Traffic and Transport Assessment

Ash Road East Subdivision

V171945

Prepared for
Eastern Ash Pty Ltd

4 December 2018

Cardno
Shaping the Future

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1 Introduction

Cardno was retained by Eastern Ash Pty Ltd to undertake a traffic and transport assessment of the proposed rezoning at 73-155 Ash Road, Leopold and subdivision at 87-127 Ash Road, Leopold.

In the course of preparing this assessment, the subject site and its environs have been inspected, plans of the development (Drawing No. 0318-0036-30-D001, dated 16/11/2018) examined, and all relevant traffic and parking data collected and analysed.

2 Background and Existing Conditions

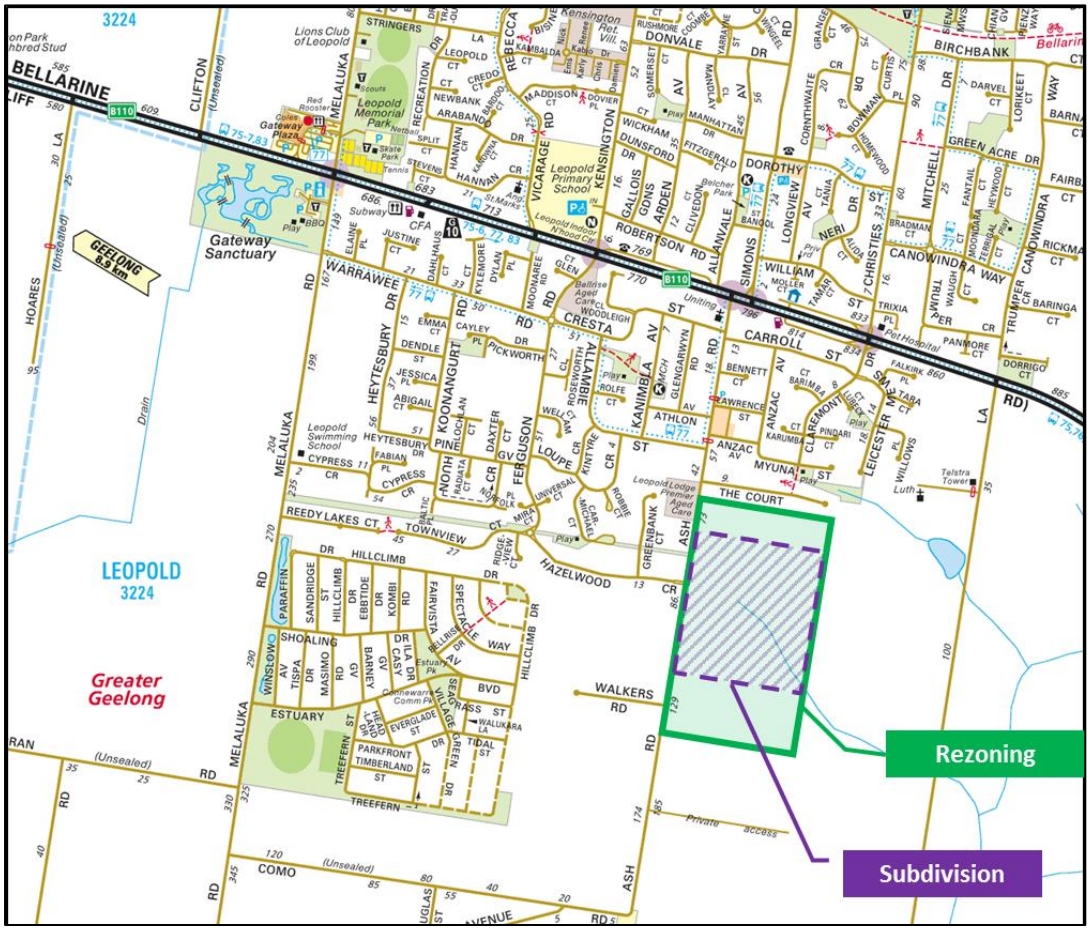
2.1 Location and Land Use

The subject site is located to the east of Ash Road, Leopold, with a rectangular land area of 16.5 hectares within the block shown in Figure 2-1. It is generally bounded by residential lots to the north, Ash Road to the west, Mollers Lane development to the east and farming land to the south. The frontage of the land to Ash Road is approximately 710m.

The site (Ash Road Development) and the adjoining land (Mollers Lane) to the east is currently identified as South East Leopold development area within the Leopold Structure Lane for rezoning to residential land.

The site is currently undeveloped, and was previously utilised for farming purposes. Land surrounding the site is generally residential to the north, with farming land to the east and south.

Figure 2-1 Site Location

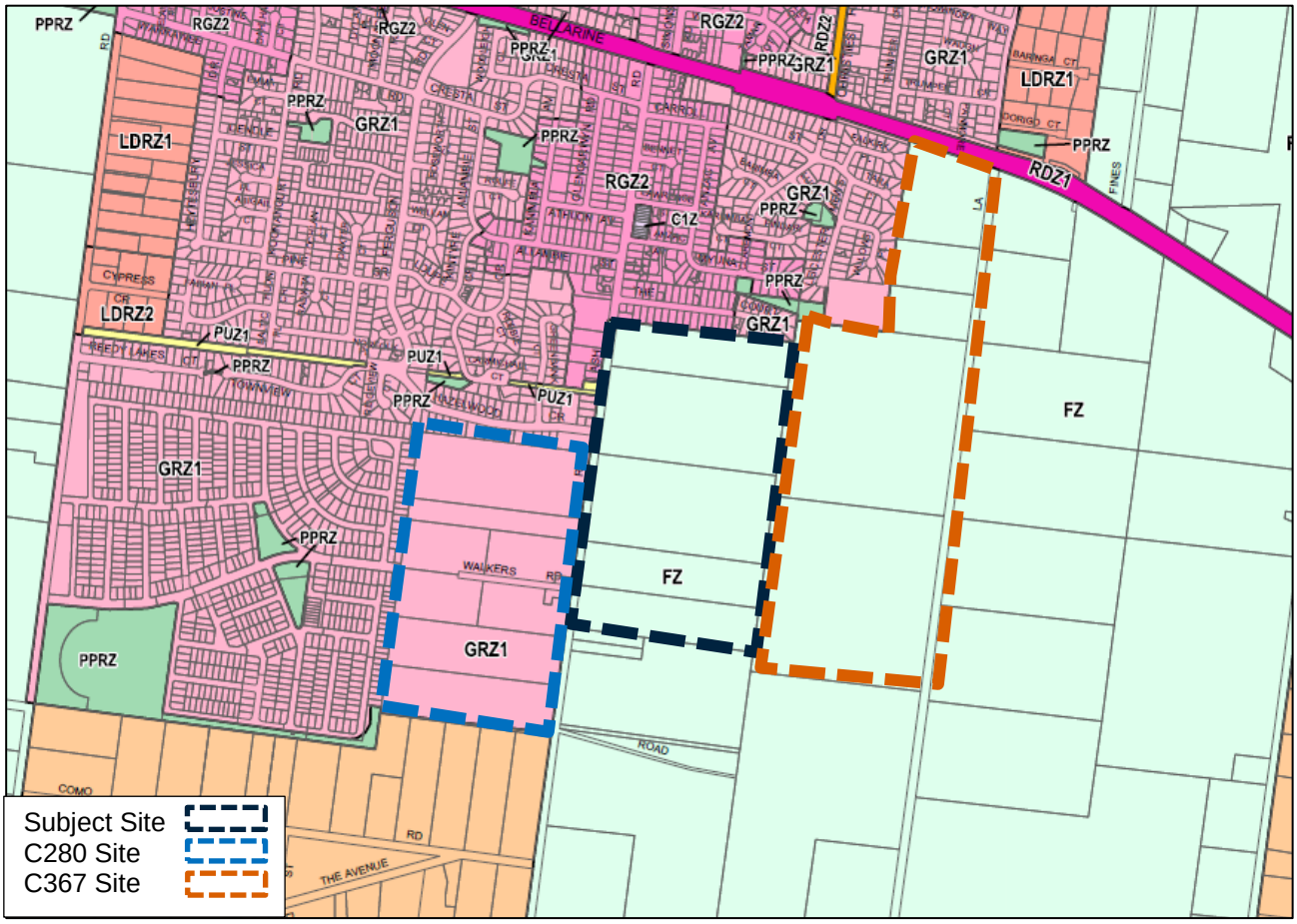


2.2 Planning Zones

Figure 2-2 demonstrates that the subject site is located within the Farming Zone (FZ). It is proposed to rezone this area into a General Residential Zone (GRZ).

West of the site is the DPO33 area which was formerly located within farming zone, but was rezoned to general residential under Amendment C280 in 2016. To the east of the site is the Mollers Lane development area, which is being reviewed in December 2018 by Planning Panels Victoria to also rezone the land to General Residential Zone under Amendment C367.

Figure 2-2 Planning Scheme Zones

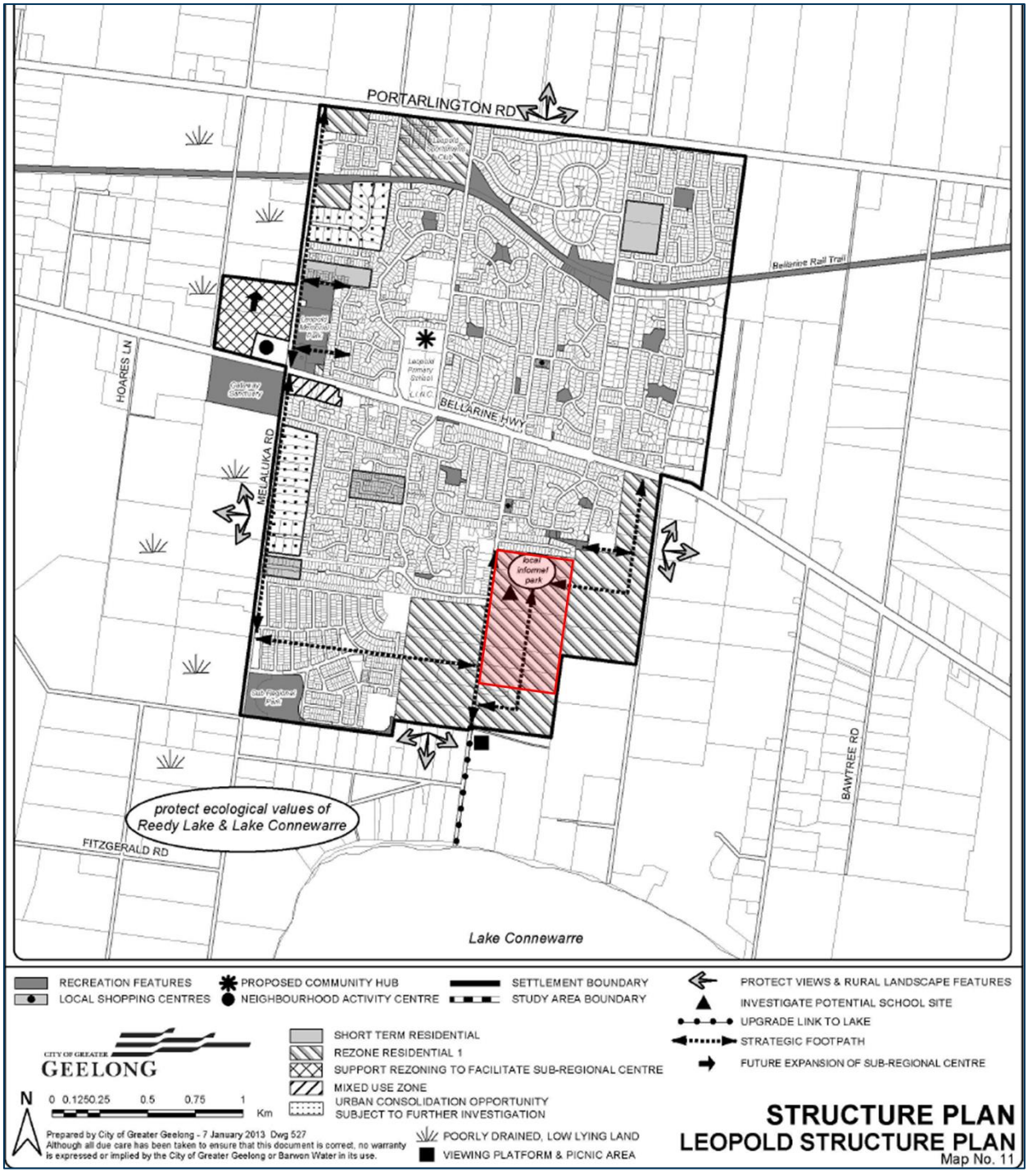


2.3 Leopold Structure Plan

The Leopold Structure Plan was adopted by the City of Greater Geelong in March 2006. It was reviewed in 2011 and was subject to Planning Scheme Amendment C254 and was re-adopted in 2013. Within the Structure Plan, the subject site is identified as a long term residential growth area, with land to the east also identified for long term residential development.

The location of the site within the Leopold Structure Plan area is shown in Figure 2-3.

Figure 2-3 Leopold Structure Plan Areas

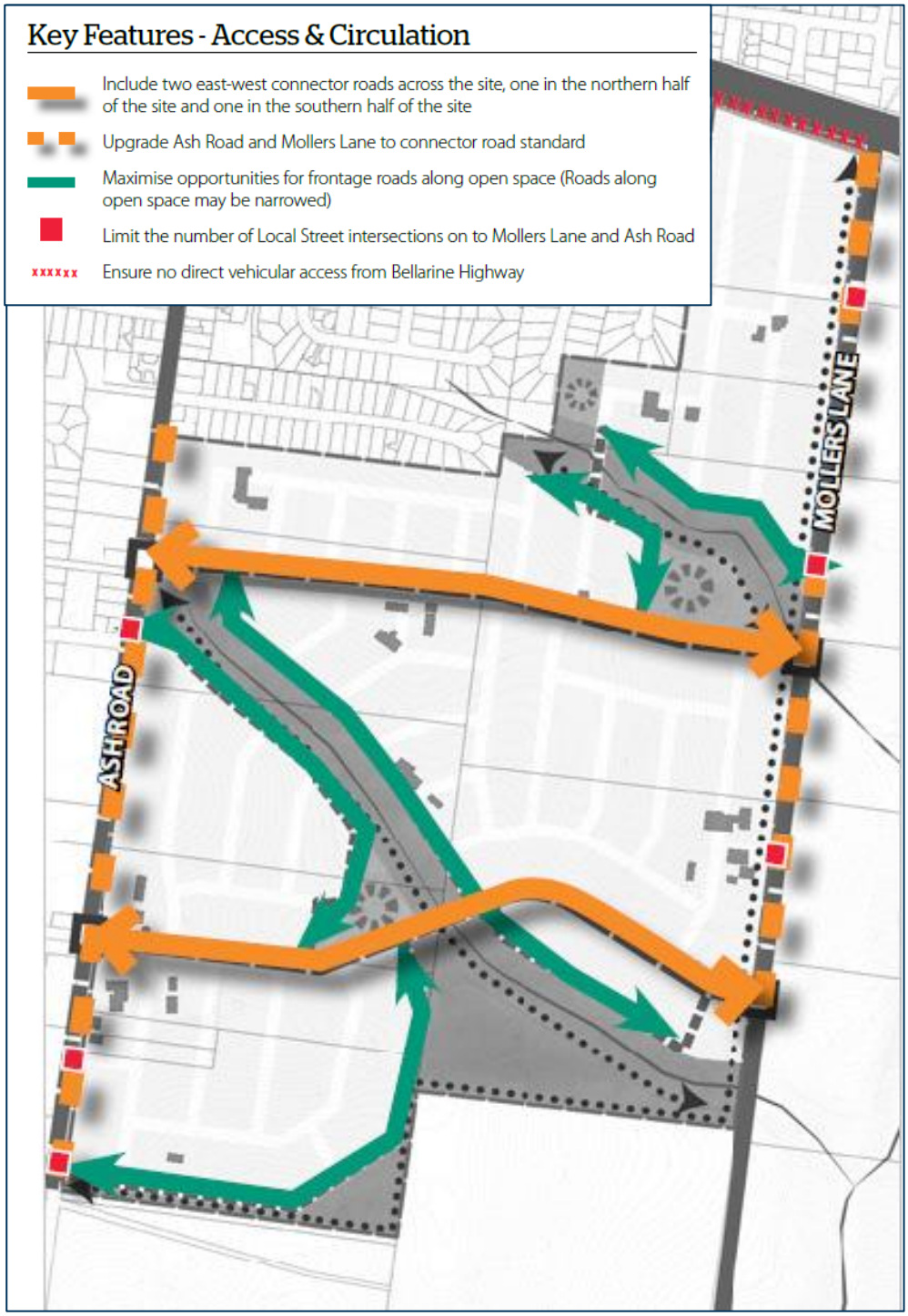


The South East Leopold Framework Plan (Tract, 2016) outlines a vision for the development of the site and neighbouring Mollers Lane development area, as shown in Figure 2-4.

The Framework Plan also identifies two local connector road links between Ash Road and Mollers Lane through the subject site via the continuation of internal road network, as well as the upgrade of Ash Road and Mollers Lane to Connector Road standards, as well as providing a series of local street intersections along Ash Road and Mollers Lane.

The plan also shows frontage roads along all open space interfaces.

Figure 2-4 South East Leopold Framework Plan – Access and Circulation



2.4 Road Network

2.4.1 Ash Road

Ash Road extends south from Bellarine Highway, to Como Road, with its intersection with Bellarine Highway controlled by traffic signals. The right turn from Bellarine Highway to Ash Road is fully controlled. The intersection layout is shown in Figure 2-5.

Figure 2-5 Bellarine Highway / Ash Road Intersection

The first 100 metres of Ash Road from Bellarine Highway provides a single traffic lane in each direction with a kerbside parallel parking lane on the eastern side of the road, as shown in Figure 2-6. The speed limit in this section of the road is 60 km/h with a localised speed reduction to 40 km/h in the vicinity of the strip shopping area. Between Cresta Street and The Court, the kerbside parallel parking lane extends on both sides of the road.

Figure 2-6 Ash Road – Northern Section (looking south)

North of Hazelwood Crescent, Ash Road is constructed with a single traffic lane in each direction, with a kerbside parallel parking lane on the western side of the road, clear of the traffic lanes, within a road reserve of 20 metres, as shown in Figure 2-7.

Figure 2-7 Ash Road – Middle Section (looking north)

South of Hazelwood Crescent, Ash Road is similar to the southern section of Melaluka Road with a single central lane of approximately 3.5-4 metres flanked by wide gravel shoulders as shown in Figure 2-8. The road reserve in this section is approximately 20 metres and the speed limit 70km/h. Vehicles travelling on this section of road are required to slow and use the gravel shoulders to pass.

Figure 2-8 Ash Road – Southern Section (looking north)

2.4.2 Bellarine Highway

Bellarine Highway through Leopold provides two through lanes and a bicycle lane in each direction separated by a narrow median, as shown in Figure 2-9. Signalised intersections (with pedestrian facilities) are provided at Melaluka Road, Kensington Road, Ash Road, and Christies Road further east. The prevailing speed limit is 70 km/h.

Figure 2-9 Bellarine Highway (looking northwest toward Ash Rd intersection)

2.4.3 Mollers Lane

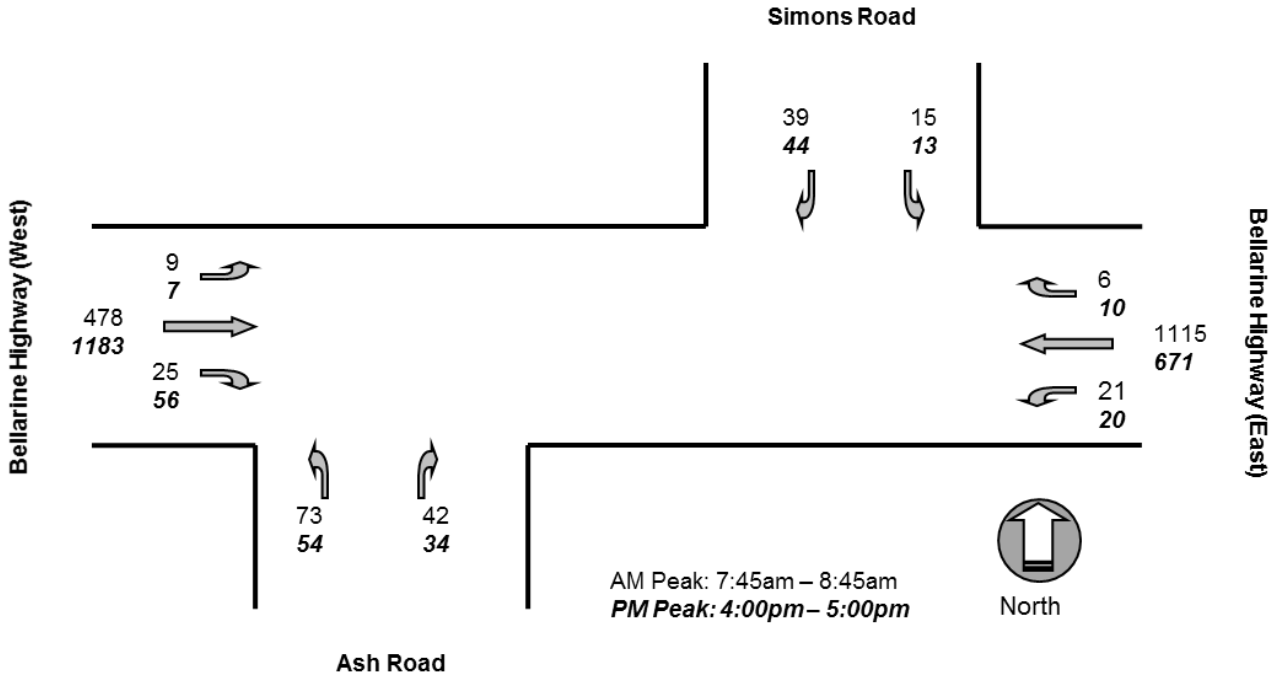
Mollers Lane extends south from Bellarine Highway to near Lake Connewarre. For approximately 100 m north of Mollers Lane, it is sealed with an approximately 5.8m carriageway in width and grassed verges on both sides. Mollers Lane can accommodate a single traffic lane in each direction and has an 80km/h speed limit posted near the Bellarine Highway. A T intersection controlled by 'Give Way" signage is formed at Bellarine Highway.

Figure 2-10 Mollers Lane (looking north towards Bellarine Highway)

2.5 Existing Traffic Volumes

Cardno sourced VicRoads SCATS data from the intersection of the Bellarine Highway and Ash Road for a week in May 2017. Peak intersection volumes are shown in Figure 2-11.

Figure 2-11 SCATS Traffic Volumes – Thursday, 11th May 2017



2.6 Sustainable Transport

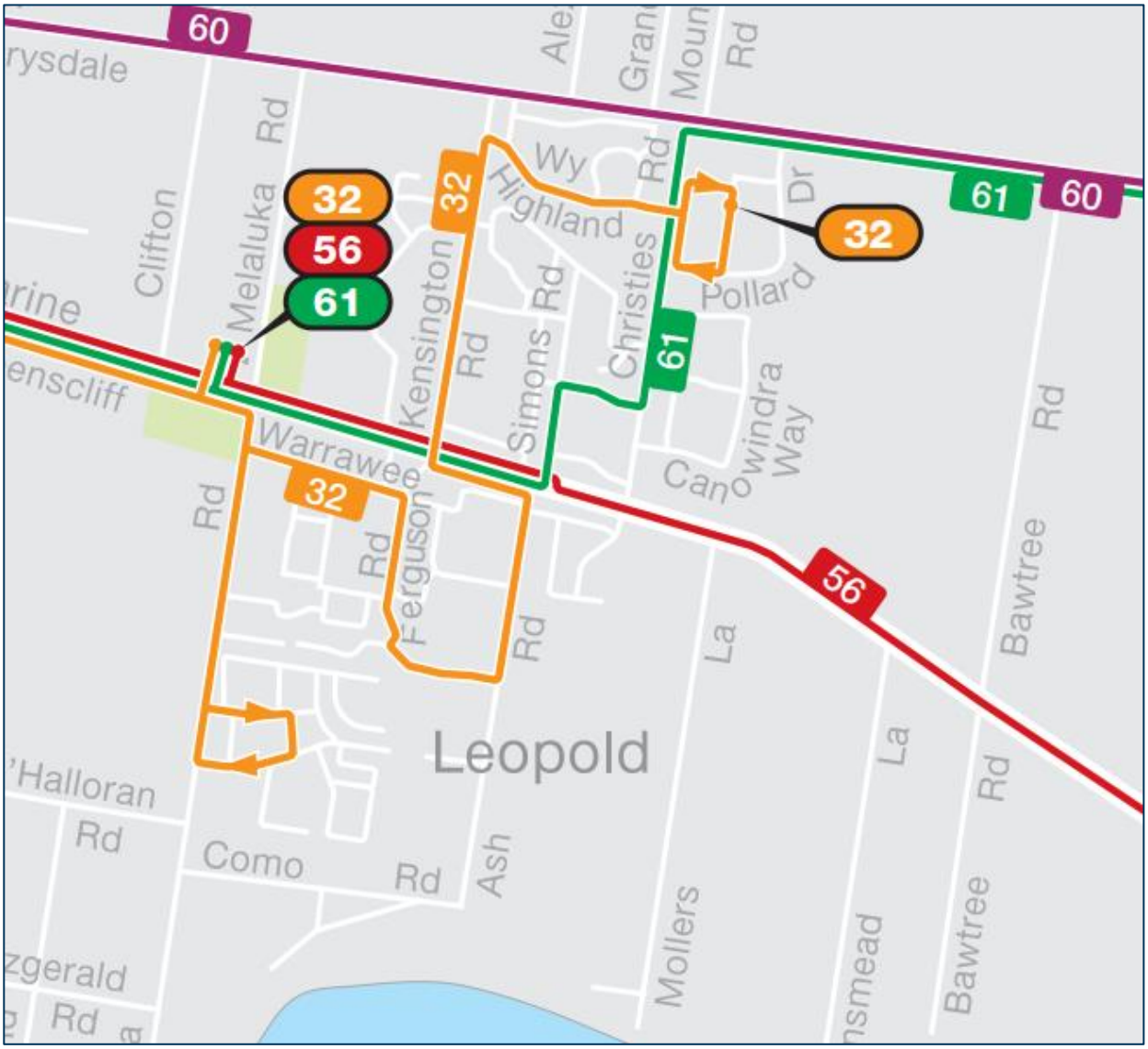
Public transport services in Leopold are limited to Bellarine Transit services bus routes, which generally operate along Bellarine Highway and Geelong-Portarlington Road, with some services extending into residential streets, as shown in Figure 2-12.

Route 32 operates between Geelong Station and Leopold and passes closest to the site, at the corner of Ash Road and The Court. Twenty-two (22) Leopold to Geelong services operate between 5:30 am and 9:00 pm weekdays, with services running with approximately 30-40 minutes interval. No services operate on weekends or Public Holidays.

Other routes that connect Geelong to Queenscliff and Ocean Grove pass through Leopold along Bellarine Highway, with the closest stop to the site at the corner of Ash Road and Bellarine Highway. There are approximately 12 such services each way on weekdays, 7 on Saturdays and 5 on Sundays.

Extension of the bus network to the south has been identified as necessary

Figure 2-12 Existing Leopold Bus Route Locations

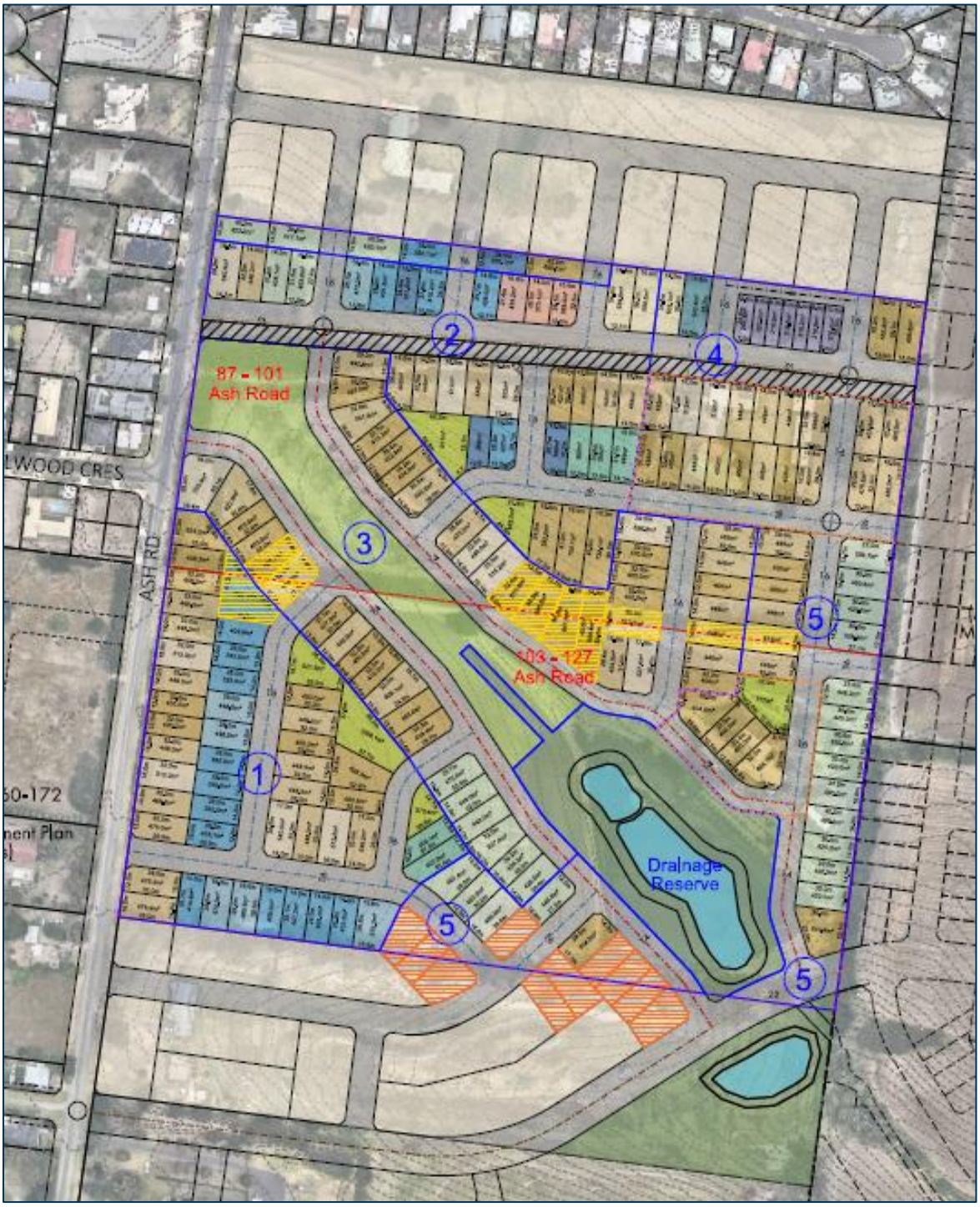


3 Proposed Development

3.1 General

Concept plans for the layout of the rezoning and subdivision areas of Ash Road development have been prepared by Tract (Drawing No. 0318-0036-30-D001, dated 16/11/2018). The proposal is to rezone the 73-155 Ash Road site (approximately 330 lots) to a General Residential Zone (GRZ) and redevelop the 87-127 Ash Road site for the purposes of a residential subdivision with a yield of approximately 196 lots. Figure 3-1 illustrates the proposed residential subdivision lot layout as well as the full rezoning area.

Figure 3-1 Proposed Residential Subdivision Layout



3.2 Vehicle and Pedestrian Access

Access to the proposed Ash Road East Development area is proposed to occur as follows:

- Across the frontage of the site, upgrade the existing section of Ash Road to urban standard inclusive of 2x3.0m traffic lanes and kerbside parking lanes as per the northern section of Ash Road.
- Five (5) new give way T-intersections to Ash Road on the western side of the Subdivision Plan, all offset at least 30m from other intersections.
- One (1) new cross intersection to Ash Road that continues providing access to the adjacent development area. The cross intersection is recommended to be controlled/defined by treatments such as roundabout, signage, linemarking, threshold treatments, etc.
- Five (5) internal east-west roads, connecting the Subdivision Plan area to the Mollers Lane development.

A pedestrian path is currently provided on the eastern side of Ash Road between Bellarine Highway and The Court. As such, it is proposed to extend the footpath along the site frontage to provide external pedestrian connectivity to the subject land as Ash Road is constructed.

A shared path is proposed within the site, which will accommodate pedestrians and cyclists within the residential subdivision. No separate bicycle facilities are required within the development as traffic volume on the street network will be relatively low and bicycle could be accommodated on street.

3.3 Internal Road Network

Conceptual drawings of the subdivision show that most properties will be accessed from the internal road network proposed. The internal roads are proposed to be constructed generally in accordance with Clause 56 of the Greater Geelong Planning Scheme. The construction of the connector roads is recommended to be designed to match in with the cross section of the continuation of these roads to the Mollers Lane development and C280 area. There is scope to provide additional access streets internally to the subdivision. It is recommended that any additional access streets are offset at least 30m from other intersections, and do not provide an access to Ash Road.

It is recommended to provide pedestrian and cyclist connections to the road connections.

3.4 Staging

It is proposed to construct the site in five stages, with Stages 2-4 being located in the northern section of the subdivision development area and Stages 1 and 5 being located in the southern section of the subdivision development area.

3.5 Public Transport

As development of the Leopold occurs, bus routes may need to be extended within the area to meet future demands of residents.

The existing Ash Road and Estuary Boulevard/Walkers Road routes could be supplemented and extended to include the Connector roads within the development area, with cross-sections accommodating a minimum carriageway width of 7.0 metres respectively, which would be suitable to accommodate bus routes. It is noted that if bus routes are extended by Public Transport Victoria (PTV) in the future, associated bus stops would also be subject to PTV approval.

4 Parking Considerations

4.1 Bicycle Parking Requirements – Clause 52.34

Clause 52.34 of the Greater Geelong Planning Scheme does not specify bicycle parking provision requirements for dwellings or townhouse style developments, generally assuming that bicycles can be stored in the garage required for each dwelling.

Within high density dwellings, in developments of four or more storeys, Clause 52.34 recommends a bicycle parking provision of 1 to each 5 dwellings for residents and 1 to each 10 dwellings for visitors.

4.2 Car Parking Requirements - Residents

With regard to residential development, Clause 52.06 of the Greater Geelong Planning Scheme requires two car spaces to be provided per dwelling, with at least one space covered.

All lots with three bedrooms or more should be provided with a minimum of two off-street spaces, including a mix of single garages with a second space in tandem arrangement, or double garages, in accordance with the requirements of the Planning Scheme.

For all one and two bedroom dwellings a single off-street space should be provided. The reduced parking supply is considered appropriate, due to the reduced parking demand for these smaller homes, the on-street parking provisions, and the accessibility of public transport in the vicinity of the site.

4.3 Car Parking Requirements - Visitors

With regard to the visitors, on-street parking is able to be accommodated along the street frontages of all access streets and connector streets.

Garage and crossover locations are to be rationalised and located to enable a high yield of parking spaces for visitors to supplement on site garages for residents.

Overall, the visitor parking supply on street is a minimum of 1 on-street space per dwelling.

5 Residential Subdivision Considerations

Table C1 in Section 56.06 of the Greater Geelong Planning Scheme details carriageway requirements for the different levels of local roads. It is of note that these road cross sections match the subdivision to the west of Ash Road (C280 area).

5.1 Access Street Level 2

The Access Streets are proposed to be provided with a minimum road reserve of 16.0 metres in width, which would accommodate a proposed cross-section allowing a carriageway width of 7.3 metres, a 1.5 metre wide footpath on either side of the road, and would accommodate kerbside parking on both sides of the carriageway.

The indicative capacity specified under Clause 56.06 of the Greater Geelong Planning Scheme is for 2,000-3,000 vehicles per day.

5.2 Access Street Level 2 – Adjacent Open Space

The Access Streets, adjacent open space, are proposed to be provided with a minimum road reserve of 14 metres in width, which would accommodate a proposed cross-section allowing a carriageway width of 7.3 metres, a 1.5 metre wide foot path within the road reserve and would accommodate kerbside parking along one side of the carriageway.

The indicative capacity specified under Clause 56.06 of the Greater Geelong Planning Scheme is for 2,000-3,000 vehicles per day.

5.3 Connector Street

Connector Streets are proposed to be provided with a minimum road reserve of 22 metres in width, which would accommodate a proposed cross-section allowing a carriageway width of 7.0 metres and a 2.5 metre wide shared path within the road reserve on both sides and would accommodate kerbside parking along both sides of the carriageway.

The indicative capacity specified under Clause 56.06 of the Greater Geelong Planning Scheme is for 3,000 - 7,000 vehicles per day.

5.4 Garbage and Emergency Vehicle Access

Garbage collection is expected to be undertaken from the kerbside areas of all Access Streets. Where a shared driveway is provided, a bin pad is proposed along the abutting Access Street so that garbage trucks will not have to enter and perform turning manoeuvre. All road carriageway widths meet or exceed the minimum Planning Scheme requirements and therefore are considered appropriate.

Provision for CFA vehicles has been allowed for within the road cross-sections adopted. The minimum carriageway widths required by the CFA is exceeded with the Access Level 2 street classification.

5.5 Residential Road Layout

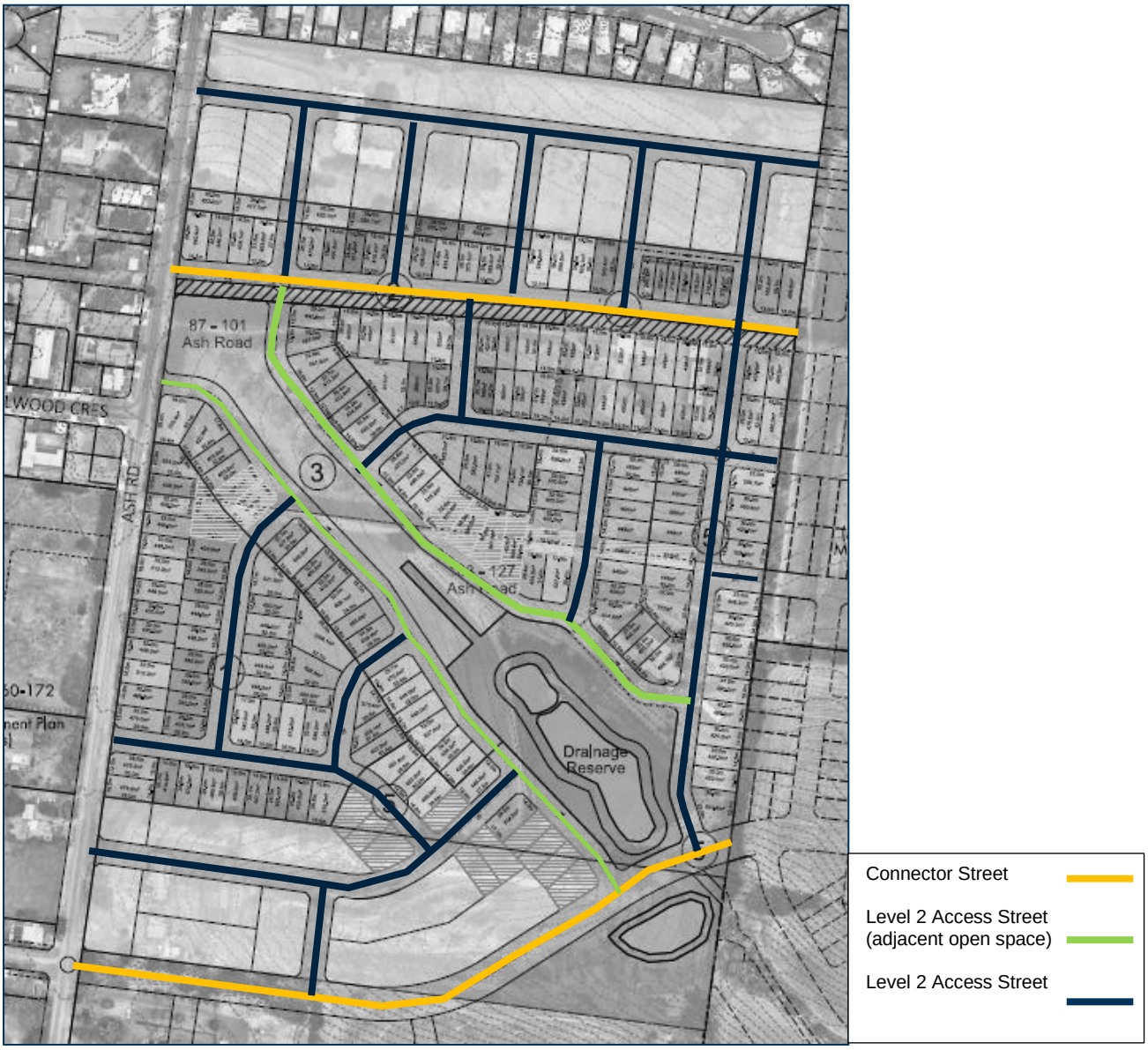
Details of the proposed internal hierarchy are shown in Table 5-1, with detailed road cross sections provided in Appendix A.

The proposed road network for the Development Plan is shown in Figure 5-1.

Table 5-1 Standard Cross-Sections

Type	Road Reserve	Indicative Capacity	Carriageway	Pedestrians
Connector Street	22.0m	3,000-7,000 vpd	7.0m	2.5m wide footpaths on both sides
Level 2 Access Street (Adjacent Open Space)	14.0m	2,000-3,000 vpd	7.3m	1 x 1.5m wide footpath within road reserve
Level 2 Access Street	16.0m	2,000-3,000 vpd	7.3m	2 x 1.5m wide footpath

Figure 5-1 Proposed Road Network



6 Internal Traffic Management

6.1 Entry Threshold Treatments and Slow Points

Local street intersections with higher order streets will be constructed with entry/threshold treatments or splitter islands to define the road hierarchy.

Where street lengths of local access streets exceed 200 metres, suitable mid-block slow points will be incorporated in the form of road narrowings. These narrowings will generally coincide with the open space connections. A minimum width of 3.5m is proposed at these points to allow one vehicle to proceed at a time.

Roundabouts are proposed at the four cross intersections within the subdivision, which will provide both a slow point as well as defined vehicular priority.

6.2 Road Design Speeds

All roads within the subdivision will have a posted speed limit of 50 kilometres per hour.

6.3 Signage and Line marking

Signage and line marking throughout the subdivision should be in accordance Vic Roads Traffic Engineering Manual Volume 2, with signage to be in accordance with the Australian Standard Manual of Uniform Traffic Control Devices, AS1742.

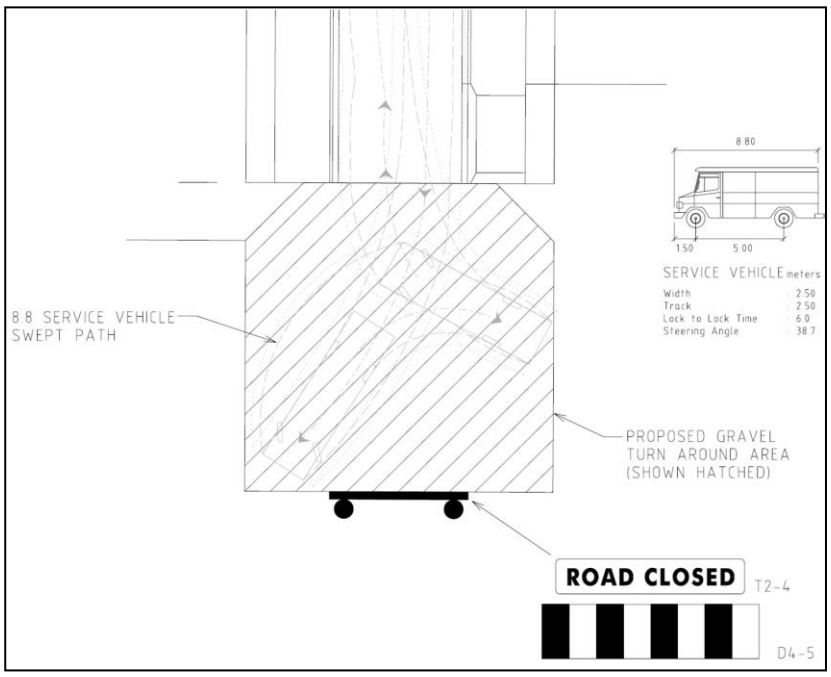
6.4 End of Stage Treatments

Where required, temporary end treatments will be installed at road discontinuations between stages. These end treatments will consist of a gravelled turn around area beyond the end of the road/street pavement with road closure signage installed at the far end of the end treatment.

End treatments will be of sufficient size to accommodate a 3 point turn manoeuvre of a medium rigid vehicle (i.e. a garbage truck / standard CFA tanker).

The proposed configuration of a typical end of stage end treatment is shown in Figure 6-1.

Figure 6-1 Temporary End of Stage Road End Treatment



7 Traffic Considerations

7.1 Traffic Generation

Guidance on traffic generation characteristics of residential developments is set out within the Victorian Code for Residential Developments, April 1992, which suggests in Table E9.1 that for:

"single dwelling lots apply traffic generation rates of 10 vehicles per day per lot, equivalent to approximately 1 vehicle per hour in the peak hour, unless a lower rate can be demonstrated. Lower rates can be applied to multi-unit dwellings based on locally derived rates."

To provide a robust assessment of the traffic impacts of the proposed rezoning and subdivision, the full 10 vehicles per lot has been adopted for all dwellings for the purposes of this report, noting that this is considered to be a conservatively high estimate.

It is generally accepted that for residential developments approximately 80% of trips are outbound and 20% inbound in the AM peak. Conversely in the PM peak, 60% are inbound and 40% are outbound.

The anticipated traffic volumes associated with the Development Plan and subdivision are summarised in Figure 7-1.

Table 7-1 Anticipated Traffic Volumes

Period	Traffic Generation Estimate (vehicle movements)		
	In	Out	Total
Subdivision			
AM Peak	39	157	196
PM Peak	117	79	196
Daily	980	980	1960
Rezoning			
AM Peak	66	264	330
PM Peak	132	198	330
Daily	1650	1650	3300

Further to this trip generation, the planned subdivisions to the east and west of the site need to be considered as part of the traffic analysis. It is understood that approximately 320 lots will be constructed in the Ash Road West area (C280) and the Mollers Lane Development will generate approximately 560 lots.

It is therefore expected an additional 5000vpd are likely to use Ash Road, inclusive of all growth area traffic.

7.2 Traffic Distribution

In consideration of the existing road network and in particular the locations of local schools, the Leopold and Geelong Townships and access to arterial roads, it is expected that traffic generated by the site will mainly utilise:

- Ash Road (or Melaluka Road, or Mollers Lane) and Bellarine Highway to access the Leopold Township and Geelong; and
- Ash Road or Mollers Lane and Bellarine Highway to access all other areas of the Bellarine Peninsula;

The distribution of vehicle movements is based on the location of surrounding employment centres, local and major shopping destinations, recreational destinations and schools and other education centres.

Only a small percentage of the work related trips will be to destinations within the Leopold Township, with the majority to Geelong and the remainder to the Bellarine Peninsula / Barwon Heads / Ocean Grove. With the

exception of Ash Road Shopping Centre, likely traffic destinations within Leopold, such as the schools and shops, typically front or are north of Bellarine Highway.

The majority of local and supermarket shopping trips will be to the Gateway Shopping Centre on the corner of Melaluka Road and Bellarine Highway. Other shopping trips will be made to the Ash Road Centre which includes a convenience supermarket, newsagents, bakery and a fish and chip shop. Other shopping trips for items such as household goods and clothing will primarily be to Geelong.

Recreational trips will likely be biased to Geelong. The majority of educational trips will be generated to and from Leopold or Geelong, with some trips also likely to Ocean Grove / Barwon Heads.

From the above, the following distribution of residential traffic to the surrounding area has been adopted.

- Geelong 55%
- Leopold 25%
- Bellarine Peninsula/ Ocean Grove / Barwon Heads 20%

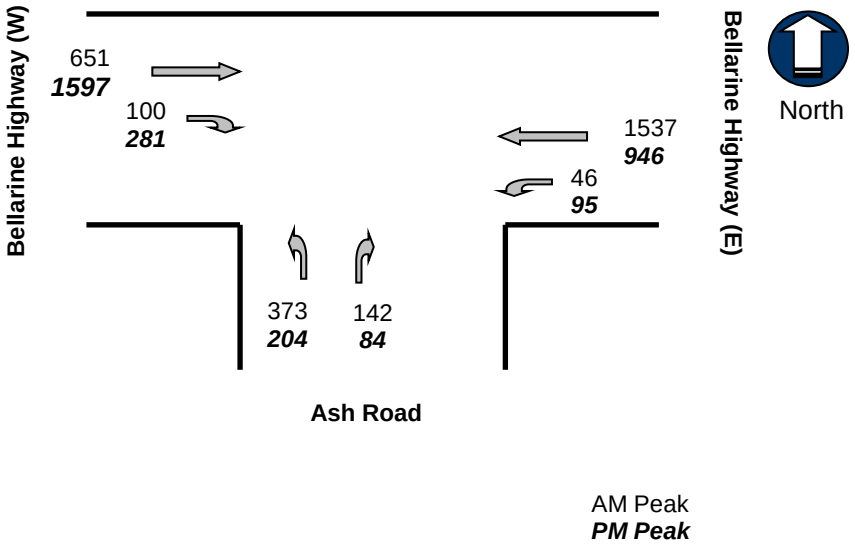
A high proportion (approximately 50%) of Ash Road West traffic would use Melaluka Road to access the Bellarine Highway, while the Mollers Lane Development site is more likely to utilise Mollers Lane to access the Bellarine Highway as noted in the expert evidence statement for C367. Given that Ash Road is located centrally within the Leopold Growth Area and will have residential development to the east and west, it is likely that traffic will utilise the quieter parallel north-south roads of Melaluka Road and Mollers Lane in preference to Ash Road if this road approaches capacity.

7.3 Generated Traffic Volumes

Considering the traffic generation rates and distributions detailed above, the proposed development is expected to result in the following additional traffic volumes to the surrounding road network.

Future traffic volumes for the Bellarine Highway are shown below in Figure 7-1 (note that no development to the east of this Ash Road development area been considered in these estimates). A cumulative growth factor of 3% has been adopted for through traffic on the Bellarine Highway.

Figure 7-1 Development Plan Traffic Volumes – Bellarine Highway / Ash Road / Simons Road



7.4 Traffic Impact Assessment

7.4.1 Ash Road

Traffic volumes on Ash Road are estimated to be in the order of 7,000-8,000 vehicles per day after development of the entire area covered by the Leopold Structure Plan. The cross section of Ash Road has therefore been designed to accommodate traffic volumes greater than what the development of the subject site will generate, and therefore is anticipated to operate adequately after the subdivision of the land north of Ash Road Development area.

7.4.2 Bellarine Highway/ Ash Road Intersection Performance

To determine the impact of the additional traffic generated by the Development Plan on the road network, SIDRA Intersection analyses have been undertaken for the Bellarine Highway/ Ash Road intersection. SIDRA Intersection is a computer package, originally developed by the Australian Road Research Board, provides information about the capacity of an intersection in terms of a range of parameters, as described below:

Degree of Saturation (D.O.S.) is the ratio of the volume of traffic observed making a particular movement compared to the maximum capacity for that movement. Various values of degree of saturation and their rating are shown in Table 7-2:

Table 7-2 Rating of Degrees of Saturation

D.O.S.	Rating
Up to 0.6	Excellent
0.6 to 0.7	Very Good
0.7 to 0.8	Good
0.8 to 0.9	Fair
0.9 to 1.0	Poor
Above 1.0	Very Poor
D.O.S.	Rating

It is considered acceptable for some critical movements in an intersection to operate in the range of 0.9 to 1.0 during the high peak periods, reflecting actual conditions in a significant proportion of suburban signalised intersections.

The ***95th Percentile (95%ile) Queue*** represents the maximum queue length, in metres, that can be expected not to be exceeded during 95% of observed maximum queue lengths in the peak hour; and

Average Delay is the delay time, in seconds, which can be expected over all vehicles making a particular movement in the peak hour.

It is noted that there is an offset northern leg of the intersection at Simons Road, which adds complexity to the intersection modelling. However, due to the signal phasing and low traffic volumes, this has little impact on the Sidra analysis of the intersection (as the right turning movements run from Ash Road and Simons Road at the same time). This leg has therefore been deleted from the model.

The results of the SIDRA Intersection analysis are summarised in Table 7-3 .

Table 7-3 SIDRA Intersection Analysis Summary

	Approach	Degree of Saturation	95th%ile Queue	Average Delay
AM Peak	Ash Road	0.751	151.9 m	47.6 sec
	Bellarine Highway (East)	0.771	208.9 m	14.1 sec
	Bellarine Highway (West)	0.694	48.2 m	17.6 sec
PM Peak	Ash Road	0.307	62.3 m	37.2 sec
	Bellarine Highway (East)	0.570	125.9 m	18 sec
	Bellarine Highway (West)	1.014	586.2 m	82.1 sec

The results of the analysis show that the intersection will operate well within capacity during the morning peak period and will experience traffic delay on Bellarine Highway - west to south right turn, during afternoon commuter peak periods. The queues on the Bellarine Highway that are observed in the above results are mostly attributable to the network growth that has been adopted for this analysis.

It is of note that the traffic generation rate of 10 movements per dwelling is considered conservatively high, and that at full development of Leopold South East, there will be parallel signalised intersections at Bellarine Highway / Melaluka Road and Bellarine Highway / Mollers Lane, which will redistribute traffic to the three intersections and create an equilibrium in terms of traffic delays and queues.

8 Road Network Considerations

Having regard to the expected traffic volumes and road functions, the following road works are recommended:

8.1 External

As outlined in the previous section, the Ash Road East Development is expected to cause significant operational impact on the signalised intersection at Ash Road.

8.1.1 Bellarine Highway/Ash Road Intersection

As part of the delivery of the overall Ash Road West site, it is proposed that the right turn lane on the western approach of the Bellarine Highway / Ash Road intersection will be extended.

Negotiations with VicRoads to this effect were previously undertaken in conjunction with the preparation of the Ash Road West Outline Development Plan. No other intersection improvements are considered available due to the property boundaries and road alignment.

Ash Road East development will add additional traffic and may require further lengthening of the right

8.1.2 Ash Road

It is recommended that the through traffic lanes on Ash Road are supplemented on the developed side of the road with kerb and channel, as well as a footpath.

A parking lane is also recommended on the eastern side of the carriageway. It is noted that the drainage, parking and footpath works would be undertaken by the developer for the eastern side of the road only as the western side in already proposed to be undertaken by the Ash Road West development.

8.1.3 Walkers Road Roundabout

As mentioned previously, it is proposed to provide a connector road on the southern side of the development which is connected to the intersection of Walkers Road and Ash Road and continues providing access to the Ash Road West Development area via Walkers Road. Therefore, it is recommended that the cross intersection is to be controlled/defined by treatments such as roundabout, signage, linemarking, threshold treatments, etc in order to ensure pedestrian and traffic safety at this intersection.

8.2 Internal

The internal road network is designed in accordance with Clause 56.06 of the City of Greater Geelong Planning Scheme, with cross sections generally designed as Level 2 Access Street, other than the roads that continues providing access to the Mollers Lane Development area and Walkers Road.

The cross section for these roads are identical to the cross section approved for the Walkers Road and the Mollers Lane Development area.

Anticipated road cross sections, commensurate with the Greater Geelong Planning scheme and the neighbouring subdivision to the west, are shown in Appendix A.

Treatments such as midblock slow points should be incorporated into the road design at the cross intersections to ensure that vehicle speeds are maintained at appropriate levels on these roads.

No separate bicycle facilities are required within the development as traffic volumes on the street network will be relatively low and bicycles could be accommodated on street.

9 Conclusions

The Ash Road East Development area is expected to be developed for the purposes of approximately 330 residential lots. Additionally, a Planning Permit is sought for the subdivision area of the development which will see the construction of approximately 196 lots.

Based on the preceding analysis it is concluded that:

> The site proposes six (6) new development access roads from Ash Road with five (5) new T intersections and one new cross intersection (roundabout)

> The internal site layout is designed in accordance with the requirement of Clause 56 of the Greater Geelong Planning Scheme and the standards applied to the adjoining development site.

> The rezoning and subdivision will result in the extension of the right turn on the western approach of the intersection of Bellarine Highway / Ash Road to accommodate additional right turn manoeuvres.

> The rezoning and subdivision will result in the urbanisation of the eastern side of Ash Road along its frontage.

> The rezoning and subdivision provides for public transport, cyclist and pedestrian connectivity, as appropriate.

> The subject site will generate approximately 3,300 vehicle movements per day, with the majority of residential traffic generated by the development will be to/from Geelong, with the remainder to Leopold and the Bellarine Peninsula.

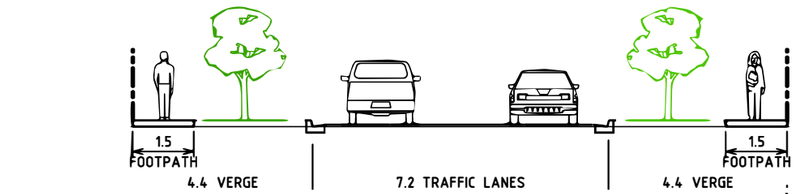
> It is expected that traffic volumes on Ash Road will increase by approximately 5,000 vehicle movements per day post development, inclusive of volumes from Mollers Lane and Ash Road West Development area.

> The impact of the expected traffic volumes on the intersection of Bellarine Highway and Ash Road has been analysed using SIDRA. The results of the analysis show that the intersection will operate well within capacity during the morning peak period but will experience traffic delays on Bellarine Highway for right turners, during afternoon commuter peak periods. It is recommended to extend the right turn lane on the western approach of the Bellarine Highway / Ash Road intersection to VicRoads satisfaction, and consider the parallel north-south routes at Melaluka Road and Mollers Lane as part of the consideration.

Ash Road East Subdivision

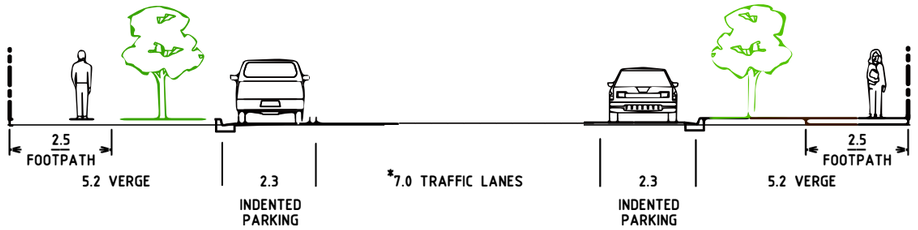
APPENDIX A

INTERNAL CROSS SECTION



16.0 ROAD RESERVE

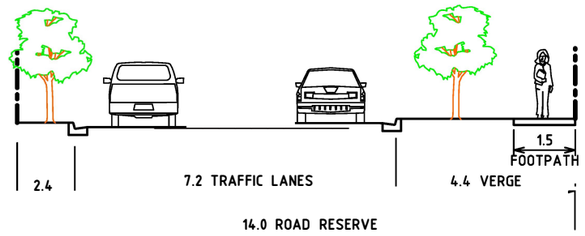
ACCESS STREET
16m ROAD RESERVE



22.0 ROAD RESERVE

CONNECTOR STREET WITH INDENTED PARKING
22m ROAD RESERVE

* FLARED TO 8.0m AT ROUNDABOUT AND PARKING REMOVED



14.0 ROAD RESERVE

ACCESS STREET
14m ROAD RESERVE

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ROAD CROSS SECTIONS

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1