridge over Jackson's Creek;
- Intersection safety and capacity improvements at **Ross Watt Road / Morrow Road, Cherry Lane,** and Frith Road; and
- Improved layouts at direct property access points such as Caltex Garage and Sankey Reserve.

Cherry Lane should be upgraded to a collector road to provide access to the vacant residential land west of Swinburne Avenue and Skyline Drive, and upgrade the intersection at Station Road (the upgrade of Cherry Lane has been included in future traffic model scenarios).

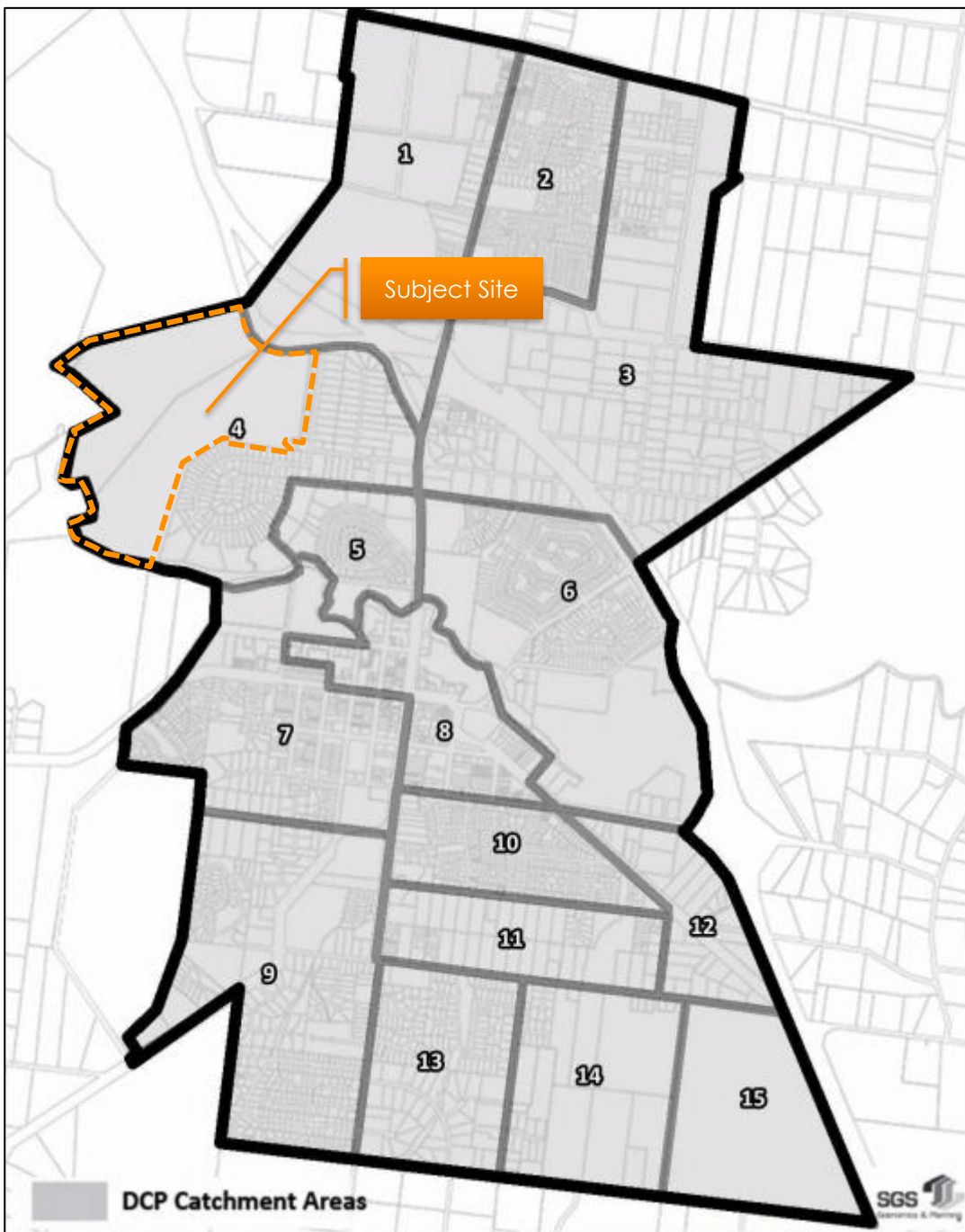
Ross Watt Road should be upgraded east of Swinburne Avenue along with the intersection at Station Road.

4.3 Gisborne Development Contributions Plan (DCP)

The subject site is located within the Gisborne Development Contributions Plan which has been prepared by the MPA (now the VPA) in partnership with the Shire of Macedon Ranges. The DCP has been prepared to outline the projects, framework and financial contribution required to deliver the infrastructure projects necessary for future residents. It includes the land and cost to fund road network upgrades, intersection construction and community facilities. The subject site is located within Area 4.

An extract of the Gisborne DCP is provided in Figure 13.

Figure 13 Gisborne DCP



5 DEVELOPMENT PROPOSAL

5.1 General

It is proposed to develop the subject site for the purposes of a residential subdivision, comprising of mixed-density residential lots (low, medium and standard density or residential village type dwellings), a local convenience centre and a childcare centre, as summarised below in Table 3.

The ultimate development of the site is expected to be in the order of 775-800 standard density lots (yield expected to vary depending on density). A portion of the subject site may be developed as residential village type dwellings which may increase the overall number of dwellings on-site.

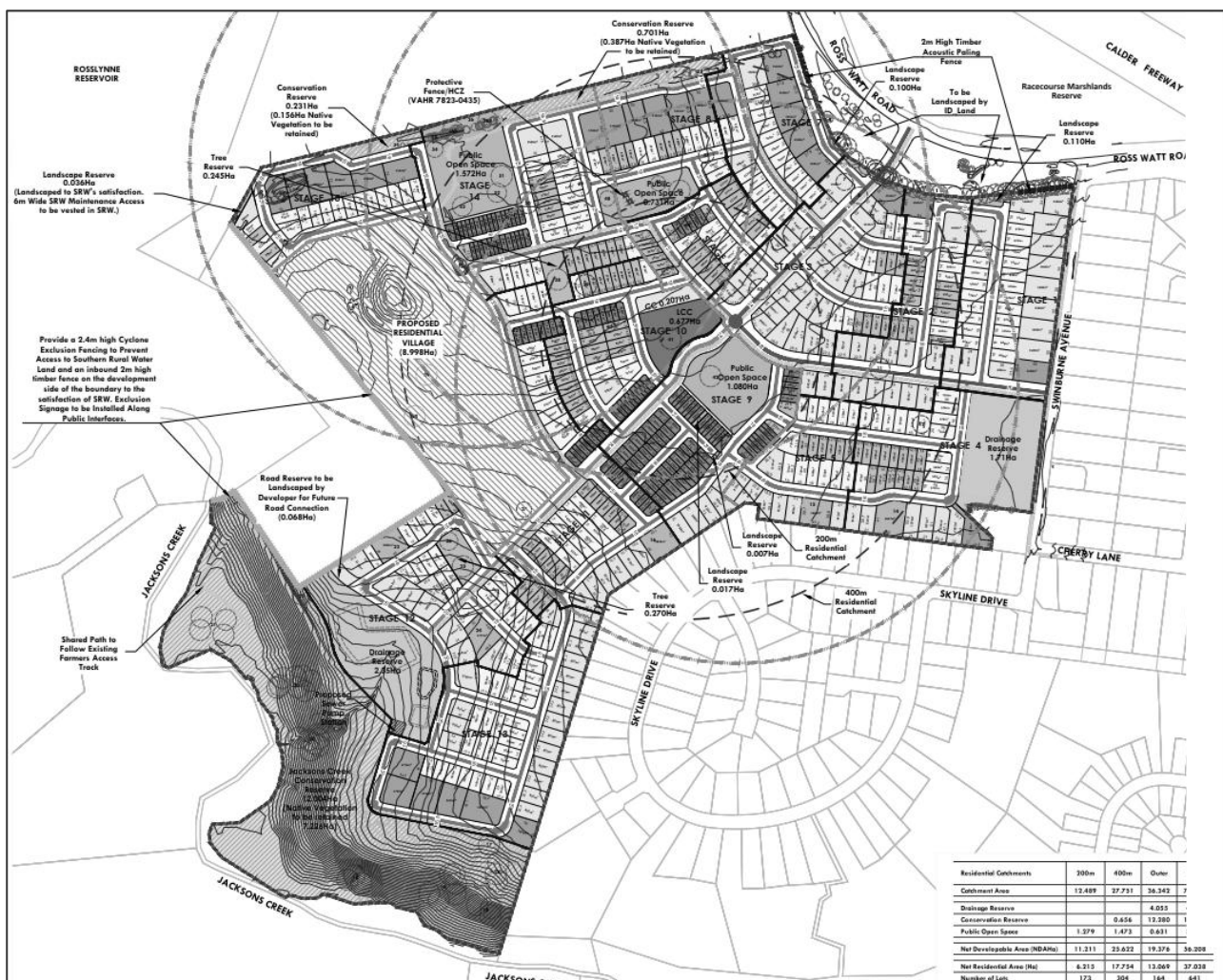
Table 3 Proposed Development

Component	No/Area
Standard Density Dwellings	775-800 lots (65.206Ha)
Local Convenience Centre	0.677Ha
Childcare Centre	0.204Ha

It is envisaged that the residential development will be delivered in stages.

A view of the indicative lot layout is provided in Figure 14.

Figure 14 Proposed Lot Layout



5.2 Vehicle Access

Vehicular access to the subject site is to be provided at two access points along the northern and eastern boundaries, as summarised below.

- Unsignalised T-intersection to Ross Watt Road along the site's northern boundary; and
- Fully-directional unsignalised T-intersection to Swinburne Avenue along the site's eastern boundary.

5.3 Internal Road Layout

The proposed internal road network is generally consistent with that identified within the Gisborne ODP. A Connector Street with a road reserve of 24m bisects the site, running southwest from Ross Watt Road for approximately 400 metres, before realigning and running east to Swinburne Avenue.

The remainder of the site provides for a connected road network which includes Local Access Streets which link to the Connector Street network or Swinburne Avenue. Generally, all Local Access Streets have a 7.3m wide carriageway capable of providing kerbside parking and traffic in both directions within an 18 metre cross-section. In addition, a 24m modified Local Access Street with an off-road shared path is located to the south of the realigned connector street, which then narrows to 20m in width (by reducing the verge).

All internal roads fronting open spaces (including the Jacksons Creek open space) will incorporate the footpath or shared path (subject to confirmation on Council's shared path strategy) within the open space network and thus the formal road reserve will be reduced in width by up to 4 metres to acknowledge the effective verge and path within the open space area, in accordance with the cross-section shown in Figure 22.

Laneways are proposed to provide access to rear loaded lots as required.

With regard to intersections across the internal road network, a roundabout is proposed to manage movements at the 4-way intersection between the realigned connector road and the modified Local Access Streets. All other internal intersections will be controlled by unsignalised T-intersections.

Speed control measures will be required to be implemented along roads exceeding 240m in length. It is recommended that threshold treatments be proposed at the location of T-intersections as an effective means of speed control.

A view of the proposed internal road network is provided in Figure 15, with the corresponding cross-sections shown below.

Figure 15 Proposed Internal Road Layout

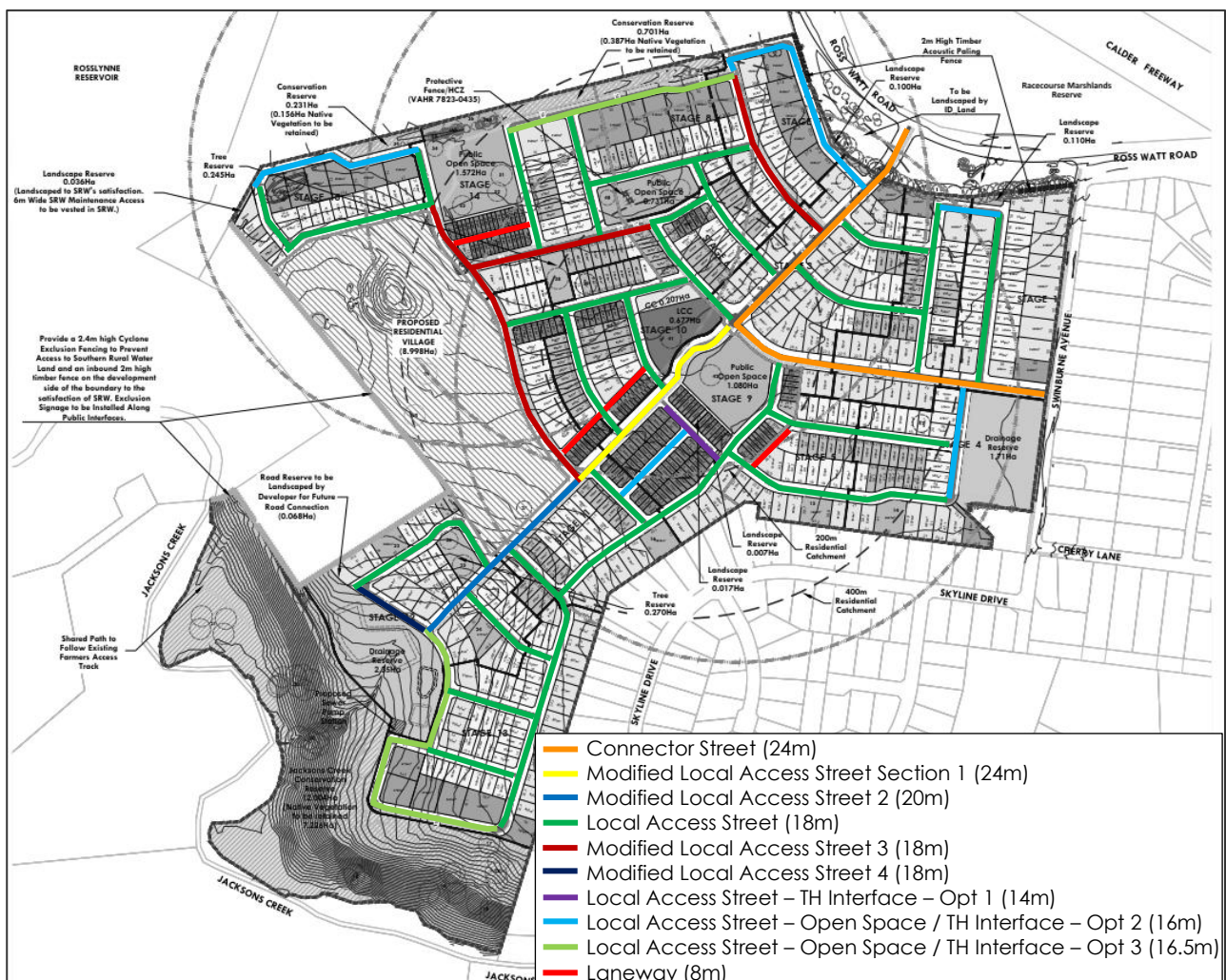


Figure 16 Connector Street Cross Section (24m)

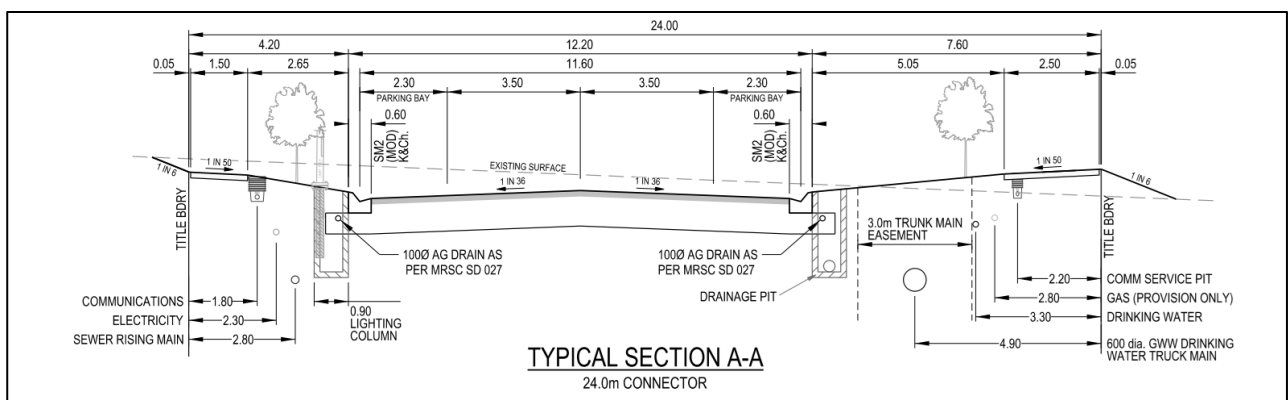


Figure 17 Modified Local Access Street Cross Section 1 (24m)

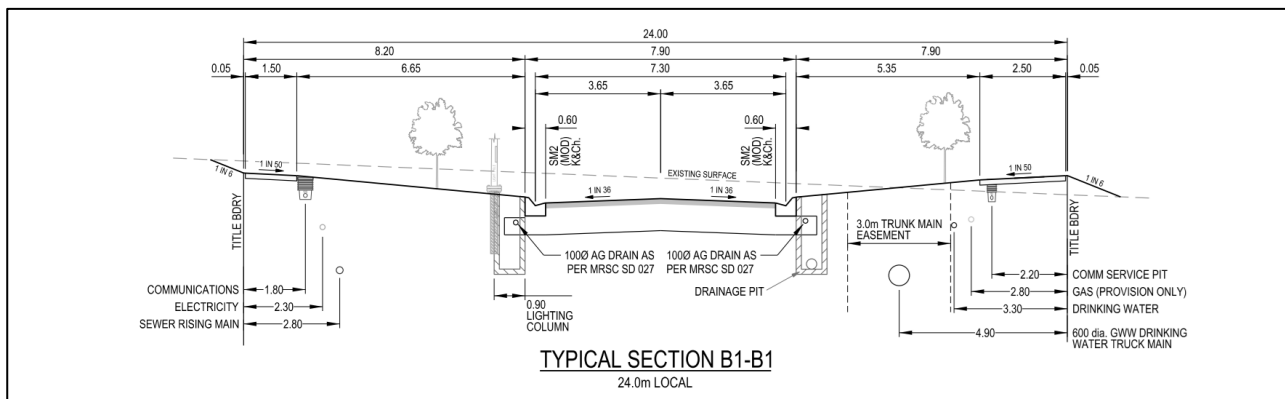


Figure 18 Modified Local Access Street Cross Section 2 (20m)

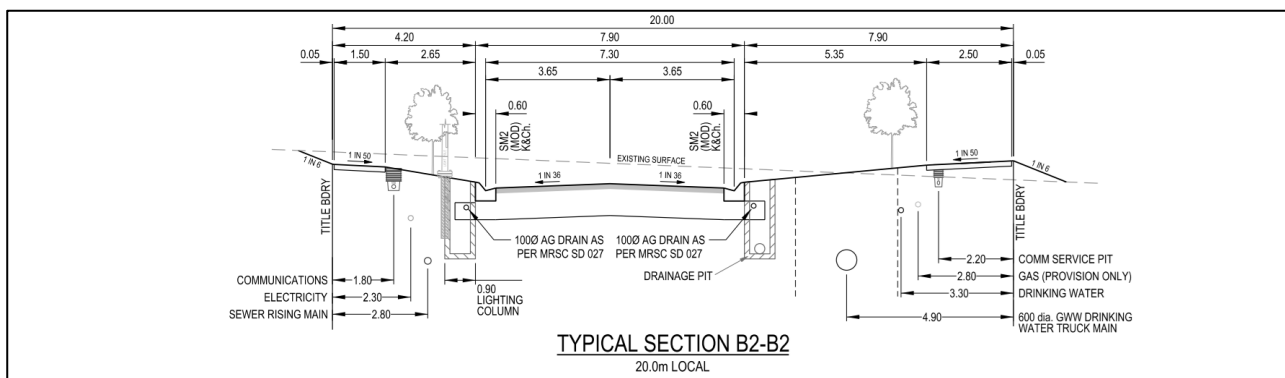


Figure 19 Local Access Street Cross Section (18m)

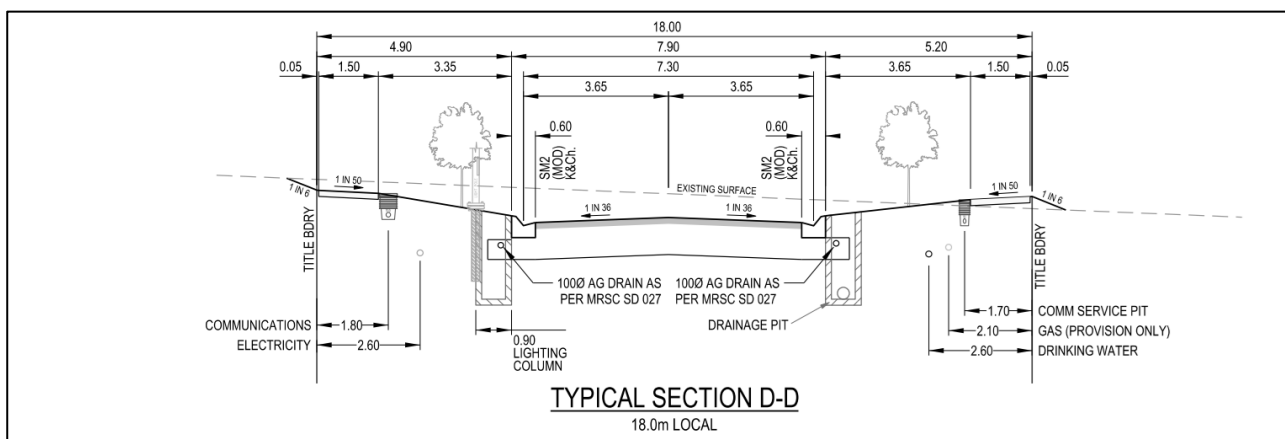


Figure 20 Modified Local Access Street Cross Section 1 (18m)

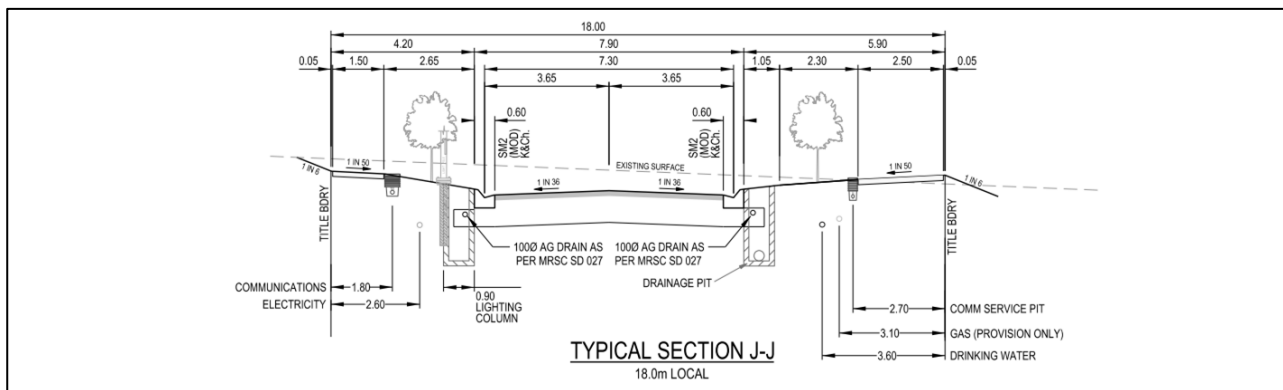


Figure 21 Modified Local Access Street Cross Section 2 (18m)

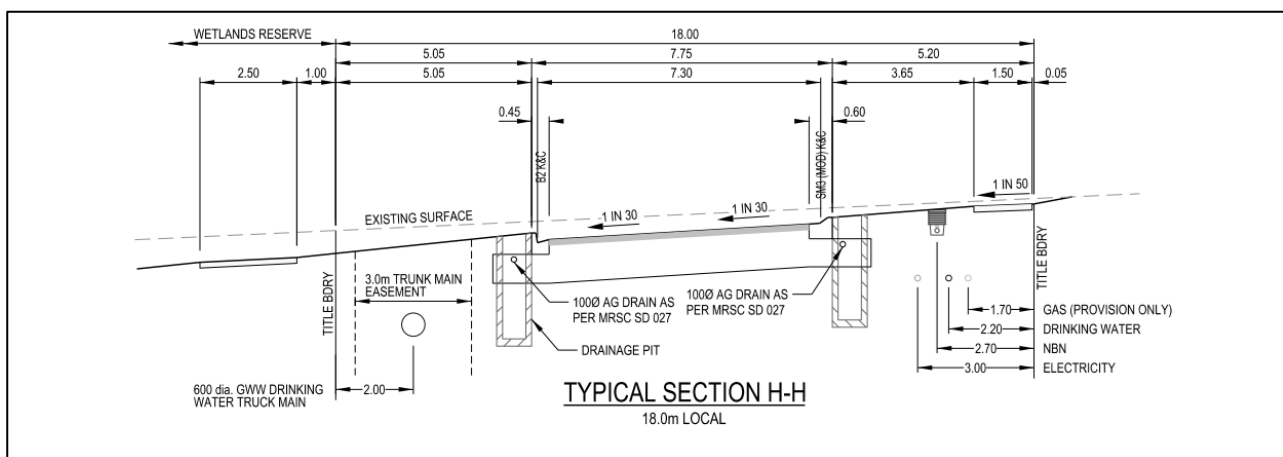


Figure 22 Local Access St – Open Space Interface Cross-Section – Opt 1 (14m)

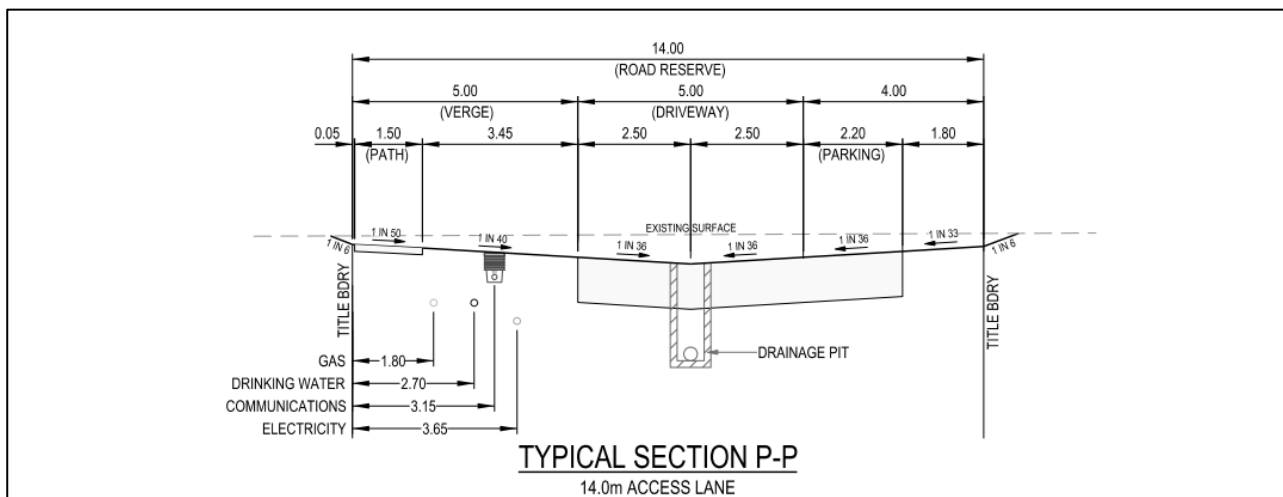


Figure 23 Local Access St – T'house Cross-Section – Opt 2 (14m)

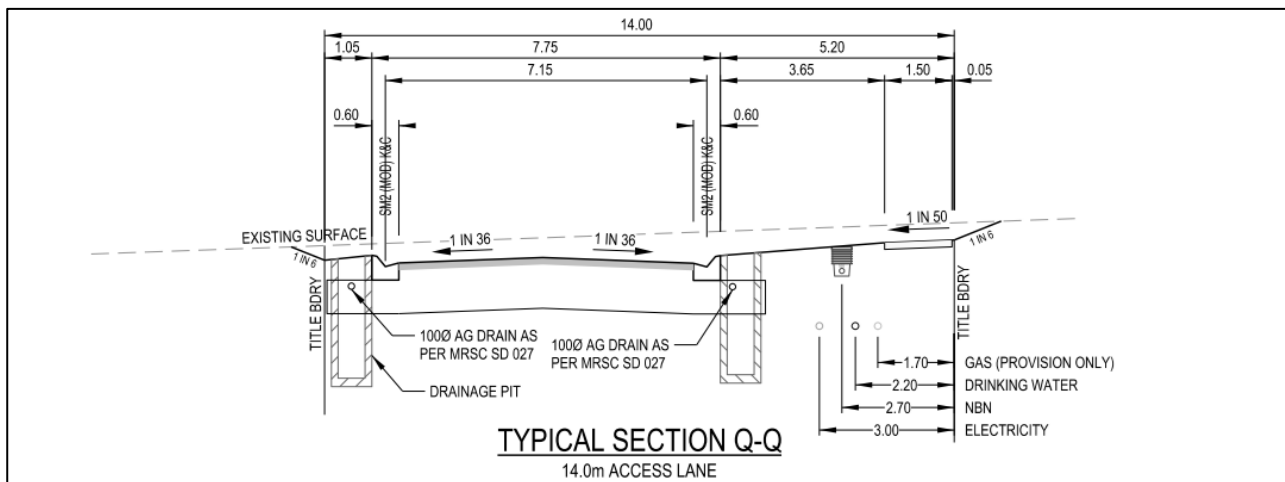


Figure 24 Local Access St – Open Space Interface / T'house Cross-Section – Opt 3 (16m)

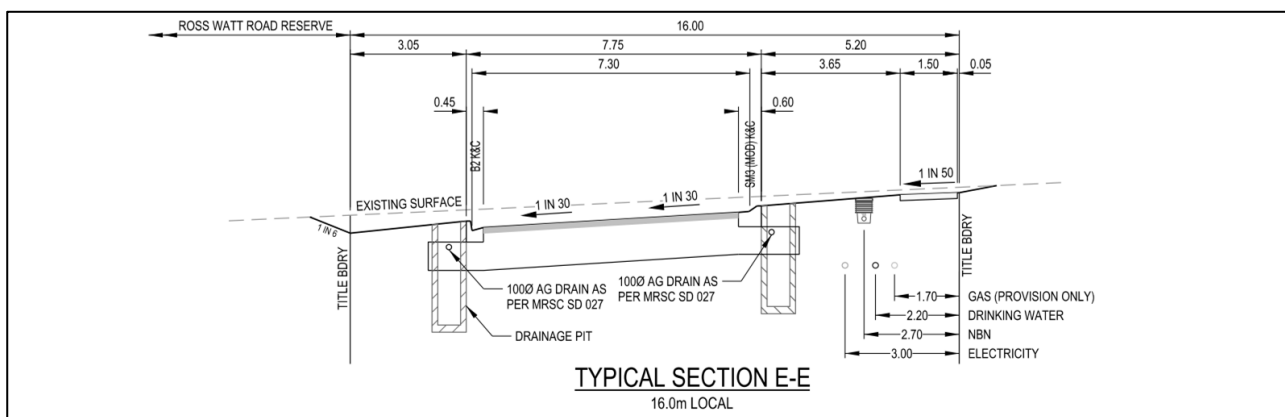


Figure 25 Local Access St – Open Space Interface / T'house Cross-Section – Opt 4 (16.5m)

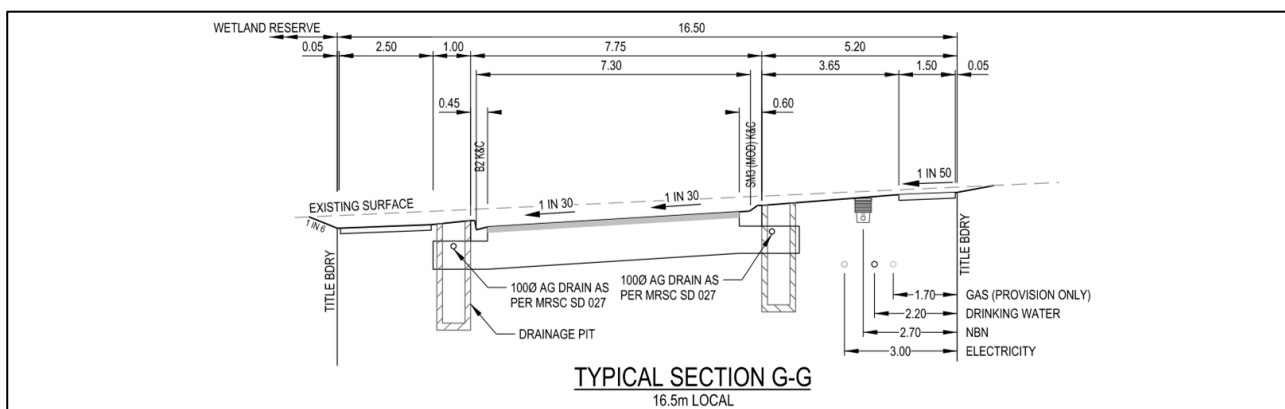
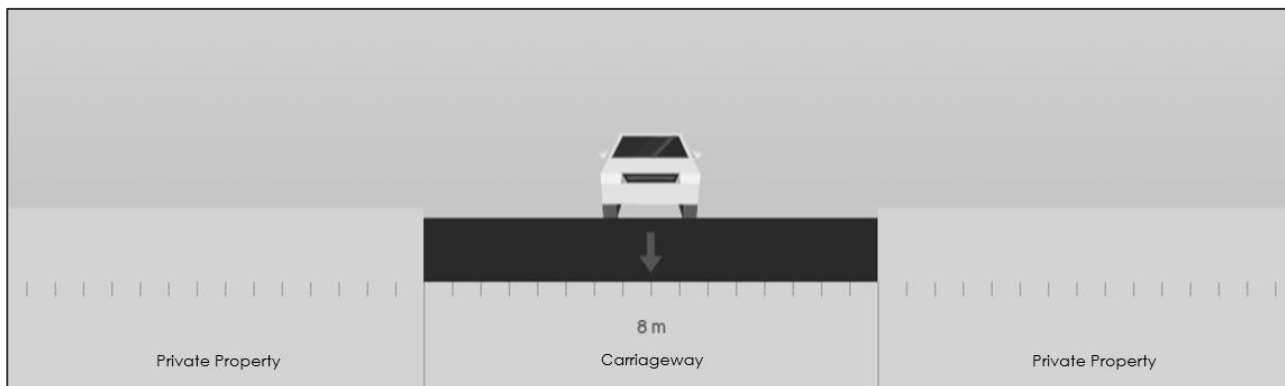


Figure 26 Laneway Cross Section (8m)



5.4 External Road Infrastructure Upgrades

5.4.1 Intersections

5.4.1.1 Station Road / Ross Watt Road and Station Road / Cherry Lane

5.4.1.1.1 *Interim*

It is proposed to upgrade the intersections of Cherry Lane / Station Road and Ross Watt Road / Station Road to allow for not only traffic generated by the proposed development but also allow for the relatively high through traffic volumes on Station Road.

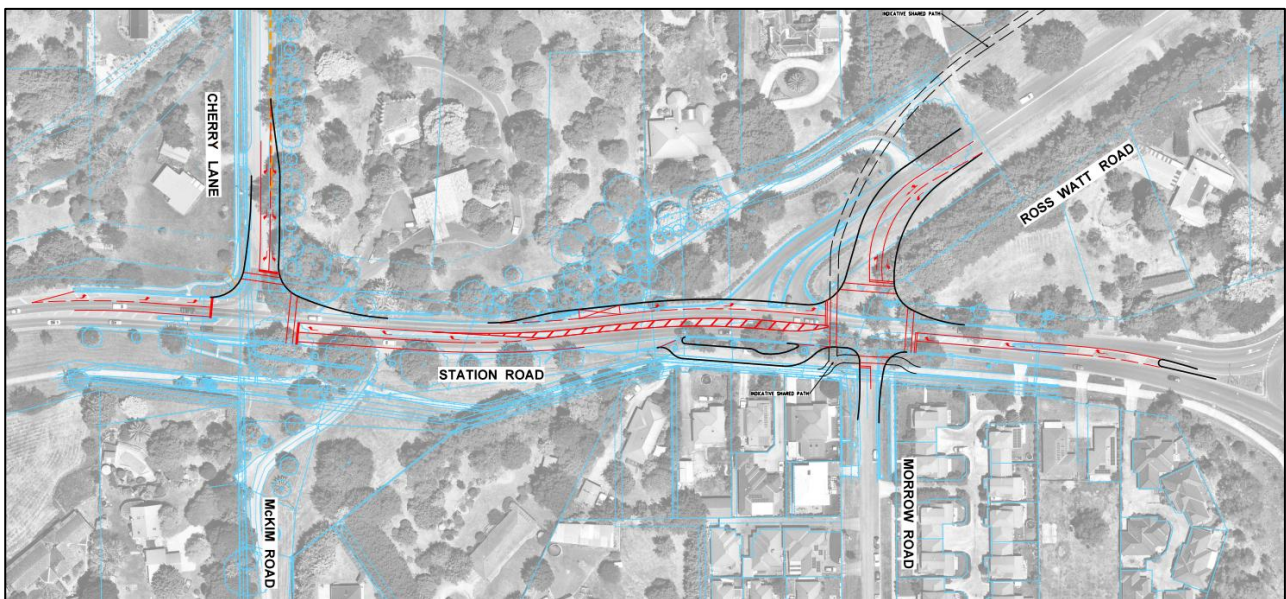
Extensive discussions were undertaken as part of the planning process for the site with various stakeholders (Macedon Ranges Shire Council, Department of Transport and Planning etc) and during the VCAT proceedings for the matter to determine the appropriate upgrades at the intersections of Cherry Lane / Station Road and Ross Watt Road / Station Road. These assessments to determine the appropriate intersection treatments included peer reviews by other traffic engineering firms and adjudication by VCAT.

As part of the assessments, a number of scenarios were tested with regard to the intersection configurations. It was found that the level of through traffic on Station Road was the determining input factor to the analysis scenarios. Following the VCAT proceeding, it was determined that the most appropriate upgrades at these intersections are a signalised configuration (from an unsignalised T-intersection). The interim intersection arrangements have been designed to, where practical minimise the works that are required to accommodate the ultimate intersection configuration (duplication of Station Road).

It is noted that as part of the proposed signalised intersection arrangement, it is proposed to realign Ross Watt Road to form a four-way signalised intersection arrangement between Ross Watt Road / Station Road / Morrow Road. It is noted that the re-alignment of Ross Watt Road was considered as part of the McKim Road Development Plan, however, the status of these works is unknown and therefore the works will be undertaken as part of this Development Plan to ensure that access to Morrow Road is not restricted in the future.

A view of the interim Station Road signalised intersection works is shown in the figure below.

Figure 27 Proposed Interim Signalised Upgrades – Station Road



5.4.1.1.2 *Ultimate*

The overall preliminary planning for the area included in the Cardno traffic report contemplates the widening of Station Road to provide additional through capacity (i.e 2 lanes in each direction). In addition, based on discussions with the Department of Transport and Macedon Ranges Shire Council, the duplication of Station Road may be provided at some stage in the near future, however, is currently not funded or included in any works proposed by the Department of Transport. It is noted that existing traffic volumes along Station Road are operating near the theoretical capacity for a two lane arterial road.

Noting the above, an ultimate intersection design has been prepared for the Cherry Lane / Station Road and Ross Watt Road / Station Road intersections which includes the duplication of Station Road, if funded/provided by the Department of Transport in the future. The ultimate intersection treatments have been designed to minimise construction works at the intersections.

A view of the ultimate Station Road signalised intersection works is shown in the figure below.

Figure 28 Proposed Ultimate Signalised Upgrades – Station Road



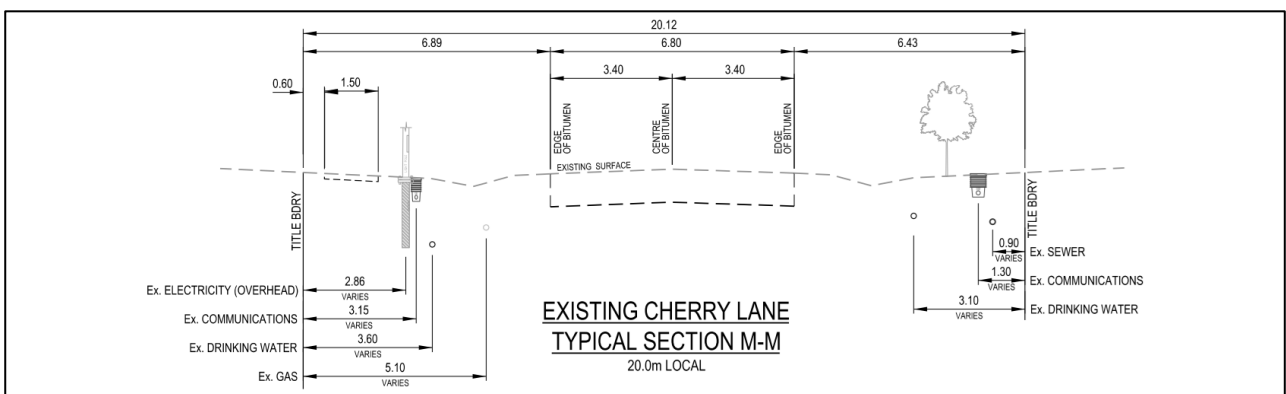
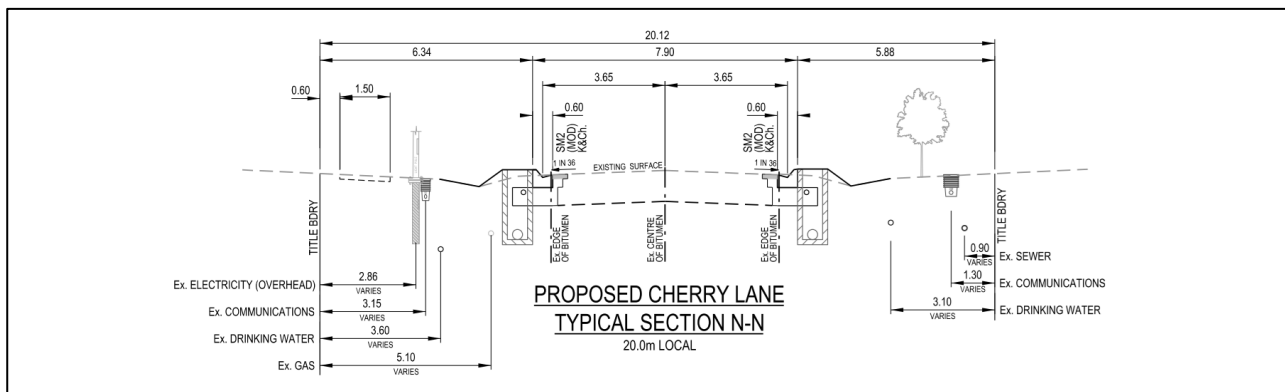


Figure 31 Proposed Cherry Lane Cross-Section



5.5 Pedestrian and Bicycle Network

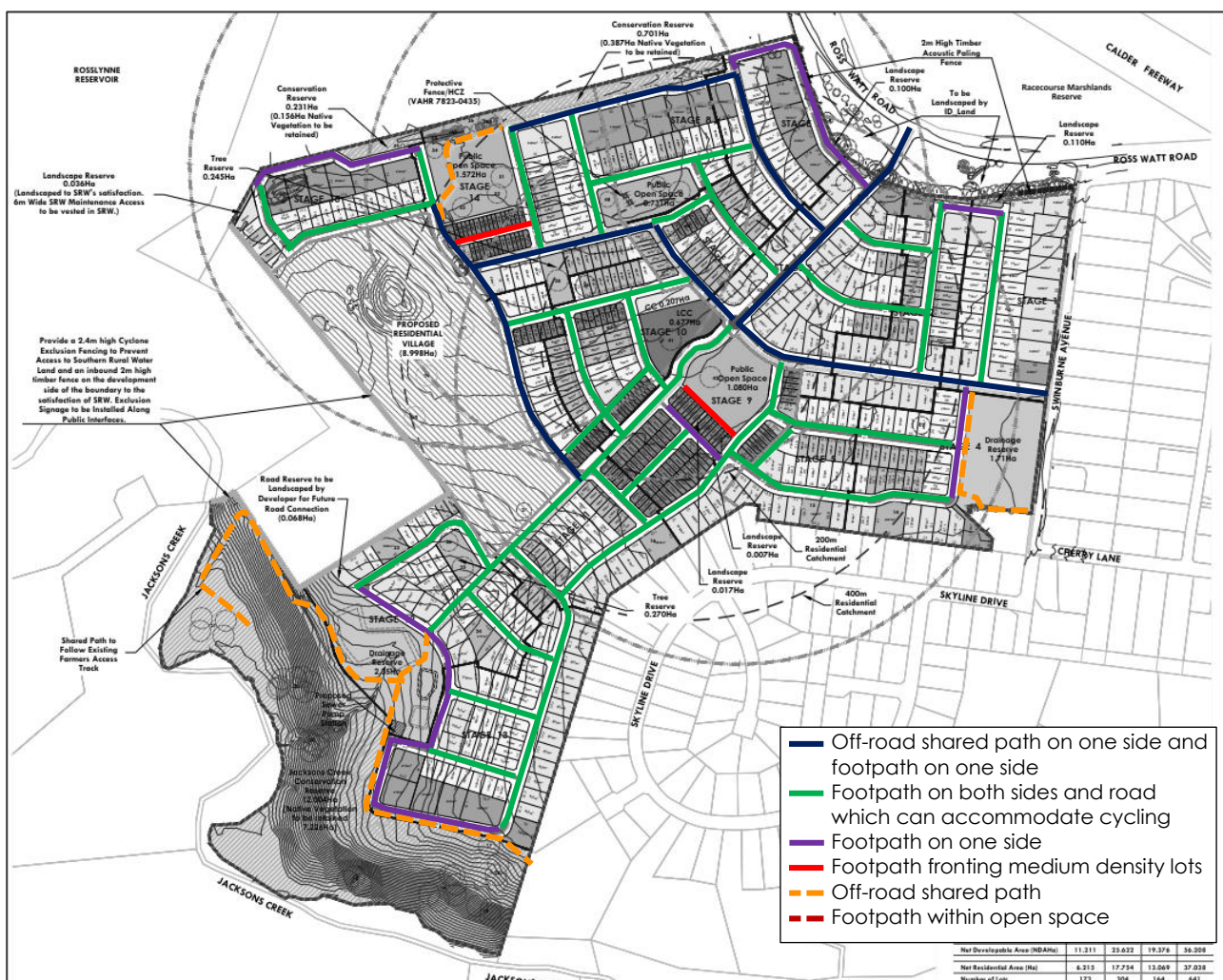
The proposed road network includes footpaths on both sides of all access streets and connector roads, with the exception of all roads adjacent to Jacksons Creek and the open spaces, where a footpath or shared path (subject to Council's shared path strategy) will be provided within the open space. Whilst the connector roads and the 16.5m to 24m modified local access streets will be provided with an off-road shared path on one side of the road reserve in lieu of a standard footpath.

It is noted that laneways will not be provided with a dedicated footpath, as they will operate as a shared environment. At the frontage of the rear loaded lots, a footpath will be provided.

The proposed access streets are designed to form a low speed and low traffic volume network, which can comfortably accommodate bicycle movements on-road within their cross-sections.

The subject sites pedestrian and bicycle network is shown below in Figure 32.

Figure 32 Proposed Pedestrian and Bicycle Network



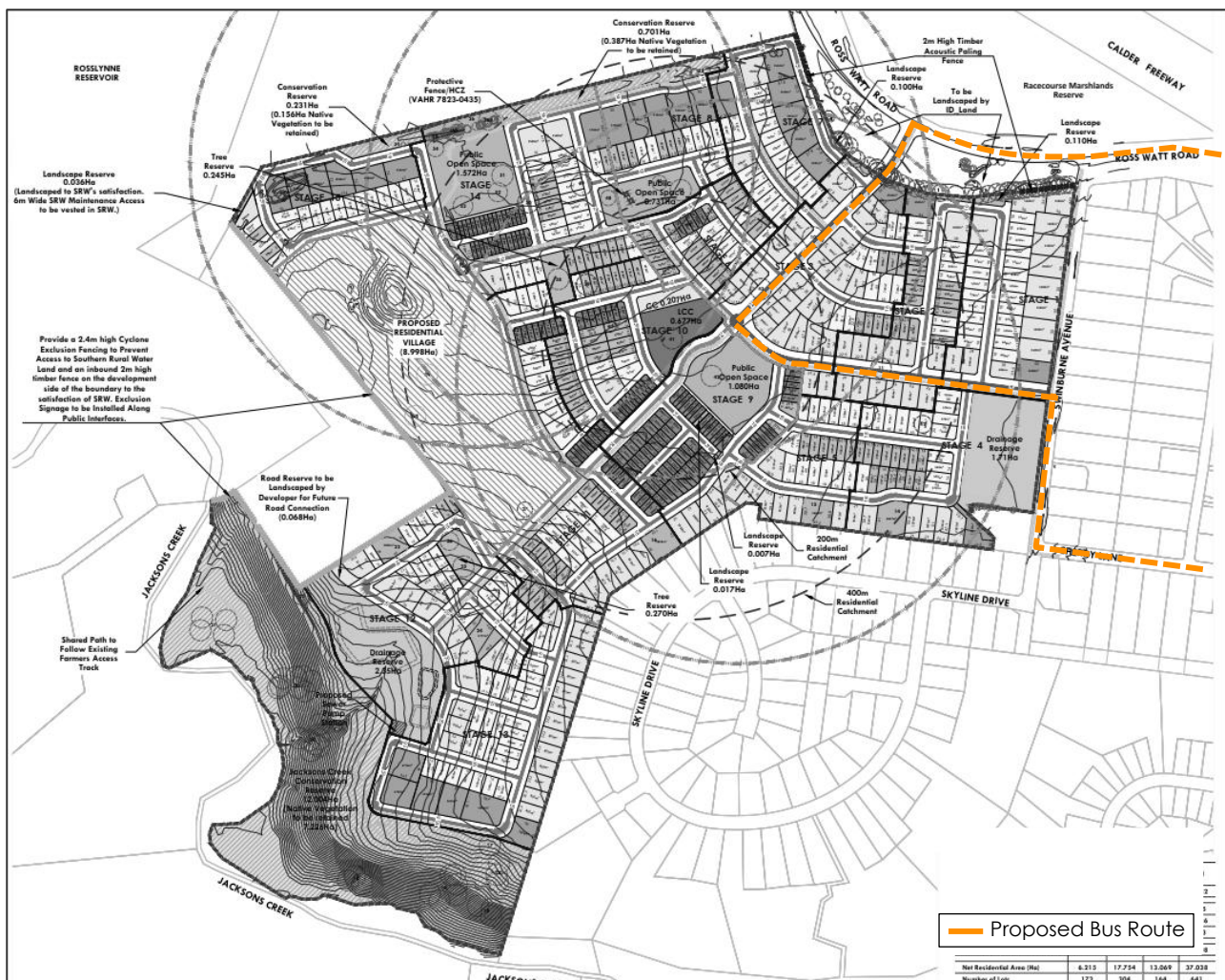
5.6 Public Transport

It is proposed for the connector road to have a 24m road reserve which is appropriately sized to accommodate any future bus routes.

The proposed bus capable connector road will provide access to Cherry Lane.

The proposed bus route will ensure that the entire development is situated within close proximity to public transport and is shown below in Figure 33.

Figure 33 Proposed Public Transport



6 ACCESS REVIEW

The development proposes a new intersection to Ross Watt Road which has a curved alignment in the vicinity of the subject site. To verify the suitability of the proposed T-intersection, a review has been undertaken with regard to sight distance and intersection configuration.

6.1 Sight Distances

A sight distance assessment has been undertaken with Austroads Guide to Road Design Part 4A, Table 3.2 which specifies that a 181 m safe intersection sight distance is required for an 80km/h road.

A SISD assessment is provided below for the T-intersection treatment at the Ross Watt Road site access. As shown, pruning would be required on the northern approach (within the road reserve) to meet the sight distance requirements.

Figure 34 Safe Intersection Sight Distance Assessment

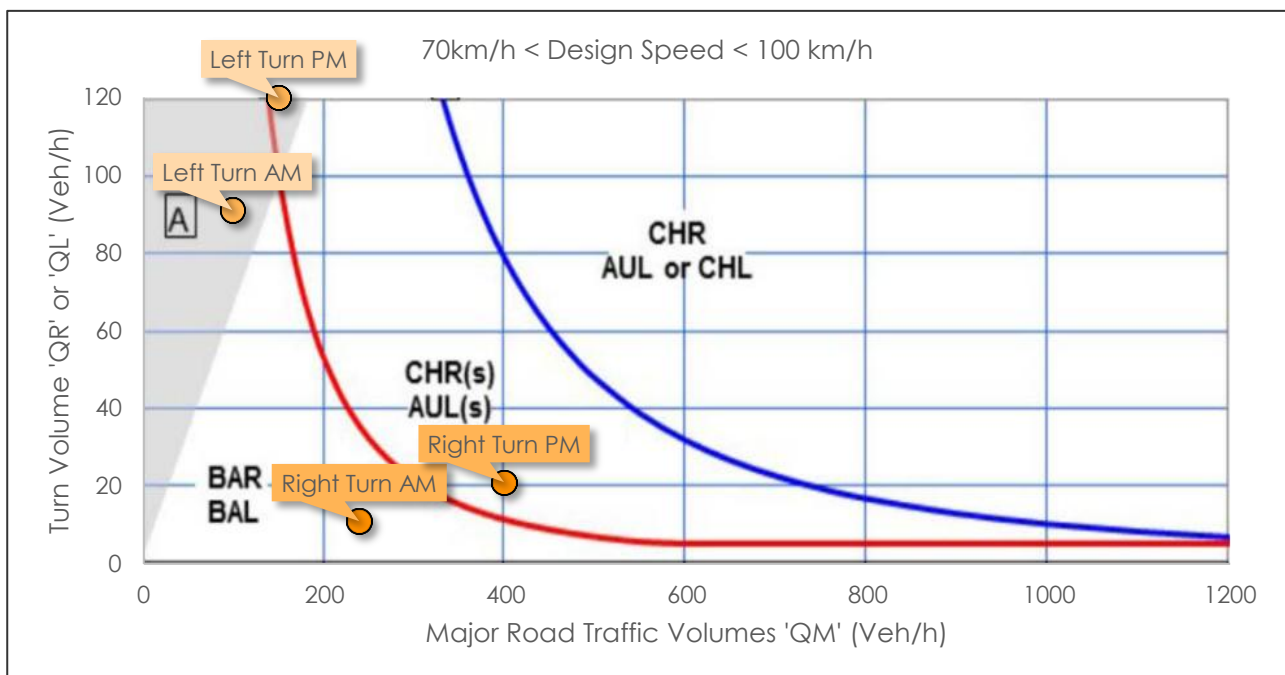


6.2 Austroads Turn Lane Warrants

In determining an appropriate intersection configuration, the anticipated post-development peak hour volumes were assessed against the turn lane treatment warrants specified in the *Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings*.

Based on the anticipated post-development traffic volumes (as shown Figure 40 and Figure 41), the turn lane requirements for the Ross Watt Road access are demonstrated in Figure 35.

Figure 35 Austroads Turn Treatment Warrants



As identified in the figure above, the anticipated turning movements at the site access indicate that a short channelised right-turn treatment (CHR(S)) and a short auxiliary left-turn treatment (AUL(S)) would be required.

Based on the above assessment, a T-intersection configuration to Ross Watt Road is considered appropriate.

7 RESIDENTIAL SUBDIVISION DESIGN ASSESSMENT

7.1 General

The design of the proposed residential subdivision has been assessed, in relation to the Gisborne/New Gisborne Outline Development Plan and the Clause 56 of the Macedon Ranges Planning Scheme (Residential Subdivision).

7.2 Gisborne/New Gisborne Outline Development Plan

In reference to the ODP documents summarised in Section 4.1, the proposed road network is generally in accordance with the ODP, with an internal road network proposed which connects to both Ross Watt Road and Cherry Lane and comprising of local streets.

Based on the above, the proposed residential subdivision is considered to be generally in accordance with the ODP.

7.3 Macedon Ranges Planning Scheme – Clause 56

Clause 56.06 identifies Access and Mobility Management requirements for residential subdivisions such as that proposed at the site. The following Clauses are applicable.

7.3.1 Clause 56.06-2, Walking and cycling network objectives

Standard C15

The walking and cycling network should be designed to:

- *Implement any relevant regional and local walking and cycling strategy, plan or policy for the area set out in this scheme.*
- *Link to any existing pedestrian and cycling networks.*
- *Provide safe walkable distances to activity centres, community facilities, public transport stops and public open spaces.*
- *Provide an interconnected and continuous network of safe, efficient and convenient footpaths, shared paths, cycle paths and cycle lanes based primarily on the network of arterial roads, neighbourhood streets and regional public open spaces.*
- *Provide direct cycling routes for regional journeys to major activity centres, community facilities, public transport and other regional activities and for regional recreational cycling.*
- *Ensure safe street and road crossings including the provision of traffic controls where required.*
- *Provide an appropriate level of priority for pedestrians and cyclists.*
- *Have natural surveillance along streets and from abutting dwellings and be designed for personal safety and security particularly at night.*
- *Be accessible to people with disabilities.*

The proposed development includes footpaths on one or both sides of all internal roads. Whilst the connector roads and the 16.5 metre to 24 metre modified local access streets will be provided with a shared path in lieu of a footpath on one side of the road.

Access streets are expected to have minimal traffic volumes and low speeds, and are considered suitable for cyclists.

All roads and paths are provided with natural surveillance. The proposed rear access laneways are short, with side abutments to adjacent lots, enabling appropriate surveillance.

It is therefore considered that the subdivision satisfies the objectives of Clause 56.06-2.

7.3.2 Clause 56.06-3, Public transport network objectives

Standard C16

The public transport network should be designed to:

- *Implement any relevant public transport strategy, plan or policy for the area set out in this scheme.*
- *Connect new public transport routes to existing and proposed routes to the satisfaction of the relevant public transport authority.*
- *Provide for public transport links between activity centres and other locations that attract people using the Principal Public Transport Network in Metropolitan Melbourne and the regional public transport network outside Metropolitan Melbourne.*
- *Locate regional bus routes principally on arterial roads and locate local bus services principally on connector streets to provide:*
 - ✦ *Safe and direct movement between activity centres without complicated turning manoeuvres.*
 - ✦ *Direct travel between neighbourhoods and neighbourhood activity centres.*
 - ✦ *A short and safe walk to a public transport stop from most dwellings.*

The internal connector roads are designed to accommodate future public transport routes, ensuring that the entire development is situated within close proximity to public transport. Externally to the site, Cherry Lane is slated for an upgrade to a connector road, and Ross Watt Road has a sealed road width to accommodate bus movements.

It is therefore considered that the subdivision satisfies the objectives of Clause 56.06-3.

7.3.3 Clause 56.06-4, Neighbourhood street network objective

Standard C17

The neighbourhood street network must:

- *Take account of the existing mobility network of arterial roads, neighbourhood streets, cycle paths, cycle paths, footpaths and public transport routes.*
- *Provide clear physical distinctions between arterial roads and neighbourhood street types.*
- *Comply with the Roads Corporation's arterial road access management policies.*
- *Provide an appropriate speed environment and movement priority for the safe and easy movement of pedestrians and cyclists and for accessing public transport.*
- *Provide safe and efficient access to activity centres for commercial and freight vehicles.*
- *Provide safe and efficient access to all lots for service and emergency vehicles.*
- *Provide safe movement for all vehicles.*
- *Incorporate any necessary traffic control measures and traffic management infrastructure.*

The neighbourhood street network should be designed to:

- *Implement any relevant transport strategy, plan or policy for the area set out in this scheme.*

- *Include arterial roads at intervals of approximately 1.6 kilometres that have adequate reservation widths to accommodate long term movement demand.*
- *Include connector streets approximately halfway between arterial roads and provide adequate reservation widths to accommodate long term movement demand.*
- *Ensure connector streets align between neighbourhoods for direct and efficient movement of pedestrians, cyclists, public transport and other motor vehicles.*
- *Provide an interconnected and continuous network of streets within and between neighbourhoods for use by pedestrians, cyclists, public transport and other vehicles.*
- *Provide an appropriate level of local traffic dispersal.*
- *Indicate the appropriate street type.*
- *Provide a speed environment that is appropriate to the street type.*
- *Provide a street environment that appropriately manages movement demand (volume, type and mix of pedestrians, cyclists, public transport and other motor vehicles).*
- *Encourage appropriate and safe pedestrian, cyclist and driver behaviour.*
- *Provide safe sharing of access lanes and access places by pedestrians, cyclists and vehicles.*
- *Minimise the provision of culs-de-sac.*
- *Provide for service and emergency vehicles to safely turn at the end of a dead-end street.*
- *Facilitate solar orientation of lots.*
- *Facilitate the provision of the walking and cycling network, integrated water management systems, utilities and planting of trees.*
- *Contribute to the area's character and identity.*
- *Take account of any identified significant features.*

It is considered that the layout proposed and the cross-sections of internal roads is appropriate to promote safe and easy movement throughout the subdivision for all road users.

Furthermore, the proposed road network will provide adequate clearances to cater for the access requirements of service and emergency vehicles (e.g. typically up to a 9.8m truck).

The forecast daily traffic volumes for the internal subdivision roads will be well within the recommended volume limits specified in Table C1 of Clause 56.06.

To ensure speeds are controlled, street lengths are limited and where longer streets are required speed control devices are proposed to be implemented.

It is therefore considered that the subdivision generally satisfies the objectives of Clause 56.06-4.

7.3.4 Clause 56.06-5, Walking and cycling detail network objectives

Standard C18

Footpaths, shared paths, cycle paths and cycle lanes should be designed to:

- *Be part of a comprehensive design of the road or street reservation.*
- *Be continuous and connect.*
- *Provide for public transport stops, street crossings for pedestrians and cyclists and kerb crossovers for access to lots.*
- *Accommodate projected user volumes and mix.*
- *Meet the requirements of Table C1.*
- *Provide pavement edge, kerb, channel and crossover details that support safe travel for pedestrians, footpath bound vehicles and cyclists, perform required drainage functions and are structurally sound.*

- *Provide appropriate signage.*
- *Be constructed to allow access to lots without damage to the footpath or shared path surfaces.*
- *Be constructed with a durable, non-skid surface.*
- *Be of a quality and durability to ensure:*
 - ✦ *Safe passage for pedestrians, cyclists, footpath bound vehicles and vehicles.*
 - ✦ *Discharge of urban run-off.*
 - ✦ *Preservation of all-weather access.*
 - ✦ *Maintenance of a reasonable, comfortable riding quality.*
 - ✦ *A minimum 20 year life span.*
- *Be accessible to people with disabilities and include tactile ground surface indicators, audible signals and kerb ramps required for the movement of people with disabilities.*

The proposal includes continuous footpath connections along the proposed Access Streets and Connector Roads, generally satisfying the objectives of Clause 56.06-5. Whilst the connector roads and the 16.5 metre to 24 metre modified local access streets will be provided with a shared path in lieu of a footpath on one side of the road.

The Access Streets will be low speed environments and suitable for on road bicycle traffic.

Additionally, a shared path network may potentially be provided along the Jacksons Creek open space (subject to confirmation on Council's shared path strategy) allowing increased pedestrian and cyclist permeability throughout the site.

It is therefore considered that the subdivision satisfies the objectives of Clause 56.06-5.

7.3.5 Clause 56.06-6, Public transport network detail objectives

Standard C19

Bus priority measures must be provided along arterial roads forming part of the existing or proposed Principal Public Transport Network in Metropolitan Melbourne and the regional public transport network outside Metropolitan Melbourne to the requirements of the relevant roads authority.

Road alignment and geometry along bus routes should provide for the efficient, unimpeded movement of buses and the safety and comfort of passengers.

The design of public transport stops should not impede the movement of pedestrians.

Bus and tram stops should have:

- *Surveillance from streets and adjacent lots.*
- *Safe street crossing conditions for pedestrians and cyclists.*
- *Safe pedestrian crossings on arterial roads and at schools including the provision of traffic controls as required by the roads authority.*
- *Continuous hard pavement from the footpath to the kerb.*
- *Sufficient lighting and paved, sheltered waiting areas for forecast user volume at neighbourhood centres, schools and other locations with expected high patronage.*
- *Appropriate signage.*

The connector roads have been designed to cater for buses, satisfying the objectives of Clause 56.06-6.

7.3.6 Clause 56.06-7, Neighbourhood street network detail objective

Standard C20

The design of streets and roads should:

- *Meet the requirements of Table C1. Where the widths of access lanes, access places, and access streets do not comply with the requirements of Table C1, the requirements of the relevant fire authority and roads authority must be met.*
- *Provide street blocks that are generally between 120 metres and 240 metres in length and generally between 60 metres to 120 metres in width to facilitate pedestrian movement and control traffic speed.*
- *Have verges of sufficient width to accommodate footpaths, shared paths, cycle paths, integrated water management, street tree planting, lighting and utility needs.*
- *Have street geometry appropriate to the street type and function, the physical land characteristics and achieve a safe environment for all users.*
- *Provide a low-speed environment while allowing all road users to proceed without unreasonable inconvenience or delay.*
- *Provide a safe environment for all street users applying speed control measures where appropriate.*
- *Ensure intersection layouts clearly indicate the travel path and priority of movement for pedestrians, cyclists and vehicles.*
- *Provide a minimum 5 metre by 5 metre corner splay at junctions with arterial roads and a minimum 3 metre by 3 metre corner splay at other junctions unless site conditions justify a variation to achieve safe sight lines across corners.*
- *Ensure streets are of sufficient strength to:*
 - ✦ *Enable the carriage of vehicles.*
 - ✦ *Avoid damage by construction vehicles and equipment.*
- *Ensure street pavements are of sufficient quality and durability for the:*
 - ✦ *Safe passage of pedestrians, cyclists and vehicles.*
 - ✦ *Discharge of urban run-off.*
 - ✦ *Preservation of all-weather access and maintenance of a reasonable, comfortable riding quality.*
- *Ensure carriageways of planned arterial roads are designed to the requirements of the relevant road authority.*
- *Ensure carriageways of neighbourhood streets are designed for a minimum 20 year life span.*
- *Provide pavement edges, kerbs, channel and crossover details designed to:*
 - ✦ *Perform the required integrated water management functions.*
 - ✦ *Delineate the edge of the carriageway for all street users.*
 - ✦ *Provide efficient and comfortable access to abutting lots at appropriate locations.*
 - ✦ *Contribute to streetscape design.*
- *Provide for the safe and efficient collection of waste and recycling materials from lots.*
- *Be accessible to people with disabilities.*
- *Meet the requirements of Table C1. Where the widths of access lanes, access places, and access streets do not comply with the requirements of Table C1, the requirements of the relevant fire authority and roads authority must be met. Where the widths of connector streets do not comply with the requirements of Table C1, the requirements of the relevant public transport authority must be met.*

A street detail plan should be prepared that shows, as appropriate:

- The street hierarchy and typical cross-sections for all street types.
- Location of carriageway pavement, parking, bus stops, kerbs, crossovers, footpaths, tactile surface indicators, cycle paths and speed control and traffic management devices.
- Water sensitive urban design features.
- Location and species of proposed street trees and other vegetation.
- Location of existing vegetation to be retained and proposed treatment to ensure its health.
- Any relevant details for the design and location of street furniture, lighting, seats, bus stops, telephone boxes and mailboxes.

Table C1 Design of roads and neighbourhood streets

Element	Access Lane	Access Place	Access Street – Level 1	Access Street – Level 2	Connector Street – Level 1	Connector Street – Level 2
Traffic Volume	300 vpd	300-1000 vpd	1000-2000 vpd	2000-3000 vpd	3000 vpd	3000-7000 vpd
Target Speed	10 km/h	15 km/h	30 km/h	40 km/h	50 km/h (40 km/h at schools, 20km/h at crossing points)	60 km/h or 50 km/h (40 km/h at schools)
Carriageway Width	5.5m	5.5m	5.5m	7 – 7.5m	3.5m per lane (4.0m at intersections)	3.5m per lane (4.0m at intersections)
Parking Within Street	None	1 verge space per 2 lots, or one-side on carriageway	1 verge space per 2 lots	Both sides	Dedicated lane 2.3m where required	Dedicated lane 2.3m where required
Verge Width	Not required	7.5m (3.5m / 2.5m min)	4.0 / 4.0m	4.5 / 4.5m	4.5 / 4.5m	6.0 / 6.0m
Footpath Provision	Shared Zone	1.5m (Not required if < 5 dwellings)	2 x 1.5m (2.0m at schools, shop, activity centre)	2 x 1.5m (2.0m at schools, shop, activity centre)	2 x 1.5m (2.0m at schools, shop, activity centre)	2 x 1.5m (2.0m at schools, shop, activity centre)
Cycle Path Provision	None	None	Shared Zone	Shared Zone	0.7 - 1.7m	0.7 - 1.7m or shared path

Appropriate splays are provided on the corner of intersections.

Road cross-sections are generally in accordance with Table C1 of the Planning Scheme.

It is therefore considered that the subdivision satisfies the objectives of Clause 56.06-7.

7.3.7 Clause 56.06-8, Lot access objective

Standard C21

Vehicle access to lots abutting arterial roads should be provided from service roads, side or rear access lanes, access places or access streets where appropriate and in accordance with the access management requirements of the relevant roads authority.

Vehicle access to lots of 300 square metres or less in area and lots with a frontage of 7.5 metres or less should be provided via rear or side access lanes, places or streets.

The design and construction of a crossover should meet the requirements of the relevant road authority.

No lots are provided with direct access to an arterial road, and all lots with a frontage of less than 7.5m are provided with rear access.

Whilst some lots are less than 300m² in area (north of the Public Open Space), they have a frontage of greater than 7.5 metres, and therefore access via the frontage road is considered to be appropriate.

It is therefore considered that the subdivision satisfies the objectives of Clause 56.06-8.

8 TRAFFIC

8.1 Traffic Generation

As noted in Section 5.1, it is envisaged that in the order of 775-800 standard density lots will be delivered on-site, however, a portion of the subject site may be developed as residential village type dwellings which may increase the overall number of dwellings on-site however is unlikely to have a corresponding increase in traffic. Regardless, it is expected that undertaking a traffic analysis on the maximum number of standard density dwellings will provide the most conservative assessment, i.e 800 standard residential lots.

Considering the size of the lots proposed and the proximity of the site to public transport, it is anticipated that the proposed development may initially generate up to 9 vehicle trips per day per lot. Following full development of the area, including recreational facilities, retail developments and public transport routes, a reduction in traffic generation is expected.

Application of the above traffic generation rates to the maximum lot yield of 800 standard density residential lots equates to a total traffic generation of approximately 7,200 vehicle trips per day, and approximately 720 vehicle trips per hour during both the AM and PM peak hours.

Traffic volumes generated by residential uses is typically tidal, with the majority of movements generated during the AM peak hour occurring in the outbound direction and the majority of movements during the PM peak hour occurring in the inbound direction.

For the purposes of this assessment, the following directional splits will be adopted:

- AM peak hour: 70% outbound, 30% inbound; and
- PM peak hour: 40% outbound, 60% inbound.

The peak hour traffic volumes anticipated to be generated by the proposed residential subdivision are outlined in Table 4.

Table 4 Anticipated Peak Hour Traffic Generation

<i>Period</i>	<i>Outbound</i>	<i>Inbound</i>	<i>Two-Way</i>
AM Peak Hour	504	216	720
PM Peak Hour	288	432	720

8.2 Traffic Distribution

The adopted traffic distribution has been derived using the existing traffic volumes shown in 3.4.1. The traffic volumes showed that traffic along the external road network is distributed as follows:

- 5% west along Ross Watt Road;
- 51% south along Station Road; and
- 44% north along Station Road.

North of Ross Watt Road, the traffic has been distributed generally in accordance with the existing traffic distribution onto Calder Freeway.

8.3 Generated Traffic Volumes

Based on the above, the expected traffic volumes generated by the development for AM and PM peak periods are shown below in Figure 36 and Figure 37.

Figure 36 Generated Traffic Volumes – AM Peak

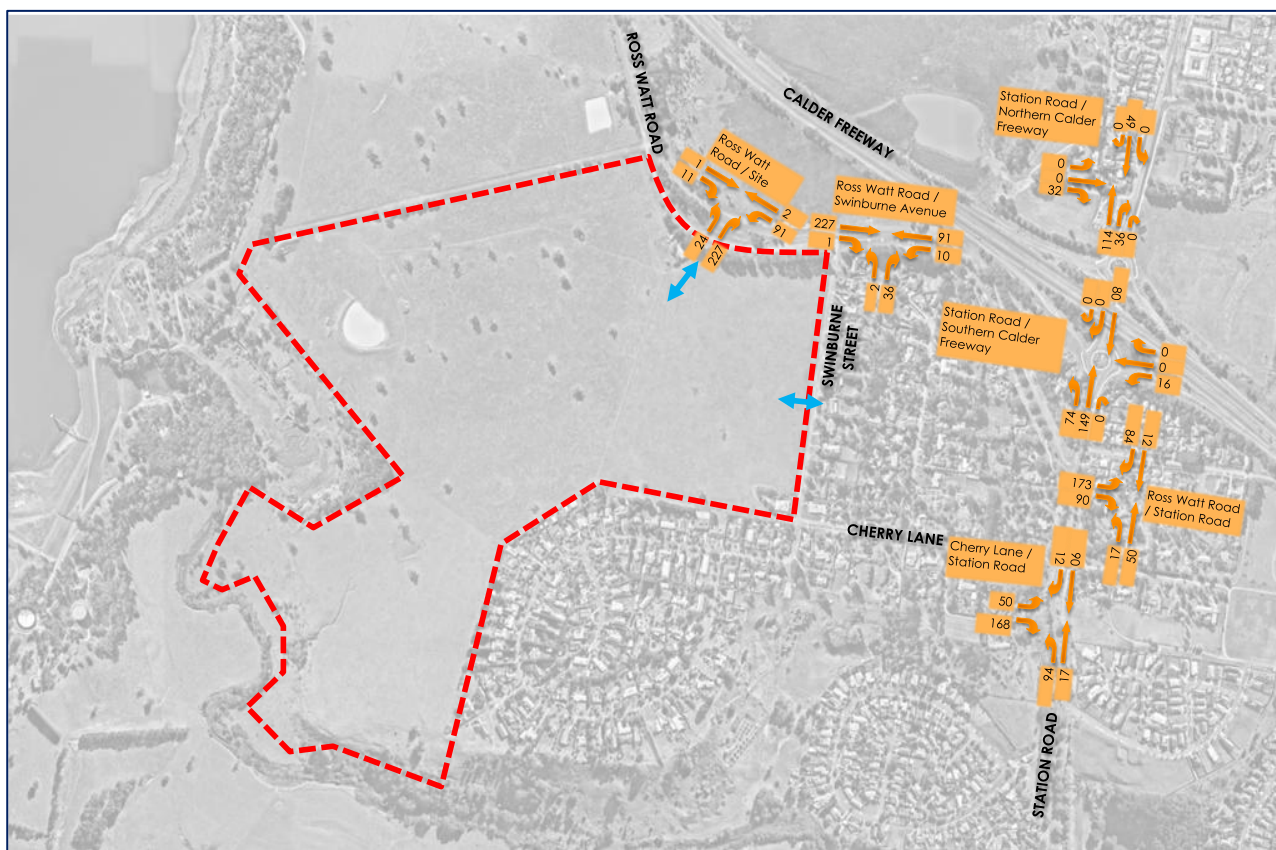
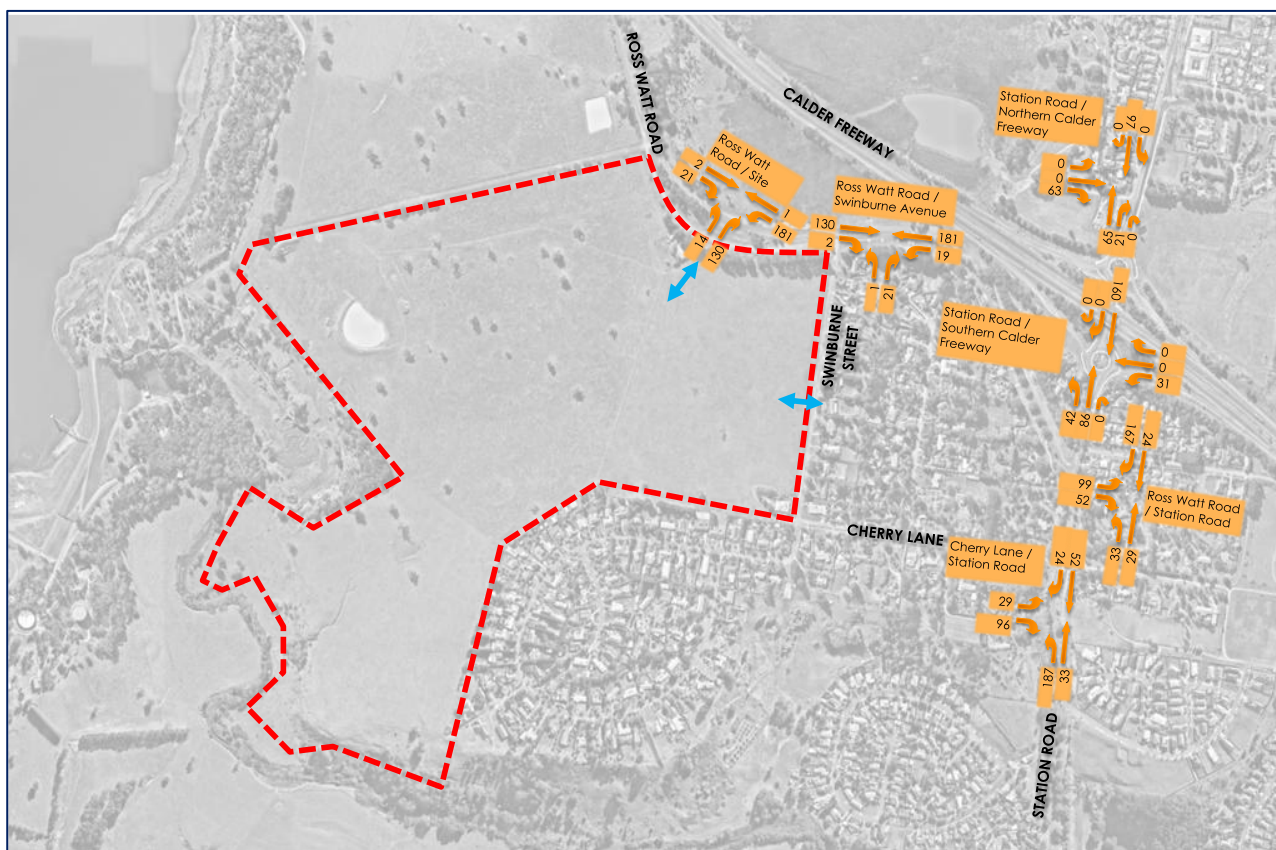


Figure 37 Generated Traffic Volumes – PM Peak



8.4 Expected Traffic Volume Growth

To confirm that the operation of surrounding intersections will operate appropriately into the future, it is considered appropriate to include future traffic volume growth.

It is noted that the Cardno report (ref: V180578) contemplates several significant road upgrades in the vicinity which will significantly impact the operation of Station Road, these include the duplication of Station Road. In addition, several other residential developments are proposed or under construction within Gisborne.

Noting the above, a growth rate of 2% per year (compound) has been applied to the existing traffic volumes along Station Road and Ross Watt Road over a 15-year period, equivalent to a 34.6% increase in traffic volumes respectively. The 15-year period equates to 5 years of development and 10 years post-development. The 2% growth rate and 15-year analysis is as agreed with the Department of Transport at meetings held between **onemilegrid** and the Department of Transport.

It is expected that no traffic growth is required for Swinburne Avenue and Cherry Lane, as the area is fully developed apart from the subject site's land which will be included in the analysis regardless.

The below traffic volumes are based on the modified 2022 traffic volumes previously shown in Figure 7.

Based on the above, the existing traffic volumes with growth are shown below in the figures below.

Figure 38 Traffic Volumes with 15yr Growth – AM Peak

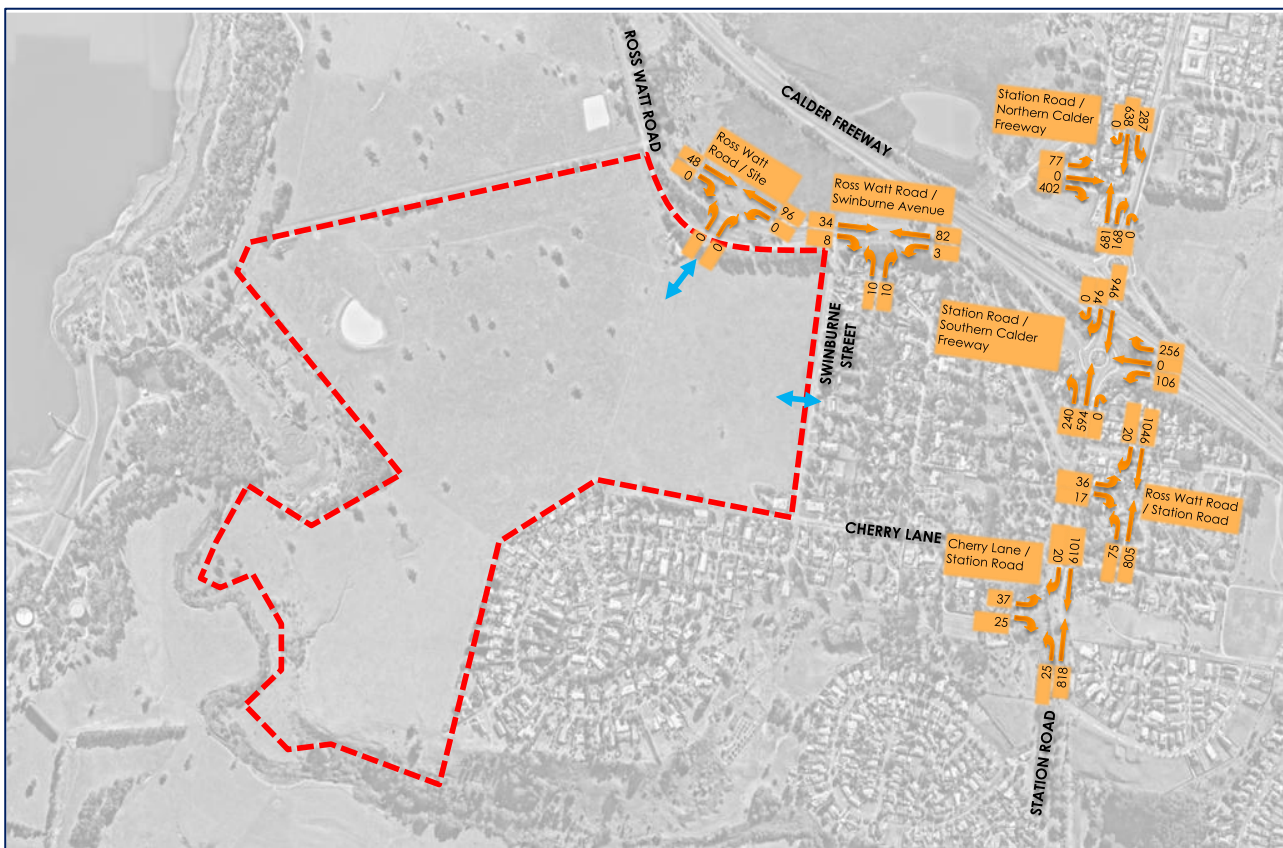
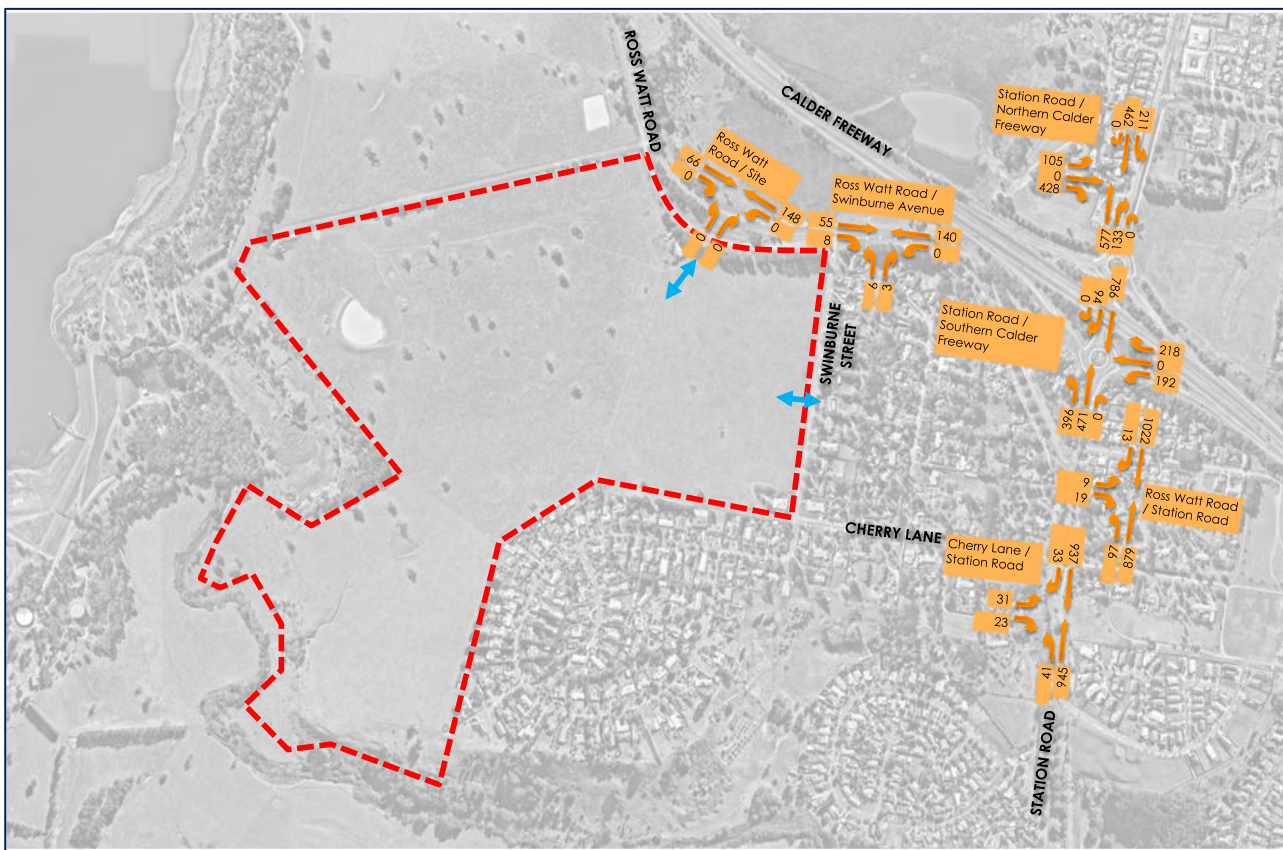


Figure 39 Traffic Volumes with 15yr Growth – PM Peak



8.5 Resultant Future Traffic Volumes

Based on the above, the future volumes at intersections within the vicinity of the site can be calculated by combining the existing volumes with the expected traffic volume growth, and superimposing the traffic anticipated to be generated by the proposed development.

The resultant peak hour traffic volumes are shown in the figure below.

Figure 40 Resultant Future Traffic Volumes with 15yr Growth – AM Peak

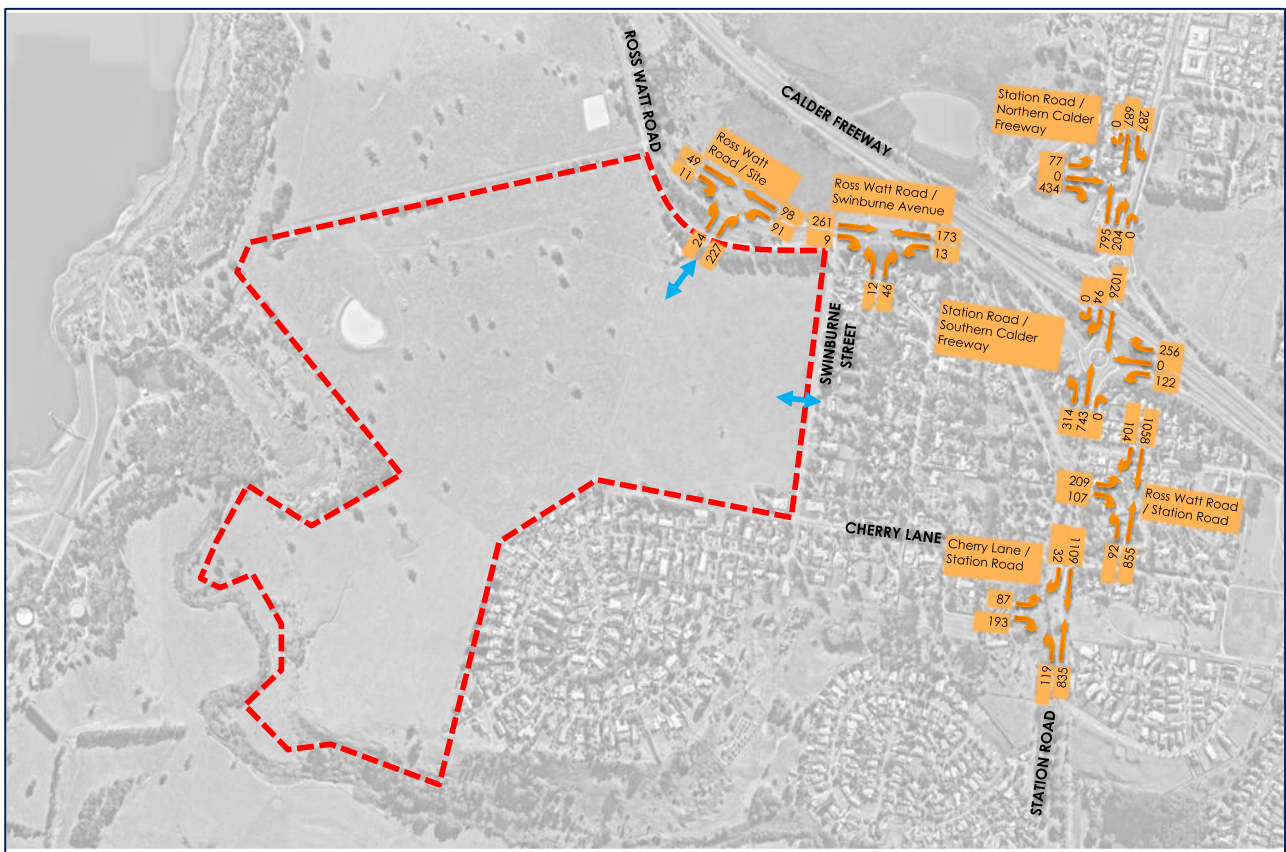
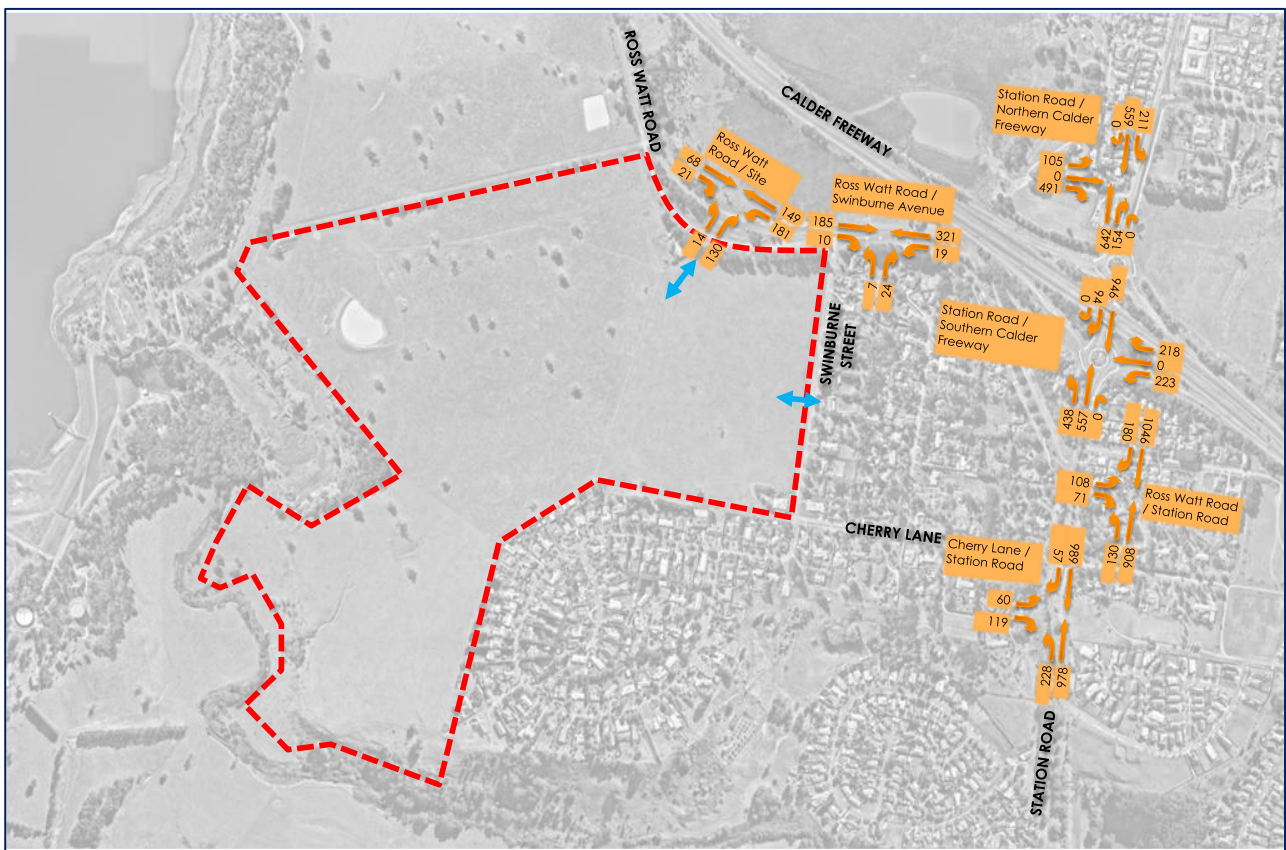


Figure 41 Resultant Future Traffic Volumes with 15yr Growth – PM Peak



8.6 Traffic Impact

8.6.1 Overview

Given the proximity of the Station Road / Cherry Lane, Station Road / Ross Watt Road and the Station Road / Calder Freeway intersections, the four intersections have been modelled as a network model to accommodate any capacity reductions caused by downstream queueing effects.

It is noted that much of the traffic travelling through these intersections are associated with background general traffic rather than specifically development generated traffic. In this regard, an assessment of the operation of the intersections in the vicinity of the site has been undertaken firstly assessing the base conditions over a 15-year horizon without development and then the ultimate configuration of the intersections over a 15-year horizon with development.

8.6.2 Intersection Capacity Assessment

To assess the operation of the intersections the future traffic volumes have been input into SIDRA Intersection, a traffic modelling software package.

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

Table 5 SIDRA Intersection Parameters

Parameter	Description														
Degree of Saturation (DoS)	The DoS represents the ratio of the traffic volume making a particular movement compared to the maximum capacity for that particular movement. The value of the DoS has a corresponding rating depending on the ratio as shown below. <table><tr><th>Degree of Saturation</th><th>Rating</th></tr><tr><td>Up to 0.60</td><td>Excellent</td></tr><tr><td>0.61 – 0.70</td><td>Very Good</td></tr><tr><td>0.71 – 0.80</td><td>Good</td></tr><tr><td>0.81 – 0.90</td><td>Fair</td></tr><tr><td>0.91 – 1.00</td><td>Poor</td></tr><tr><td>Above 1.00</td><td>Very Poor</td></tr></table> It is noted that whilst the range of 0.91 – 1.00 is rated as 'poor', it is acceptable for critical movements at an intersection to be operating within this range during high peak periods, reflecting actual conditions in a significant number of suburban signalised intersections.	Degree of Saturation	Rating	Up to 0.60	Excellent	0.61 – 0.70	Very Good	0.71 – 0.80	Good	0.81 – 0.90	Fair	0.91 – 1.00	Poor	Above 1.00	Very Poor
Degree of Saturation	Rating														
Up to 0.60	Excellent														
0.61 – 0.70	Very Good														
0.71 – 0.80	Good														
0.81 – 0.90	Fair														
0.91 – 1.00	Poor														
Above 1.00	Very Poor														
Average Delay (seconds)	Average delay is the time delay that can be expected for all vehicles undertaking a particular movement in seconds.														
95th Percentile (95%ile) Queue	95%ile queue represents the maximum queue length in metres that can be expected in 95% of observed queue lengths in the peak hour														

8.6.2.1 Growth Only

Prior to analysing the proposed developments impact on the existing intersections in the vicinity. It is considered necessary to analyse the existing intersections with growth applied without any development. The results of the analysis using the 15-year growth traffic volumes shown in Figure 38 and Figure 39 are shown below for the critical intersections in the vicinity. Detailed SIDRA results are attached in Appendix B.

Table 6 SIDRA 15 Year Growth Conditions – Ross Watt Rd / Station Rd

Approach	Existing Conditions			Growth Only		
	DoS	Avg Delay (sec)	Queue (m)	DoS	Avg Delay (sec)	Queue (m)
AM Peak						
Station Road - South	0.363	0.5	0	0.480	0.5	0
Station Road – North	0.430	0.2	0.5	0.579	0.3	1.0
Ross Watt Road - West	0.143	19.5	2.8	0.783	90.0	15.8
PM Peak						
Station Road – South	0.403	0.6	0	0.536	0.6	0
Station Road - North	0.420	0.2	0.4	0.566	0.3	0
Ross Watt Road - West	0.166	33.8	3.3	0.968	245.9	23.3

Table 7 SIDRA 15 Year Growth Conditions – Station Rd / Cherry Ln

Approach	Existing Conditions			Growth Only		
	DoS	Avg Delay (sec)	Queue (m)	DoS	Avg Delay (sec)	Queue (m)
AM Peak						
Station Road - South	0.332	0.3	0	0.453	0.3	0
Station Road - North	0.414	0.3	0.8	0.554	0.3	1.2
Cherry Lane - West	0.420	34.2	10.1	1.736	784.5	142.7
PM Peak						
Station Road - South	0.389	0.4	0	0.523	0.5	0
Station Road - North	0.385	0.5	1.6	0.519	0.6	2.6
Cherry Lane - West	0.389	35.5	9.3	1.673	745.3	121.3

Table 8 SIDRA 15 Year Growth Conditions – Station Rd / Calder FWY Westbound Ramp

Approach	Existing Conditions			Growth Only		
	DoS	Avg Delay (sec)	Queue (m)	DoS	Avg Delay (sec)	Queue (m)
AM Peak						
Station Road - South	0.254	3.8	8.8	0.358	4.2	13.6
Calder Freeway Off-ramp - East	0.135	10.2	4.0	0.201	11.6	6.6
Station Road - North	0.308	3.9	0	0.415	4.3	0
PM Peak						
Station Road - South	0.259	3.8	9.1	0.362	4.2	13.8
Calder Freeway Off-ramp - East	0.146	8.9	4.3	0.214	10.2	6.8
Station Road - North	0.261	3.9	0	0.351	4.2	0

Table 9 SIDRA 15 Year Growth Conditions – Station Rd / Calder FWY Eastbound Ramp

Approach	Existing Conditions			Growth Only		
	DoS	Avg Delay (sec)	Queue (m)	DoS	Avg Delay (sec)	Queue (m)
AM Peak						
Station Road - South	0.197	4.2	0	0.263	4.2	0
Station Road - North	0.307	4.4	10.9	0.450	5.2	18.6
Calder Freeway Off-ramp - West	0.167	10.1	4.6	0.239	10.7	7.1
PM Peak						
Station Road - South	0.165	4.1	0	0.220	4.1	0
Station Road - North	0.223	4.2	7.3	0.325	4.8	11.7
Calder Freeway Off-ramp - West	0.179	9.7	5.0	0.255	10.2	7.6

As shown above, the Calder Freeway interchanges are expected to operate under 'excellent' conditions with 15 years growth. Whilst the Station Road / Cherry Lane intersection will operate under 'very poor' conditions with a degree of saturation in excess of 1.6 in both the AM and PM peak hour, with an average delay in excess of 12 minutes on the western approach during both the AM and PM peak hour. In addition, the Station Road / Ross Watt Road intersection will operate under 'poor' conditions with a degree of saturation in excess of 0.9 during the PM peak hour, with an average delay in excess of four minutes on the western approach during both the AM and PM peak hour. These operational characteristics are not tenable.

Noting the above, the Cherry Lane / Station Road and Ross Watt Road / Station Road intersections are unable to accommodate the 15-year growth traffic volume scenario and should be upgraded regardless of the development. This scenario assessment highlights that the upgrades are required due to the high through traffic growth along Station Road itself which impacts the ability for motorists to exit from Cherry Lane and Ross Watt Road.

8.6.2.2 Post-Development Conditions - Ultimate

onemilegrid has undertaken a traffic analysis of the Station Road / Cherry Lane and Station Road / Ross Watt Road intersections based on the resultant traffic volumes shown previously (subject site and growth in the area). For the post-development conditions, it has been assumed that both intersections have been upgraded to signalised intersections.

In addition, as mentioned earlier in this report, Station Road does not have the capacity to manage future growth along the road and therefore, Station Road has been assumed to be duplicated for the ultimate traffic analysis as per the ultimate signalised design previously shown in Figure 28.

The results of the analysis are provided below and the detailed SIDRA results are attached in Appendix B.

Table 10 SIDRA Post-Development Conditions (15 Yr Growth) – Ross Watt Rd / Site Access

Approach	Existing Conditions			Future Conditions (10 Year Growth)		
	DoS	Avg Delay (sec)	Queue (m)	DoS	Avg Delay (sec)	Queue (m)
AM Peak						
Site Access - South	N/A	N/A	N/A	0.244	6.4	6.7
Ross Watt Road - East	N/A	N/A	N/A	0.106	2.7	0
Ross Watt Road - West	N/A	N/A	N/A	0.035	1.3	0.5
PM Peak						
Site Access - South	N/A	N/A	N/A	0.159	7.0	4.0
Ross Watt Road - East	N/A	N/A	N/A	0.186	3.1	0
Ross Watt Road - West	N/A	N/A	N/A	0.055	2.0	1.2

Table 11 SIDRA Post-Development Conditions (15 Yr Growth) – Ross Watt Rd/Swinburne Ave

Approach	Existing Conditions			Future Conditions (10 Year Growth)		
	DoS	Avg Delay (sec)	Queue (m)	DoS	Avg Delay (sec)	Queue (m)
AM Peak						
Swinburne Avenue - South	0.016	5.8	0.4	0.069	7.3	1.6
Ross Watt Road - East	0.035	0.3	0	0.102	0.4	0
Ross Watt Road - West	0.019	1.4	0.3	0.149	0.2	0.5
PM Peak						
Swinburne Avenue - South	0.007	5.9	0.2	0.041	7.7	0.9
Ross Watt Road - East	0.057	0.1	0	0.186	0.4	0
Ross Watt Road - West	0.028	1	0.4	0.110	0.5	0.7

As shown above, the site access to Ross Watt Road will operate with excellent conditions. In addition, the intersection of Ross Watt Road / Swinburne Avenue will also operate under excellent conditions.

Table 12 SIDRA Post-Dev Conditions (15 Yr Growth) – Station Rd / Calder FWY E'Bnd Ramp

Approach	Existing Conditions			Future Conditions (Option 2)		
	DoS	Avg Delay (sec)	Queue (m)	DoS	Avg Delay (sec)	Queue (m)
AM Peak						
Station Road - South	0.197	4.2	0	0.312	4.2	0
Station Road - North	0.307	4.4	10.9	0.493	5.7	19.7
Calder Freeway Off-ramp - West	0.167	10.1	4.6	0.267	11.2	8.1
PM Peak						
Station Road - South	0.165	4.1	0	0.249	4.2	0
Station Road - North	0.223	4.2	7.3	0.389	5.1	13.0
Calder Freeway Off-ramp - West	0.179	9.7	5.0	0.294	10.6	8.9

Table 13 SIDRA Post-Dev Conditions (15 Yr Growth) – Station Rd / Calder FWY W'Bnd Ramp

Approach	Existing Conditions			Future Conditions		
	DoS	Avg Delay (sec)	Queue (m)	DoS	Avg Delay (sec)	Queue (m)
AM Peak						
Station Road - South	0.254	3.8	8.8	0.456	4.4	16.9
Calder Freeway Off-ramp - East	0.135	10.2	4.0	0.205	10.3	6.1
Station Road - North	0.308	3.9	0	0.354	3.4	0
PM Peak						
Station Road - South	0.259	3.8	9.1	0.420	4.3	15.4
Calder Freeway Off-ramp - East	0.146	8.9	4.3	0.241	9.0	6.8
Station Road - North	0.261	3.9	0	0.340	3.5	0

Table 14 SIDRA Post-Development Conditions (15 Yr Growth) – Ross Watt Rd / Station Rd

Approach	Existing Conditions			Future Conditions (Option 2)		
	DoS	Avg Delay (sec)	Queue (m)	DoS	Avg Delay (sec)	Queue (m)
AM Peak						
Station Road - South	0.363	0.5	0	0.460	20.8	119.5
Morrow Road – East	N/A	N/A	N/A	0.433	44.3	20.5
Station Road – North	0.430	0.2	0.5	0.588	26.8	163.2
Ross Watt Road - West	0.143	19.5	2.8	0.593	54.3	77.1
PM Peak						
Station Road – South	0.403	0.6	0	0.503	10.2	86.9
Morrow Road – East	N/A	N/A	N/A	0.295	46.7	13.0
Station Road - North	0.420	0.2	0.4	0.621	29.9	172.8
Ross Watt Road - West	0.166	33.8	3.3	0.580	50.9	35.6

Table 15 SIDRA Post-Development Conditions (15 Yr Growth) – Station Rd / Cherry Lane

Approach	Existing Conditions			Future Conditions (Option 2)		
	DoS	Avg Delay (sec)	Queue (m)	DoS	Avg Delay (sec)	Queue (m)
AM Peak						
Station Road - South	0.332	0.3	0	0.500	23.4	131.1
Station Road - North	0.414	0.3	0.8	0.557	21.6	159.1
Cherry Lane - West	0.420	34.2	10.1	0.510	41.5	100.1
PM Peak						
Station Road - South	0.389	0.4	0	0.486	17.2	130.3
Station Road - North	0.385	0.5	1.6	0.396	2.3	39.4
Cherry Lane - West	0.389	35.5	9.3	0.475	50.2	69.3

As shown above, all four intersections will operate under 'excellent' or 'very good' conditions in the ultimate scenario when the intersections of Station Road / Ross Watt Road and Station Road / Cherry Lane are signalised and Station Road is duplicated.

Irrespective of the above, the provision of signals at Cherry Lane and Ross Watt Road will increase queuing in the vicinity with the queuing likely to extend up to the Station Rd / Calder Freeway Westbound Ramp.

As noted previously, the duplication of Station Road is required in the ultimate scenario to relieve the through-traffic issues and improve the operation of the intersections along Station Road. Nevertheless, the timing for this project has not been determined and funding for the project has not been allocated, therefore, the required timing for the ultimate upgrade of these intersections is provided in Section 8.7.2. It is reiterated that the duplication of Station Road is required regardless of development, with through background traffic volumes triggering the upgrade rather than the development of the subject site.

8.6.3 Other Commentary

It is noted that the proposed development is generally in accordance with the development anticipated and analysed as part of the Gisborne Movement Network Study (2016) and the traffic study undertaken by Cardno (2020).

The traffic generation of the proposed development has therefore been included in the traffic modelling, intersection analysis and therefore road network design in the vicinity which was undertaken by Cardno. This would include:

- The duplication of Station Road; and

- Upgrade of Cherry Lane and Swinburne Avenue to a connector road.

It is noted that the Cardno VITM modelling had assumed that a total of 8,390 daily vehicle movements will be generated by the subject site. Of note, based on the residential yield prepared by Breese Pitt Dixon, it is expected that a total of 7,200 daily vehicles movements will be generated by the subject site which is approximately 14% lower than the VITM modelling.

8.6.4 Midblock Assessment

In order to assess the appropriateness of the external road network, a review of the theoretical road capacity and the expected post-development impact has been undertaken, based on the road classifications identified within the Infrastructure Design Manual and for a single carriageway arterial road accommodating two-way traffic.

Station Road and Ross Watt Road have been assessed with 15-years growth, whilst Cherry Lane and Swinburne Avenue have had no growth applied.

The 2022 traffic volumes previously shown in Section 3.4.1 have been used for the below traffic assessment.

Table 16 Midblock Capacity Assessment

Road Name	IDM Classification	Traffic Capacity (vpd)	Existing Traffic with 15yr Growth	Site Generated Traffic	Future
Station Road (North of Ross Watt Road)	Arterial Road	<18,000 vpd	21,838	+3,169	25,007
Ross Watt Road	Trunk Collector	6,000 – 8,000 vpd	2,297	+3,533	5,830
Cherry Lane	Access Street	<2,500 vpd	1,161 ¹	+3,310	4,471
Swinburne Avenue (North of access)	Access Street	<2,500 vpd	253 ¹	+428	681
Swinburne Avenue (South of access)	Access Street	<2,500 vpd	253 ¹	+3,310	3,563

¹No growth applied

As shown above, Ross Watt Road and the northern portion of Swinburne Avenue are operating within their theoretical capacity at the completion of the proposed subdivision. Whilst the southern portion of Swinburne Avenue is expected to exceed its theoretical capacity only marginally, and therefore is considered appropriate. Furthermore, Swinburne Avenue will be urbanised along the site's frontage when development commences along the Swinburne Avenue frontage and Ross Watt Road will be urbanised along the site's frontage when the proposed connector road connection is provided to Ross Watt Road. Cherry Lane is anticipated to operate in excess of its theoretical capacity and therefore should be upgraded prior to the completion of the full subdivision. In relation to Station Road, it is also expected to operate in excess of its theoretical capacity and therefore should be upgraded when funding is allocated by the Government / Department of Transport.

8.7 Timing of Road Upgrades

8.7.1 Approved Road Upgrades

A summary of the road and intersection upgrades associated with the development of the site as outlined within the approved Development Plan is provided in Table 17.

Table 17 Intersection/Road Upgrades – Development Plan Requirements

<i>Proposed Upgrade</i>	<i>Lot Trigger</i>
Upgrade Ross Watt Road along site's frontage to urban standard	Built with abutting stage
Upgrade Swinburne Avenue along site's frontage to urban standard	Built with abutting stage
Upgrade Ross Watt Road / Swinburne Avenue intersection	Built with abutting stage
Upgrade Station Road / Cherry Lane intersection to interim arrangement	72 nd Lot
Upgrade Cherry Lane to an urban standard road	557 th Lot
Upgrade Station Road / Ross Watt Road intersection to interim arrangement	541 st Lot

As noted in Section 5.1, a portion of the site may be developed as a residential village. Preliminary plans indicate that approximately 221 residential village-style dwellings may be delivered in the western portion of the site, with construction anticipated to commence during the early stages of the site's development. Given that residential village dwellings typically generate less traffic compared to standard residential subdivision dwellings, an assessment has been conducted below to determine the appropriate lot trigger if the western portion of the site is developed as a residential village.

8.7.1.1 Amended Trigger Upgrades

It is commonly acknowledged that residential villages generate lower traffic volumes than standard density residential lots due to the nature of the residential village product and occupant. In this regard, case study data from an existing 'lifestyle village' on Booker Rise in Bittern has been sourced from Traffix Group. The village contains 210 units (of which 202 were occupied at the time of the surveys) with associated recreation and community facilities.

Traffic volume surveys were undertaken at the site access point over a 1-week period commencing on Wednesday, 5 February 2020, between 10:00am and 1:00pm, with the average weekday results summarised below in Table 18.

Table 18 Retirement Village Case Study Data – Bittern

<i>Period</i>	<i>Total Vehicle Movements</i>	<i>Rate (Veh/unit*)</i>	<i>Directional Distribution</i>	
			<i>Inbound</i>	<i>Outbound</i>
AM Peak (8:00am – 9:00am)	44	0.22	32%	68%
Site Peak (10:00am – 11:00am)	69	0.34	39%	61%
PM Peak (5:00pm – 6:00pm)	44	0.22	66%	34%
Daily	692	3.43	50%	50%

* Occupied Unit

As shown above, during the commuter peak periods, 0.22 movements per occupied dwelling were generated. This is notably lower than the standard residential rate adopted for the assessment of 0.9 movements per dwelling.

Application of the above rates to the potential residential village which may comprise in the order of 221 dwellings equates to the following traffic movements, as summarised in Table 19.

Table 19 Anticipated Traffic Generation – Residential Village

<i>Period</i>	<i>Outbound</i>	<i>Inbound</i>	<i>Total</i>
AM Peak Hour	33 movements	15 movements	48 movements
PM Peak Hour	16 movements	32 movements	48 movements
Daily	379 movements	379 movements	758 movements

Based on the above, if the western portion of the site was developed as a residential village, then it is expected to generate in the order of 48 movements during the AM and PM peak hour, and 758 movements per day.

In comparison, a typical standard residential dwelling is expected to generate 0.9 vehicle movements per dwelling during both the AM and PM peak hours, and 9 vehicle movements per dwelling per day. Based on the traffic generation analysis above, it is estimated that 221 residential village lots will generate traffic equivalent to 53 standard residential lots during the AM and PM peak hours and 84 standard residential lots in terms of daily traffic generation, as summarised below in Table 20.

Table 20 Equivalent Traffic Generation – Standard Density Dwellings

<i>Period</i>	<i>Rate (veh / dwelling)</i>	<i>No. / Dwelling</i>	<i>Traffic Generation</i>
AM / PM Peak Hour	0.9	53	48
Daily	9	84	756

Acknowledging that the residential village component will be begin construction in one of the earlier stages of the subdivision, it is expected that the Development Plan lot triggers for the intersection / road works should be amended as per the below.

Table 21 Intersection/Road Upgrades – Amended Development Plan Requirements

<i>Proposed Upgrade</i>	<i>Lot Trigger</i>
Upgrade Ross Watt Road along site's frontage to urban standard	Built with abutting stage
Upgrade Swinburne Avenue along site's frontage to urban standard	Built with abutting stage
Upgrade Ross Watt Road / Swinburne Avenue intersection	Built with abutting stage
Upgrade Station Road / Cherry Lane intersection to interim arrangement	72 nd Subdivision Lot
Upgrade Cherry Lane to an urban standard road	557 th Subdivision Lot or Residential Village and 473 rd Subdivision Lot
Upgrade Station Road / Ross Watt Road intersection to interim arrangement	541 st Subdivision Lot Or Residential Village and 488 th Subdivision Lot

It must be noted that the above assumes that all dwellings within the residential village will be completed by the above lot triggers, however, it is expected that approximately 50% of the residential village dwellings will be constructed and therefore the traffic impact on the road network will be lower than the endorsed Development Plan.

8.7.2 Ultimate Upgrade

Whilst it is acknowledged that the interim intersections should be upgraded to their interim arrangement prior to the D.o.S exceeding 0.9 for a signalised intersection. It is expected that funding may not be available at this stage, with other infrastructure upgrades receiving priority over the duplication of Station Road.

Therefore, to determine the timing of the Station Road ultimate upgrade works, the interim signalised intersections will be assessed at when they reach a Degree of Saturation of 1.0 (when the theoretical capacity is exceeded).

Based on the above, it has been determined that the signalised intersections of Station Road / Cherry Lane and Station Road / Ross Watt Road / Morrow Road should be upgraded to its ultimate arrangement within 9 years.

The SIDRA results for the interim signalised intersection arrangement with 9 years of growth is provided below.

Table 22 SIDRA Post-Dev Conditions – Interim – Station Rd / Calder FWY Eastbound Ramp

Approach	Existing Conditions			9yr Growth		
	DoS	Avg Delay (sec)	Queue (m)	DoS	Avg Delay (sec)	Queue (m)
AM Peak						
Station Road - South	0.195	4.2	0	0.267	4.1	0
Station Road - North	0.304	4.3	10.6	0.348	4.7	11.0
Calder Freeway Off-ramp - West	0.163	10	4.5	0.267	9.3	7.9
PM Peak						
Station Road - South	0.163	4.1	0	0.218	4.0	0
Station Road - North	0.22	4.2	7.1	0.278	4.5	8.3
Calder Freeway Off-ramp - West	0.176	9.6	4.9	0.219	10.3	6.3

Table 23 SIDRA Post-Dev Conditions - Interim – Station Rd / Calder FWY W'Bnd Ramp

Approach	Existing Conditions			9yr Growth		
	DoS	Avg Delay (sec)	Queue (m)	DoS	Avg Delay (sec)	Queue (m)
AM Peak						
Station Road - South	0.252	3.8	8.6	0.385	4.1	13.0
Calder Freeway Off-ramp - East	0.132	10.1	3.9	0.178	10.6	26.1
Station Road - North	0.305	3.9	0	0.572	4.4	72.3
PM Peak						
Station Road - South	0.257	3.8	8.8	0.370	4.1	13.0
Calder Freeway Off-ramp - East	0.144	8.7	4.2	0.205	9.7	15.2
Station Road - North	0.258	3.9	0	0.537	4.4	21.4

Table 24 SIDRA Post-Development Conditions - Interim – Ross Watt Rd / Station Rd

Approach	Existing Conditions			9yr Growth		
	DoS	Avg Delay (sec)	Queue (m)	DoS	Avg Delay (sec)	Queue (m)
AM Peak						
Station Road - South	0.359	0.5	0	0.790	20.0	225.9
Morrow Road – East	N/A	N/A	N/A	0.345	47.4	15.5
Station Road – North	0.427	0.2	0.5	0.909	46.1	277.4
Ross Watt Road - West	0.131	18.5	2.7	0.814	69.8	87.1
PM Peak						
Station Road – South	0.398	0.6	0	0.678	4.8	125.8
Morrow Road – East	N/A	N/A	N/A	0.429	71.5	12.0
Station Road - North	0.419	0.2	0.4	0.882	17.5	277.4
Ross Watt Road - West	0.151	31	3.2	0.812	69.7	50.5

Table 25 SIDRA Post-Development Conditions - Interim – Station Rd / Cherry Lane

Approach	Existing Conditions			9yr Growth		
	DoS	Avg Delay (sec)	Queue (m)	DoS	Avg Delay (sec)	Queue (m)
AM Peak						
Station Road - South	0.332	0.3	0	0.921	40.2	365.7
Station Road - North	0.417	0.3	0.8	0.827	8.4	80.3
Cherry Lane - West	0.398	33.8	10.1	0.926	70.7	107.9
PM Peak						
Station Road - South	0.384	0.4	0	0.693	9.1	175.3
Station Road - North	0.384	0.5	1.6	0.620	4.8	121.7
Cherry Lane - West	0.391	36.9	9.5	0.676	63.4	52.5

As shown above, all intersections are able to accommodate traffic until the designated failure year. However, it must be acknowledged that the queues extend well past the Calder Freeway and therefore duplication of Station Road should occur earlier if possible.

9 RESPONSE TO COUNCIL COMMENTS

onemilegrid has reviewed the traffic engineering comments received by Macedon Ranges Shire Council. Table 26 provides a response to each of the issues raised.

Table 26 Response to Council Comments

Comment	Response
Council	
1. The staging and timing of the residential village regarding the Project Infrastructure Plan needs to account for the demand the village will contribute to the Station Road and Ross Watt Road Intersection (interim) and Station Road and Cherry Lane Intersection (Interim). It is acknowledged that Cherry Lane upgrade will occur prior to the residential village under the permit area 1 permit. The appropriate point for the Ross Watt Road intersection needs to account for the village's 221 dwellings which will be located on a single lot. Conditions in the concurrent permits for subdivision and the residential village will need to reflect this timing so the intersections are upgraded in the appropriate time. The Traffic Impact Assessment by One Mile Grid should outline this timing and demand so appropriate outlining in the PIP what the trigger will be.	The traffic generated by a residential village dwelling is significantly lower than a typical standard density lot as shown in various studies of traffic generation for this type of dwelling. A comparison of the traffic generation between a residential village and standard density lot is provided in Section 8.7.1.1, which also outlines the amended lot triggers if a residential village was to be delivered within the site.
Department of Transport and Planning	
1. The Head, TfV has reviewed the TIAR submitted and would like to present the following points for Council's consideration: From a planning perspective, the residential village is treated as a single combined lot rather than individual lots. Consequently, enforcing a lot-based trigger for the delivery of intersection treatments poses significant challenges and risks, including the potential for critical infrastructure to be delayed beyond the necessary timeframe.	As noted above, an updated traffic assessment has been included in in Section 8.7.1.1, which also outlines the amended lot triggers if a residential village was to be delivered within the site.
2. The upgrade of the intersection of Station Road / Cherry Lane to an interim arrangement i.e. signals will be delivered (at no cost to Head, Transport for Victoria) by the developer prior to the creation of the 72nd lot of the development.	Noted.
3. The upgrade of the intersection of Ross Watt Road / Station Road to an interim arrangement i.e. signals will be delivered by the developer (at no cost to Head, Transport for Victoria) prior to the creation of the 541st lot of the development. It is also proposed to realign the Ross Watt Road intersection to a 4-way signalised intersection arrangement with Ross Watt Road / Station Road /Morrow Road.	As noted above, an updated traffic assessment has been included in in Section 8.7.1.1, which also outlines the amended lot triggers if a residential village was to be delivered within the site.

4. Along with the review of the current Traffic Impact Assessment Report prepared by One Mile Grid dated 12/09/2024, It is noted that the Transport Impact Assessment Report prepared by One Mile Grid dated 28 March 2023 advises that the Development Plan should contribute 44.5% and 47.1% for the ultimate construction costs of the Station Road/ Ross Watt Road intersection and the Station Road/ Cherry Lane intersection respectively. As such the Head, Transport for Victoria requests that appropriate contributions should be made for the ultimate intersection scenarios.	The tribunal confirmed at the VCAT proceeding that the Development Plan is not required to contribute to the costs associated with the ultimate intersections along Station Road. As a result, no financial contributions will be made toward the construction of these intersections.
5. The additional traffic generated by the development must not adversely affect the operation of the Station Road/Calder Freeway interchange.	A significant amount of traffic modelling was undertaken as part of the planning process to determine the appropriate infrastructure along Station Road to accommodate the development of the site and future growth within the region. The traffic analysis for the agreed interim works along Station Road is provided in Section 8.6.2 which shows that the Calder Freeway interchange is expected to operate under excellent condition in the future. It is noted that the residential village component will not impact the previous findings.
6. Public Transport: Due to recent changes that have been made to the PT services in the locality, the TIAR should be updated to reflect these changes.	Section 3.5 has been updated to include the changes to the bus network in Gisborne which was incorporated in late 2024. It is noted that the previous bus network shown was accurate at the time of submission and the bus network in Gisborne is subject to future changes.

10 CONCLUSIONS

It is proposed to develop the subject site for the purposes of a residential subdivision comprising of approximately 800 standard density residential lots a Local Convenience Centre and a Childcare Centre. It is noted that the western portion of the site may be delivered as a residential village which will increase the total number of lots on-site.

Considering the analysis presented above, it is concluded that:

- The site is located within the Gisborne ODP, and is largely earmarked for residential land-uses;
- The site is able to gain access to Ross Watt Road via a unsignalised T-intersection;
- The design of the internal road network is generally in accordance with the Gisborne ODP and the requirements of Clause 56 of the Macedon Ranges Planning Scheme; and
- The development is expected to generate 7,200 vehicles per day which will be comfortably accommodated by the proposed external road network, and is less than what was previously modelled by Cardno;
- Cherry Lane should be upgraded to an urban standard prior to the delivery of the 557th lot of the subdivision or 473rd lot of the subdivision if a residential village is delivered on-site;
- The Station Road / Cherry Lane intersection should be upgraded to an interim arrangement prior to the delivery of the 72nd lot of the subdivision; and
- The Ross Watt Road / Station Road intersection should be upgraded to an interim arrangement prior to the delivery of the 541st lot of the subdivision or 488th lot of the subdivision if a residential village is delivered on-site.

Appendix A Concept Intersection Plans

Appendix B SIDRA Results