

Amendment C369 to the Greater Geelong Planning Scheme: Drysdale Bypass

Planning Panels Victoria

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Prepared For: VicRoads
Instructed By: HWL Ebsworth Lawyers

STATEMENT TO PLANNING PANELS VICTORIA BY HENRY TURNBULL, TRAFFIC ENGINEER

Traffic Engineering Assessment

Amendment C369 to the Greater Geelong Planning Scheme

Drysdale Bypass

Document Control

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1 Executive Summary

1.1 Introduction

I have been retained by HWL Ebsworth Lawyers on behalf of VicRoads in June 2017 to undertake traffic engineering assessments and prepare traffic evidence in relation to Amendment C369 to the Greater Geelong Planning Scheme, to implement a bypass around the Drysdale Township, between Jetty Road and Whitcombes Road.

I've also been engaged to assess and respond to the submissions in relation to this matter.

In preparing this report, I have relied upon the facts, matters and assumptions detailed in Appendix A.

1.2 Qualifications and Experience

Appendix A contains a statement setting out my qualifications and experience, and the other matters raised by "Planning Panels Victoria – Planning Panels – Expert Evidence".

Appendix B contains my CV.

1.3 Summary of Opinions

Having inspected the site, perused relevant documents and plans and undertaken traffic engineering assessments, I am of the opinion that:

- a) the bypass project as conceived is an appropriate response to the need to provide a bypass for Drysdale,
- b) the proposed intersection treatments, including signalised intersections at High Street/Bypass/Grubb Road/Portarlinton Road and at Reserve Road/High Street are acceptable treatments and will continue to function efficiently even under predicted 2046 traffic volumes,
- c) the design should be modified to provide for earthworks and an allowance in the future for four traffic lanes beyond Murradoc Road,
- d) the underpass connecting from the northern end of Peninsula Drive to Anderson Street should not be a road underpass as it does not provide suitable road access to the town at this location, however, to work well, the following should be considered as part of the design:
 - i) the underpass should be at-grade and wide (in the order of 5 – 6 metres), providing for a separate pedestrian walkway (say 2 metres) and two-way cycle lanes,
 - ii) the underpass should link in well with pedestrian/cycle connections to the town centre,
- e) what is currently shown in terms of drop-off/pick-up arrangements for the school precinct on the northern side of the bypass (including approximately 20 parallel parking bays with vehicles required to continue for over 300 metres past the last space to the court bowl to turn around) is not sufficient,

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- f) the footpath on the south side of Andersons Road is appropriately located, however, in order for the northern drop-off proposal and underpass to have the best chance of functioning well, the following is recommended:
 - i) additional car parking should be provided to cater for pick-up time, when parents typically arrive before school finishes and park for longer periods (particularly for primary school aged children),
 - ii) better provision should be made for vehicles undertaking U-turns, and
 - iii) the unsealed road access to this area is not particularly compatible with frequent use as a school pick-up/drop-off area, and sealing of the access roads (connecting between Andersons Road and Princess Street in particular) should be considered to support the drop-off and underpass, and
- g) the planned Peninsula Drive-Belchers Road connection is an important link to support the schools and sports precinct and should be given high priority, but the need for the link is not attributable to the bypass project.

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2 Amendment C369

Amendment C369 to the Greater Geelong Planning Scheme applies to land within the City of Greater Geelong, and more specifically affects land east of Jetty Road from the intersection at Portarlington Road and Grubb Road, to the intersection at Whitcombes Road and Portarlington Road. The project extends for a distance of approximately 5.9km.

The Amendment amends the existing Public Acquisition Overlay (PAO) – Schedule 3 to include portions of land between Jetty Road and Whitcombes Road and introduces the Drysdale Bypass, April 2017 as an incorporated document within the Greater Geelong Planning Scheme.

The amendment proposes to:

- *Amend the existing PAO3 for the land reserved for the Drysdale Bypass by amending the following planning maps in the Greater Geelong Planning Scheme:*
 - 59PAO
 - 60PAO
- *Amend Clause 21.14-2 to include an additional strategy under ‘Drysdale/Clifton Springs’.*
- *Amend the Schedule to Clause 52.03 to include reference to a new incorporated document titled Drysdale Bypass – April 2017 to exempt use and development associated with the project from the need for a planning permit.*
- *Amend the Schedule to Clause 52.17 to include reference to the Drysdale Bypass project.*
- *Amend Clause 81.01 to introduce the incorporated documented titled Drysdale Bypass – April 2017 into the Planning Scheme.*

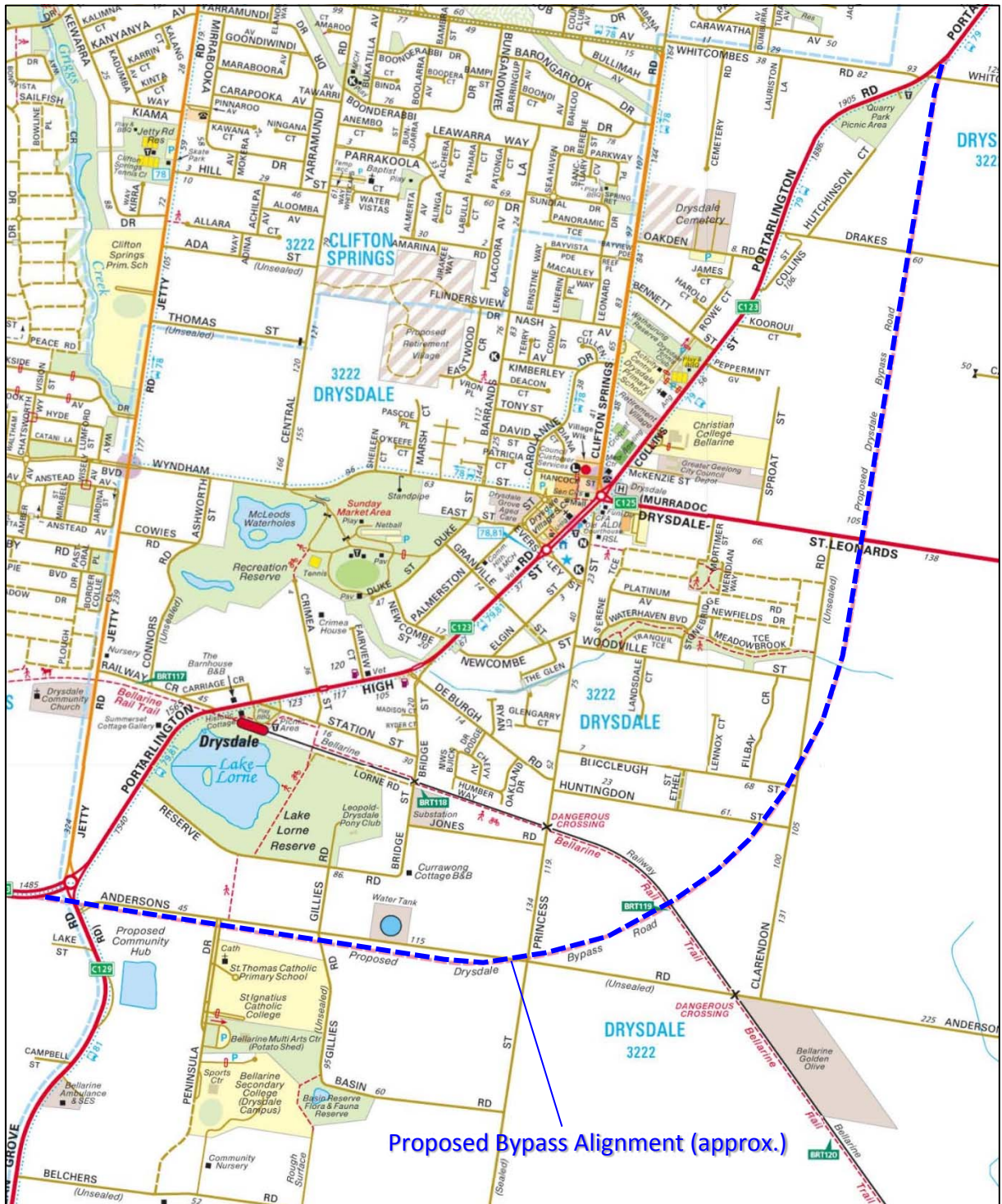
The land proposed to be included in the PAO3 is shown in the maps attached at Appendix C.

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3 Existing Conditions

3.1 Subject Site

The bypass alignment proposed by Amendment C369 is generally shown in Figure 1 below.



Proposed Bypass Alignment (approx.)

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Figure 1: Locality Plan

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A plan showing alignment details is attached at Appendix D.

An aerial view of the start of the proposed bypass, in the vicinity of the school precinct is shown in Figure 2 below.

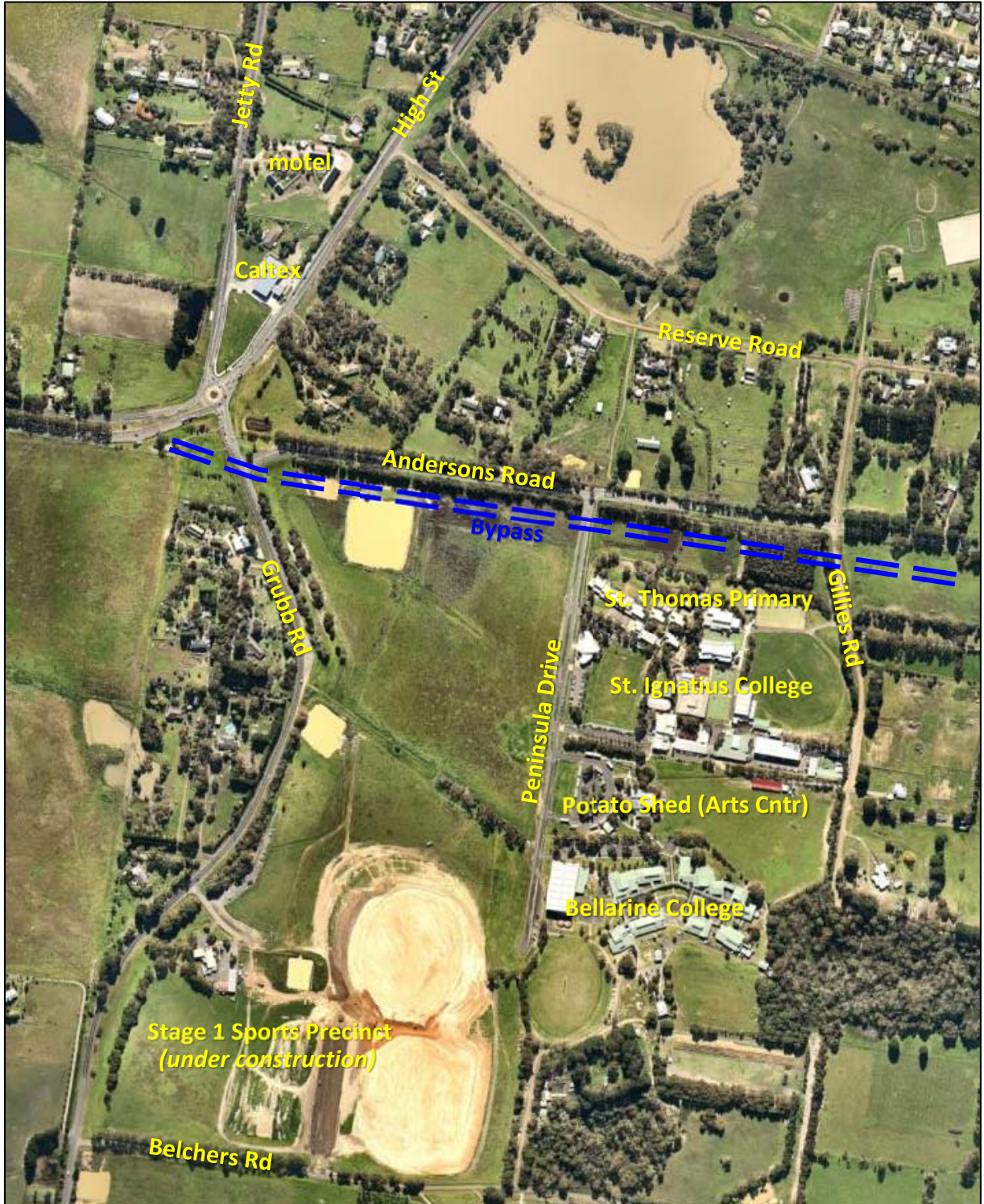


Figure 2: Aerial View

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3.2 Land Use

Land is to be acquired from approximately 47 properties (approximately 51 land parcels), which includes properties owned by the government and private organisations.

A total of 22 private properties would be subject to partial or full acquisition for the Bypass alignment. The majority of the 22 private properties are zoned Rural Living Zone (RLZ), Low Density Residential Zone (LDRZ) or Farming Zone (FZ). The majority of land uses along the Bypass alignment consist of low density residential land, vacant lots or small rural allotments. Other land uses include:

- St Ignatius College and Bellarine Secondary College,
- Proposed Drysdale Clifton Springs Sports Precinct, and
- Bellarine Rail Trail.

Other nearby uses potentially impacted by road closures include those on the southern part of Jetty Road, including a motel (323 on Jetty) and Caltex.

3.3 Road Network

High Street

High Street (Portarlington Road) is an arterial road (Road Zone Category 1) under the control of VicRoads, and currently provides the primary route through the centre of Drysdale, as well as providing the arterial connection to Portarlington, Indented Head and St. Leonards.

Jetty Road

Jetty Road is classified as a “Category 4 Main Distributor Urban” on Council’s Public Road Register, and currently extends approximately 3.1km in a north-south direction between Bay Shore Avenue and the Portarlington Road/Grubb Road roundabout-controlled intersection.

Grubb Road

Grubb Road (Drysdale – Ocean Grove Road) is an arterial road (Road Zone Category 1) under the control of VicRoads, and extends approximately 8.2km in a north-south direction between Portarlington Road and Ocean Grove.

Reserve Road

Reserve Road is classified as a “Category 2 Local Road Rural” on Council’s Public Road Register, and extends approximately 1km generally in an east-west direction between Bridge Street and High Street. It is configured with a nominal 6 metre wide gravel carriageway within a 20 metre road reservation.

Andersons Road

Andersons Road is classified as a “Category 3 Collector Road Rural” on Council’s Public Road Register and extends approximately 9.6km east from Grubb Road to Swan Bay. In the vicinity of the bypass, Andersons Road comprises a 6.1 metre sealed carriageway with gravel shoulders on both sides, within a 21 metre (approx.) reservation.

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Figure 3: Andersons Road Looking East Towards Peninsula Drive

Peninsula Drive

Peninsula Drive is classified as a “Category 2 Local Access Urban” on Council’s Public Road Register and currently extends approximately 650 metres south from Andersons Road, terminating at a temporary dead-end. Ultimately, it is planned that Peninsula Drive will connect through to Belchers Road to the south¹. The configuration of Peninsula Drive varies along its length, with the northern half having a divided carriageway generally carrying one traffic lane in each direction, splaying to two egress lanes at its intersection with Andersons Road and two dedicated U-turn opportunities provided. The southern end is undivided, with a service lane arrangement providing angled parking in front of Bellarine Secondary College.



Figure 4: Peninsula Drive Looking South Towards U-Turn Opportunity

¹ Drysdale – Clifton Springs Sports Precinct Master Plan 2011

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Gillies Road

Gillies Road is classified as a “Category 2 Local Road Rural” on Council’s Public Road Register and extends approximately 500 metres in a north-south direction between Andersons Road and Basin Road. It is configured with a varying width gravel carriageway which provides simultaneous two-way traffic flow at its northern end and narrows to approximately 4 metres at its southern end where it takes a 90-degree bend and becomes Basin Road. The proposed bypass alignment includes a left-in/left-out access point to Gillies Road. A northern extension of Gillies Road extends from Andersons Road north to Lake Lorne Reserve and Leopold-Drysdale Pony Club, and will continue to operate as a local connection (with no access to the bypass).



Figure 5: Gillies Road Looking South at the Drysdale Bypass Location



Figure 6: Gillies Road Looking South at the Southern End Towards Basin Road

Basin Road

Basin Road is classified as a as a “Category 2 Local Road Rural” on Council’s Public Road Register and extends approximately 650 metres in an east-west direction, with the western end being a continuation of Gillies Road, and the eastern end terminating at a T-intersection with Princess Street.

Basin Road has a varying width gravel carriageway which in parts does not allow for passing, and has “blind spots” (corners and crests) and vegetation very close to the road.



Figure 7: Basin Road Looking East

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Princess Street

Princess Street is classified as a “Category 3 Secondary Distributor” on Council’s Public Road Register and extends approximately 4.8km in a north-south direction. The northern end terminates at a dead-end immediately south of High Street, and the southern end intersects Swan Bay Road at a T-intersection.

In the vicinity of the Drysdale Bypass alignment, Princess Street is configured with a sealed carriageway carrying one traffic lane in each direction within a 20 metre (approx.) reservation.

The proposed bypass alignment includes a roundabout-controlled intersection providing access to both the northern and southern legs of Princess Street, as well as providing “access restoration” for the eastern leg of Andersons Road.

Huntingdon Street

Huntingdon Street is classified as a “Category 2 Local Access Urban” on Council’s Public Road Register and extends approximately 800 metres in an east-west direction between Clarendon Road and Princess Street. It is configured with a 6.5 metre wide (approx.) gravel carriageway within a 20 metre road reservation.

The proposed bypass alignment terminates Huntingdon Street east of No.57 and constructs a T-head turning treatment. The eastern end (connecting to Clarendon Road) will be closed.



Figure 8: Huntingdon Street Looking East Towards the Bypass Alignment

Bucclough Street

Bucclough Street is classified as a “Category 2 Local Access Urban” on Council’s Public Road Register and extends approximately 800 metres in an east-west direction between Clarendon Road and Princess Street. Bucclough Street is generally configured with a 5.5 metre wide sealed carriageway within a 20 metre road reservation.

The proposed bypass alignment bisects the eastern end of Bucclough Street, and it is proposed to terminate the road at Filbay Crescent, forming a 90-degree bend at the current intersection, as well as providing a driveway extension to provide access to the existing driveway of No.2 Filbay Crescent.

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Figure 9: Buccleugh Street Looking West Towards Filbay Crescent

Clarendon Road

Clarendon Road is classified as a “Category 2 Local Access Urban” on Council’s Public Road Register and extends approximately 1.6km in a north-south direction between Drysdale-St.Leonards Road and Andersons Road. Clarendon Street is nominally configured with a 5.5 metre wide gravel carriageway within a narrow (approx. 10 – 11 metre) road reservation.

The proposed bypass alignment will result in Clarendon Road being truncated in two sections, with the southern section terminating in the vicinity of Buccleugh Street and the northern section terminating to the south of Woodville Street.

Drysdale-St Leonards Road

Drysdale-St Leonards Road (Murradoc Road) is an arterial road (Road Zone Category 1) under the control of VicRoads, and extends approximately 13.4km from the roundabout-controlled intersection of High Street/Clifton Springs Road in the Drysdale town centre to St. Leonards.

In the vicinity of the proposed bypass alignment, Drysdale-St Leonards Road is constructed with a sealed carriageway carrying one traffic lane in each direction with gravel shoulders on both sides. It is proposed that the Drysdale-St Leonards Road/Drysdale Bypass intersection be constructed as a two-lane roundabout.

Drakes Road

Drakes Road is classified as a as a “Category 2 Local Road Rural” on Council’s Public Road Register and extends approximately 1.9km in an east direction from High Street, then takes a 90-degree bend and continues 600 metre north to Founds Road. In the vicinity of the bypass alignment, Drakes Road is configured with a sealed carriageway carrying one traffic lane in each direction.

The bypass will bisect Drakes Road, and it is proposed that the western side will terminate at a courtbowl, and the eastern side will operate as a left-in/left-out intersection connecting to the bypass.

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Whitcombes Road

Whitcombes Road is classified as a “Category 3 Secondary Distributor” on Council’s Public Road Register and extends approximately 2.4km east from Clifton Springs Road, terminating at a dead-end immediately west of Drakes Road.

To the west of High Street, Whitcombes Road is configured with a sealed carriageway carrying one traffic lane in each direction. To the east of High Street, Whitcombes Road is configured with a gravel carriageway.

The bypass alignment proposes a single-lane roundabout controlled intersection incorporating the bypass, the eastern leg of Whitcombes Road and the existing alignment of High Street. The western leg of Whitcombes Road is proposed to terminate as a T-intersection with High Street to the west of the bypass roundabout.

3.4 Existing Traffic Volumes

VicRoads Open Data Portal provides the following indicative 2017 two-way daily traffic volumes for the arterial road network:

- Portarlington Road west of Jetty Road: 29,000 vehicles per day
- Portarlington Road (High Street) northeast of Jetty Road: 20,000 vehicles per day
- Portarlington Road (High Street) south of Whitcombes Road: 8,700 vehicles per day
- Portarlington Road north of Whitcombes Road: 9,000 vehicles per day
- Grubb Road south of Portarlington Road: 8,300 vehicles per day
- Drysdale-St Leonards Road east of Portarlington Road: 9,800 vehicles per day

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4 Submissions

A total of 48 submissions were received by the planning authority in response to the formal advertising of Amendment C369. Table 1 below summarises the traffic engineering related issues raised in the submissions.

Table 1: Traffic Engineering Related Submissions

Submitter	Traffic Engineering Issues Raised	Specific Changes Sought
1	Supportive submission. No traffic engineering related concerns raised.	-
2	Concerned with the condition of both Basin and Gillies Road. Design of the Drysdale Bypass will increase traffic volumes along both Basin and Gillies Road and encourage school traffic to use these roads as a "rat run" to access the back of the school. Submitter references the Unmade Road Development Policy (2014) in describing Basin and Gillies Road (not a request for sealing).	-
3	Opposed to closure of Jetty Road, concerned with the increased travel times for residents in the new housing estates such as Curlewis.	Jetty Road should be left intact for the whole of its length.
4	Lack of car parking in the school district. No right hand turn from Lake Street (to Grubb Road). Doesn't support closure of Jetty Road. Doesn't support an overpass at the Portarlington/Grubb Road intersection.	Requests an appropriate area to perform a U-turn if no right turn is allowed from Lake Street. Increase parking facilities in school district.
5	Supportive of the proposed signalised intersection at the Portarlington/Grubb Road intersection.	-
6	Supportive of the proposed signalised intersection at the Portarlington/Grubb Road intersection.	-
7	Concerned with the proposed underpass at Peninsula Drive and Andersons Road. <ul style="list-style-type: none"> - Where is the entry point for St Thomas Primary School? - Have turning lanes been included for Peninsula Drive to access all three schools safely? - Is there any car parking spaces allocated on this road to replace the parking on Andersons Road? 	-
8	Supportive submission.	-
9	No traffic related concerns, only environmental issues raised.	Discontinue bypass beyond Murradoc Road.
10	No traffic related concerns, only environmental, overlooking and noise issues.	-

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Submitter	Traffic Engineering Issues Raised	Specific Changes Sought
11	Generally supportive, but concerned that there may be increased usage of Gillies Road.	-
12	Concerned with the high frequency of traffic lights when travelling to or from Geelong via Jetty Road. The proposed signalised intersections are an unfair imposition on residents due to increased travel times.	Requests amendments to make it possible to turn off Portarlington Road at either end of Curlewis Golf Club and reach Jetty Road via Coriyule Road (if sealed), or alternatively, retain the left-turn from Portarlington Road to Jetty Road.
13	Safety at the Portarlington/Grubb Road intersection affects all residents.	-
14	No traffic related concerns.	-
15	Concern regarding the operation and functionality of the existing Motel at 323 Jetty Road. The property no longer has a road frontage. Access to the motel will no longer be easy. Motel operation will also be interrupted during construction/roadworks.	Requests new access off Portarlington Road. Keeping open the existing entrance to Jetty Road as a one-way slip lane from Portarlington Road will be beneficial to the Motel and the broader community.
16	Not supportive of the proposed signalised intersection at Portarlington/Grubb Road. Intersection will be unsafe and appear like an outer Melbourne suburb.	Suggests an overpass with a system of roundabouts.
17	Not supportive of the rerouting of Jetty Road.	-
18	Supportive of the proposed signalised intersection at the Portarlington/Grubb Road intersection. Makes reference to a Bike Safe Roundabout Research Report and states that lights are significantly safer for cyclists.	-
19	Not supportive of the proposed signalised intersection at Portarlington/Grubb Road. Concerned with safety, believes there will be an unnecessary and excessive number of vehicle-to-pedestrian conflict points in the ultimate design of the bypass. Proposed ingress/egress to the service station is unsafe, as it requires vehicles entering the service station from Drysdale or exiting towards the bypass to execute a U-turn and/or lane crossing manoeuvre. Proposed pedestrian underpass to Peninsula Drive is too narrow. The bypass will deposit a large volume of traffic around the school precinct. The proposed roundabouts are larger than necessary according to Austroads recommendations in "Guide to Road Design Part 4B Roundabouts".	Requests removal of signalised intersection and replacement with a roundabout. Alternative entry to the service station proposed. Requests a wider underpass providing for two-way cycling and pedestrian paths. Requests plan for traffic and active transport ingress/egress, parking and student drop-off for the education precinct. Requests construction of a road connection from Belchers Road through to the education precinct.

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Submitter	Traffic Engineering Issues Raised	Specific Changes Sought
20	<p>Insufficient access has been provided to the school precinct.</p> <p>Concerned with the location of both the Reserve/Portarlington Road and Portarlington/Grubb Road intersections.</p> <p>Submitter believes that roundabouts should be considered at the Portarlington Grubb Road intersection as they provide a safer option.</p>	<p>Requests relocation of the intersection at Reserve/Jetty Road to the existing intersection between Railway Crescent and Jetty Road.</p> <p>Relocate the Portarlington/Grubb Road intersection to the intersection at Portarlington/Hermsley Road.</p> <p>Redesign Portarlington/Grubb Road intersection to consist of a combination of roundabout design with the incorporation of a traffic light system used predominantly during "peak hour" traffic.</p>
21	<p>The Pedestrian underpass is not a good option.</p> <p>Peninsula Drive should be extended to connect to Belchers Road.</p> <p>Concerned with increased traffic volumes on Reserve Road.</p>	<p>A 40km/h zone should be implemented along the new bypass road.</p>
22	<p>Bypass should not be constructed past Murradoc Road.</p> <p>Bypass will not have an effect on peak traffic times.</p> <p>The intersection at Portarlington/Grubb Road should be simplified.</p>	<p>Requests bypass end at Murradoc Road.</p> <p>Include road upgrades to Coriyule and Hermsley Road.</p> <p>Construct an overpass for through traffic at Grubb Road.</p>
23	<p>No traffic related concerns.</p>	-
24	<p>Concern regarding road design at the school precinct. Insufficient space provided for safe drop-off points for school children.</p> <p>Requests detailed design for vehicles entering/exiting the existing Caltex Service Station.</p>	<p>Requests connection of Peninsula Drive with Belchers Road to the south to improve traffic movement around the school precinct.</p> <p>Relocate a U-turn point which services the Caltex Service Station.</p>
25	<p>Opposed to the closure of Jetty Road due to increased travel times for residents in new housing estates such as Curlewis.</p> <p>Not supportive of the signals at Grubb Road and believes a 2 lane roundabout is more appropriate.</p> <p>Prefers signals though at the intersection of Grubb Road/Peninsula Drive.</p> <p>Concerned with consistency of speed limits from Portarlington to Leopold.</p>	<p>Requests Jetty Road remain as is.</p> <p>Change from signals to roundabout at Portarlington Road/Grubb Road intersection and change from roundabout to signals at Grubb Road/Peninsula Drive intersection.</p> <p>Change speed limit to 80km/h for the entire section of road between Portarlington and Leopold.</p>
26	<p>Generally supportive (no traffic issues raised).</p>	-
27	<p>Supportive of the proposed signalised intersection at the Portarlington/Grubb Road intersection.</p>	-

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Submitter	Traffic Engineering Issues Raised	Specific Changes Sought
28	Proposed signalised intersection at Portarlington Road/Reserve Road will severely impact resident's amenity.	-
29	No traffic issues raised.	-
30	(City of Greater Geelong submission). Indicates that a works in kind agreement could be negotiated to allow VicRoads to upgrade Belchers Road (these works are encouraged to be delivered in the short term).	-
31	Transport for Victoria (TFV) support the proposed Amendment as exhibited.	-
32	Not supportive of the signals at Portarlington Road/Grubb Road, and suggests an overpass would provide the best outcome.	Requests an overpass at the Grubb Road/Portarlington Road intersection.
33	Ultimate design should consist of roundabouts instead of signalised intersections as they provide for faster travel times.	Requests removal of the two sets of signalised intersections and replacing them with roundabouts.
34	Concerned with the condition of Basin Road and believes the road is not suitable to carry increased traffic volumes.	Construction of speed signs along Basin Road is sought, as well as the construction of a shared path along Basin Road to allow people to ride/walk.
35	Supportive of the proposed signalised intersection at the Portarlington/Grubb Road intersection.	-
36	Supportive of the proposed signalised intersection at the Portarlington/Grubb Road intersection.	-
37	Supportive of the proposed signalised intersection at the Portarlington/Grubb Road intersection.	-
38	Supportive of the proposed signalised intersection at the Portarlington/Grubb Road intersection.	-
39	Not supportive of the signals at Portarlington Road/Grubb Road or at Reserve Road, and suggests roundabouts.	Requests removal of the two sets of signalised intersections and replacing them with roundabouts.
40	Concerned that the bypass will increase traffic flow on both Basin and Gillies Road and create an unsafe environment for road users and residents. Concerned that the bypass will cut off access for people and horses to safely navigate to the pony club.	-
41	Closure of Jetty Road will create a bottle neck effect on Railway Crescent.	The bypass should be elevated over Grubb Road.
42	Concerned that the bypass will increase traffic flow on both Basin and Gillies Road. Basin Road is not suitable for heavy traffic.	-

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Submitter	Traffic Engineering Issues Raised	Specific Changes Sought
43	Supportive of the proposed signalised intersection at the Portarlington/Grubb Road intersection. Concerned that the bypass will increase traffic volumes on Whitcombes Road. Whitcombes Road will rapidly deteriorate if traffic volumes increase.	Requests sealing of the section of road between Whitcombes and Martins Road, or alternatively speed restrictions and more regular maintenance of the road.
44	Jetty Road will be impacted from the future Curlewis population. Concerns over the “irregular” intersection at Whitcombes Road and Bayshore Avenue.	Requests sealing of Coryule Road (between Jetty Road and Hermsley Road). Requests relocation of the western entrance signalised intersection further west to the intersection of Hermsley and Curlewis Road.
45	Concerned that the design of the bypass will increase traffic volumes along Murradoc Road. More specifically, submitter is concerned that the entry/egress point of their property will become unsafe (address not given).	-
46	Design of the Drysdale Bypass will force submitter (125 Andersons Road) to travel on gravel roads to access their property, which will worsen access for emergency vehicles.	-
47	Concerned that closure of Drakes Road will increase traffic flow along Whitcombes Road for vehicles travelling towards Portarlington.	-
48	Concerned with the operation of the school precinct, including concerns with the safety of a pedestrian underpass for school children.	Recommends a “drop off zone” at the bottom of Peninsula Drive in order to help alleviate traffic congestion.
49	Concerned with the design of the bypass (particularly Portarlington Road/Grubb Road intersection) and the access to the school/sport precinct. The submitter believes that the traffic resulting from the proposed access to the school precinct will be unsafe and prone to congestion.	Proposes a roundabout at the Jetty Road/Reserve Road extension intersection. Requests a dedicated left hand turn lane from Portarlington Road eastbound onto Jetty Road. Proposes that Peninsula Drive should be one-way (southbound traffic only) flowing back to Grubb Road via Belchers Road.

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The traffic engineering related concerns raised by submitters can generally be summarised as 15 key issues as follows:

1. Condition of Gillies and Basin Roads. Design of the Drysdale Bypass will increase traffic volumes along both Basin and Gillies Road and encourage school traffic to use these roads as a “rat run” to access the back of the school.
2. Opposition to the closure of Jetty Road. Closure will increase travel times for residents of new housing estates such as Curlewis, and reduces accessibility to the motel. Request for one-way (in only from Portarlington Road).
3. Lack of car parking, plus traffic congestion, etc., in the school district. Request for connection of Peninsula Drive to Belchers Road to the south, request for drop-off zone.
4. Lack of right turn access at the Grubb Road/Lake Street intersection.
5. Not supportive of signalised intersection of Bypass/Grubb Road/High Street, preference for a roundabout (or series of roundabouts).
6. Pedestrian underpass at Peninsula Drive/Anderson Street is too narrow, unsafe for school children.
7. Proposed ingress/egress to the Caltex service station is unsafe, as it requires vehicles entering the service station from Drysdale or exiting towards the bypass to execute a U-turn and/or lane crossing manoeuvre.
8. The proposed roundabouts are larger than necessary according to Austroads recommendations in “Guide to Road Design Part 4B Roundabouts”.
9. Potential increased traffic volumes on Reserve Road.
10. Speed limit concerns, including a request for consistent 80km/h speed limit from Leopold to Portarlington, and a request for a 40km/h speed limit on the bypass near the schools.
11. Signalised intersection at Portarlington Road/Reserve Road will severely impact residents’ amenity.
12. Concerned that the bypass will increase traffic volumes on Whitcombes Road. Whitcombes Road will rapidly deteriorate if traffic volumes increase.
13. Concerns over the “irregular” intersection at Whitcombes Road and Bayshore Avenue.
14. Concerned that the design of the bypass will increase traffic volumes along Murradoc Road and property access will become unsafe.
15. Design of the Drysdale Bypass will force submitter (Andersons Road address) to travel on gravel roads to access their property, which will worsen access for emergency vehicles.

5 Traffic Engineering Assessments

5.1 Review of Intersection Treatment – Western End of Bypass

VicRoads commissioned GHD to assess various alignment options for the western end of the bypass, using VISSIM computer modelling software.

I have undertaken a review of the primary options under consideration, being a signalised intersection and a roundabout-controlled intersection.

In particular, network models were prepared using SIDRA Intersection version 7.0 to compare the performance of VicRoads Options 3a and 3b as described in Consolidated Options Assessment report prepared by GHD incorporating a single 4-leg signalised intersection and a single 4-leg roundabout respectively on the Drysdale Bypass at Grubb Road. Both models also included the separate 3-leg roundabout on Grubb Road at Peninsula Drive, 200m to the south.

Traffic volumes adopted for the SIDRA models are those described in Figures 3 and 4 of the GHD report for the AM and PM peak hour periods estimated for the year 2046. A copy of these diagrams are attached at Appendix E. The default Peak Flow Factor of 95% has been adopted for all movements.

The assumed intersection geometry for the signalised intersection option (Option 3a) is based on the alignment roll overview (Drawing No. 60528402-SKE-0003). The assumed geometry for the roundabout option incorporates a standard 2-lane roundabout with a 50m internal island diameter. Default values have been assumed for the entry radius, entry angle and environment factors.

The adopted network layouts for the two options incorporating the roundabout at Peninsula Drive to the south are presented in Figure 10.

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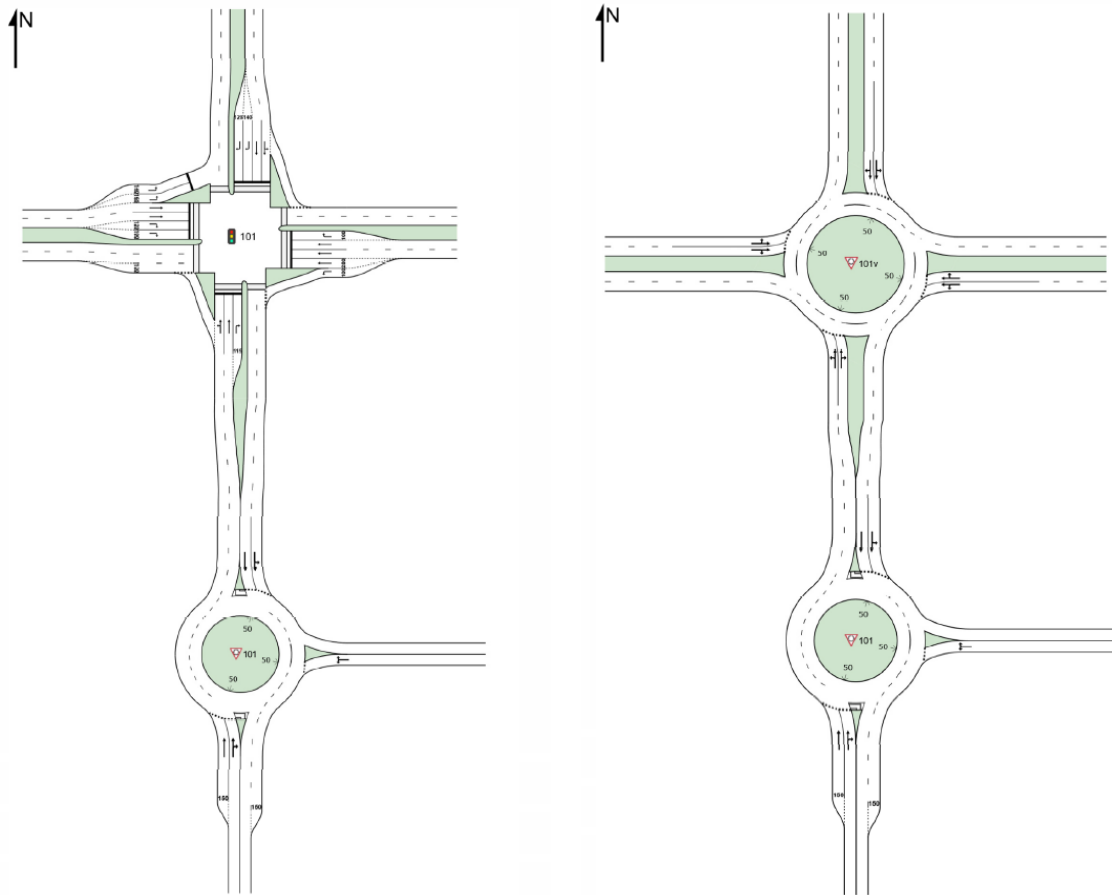


Figure 10: Adopted Network Layouts (Signals vs Roundabout at the Bypass)

A standard phasing arrangement for the signalised intersection option was adopted incorporating fully controlled right turns on all approaches.

A standard cycle time of 90 seconds was adopted for both peak periods, with the SIDRA program used to determine the optimal allocation of phase times for each signal phase.

Results

It was found that the AM peak hour presented the overall peak operating conditions for the network. The Degree of Saturation for the two options during the AM peak is presented in Figure 11.

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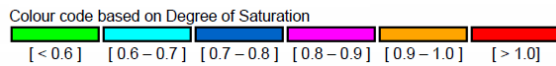
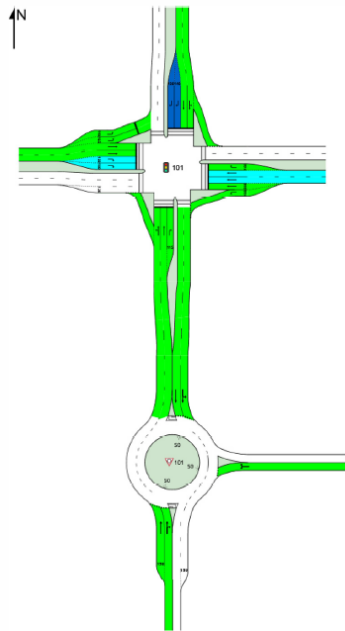
Drysdale Bypass

DEGREE OF SATURATION

Ratio of Demand Volume to Capacity (v/c ratio)

☘☘ Network: N101 [AM Signals]

New Network



DEGREE OF SATURATION

Ratio of Demand Volume to Capacity (v/c ratio)

☘☘ Network: N101 [AM Roundabout]

New Network

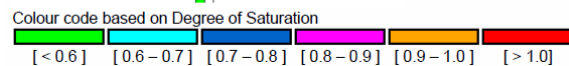
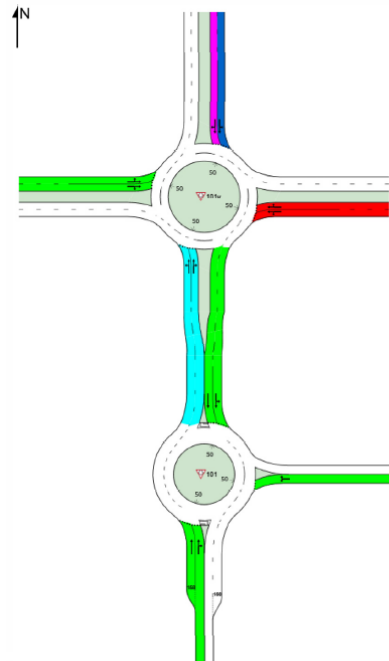


Figure 11: AM Peak Degree of Saturation Comparison (Signals vs Roundabout at the Bypass)

The results show that during the AM peak the signalised intersection performs much better than the roundabout option, with the roundabout option resulting in an unacceptable Degree of Saturation exceeding 1.0 on the Drysdale Bypass (east) approach at the main roundabout. This is due to the need for this traffic to give way to the high volume of traffic approaching the intersection from the adjacent approach to the north. Conversely, all movements in the signalised intersection option experience a Degree of Saturation of no more than 0.8 which is considered acceptable.

A similar comparison of the SIDRA outputs between the two options can be undertaken in terms of Level of Service. The default definition of Level of Service in SIDRA is based on vehicle delays. The comparison of Level of Service during the AM peak hour period is presented in Figure 12.

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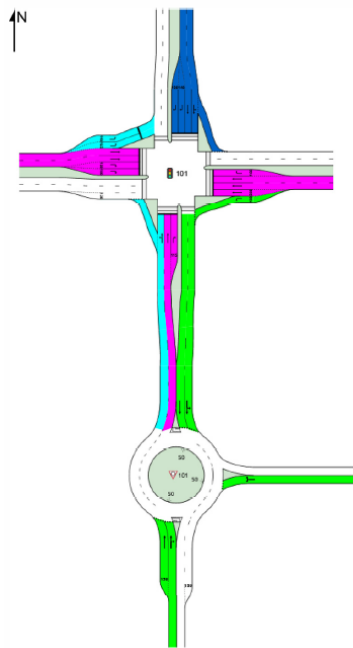
Drysdale Bypass

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [AM Signals]

New Network



Colour code based on Level of Service

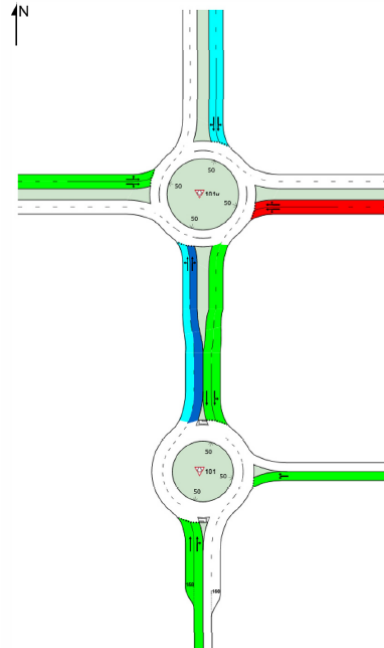


LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

Network: N101 [AM Roundabout]

New Network



Colour code based on Level of Service



Figure 12: AM Peak Hour Level of Service Comparison (Signals vs Roundabout at the Bypass)

The Level of Service for all approaches in the signalised intersection option is found to be acceptable at LOS D or above, however for the roundabout option and unacceptable LOS F is obtained for the Drysdale Bypass east approach to the main roundabout.

In both options there are no issues at the southern roundabout at Peninsula Drive either in terms of Degree of Saturation or Level of Service.

During the PM peak period, conditions for both options are significantly better. For the signalised intersection option, the intersection performs exceptionally, with all approaches operating with a Degree of Saturation less than 0.6. For the roundabout option, most approaches also operate well, however the Portarlington Road west approach experiences a Degree of Saturation of between 0.9 and 1.0 which represents poor operating conditions.

The Degree of Saturation for both options during the PM peak period is presented in Figure 13.

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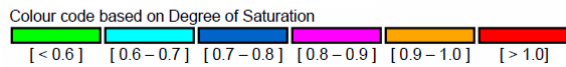
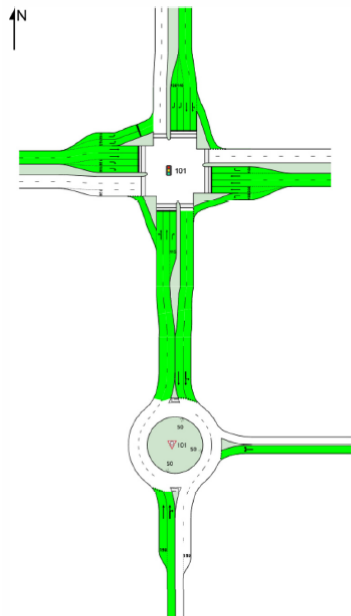
Drysdale Bypass

DEGREE OF SATURATION

Ratio of Demand Volume to Capacity (v/c ratio)

☐☐ Network: N101 [PM Signals]

New Network



DEGREE OF SATURATION

Ratio of Demand Volume to Capacity (v/c ratio)

☐☐ Network: N101 [PM Roundabout]

New Network

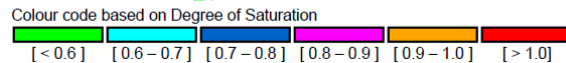
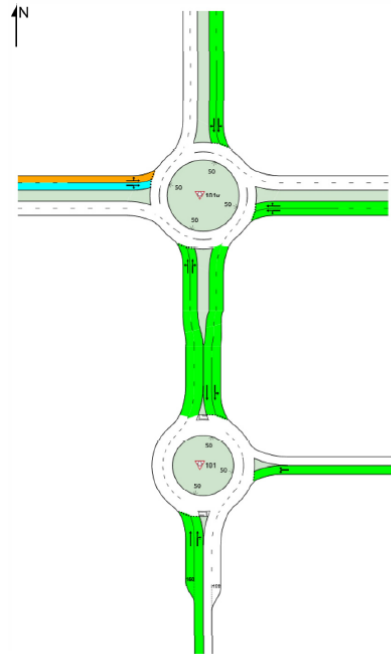


Figure 13: PM Peak Degree of Saturation Comparison (Signals vs Roundabout at the Bypass)

In terms of Level of Service during the PM peak, the roundabout option generally performs marginally better than the signalised intersection option as most movements experience reduced delays. However, in both options the Level of Service is considered to be acceptable with no movements experiencing a Level of Service worse than LOS D.

The Level of Service for both options during the PM peak period is presented in Figure 14.

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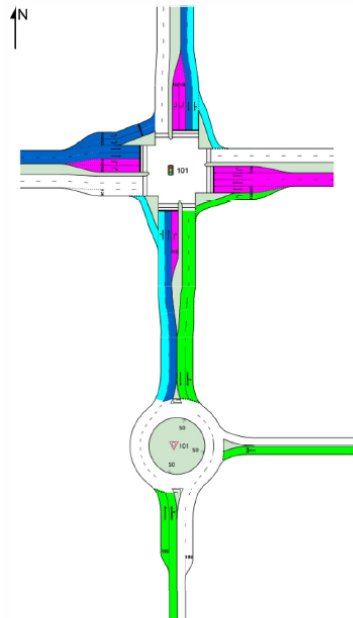
Drysdale Bypass

LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

☐☐ Network: N101 [PM Signals]

New Network



Colour code based on Level of Service

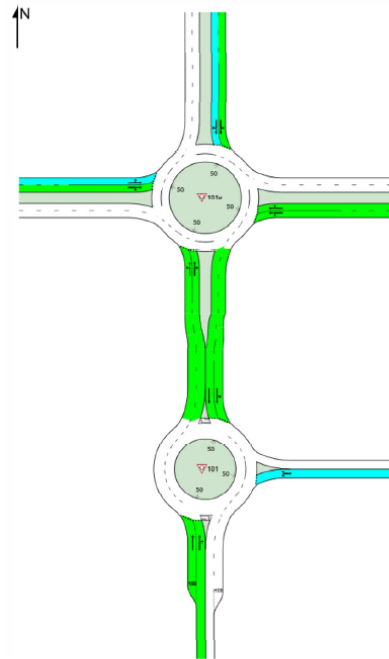


LANE LEVEL OF SERVICE

Lane Level of Service for Network Sites

☐☐ Network: N101 [PM Roundabout]

New Network



Colour code based on Level of Service



Figure 14: PM Peak Hour Level of Service Comparison (Signals vs Roundabout at the Bypass)

More detailed outputs comparing both options at the Portarlington Road/Grubb Road intersection are presented at Appendix F.

Based on the results of the SIDRA Intersection analysis it is considered that the signalised intersection option (Option 3a) provides a superior solution to the roundabout option (Option 3b) from a traffic capacity perspective due to congestion issues on the Drysdale Bypass approach in the roundabout option during the AM peak hour period.

5.2 Pedestrian and Cycle Key Routes

There are a number of existing (primarily off-road) cycle paths in the vicinity of the western end of the bypass, as follows:

- The Bellarine Rail Trail,
- a concrete path extending between Andersons Road and Reserve Road within a dedicated reservation, and
- a concrete path through Lake Lorne Reserve, connecting from Reserve Road to the Bellarine Rail Trail.

A number of planned pedestrian and cycle facilities are proposed within the Jetty Road Urban Growth Plan (UGP) area, including a perimeter path along the northern side of Portarlington Road and the western side of Jetty Road, as shown in Figure 10 below.

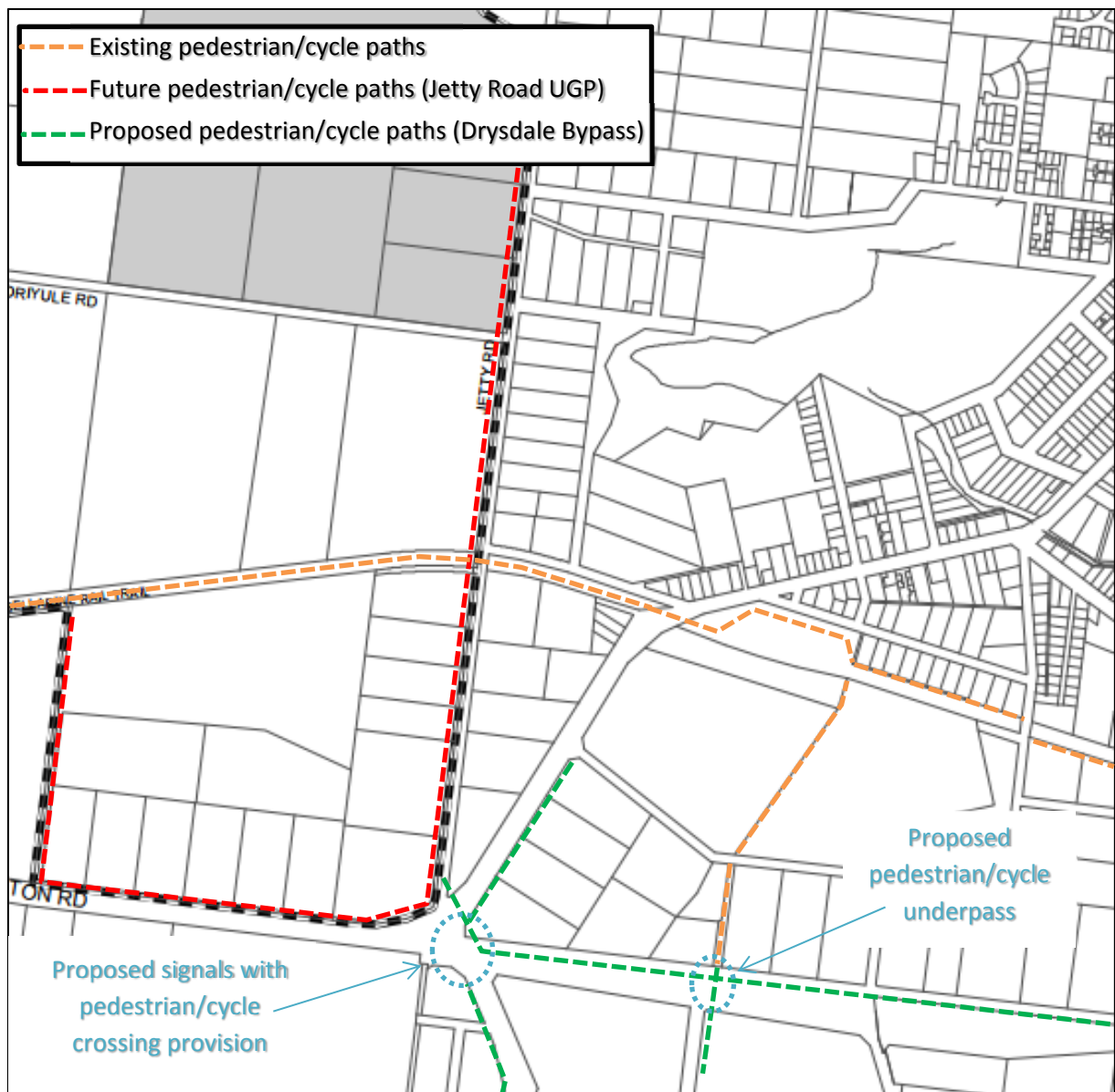


Figure 15: Pedestrian and Cycle Routes

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There is also a desire line for students from the schools precinct accessing bus stops on High Street. There will also be an increased desire line for access between the future sports precinct (to the west of the schools) and the developing Jetty Road UGP area, which needs to be taken into account in the design of the bypass.

Furthermore, with the development of the sports precinct (as well as the two secondary schools) and the nearest retail option being the Caltex service station on the west side of High Street north of the bypass, there is likely to be an increase in the number of pedestrians/cyclists crossing between these destinations (looking to purchase drinks, etc).

Figure 10 shows the planned pedestrian/cycle path facilities as part of the bypass project, and includes:

- a pedestrian/cycle underpass connecting the schools precinct to Anderson Street,
- a path on the southern side of Anderson Road connecting to the future signalised intersection of the bypass road/High Street/Portarlington Road/Grubb Road,
- crossing facilities on all four legs of the signalised intersection,
- a path connecting the signalised intersection of the bypass road/High Street/Portarlington Road/Grubb Road to the Jetty Road UGP area and future connection to the rail trail,
- a path on the western side of Grubb Road, and
- a path on the eastern side of High Street.

Having regard to the high volume and speed of traffic anticipated to utilise the bypass road, it is important to provide safe crossing points for pedestrians and cyclists.

The safest options are grade-separated crossing points and signals, which is what is proposed by VicRoads (including grade-separation at Peninsula Drive/Anderson Street, and signals at Grubb Road).

In order to ensure that the proposed underpass operates in a safe manner for school children, it will be necessary to provide a wide, open arrangement at-grade, with separate provision for pedestrians (say 2 metres wide) and cyclists (two-way access, 1.5 metre wide lanes in each direction recommended), i.e. a total underpass width of 5 – 6 metres.

Subject to the above recommendation, I am satisfied that the bypass adequately provides for pedestrian and cyclist connectivity.

6 Review of Submissions

6.1 Review of Traffic Engineering Issues Raised

The traffic engineering related concerns raised by submitters are summarised in Table 1, and further collated into 15 separate issues below Table 1. These issues are addressed in Table 2 below.

Table 2: Review of Submissions

Issue	Response
<p>Condition of Gillies and Basin Roads. Design of the Drysdale Bypass will increase traffic volumes along both Basin and Gillies Road and encourage school traffic to use these roads as a “rat run” to access the back of the school.</p>	<p>I agree that Gillies and Basin Roads are not suitable for increased/school-related traffic (including pick-ups/drop-offs).</p> <p>I recommend that any future applications to expand the schools do not result in an increase in access via Gillies Road, which should be for local residential traffic only having regard to the constraints particularly around Basin Road.</p> <p>In addition, improvements to the existing drop-off and pick-up arrangements are required on Peninsula Drive, however this is an existing issue which will not be made worse by the bypass.</p>
<p>Opposed to the closure of Jetty Road. Closure will increase travel times for residents of new housing estates such as Curlewis, and reduces accessibility to the motel.</p>	<p>I agree that the closure of the southern end of Jetty Road may increase travel times for some residents of the new housing estates in the short term due to the need to navigate two signalised intersections.</p> <p>However as the estates develop, a future connection to Portarlington Road will be established approximately 800 metres to the west of Jetty Road (along the alignment of Greenvale Drive, on the eastern boundary of the golf course) which will return travel times for these residents to pre-bypass times (or better in some cases).</p> <p>With regard to the motel, the physical distance a vehicle coming to the site (from the Geelong direction) would need to travel will be increased by approximately 500 metres under the bypass proposal. This additional travel distance (and associated minor increase in travel time) is not likely to discourage motel guests. In addition, Jetty Road is not the primary access route to Drysdale for visitors currently, and accordingly it is unlikely that the motel generates much of its business from passing trade.</p> <p>Furthermore, the proposed PAO will acquire a small amount of land from the motel, and accordingly any applicable compensation for this business will be considered at the time of acquisition.</p>

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Issue	Response
<p>Lack of car parking, plus traffic congestion, etc., in the school district. Request for connection of Peninsula Drive to Belchers Road to the south, request for drop-off zone.</p>	<p>I understand that congestion at drop-off and pick-up times is already a concern which is Council is addressing as part of its school/sports precinct planning.</p> <p>I agree that a connection of Peninsula Drive to Belchers Road to the south would assist in easing this congestion and improving safety and circulation around the schools/sports precinct. I note that this connection is shown on Council's masterplan for the sports precinct to the west of the schools, and I strongly support the connection being established in the short term.</p> <p>However, I note that the proposed changes to the road network in the vicinity of the schools precinct as a result of the bypass essentially replace what is there now, and will not make conditions worse. Accordingly, it is not the responsibility of the bypass project to provide additional car parking or construct a road connection to Belchers Road to assist in managing existing issues in the schools precinct.</p>
<p>Lack of right turn access at the Grubb Road/Lake Street intersection.</p>	<p>Lake Street is a short gravel road located on the west side of Grubb Road south of Andersons Road, providing access to a handful of rural (Farming Zone) properties.</p> <p>The proposed bypass works show left-in/left out access for Lake Street at Grubb Road due to the construction of a new median on Grubb Road between the bypass and Peninsula Drive.</p> <p>A roundabout-controlled intersection is proposed at the Grubb Road/ Peninsula Drive intersection which will adequately provide for vehicles accessing Lake Street from the north (undertaking a U-turn at the roundabout and turning left in to Lake Street).</p> <p>For vehicles wishing to exit Lake Street and head south along Grubb Road towards Ocean Grove (or access the schools precinct), a U-turn would need to be undertaken. This could occur at the signalised intersection at the bypass. In the event that this manoeuvre needs to be undertaken by a very large vehicle (such as a semi-trailer), it would be necessary to either seek an alternative route or turn right onto the bypass and undertake a U-turn at the Princess Street roundabout to return to Grubb Road. Given the nature of Lake Street, it is highly unlikely that such a movement would be required very often and would therefore at most be a very minor inconvenience.</p>
<p>Not supportive of signalised intersection of Bypass/Grubb Road/High Street, preference for a roundabout (or series of roundabouts).</p>	<p>This issue has been addressed in detail at Section 7 of my evidence.</p> <p>Most importantly, the proposed signalised intersection provides the best outcome overall, including:</p> <ul style="list-style-type: none"> - adequately accommodating the traffic volumes anticipated to pass through it, - providing a straight forward, continuous and obvious route for the bypass, and - providing the safest and most appropriate treatment to facilitate crossing for pedestrians and cyclists. <p>A minor increase in travel time through the intersection (compared to existing conditions) is acknowledged, but there will be travel time savings and other benefits elsewhere within the town due to the bypass removing traffic (including heavy trucks) from High Street.</p>

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Issue	Response
<p>Pedestrian underpass at Peninsula Drive/Anderson Street is too narrow, unsafe for school children.</p>	<p>I agree with submitters that the pedestrian underpass needs to be wide, well lit, accommodate pedestrians and cyclists separately and be a safe environment for school children. This can be addressed at the detailed design stage.</p>
<p>Proposed ingress/egress to the service station is unsafe, as it requires vehicles entering the service station from Drysdale or exiting towards the bypass to execute a U-turn and/or lane crossing manoeuvre.</p>	<p>The service station will suffer reduced traffic flow past the site as a result of the bypass however, this has been a long-standing proposal. Access to the site has been considered with the provision for direct right-turns in for vehicles entering from Drysdale. Vehicles exiting and wishing to head south will need to undertake a U-turn manoeuvre, and there is a 70+ metre separation from the service station egress point to the point where U-turns would be undertaken, which is an appropriate off-set.</p> <p>During the peak hours, the majority of traffic accessing the petrol station is likely to be “passing trade”, with vehicles turning left in and left out of the site. There is another petrol station on the other side of the High Street approximately 1.2km to the north-east which would likely serve passing trade in the opposite direction. Only a small proportion of traffic is likely to undertake U-turn movements to egress the petrol station specifically. Vehicles can also exit the petrol station directly to Jetty Road and utilise the signals to turn right into High Street and head towards Geelong.</p>
<p>The proposed roundabouts are larger than necessary according to Austroads recommendations in “Guide to Road Design Part 4B Roundabouts”.</p>	<p>The proposed diameter of the internal island of the proposed roundabouts is approximately 45 to 50 metres. This is generally consistent with current practice for recently constructed roundabouts on similar standard roads. Examples include:</p> <ul style="list-style-type: none"> – Rossiter Road/South Gippsland Highway – 56m – Baxter-Tooradin Road/South Gippsland Highway – 43m – Bungower Road/Mornington Peninsula Freeway ramps – 42m – Anderson Link Road/Bass Highway – 42m – Bellerine Hwy/Grubb Road – 35m <p>I note that while a smaller radius might be permitted as a minimum under AustRoads guidelines, this doesn’t necessarily mean it will provide the best outcome. Larger radius roundabouts (where they can be accommodated) are preferred because they require vehicles to divert their travel path further, which reduces vehicle speeds.</p>
<p>Potential increased traffic volumes on Reserve Road.</p>	<p>I note that vehicles can currently access Peninsula Drive via sealed roads (Andersons Road). This will continue to be the case, however in order to assist with congestion around the school and also to provide appropriate active transport connectivity (including maintaining existing pedestrian/cycle connectivity to Lake Lorne), Vicroads has proposed to include a pedestrian underpass and car parking along Andersons Road for parents. As a result of the bypass, Andersons Road will be truncated at both ends and can only be accessed via Gillies Road (North) and Reserve Road, both of which are gravel roads, currently classified as Category 2 Rural Roads.</p> <p>I agree with the submitter that if school drop-off is facilitated in this location (and indeed it is likely to occur regardless of whether parking is provided or not given the proposed underpass), traffic volumes on Reserve Road and Gillies Road (North) are likely increase above existing levels.</p>

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Issue	Response
	<p>The “Category 2 Rural Road” classification is not recognised in the Greater Geelong Planning Scheme and accordingly it is not clear what traffic volumes or road construction standard is envisaged for such a classification.</p> <p>However, it would be appropriate to monitor the traffic volumes on Reserve Road and Gillies Road (north) following completion of the bypass works, and determine whether more regular maintenance and/or road sealing is needed.</p>
<p>Speed limit concerns, including a request for consistent 80km/h speed limit from Leopold to Portarlington, and a request for a 40km/h speed limit on the bypass near the schools.</p>	<p>Speed limits between Leopold and Portarlington can be considered separately to the current Planning Scheme Amendment.</p> <p>However I note that it would generally not be considered appropriate to design a new bypass in such a manner that requires a 40km/h speed limit near schools. The requirements for a 40km/h speed zone would not be met in this case, as the design of the access restoration road (Peninsula Drive connection to Grubb Road) is such that the first point that school traffic (and children) have an opportunity to interact at-grade with bypass traffic is 700+ metres via Grubb Road, or 650+ metres via the underpass (to High Street). This exceeds the distance from schools that school speed zones would apply.</p>
<p>Signalised intersection at Portarlington Road/Reserve Road will severely impact resident’s amenity.</p>	<p>There are times when an arterial road project will impact on a number of individual properties, and the road authority needs to weigh up these individual impacts against the net community benefit of a project.</p> <p>In cases where some land is being acquired from an affected property, impacts (beyond the land price only) can be considered and compensated for at the time of acquisition.</p>
<p>Concerned that the bypass will increase traffic volumes on Whitcombes Road. Whitcombes Road will rapidly deteriorate if traffic volumes increase.</p>	<p>The unsealed section (east of the bypass) may experience a very slight increase in traffic volumes due to the proposed restriction of Drakes Road to left-in/left-out (with full access via a roundabout-controlled intersection provided via Whitcombes Road).</p> <p>However the affected properties are rural (Farming Zone) and the Drakes Road/Whitcombes Road area to the east of the bypass generates very little traffic currently, and will continue to do so under the current zoning.</p> <p>It would be appropriate to measure traffic levels on Whitcombes Road east of the proposed bypass prior to and following construction to confirm that they remain within reasonable limits having regard to the road’s gravel construction.</p>
<p>Concerns over the “irregular” intersection at Whitcombes Road and Bayshore Avenue.</p>	<p>Whitcombes Road and Bayshore Avenue are constructed in a “staggered T” arrangement at Clifton Springs Road.</p> <p>There have been three casualty crashes recorded in the vicinity of these staggered T-intersections for the last 5 years of available data, including two rear-end crashes on Bay Shore Avenue and one ‘right/left’. All were “other” (not serious). Having regard to the volumes passing through this intersection, this number of minor injury crashes is not high. More importantly, it does not appear to be likely that traffic will increase significantly at these intersections as a direct result of the proposed bypass.</p>

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Issue	Response
	Accordingly, it is recommended that Council monitor “before” and directly “after” volumes to ensure there are no adverse bypass impacts at this location.
Concerned that the design of the bypass will increase traffic volumes along Murradoc Road and property access will become unsafe.	<p>There is no reason to suggest that more traffic will use Murradoc Road as a result of the bypass. Traffic will still need to turn off the main Portarlington route at a roundabout to head towards St Leonard along Murradoc Road as currently occurs.</p> <p>At any rate, the existing traffic volume along this route (9,800 vehicles per day two-way) is below the capacity of a two lane two-way arterial road which can typically carry at least 15,000 vehicles per day before duplication would be considered, albeit this is the average annual daily traffic (AADT) and is likely to vary during peak holiday times.</p>
Design of the Drysdale Bypass will force submitter (125 Andersons Road) to travel on gravel roads to access their property, which will worsen access for emergency vehicles.	<p>I note that these gravel roads which would be required to access Andersons Road (Gillies Road north and Reserve Road) are also envisaged in the Vicroads proposal to be used by parents dropping off children on the northern side of the bypass (with parking proposed, and a pedestrian underpass to access the schools).</p> <p>Accordingly, I recommend that traffic volumes on this route be monitored to determine whether sealing is required following completion of the bypass.</p>

6.1 Review of Requested Changes to the Planning Scheme Amendment

The submitter requests for changes to the Planning Scheme Amendment are addressed in Table 3 below.

Table 3: Review of Requested Changes

Specific Changes Sought	Comment
Jetty Road should be left intact for the whole of its length.	If Jetty Road were left open for two-way traffic at its intersection with Portarlington Road, it would significantly impact on VicRoads’ ability to deliver a safe and efficient bypass connection. Notably, a large three-lane roundabout would be needed to accommodate five approach legs, which is not compatible with the need to provide a safe intersection for pedestrians and cyclists.
Requests an appropriate area to perform a U-turn if no right turn is allowed from Lake Street. Increase parking facilities in school district.	No right turn is proposed for vehicles exiting from Lake Street. U-turns will be able to be completed at the bypass.
Discontinue bypass beyond Murradoc Road.	From a traffic engineering perspective there would be little benefit in constructing a bypass which finishes at Murradoc Road, as all Portarlington traffic would then still need to go through the centre of Drysdale.
Requests amendments to make it possible to turn off Portarlington Road at either end of Curlewis Golf Club and reach Jetty Road via	The Jetty Road Urban Growth Plan shows a new primary road connection with a signalised intersection to Portarlington Road located along the eastern boundary of the golf course.

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Specific Changes Sought	Comment
<p>Coriyule Road (if sealed), or alternatively, retain the left-turn from Portarlinton Road to Jetty Road.</p>	
<p>Requests new access off Portarlinton Road.</p> <p>Keeping open the existing entrance to Jetty Road as a one-way slip lane from Portarlinton Road will be beneficial to the Motel and the broader community.</p>	<p>Signage facing Jetty Road advertising the motel and access arrangements would have a similar impact from a “passing trade” perspective. An access point to Portarlinton Road may interact poorly with the proposed signalised intersection at Reserve Road.</p> <p>A one way slip lane from Portarlinton Road to Jetty Road has the potential to conflict with pedestrians and cyclists using the future connection proposed between the sports precinct (under construction opposite the schools precinct) and the rail trail. In addition, signage for such a connection may cause confusion in relation to the High Street/Grubb Road/Bypass signalised intersection. However there is potential for it to be retained subject to detailed design.</p>
<p>Suggests an overpass with a system of roundabouts.</p>	<p>An at-grade signalised intersection was shown on strategic Council documents as early as 2007 (Jetty Road Urban Growth Plan) due to its ability to cater for the increasing traffic volumes while providing pedestrian and cyclist connectivity. An overpass visually dominates the landscape and the overall land take (including a system of roundabouts) is much more significant, acting as a significant barrier between the residential areas and the school and recreation/sports precinct, which is not Vicroads’ or Council’s desired outcome.</p>
<p>Requests removal of signalised intersection and replacement with a roundabout.</p> <p>Alternative entry to the service station proposed.</p> <p>Requests a wider underpass providing for two-way cycling and pedestrian paths.</p> <p>Requests plan for traffic and active transport ingress/egress, parking and student drop-off for the education precinct.</p> <p>Requests construction of a road connection from Belchers Road through to the education precinct.</p>	<p>A single roundabout does not cater for the traffic adequately (unless it has three lanes, which provides too much of a barrier for pedestrians and cyclists). Signals are considered the safest option for vulnerable road users.</p> <p>The proposed access arrangements for the service station are appropriate in my opinion.</p> <p>I agree that a wide underpass accommodating two-way cycling and pedestrian paths is appropriate, particularly taking into account the frequent use by school children.</p> <p>I understand that Council is currently in the process of working with the schools to prepare ‘safe access to schools’ plans, which will necessarily need to change once the bypass elements are finalised.</p> <p>I agree that the road connection from Belchers Road through to the education precinct needs to be provided in the short term to alleviate existing congestion issues at school pick-up and drop-off time, however the bypass works will not make the current situation significantly worse, and accordingly the Belchers Road connection should not be tied to the bypass construction.</p>

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Specific Changes Sought	Comment
<p>Requests relocation of the intersection at Reserve/Jetty Road to the existing intersection between Railway Crescent and Jetty Road.</p> <p>Relocate the Portarlington/Grubb Road intersection to the intersection at Portarlington/Hermsley Road.</p> <p>Redesign Portarlington/Grubb Road intersection to consist of a combination of roundabout design with the incorporation of a traffic light system used predominantly during “peak hour” traffic.</p>	<p>Railway Crescent intersects Portarlington Road at a sharp angle, and it would not be appropriate to encourage increased traffic along this route. The proposed connection opposite Reserve Road is an appropriate location.</p> <p>Hermsley Road and the western end of Coriyule Road are outside of the urban growth boundary and traverse rural land, and it is not part of Council’s strategy to encourage traffic to the new residential areas within the Jetty Road Urban Growth Area to take access via the Portarlington Road/Hermsley Road intersection. Notably, the structure plan notes that internal road design should “allow local traffic access along Coriyule Road, however construct and align the road to discourage through traffic”.</p> <p>A roundabout with signals is not VicRoads’ preferred treatment.</p>
<p>A 40km/h zone should be implemented along the new bypass road.</p>	<p>The bypass road is too far from the schools for this to be required. In the vicinity of the schools there will be no interaction with the bypass as it will be elevated over the pedestrian underpass.</p>
<p>Include road upgrades to Coriyule and Hermsley Road.</p>	<p>As previously noted, these roads are outside of the urban growth boundary and are not intended to provide primary access to the Jetty Road Urban Growth Area. Council’s strategic plan shows a signalised intersection on the east side of the golf course providing direct access to the new development areas.</p>
<p>Requests connection of Peninsula Drive with Belchers Road to the south to improve traffic movement around the school precinct.</p> <p>Relocate a U-turn point which services the Caltex Service Station.</p>	<p>I agree that the Peninsula Drive/Belchers Road connection will facilitate improved circulation of traffic around the school precinct. However this is a separate project which is not required as a direct result of the bypass.</p>
<p>Change from signals to roundabout at Portarlington Road/Grubb Road intersection and change from roundabout to signals at Grubb Road/Peninsula Drive intersection.</p> <p>Change speed limit to 80km/h for the entire section of road between Portarlington and Leopold.</p>	<p>The proposed intersection treatments at the Portarlington Road/Grubb Road intersection and the Grubb Road/Peninsula Drive intersection are appropriate.</p> <p>The speed limit of the route can be reviewed at any time by VicRoads and is generally based on the design speed of the road, as well as taking into account traffic volumes, crash history, etc.</p> <p>Any speed limit review would be independent of the current Planning Scheme Amendment process.</p>
<p>Requests removal of the two sets of signalised intersections and replacing them with roundabouts.</p>	<p>A roundabout at the bypass/Grubb Road/Portarlington Road intersection does not work from a traffic capacity perspective, unless it is a three lane roundabout which is not an appropriate treatment having consideration for existing and future vulnerable road users in this locality (noting the construction of the sports precinct adjacent to the school precinct). The second set of signals at Reserve Road provides a consistent treatment for both Jetty Road and High Street traffic, noting there are existing signals on Jetty Road at Wyndham Street.</p>
<p>Construction of speed signs along Basin Road is sought, as well as the construction of a shared path</p>	<p>Speed signs could be provided along Basin Road if vehicle speeds are currently an issue. It is intended that vehicle access (other than local residential access) be discouraged along this route.</p>

Amendment C369 to the Greater Geelong Planning Scheme

Drysdale Bypass

Specific Changes Sought	Comment
along Basin Road to allow people to ride/walk.	The bypass would not directly warrant a shared path construction on Basin Road, and this would be difficult to deliver at any rate due to the extensive existing vegetation.
Requests sealing of the section of road between Whitcombes and Martins Road, or alternatively speed restrictions and more regular maintenance of the road.	It is unlikely that traffic volumes would warrant sealing of this section of Whitcombes Road. However, “before” and “after” traffic volume monitoring would be appropriate to determine whether more regular maintenance is required.
Requests sealing of Coryule Road (between Jetty Road and Hermsley Road). Requests relocation of the western entrance signalised intersection further west to the intersection of Hermsley and Curlewis Road.	As previously noted, the western end of Coriyule Road is outside the urban growth boundary and is not intended to provide significant access to the growth area in the future, with an alternative primary “boulevard” road proposed in a north-south direction to the east of the golf course, connecting to Portarlington Road at a future signalised intersection. Accordingly, sealing of Coriyule Road is not necessary.
Recommends a “drop off zone” at the bottom of Peninsula Drive in order to help alleviate traffic congestion.	While I understand that there are congestion issues around the schools precinct and I would be supportive of the provision of additional facilities for picking up and dropping off students, I note that this is unrelated to the bypass project, and the congestion will not be made worse by the bypass works. Accordingly, this matter should be addressed separately by Council.

Review of Specific Proposals – Submission 19

Submission 19 specifically requests design changes as shown in Figure 10 below.

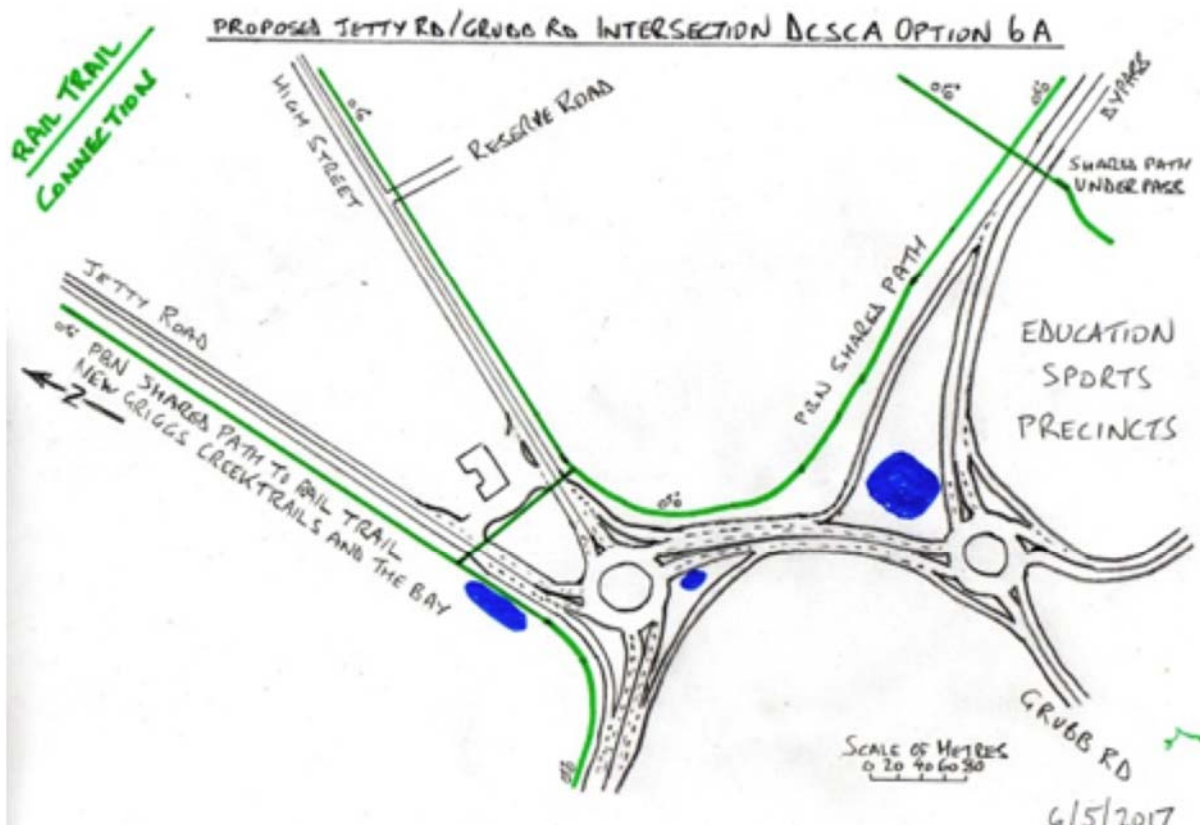


Figure 16: Submission 19 Proposal

Amendment C369 to the Greater Geelong Planning Scheme

Drysdale Bypass

Supplementary traffic modelling undertaken by GHD of the above proposal put forward by submitters demonstrates that from a purely traffic capacity perspective, the arrangement shown in Figure 10 would operate satisfactorily with the anticipated traffic volumes.

This option is not appropriate in my opinion for the following reasons:

- The layout encourages traffic to go up High Street towards Drysdale instead of using the bypass.
- The route for the bypass is disjointed.
- The slip lanes which bypass the roundabouts increase the capacity of the intersection but are not an appropriate arrangement as they create dangerous high speed/high volume merge points and would be dangerous for both motor vehicles and pedestrians and cyclists attempting to cross.
- There will be an increasing demand for both pedestrians and cyclists crossing between the developing areas of Curlewis and the schools (and future sports) precinct, and these vulnerable road users are not adequately catered for in the proposed arrangement shown in Figure 10, which focuses heavily on accommodating vehicular traffic to/from Jetty Road and High Street.

Submission 19 also raises a number of other specific issues which are addressed in Table 4 below.

Table 4: Review of Submission 19

Issue	Response
<p><i>Well-designed roundabouts are safer than signalised intersections. There are fewer "injury crashes" per million vehicles passing through roundabouts than signalised intersections. The relative speeds of vehicles at a well-designed roundabout are considerably lower than that at a signalised intersection.</i></p>	<p>Submission 19 states that ... <i>"it is undisputed that well-designed roundabouts are safer than signalised intersections"</i>. In my opinion, this is not a black and white question.</p> <p>The AustRoads' quote included in submission 19 states that ... <i>"in general, fewer motor vehicle crashes resulting in casualty crashes occur at roundabouts than at intersections containing traffic signals"</i>.</p> <p>This statement says "in general", and doesn't take into account the fact that when the degree of saturation is high (i.e. lengthy queues and delays), motorists are more likely to take risks, and also doesn't account for the fact that crashes involving pedestrians and cyclists are far more likely to result in serious injury crashes and fatalities, even at lower speeds.</p> <p>The road authority is responsible for determining the most appropriate form of traffic control. There are a number of very valid reasons why a signalised intersection has been selected in preference to a roundabout (or combination of roundabouts), including:</p> <ul style="list-style-type: none"> • Safety of pedestrians (including children) – roundabouts provide a poor level service for pedestrians. This can be improved with formal pedestrian crossings, however the relevant criteria based on the road classification, traffic volumes and opposing pedestrian volumes would mean that pedestrian crossings would need to be signalised anyway, which would potentially reduce the capacity of the roundabout. • There is a desire line for school children accessing bus services on High Street. There is also a proposed connection at this point to the rail trail, and there will be an increased desire line for pedestrians and cyclists once the sports precinct is developed

Amendment C369 to the Greater Geelong Planning Scheme

Drysdale Bypass

Issue	Response
	<p>opposite the existing schools precinct. Signals provide a far better service for both pedestrians and cyclists.</p> <ul style="list-style-type: none"> • A single roundabout does not perform satisfactorily, particularly in the AM peak hour. Notably, there is a high volume of traffic heading towards Geelong from High Street opposing a high volume of traffic heading towards Geelong from the bypass route and a roundabout provides insufficient capacity. • Signals provide better control in terms of allowing the road authority to respond to traffic conditions by changing the phase times to improve the level of service.
<p><i>Submitter believes that community expectations are that alternative intersection designs should be assessed on projected quantitative data in meaningful units listing the following criteria in the following order of priority:</i></p> <ol style="list-style-type: none"> 1. <i>Safety (predicted number of injury crashes and “property damage only” crashes for the predicted life of the intersection and the predicted cost of these crashes.</i> 2. <i>Traffic Efficiency (prediction of travel times at peak and off-peak for the major routes, predicted perceived delay for the major routes, predicted accumulated delay in hours per year).</i> 3. <i>Environmental impact (calculation of the annual fuel usage corresponding to the predicted accumulated delay and cost per year of this unnecessary fuel usage, calculation of the carbon emissions in tonnes of CO2 per year)</i> 4. <i>Engineering considerations – drainage, etc.</i> 5. <i>Local preference</i> 6. <i>Aesthetic considerations</i> 7. <i>Cost of construction</i> 8. <i>Inconvenience during construction.</i> 	<p>It is agreed that safety is a high priority, and this has been a consideration in VicRoads choosing a signalised intersection arrangement for the High Street/Bypass intersection, as the location is close to schools and a proposed community hub/sports precinct, and accordingly is likely to have a significant number of pedestrians seeking to cross the bypass to access bus services on High Street. The proposed signalised intersection is the safest option for these users.</p> <p>It is not necessary to predict the number of injury crashes and property damage only crashes. Even when looking at accident blackspots, property damage only crashes are not taken into account (with records of these not included in VicRoads’ crashstats database). When assigning values in calculating benefit-cost ratios, severe injury crashes and fatalities are assigned a higher “cost” than minor injury crashes. Pedestrians and cyclists are far more likely to experience more severe injuries from crashes.</p> <p>With regard to traffic efficiency, the proposed signalised intersection option is far more efficient than the roundabout option (which operates with an unsatisfactory level of service in the peak hours, meaning queues and delays increase disproportionately). Roundabout options which have a good level of traffic efficiency include a three lane roundabout, and a double roundabout with bypass lanes (suggested by DCSCA). The three lane roundabout option provides a very poor pedestrian environment, and the submitter’s option has other issues discussed below.</p> <p>With regard to environmental impacts, SIDRA intersection software does calculate costs, fuel consumption, emissions, etc. Costs and emissions generally increase as delays increase. VicRoads’ roundabout option(s) have excessive delays and queues in the AM peak hour and therefore have correspondingly high environmental costs.</p> <p>Local preference would only come into consideration if the road authority identified that either signals or roundabout options would operate appropriately taking into consideration all the relevant factors (including the pedestrian and cyclist volumes and desire lines, etc.).</p>

Amendment C369 to the Greater Geelong Planning Scheme

Drysdale Bypass

Issue	Response
<p>The construction of the bypass will entail a considerable amount of distribution and congestion around the education precinct. Requests construction of a road connection from Belchers Road through to the education precinct before commencing construction on the Drysdale Bypass</p>	<p>I support the resolution of the Belchers Road link. However I note that it is not part of or linked to the bypass works. The road connection (Peninsula Drive extension connecting to Grubb Road) essentially replaces what is currently provided (via the existing Anderson Street access) in terms of the standard of road, travel distance, etc. Issues regarding congestion around the school are an existing concern which needs to be addressed by Council regardless of the bypass proposal.</p>

Review of Specific Proposals – Submission 49

Submission 49 specifically requests a series of design changes as follows:

- Left-turn slip lane from Portarlington Road eastbound onto Jetty Road.
- Removal of dedicated left hand turn lane from Portarlington Road (eastbound) to High Street (northbound).
- Removal of dedicated left hand turn lane from High Street (northbound) to Reserve Road extension (westbound).
- Roundabout-controlled intersection at Jetty Road/Reserve Road extension.
- Reduction of High Street/Reserve Road intersection to single lanes.
- One-way (southbound) traffic flow in Peninsula Drive.
- Extension of Peninsula Drive to Belchers Road.
- Roundabout-controlled intersection at Belchers Road/Grubb Road.

Figure 11 below shows these proposals.

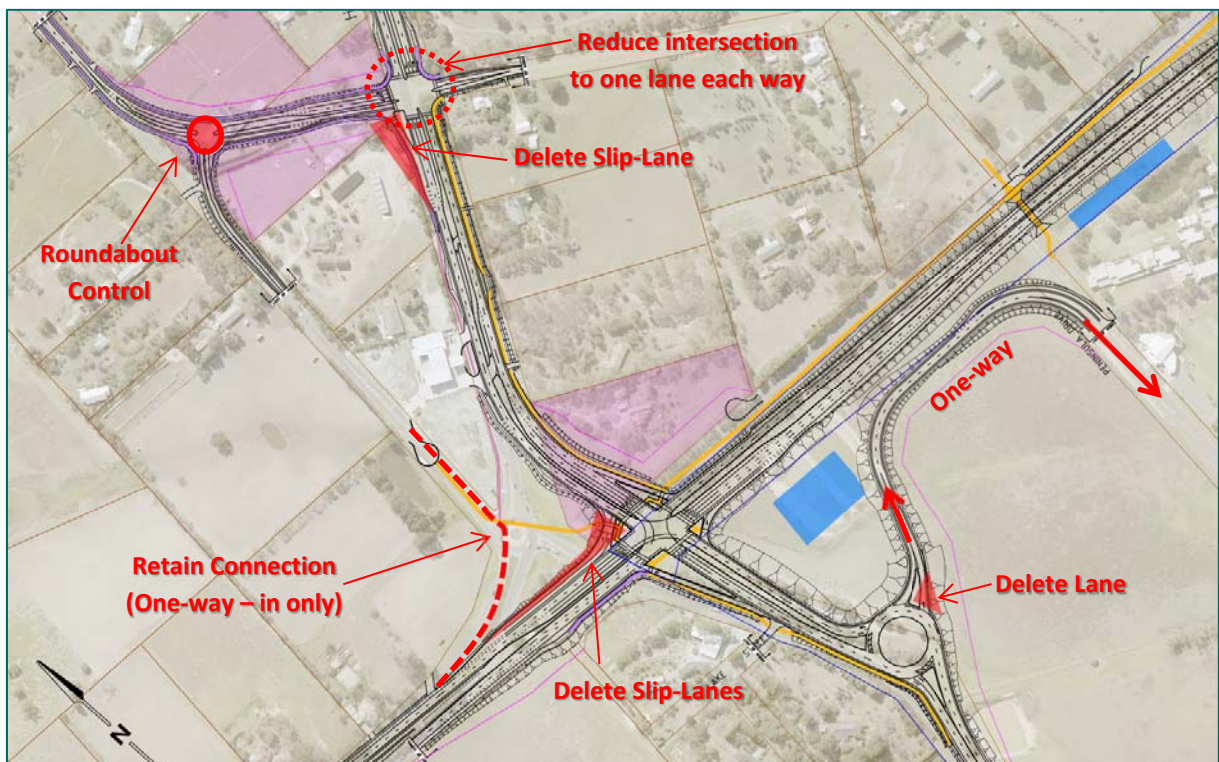


Figure 17: Submission 49 Proposal

Amendment C369 to the Greater Geelong Planning Scheme

Drysdale Bypass

The requests shown in Figure 11 are intended to be a “package” of changes, and not considered in isolation. Notably, the justification for the removal of left-turn slip lanes from Portarlington Road to High Street and from High Street to Jetty Road are noted as being a result of the proposed provision of both the left-turn slip-lane directly into Jetty Road, as well as an anticipated decreased number of vehicles using Jetty Road at such time that a new north-south connector road is constructed approximately 1km/ west of the High Street/ Portarlington Road intersection.

The request for roundabout control at the Jetty Road/Reserve Road intersection is also due to the request to keep the southern end of Jetty Road open for northbound traffic.

There are two distinctly separate issues raised by submission 49 as follows:

1. A desire to retain entry to Jetty Road directly from Portarlington Road.
2. Concern regarding the operation and circulation around the schools precinct.

Table 5 below addresses the various issues and requests raised in submission 49.

Table 5: Review of Submission 49

Issue	Response
<p><i>The addition of a left hand slip lane from Portarlington Rd, eastbound onto Jetty Road (potentially using the existing infrastructure) significantly reduces the number of vehicles from entering the two proposed controlled intersections at Portarlington Rd/High St and at High St/Reserve Rd extension.</i></p>	<p>A left hand slip lane into Jetty Road could potentially be included, but the merits of this would need to be weighed up against the dis-benefits, which include increased vehicle/pedestrian/cyclist conflict for the proposed future rail trail connection, and to a lesser extent the potential confusion with regard to signage for vehicles accessing Jetty Road versus High Street (towards Drysdale town centre).</p>
<p><i>The dedicated left hand turn lanes on both intersections will not be required thereby reducing the cost of and inconvenience from construction.</i></p>	<p>The inclusion of a left hand turn lane into Jetty Road would be unlikely to allow the dedicated left turn lanes from Portarlington Road into High Street and from High Street into Reserve Road to be removed. Under Vicroads’ proposal (which discontinues the southern end of Jetty Road), a significant proportion of traffic turning left from Portarlington Road to High Street continues to Drysdale town centre. The left turning traffic does not all continue left to Reserve Road/Jetty Road.</p> <p>Similarly, a significant amount of traffic exits the Peninsula Drive extension (from the schools/sports precinct), heads straight through (northbound) to High Street and then turns left at the Reserve Road extension to access Jetty Road. Therefore, even if the Jetty Road slip lane proposal were included, there would be a significant demand for the left-turn movement at the High Street/Reserve Road extension intersection and the left turn slip lanes would need to be retained.</p>
<p><i>The acquisition of land for these dedicated turn lanes will no longer be necessary further reducing the cost of and inconvenience from construction. Without dedicated left hand turn lanes, the two proposed intersections will be smaller thus improving safety for pedestrians, cyclists and vehicular traffic.</i></p>	<p>As noted above, a Jetty Road slip lane would not negate the need for the left turn slip lanes, and therefore there would not be the follow on benefits suggested by the submitter in relation to land take savings, cost savings and safety improvements.</p>

Amendment C369 to the Greater Geelong Planning Scheme

Drysdale Bypass

Issue	Response
<p><i>Access to and from the service station by large B double trailers, nearby businesses and property owners along Jetty Road will be improved rather than disadvantaged.</i></p>	<p>I have not had the opportunity to review the service station plans or undertake any swept path diagrams to determine whether large B double trailers can access the site currently via Jetty Road, or whether they will be able to continue to do so via High Street.</p> <p>However I note that VicRoads' gazetted B-Double network map includes High Street and Grubb Road as suitable for B-double access, but does not nominate Jetty Road, and accordingly large B-double trailers would not be able to legally enter Jetty Road to access the service station site currently anyway, so the proposed closure of the southern end of Jetty Road would not impact B-double access to the service station.</p>
<p><i>The proposed intersection between the extension of Reserve Road and Jetty Road be changed to a roundabout.</i></p>	<p>While this option may provide time savings for northbound traffic flow on Jetty Road, it would change the priorities at the intersection, with Reserve Road extension traffic needing to give way to Jetty Road traffic heading south. This arrangement may cause confusion in terms of the connectivity of Jetty Road south (which would still be a no-through-road for southbound traffic). The intersection treatment would also be a higher cost and require more land than the current proposed reverse priority T intersection treatment.</p>
<p><i>Currently access to Peninsula Drive is fed into Anderson Road from Grubb Road and Princess Street. Under the proposed entry to the school precinct, all traffic will enter via Grubb Road. The traffic congestion at peak times potentially is an unsafe environment for pedestrians and cyclists. As the population increases with adjacent development there will be an increase in the number of cars and buses using this access.</i></p>	<p>The proposed Peninsula Drive extension essentially replaces what is already there in terms of school access.</p> <p>However, it is acknowledged that some vehicles currently access the schools precinct via the western end of Andersons Road (from Princess Street). VicRoads' proposal allows for parents to enter from Princess Street via Jones Road, Bridge Street, Reserve Road and Gillies Road, and specifically provides parking spaces on Andersons Road as well as a pedestrian underpass to accommodate drop-offs in this location.</p> <p>However, I note that this route currently includes unsealed roads. Accordingly I recommend that traffic volumes be monitored before and after the bypass construction to determine whether increased maintenance and/or sealing may be required.</p> <p>With regard to the submitter's proposals in relation to circulation and construction of the Peninsula Drive extension to Belchers Road (and upgrades to the Belchers Road/Grubb Road intersection, etc.), I support these works, but note that the existing issues around the school precinct will not be made worse by the bypass, and accordingly the works need to be addressed separately to the bypass project. I also note that they are shown on Council's masterplan for the sports precinct.</p>

7 Summary of Opinions

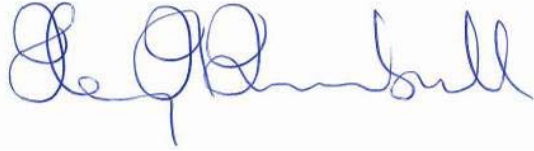
Having inspected the site, perused relevant documents and plans and undertaken traffic engineering assessments, I am of the opinion that:

- a) the bypass project as conceived is an appropriate response to the need to provide a bypass for Drysdale,
- b) the proposed intersection treatments, including signalised intersections at High Street/Bypass/Grubb Road/Portarlinton Road and at Reserve Road/High Street are acceptable treatments and will continue to function efficiently even under predicted 2046 traffic volumes,
- c) the design should be modified to provide for earthworks and an allowance in the future for four traffic lanes beyond Murradoc Road,
- d) the underpass connecting from the northern end of Peninsula Drive to Anderson Street should not be a road underpass as it does not provide suitable road access to the town at this location, however, to work well, the following should be considered as part of the design:
 - i) the underpass should be at-grade and wide (in the order of 5 – 6 metres), providing for a separate pedestrian walkway (say 2 metres) and two-way cycle lanes,
 - ii) the underpass should link in well with pedestrian/cycle connections to the town centre,
- e) what is currently shown in terms of drop-off/pick-up arrangements for the school precinct on the northern side of the bypass (including approximately 20 parallel parking bays with vehicles required to continue for over 300 metres past the last space to the court bowl to turn around) is not sufficient,
- f) the footpath on the south side of Andersons Road is appropriately located, however, in order for the northern drop-off proposal and underpass to have the best chance of functioning well, the following is recommended:
 - i) additional car parking should be provided to cater for pick-up time, when parents typically arrive before school finishes and park for longer periods (particularly for primary school aged children),
 - ii) better provision should be made for vehicles undertaking U-turns, and
 - iii) the unsealed road access to this area is not particularly compatible with frequent use as a school pick-up/drop-off area, and sealing of the access roads (connecting between Andersons Road and Princess Street in particular) should be considered to support the drop-off and underpass, and
- g) the planned Peninsula Drive-Belchers Road connection is an important link to support the schools and sports precinct and should be given high priority, but the need for the link is not attributable to the bypass project.

Amendment C369 to the Greater Geelong Planning Scheme

Drysdale Bypass

I have made all the inquiries that I believe are desirable and appropriate and there are no matters of significance which I regard as relevant which, to the best of my knowledge, have been withheld from the Panel.

A handwritten signature in blue ink, appearing to read 'H. H. Turnbull', is centered on the page.

HENRY H TURNBULL, RFD

B.E.(Civil), M.I.E.Aust., M.I.T.E., F.V.P.E.L.A.

20th July, 2017

Appendix A: Practice Note – PNVCAT2 Expert Evidence

Amendment C369 to the Greater Geelong Planning Scheme

Drysdale Bypass

STATEMENT OF WITNESS

Name

Henry Hume Turnbull

Position

Principal Consultant, Traffix Group

Address

Suite 8, 431 Burke Road

GLEN IRIS

VICTORIA 3146

Qualifications

My qualifications and membership of professional associations are as follows:-

- My educational qualifications and membership of professional associations are as follows:-
- Bachelor of Civil Engineering, University of Melbourne
- Life Member, Institute of Transportation Engineers
- Member, Institution of Engineers, Australia
- Life Fellow, Victorian Planning & Environmental Law Association

Experience

I have approximately 40 years' experience in Engineering including:

- ten years Country Roads Board of Victoria,
- two years with TTM Consulting, and
- twenty-eight years with Turnbull Fenner Pty Ltd/Traffix Group Pty Ltd.
- Additional activities and appointments include:-
- Member, Planning Panels Victoria (since 1982)
Department of Planning & Community Development
- Member, Priority Development Panel (2004 - 2010)
- Councillor, Shire of Euroa (1980-1983)
Shire President (1982-1983)
- President, Victorian Planning and Environmental Law Association (1999-2002)
Life Fellow, Victorian Planning and Environmental Law Association (2003)
- Bail Justice (Victoria)

Area of Expertise

I have substantial experience and expertise in major road design and construction, contract administration, road construction material and construction methods, development impact assessment, including traffic generation and parking generation characteristics, traffic management and general traffic engineering, road safety and transportation planning.

Amendment C369 to the Greater Geelong Planning Scheme

Drysdale Bypass

I was a member of the former Ministers for Planning Advisory Committees making a review of Clause 52.06 (Car Parking) that led to changes being incorporated into the scheme on 5th June, 2012.

Disclosure of Interests

I disclose that I have no private relationship with the Planning Scheme Amendment applicant. Traffix Group has worked with VicRoads in the past.

These relationships have not impacted on my ability to provide impartial Expert Evidence to the Panel.

Engagement and Scope of Report

I was retained by HWL Ebsworth Lawyers on behalf of VicRoads in June 2017 to undertake traffic engineering assessments and prepare traffic evidence in relation to Amendment C369 to the Greater Geelong Planning Scheme.

Facts and Assumptions

As detailed in evidence.

Reference Documents

I have reviewed the following documents as part of my assessment:

- Amendment C369 Explanatory Report and various material including supporting documents,
- Alignment Plan 60528402-SKE-0003 prepared by VicRoads,
- Drysdale Bypass Consolidated Options Assessment prepared by GHD (April 2017),
- Drysdale Clifton Springs Sports Precinct Master Plan 2011,
- Jetty Road Urban Growth Plan (amended September 2008),
- Relevant sections of the Greater Geelong Planning Scheme, and
- Relevant experience.

Summary of Opinions

See Conclusions section of the evidence statement.

Provisional Opinions

Not applicable.

Identity of Persons Undertaking Work

Henry H Turnbull as per the evidence statement.

Jodie Place (Associate, Traffix Group) assisted with preparation of the evidence report.

Report Completeness

Final report.

Appendix B: CV



Curriculum Vitae Henry Turnbull



Position Principal Consultant

Contact Details (03) 9822 2888
henry@traffixgroup.com.au

Qualifications Bachelor of Civil Engineering (Melbourne University)

Professional Affiliations Life Member, Institute of Transportation Engineers
Member, Institution of Engineers Australia
Life Fellow, Victorian Planning and Environmental Law Association (VPELA)

Work Experience Traffix Group (1988 – current)
TTM Consulting Pty Ltd (1986 – 1988)
Peat Marwick Hungerfords (1982 – 1986)
Country Roads Board (1972 – 1982)

Transport Planning

- Skills & Experience**
- Preparation of Traffic Impact Assessment Reports (TIAR) and Evidence for presentation at VCAT and Planning Panels for a range of land-use developments.
 - Other significant commissions include:
 - Co-ordination of a development contribution plan for the City of Maribyrnong including extensive traffic investigations and assessments.
 - Preparation of Parking Precinct Plans for Ocean Grove and Belmont (City of Greater Geelong).
 - TAC funding strategies and priority assessment for VicRoads – Northern Region.
 - Preston and Fairfield Parking and Access Strategy Studies including Parking Precinct Plans.
 - Preparation of transport planning studies and Integrated Travel Plans including consideration of sustainable transport modes and green travel plans, pedestrian access, bicycle paths, parking and access to public transport.
 - Provision of advice on traffic engineering and transport planning issues for major infrastructure projects for government and private clients.
 - Extensive stakeholder interaction and consultation with community bodies on technical transport issues and project planning issues.
 - Management of numerous other projects including local and district traffic management studies, heavy vehicle route assessments, pedestrian safety research, public transport passenger surveys and route studies, property rezoning and health care projects.

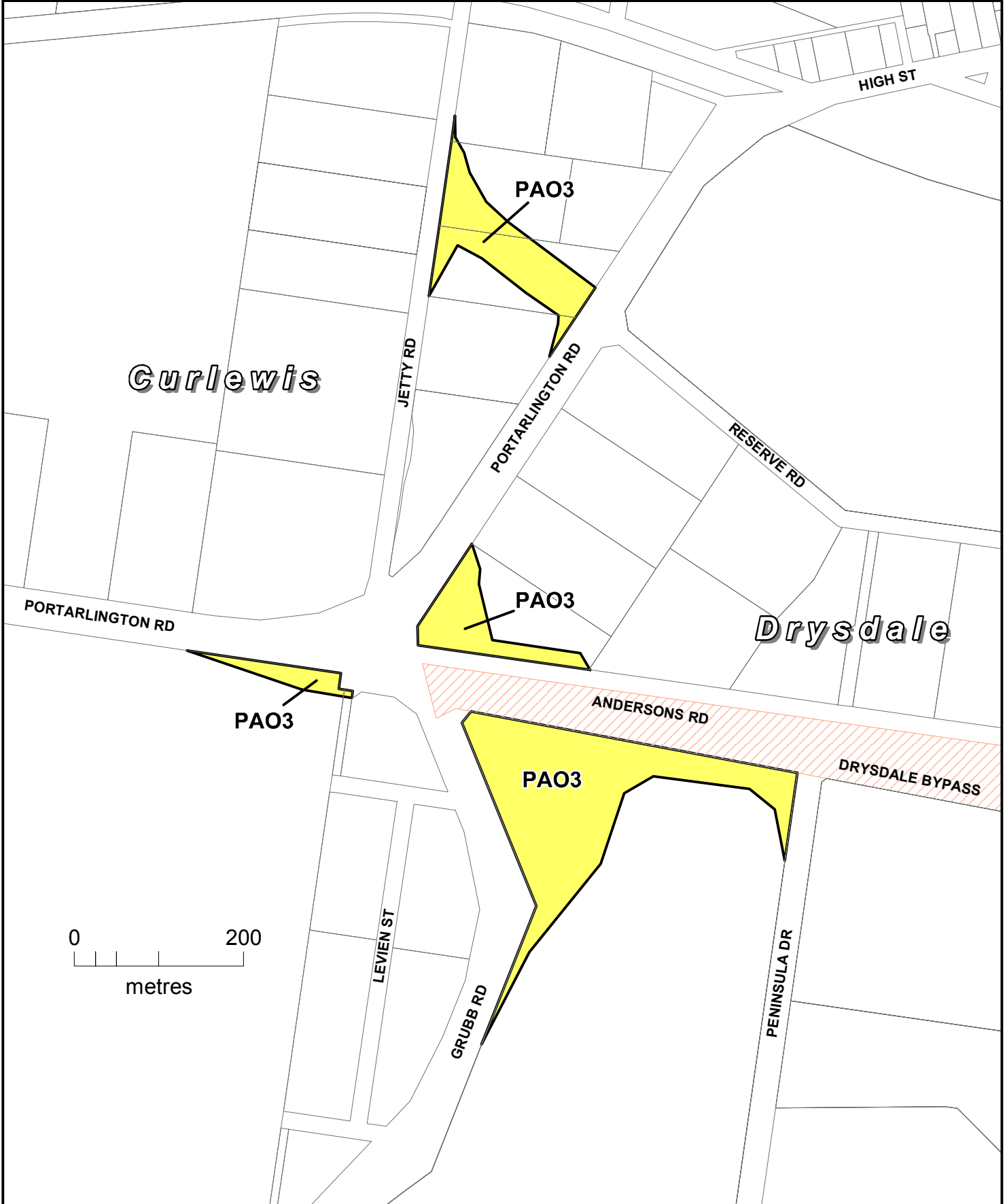
Strategic Planning & Statutory Planning

- Skills & Experience**
- Regularly appointed as a Planning Panel member by the Minister for Planning with over thirty years experience as a sessional Planning Panel member.
 - Relevant major Panels and Advisory Committees include:
 - Armstrong Creek Urban Framework Plan
 - Armstrong Creek North East Industrial Precinct Structure Plan.
 - Traralgon Bypass.
 - Webb Dock EES.
 - Melbourne Airport Rail Link.
 - Served successive Governments on Advisory Committees to assist with policy development, including the:
 - Priority Development Panel Steering Committee on the development of Practice Notes for Parking Precinct Plans.
 - Advisory Committee reviewing Clause 52.06 Carparking in the VPPs.
 - Significant experience and expertise in the provision of traffic engineering and transport planning advice to support the development of structure plans, site/precinct plans and development contribution plans.
 - Skills include working as part of project teams, analysis and design of transport projects and consultation with stakeholders and the community.
 - Relevant projects include:
 - Toolern Structure Plan.
 - Greenvale R1 Precinct Structure Plan.
 - Greenvale R3 Precinct Structure Plan.
 - Sale, Wurruk and Longford Structure Plan.

Significant Appointments Member Planning Panels Victoria (since 1982)
Member Priority Development Panel (2004 - 2010)
Member Growth Areas Authority Expert Panels for Urban Planning and Urban Design. (Appointed 2010)

Key Activities Councillor, Shire of Euroa, 1980 – 1983 (Shire President, 1982 – 1983)
President, VPELA, 1999 - 2002
Bail Justice (Victoria)

Appendix C: PAO3 Maps



LEGEND



PROPOSED PUBLIC ACQUISITION OVERLAY 3

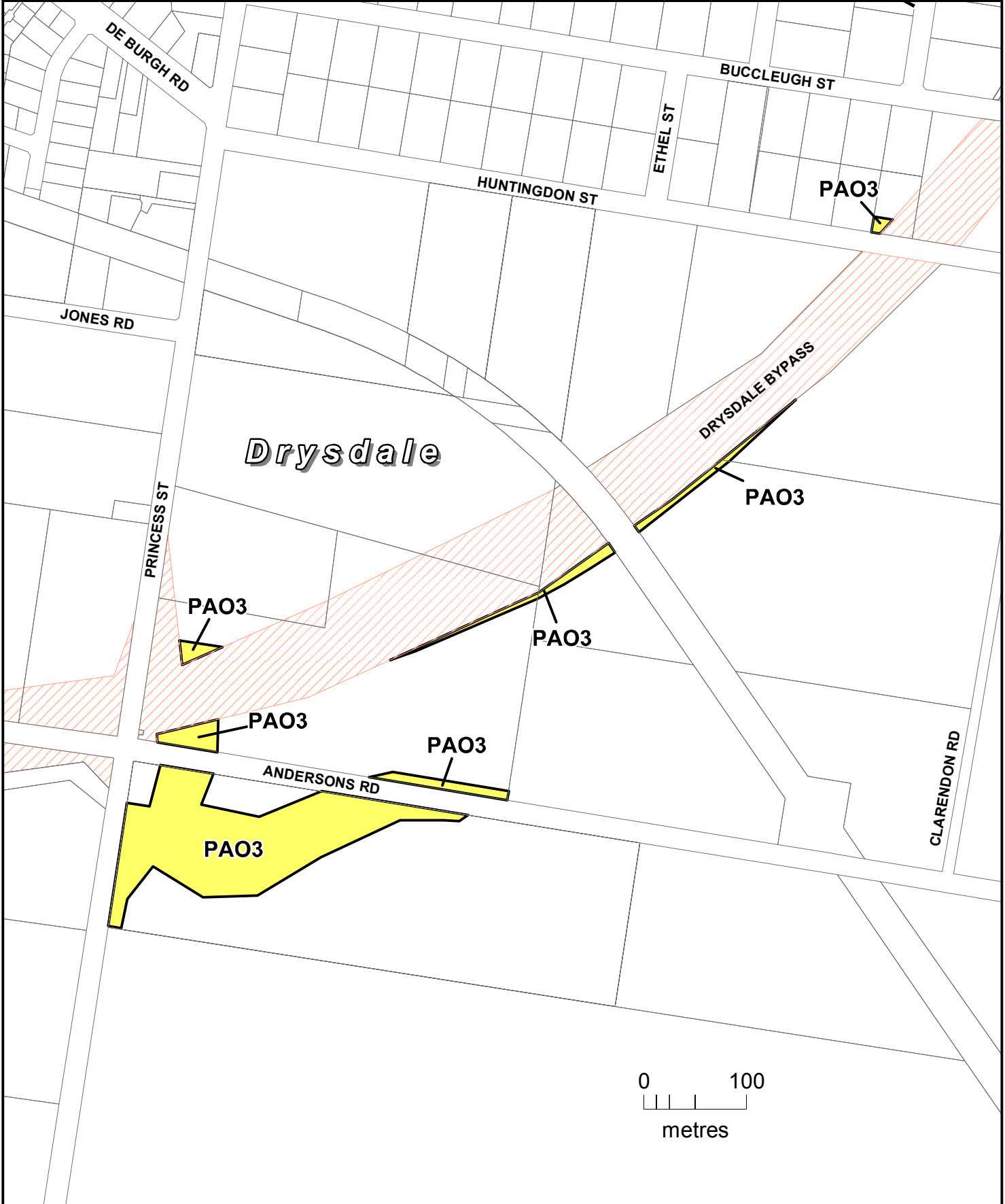


EXISTING PAO3

Part of Planning Scheme Map 59PAO



GREATER GEELONG PLANNING SCHEME



LEGEND



PROPOSED PUBLIC ACQUISITION OVERLAY 3

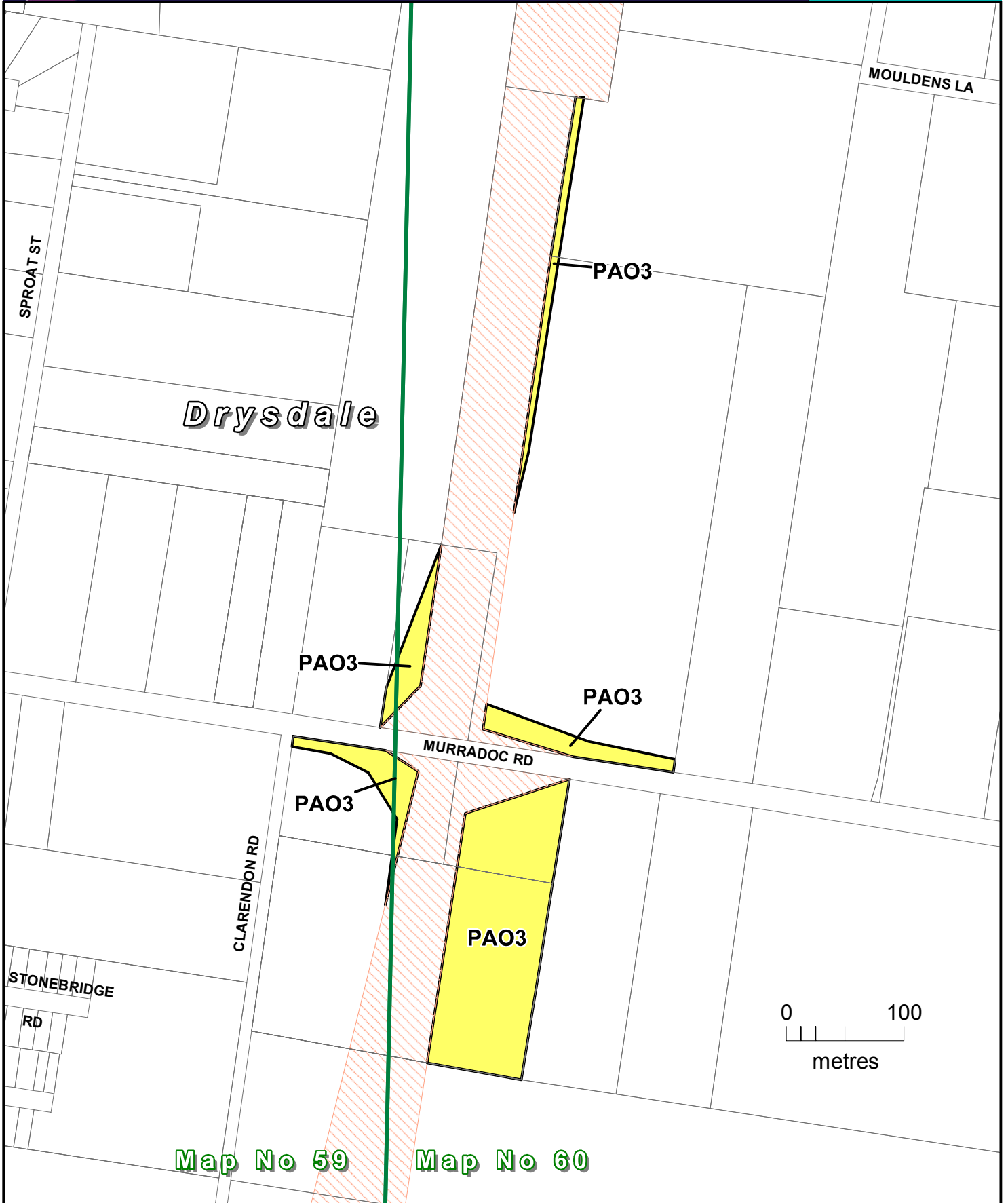


EXISTING PAO3

Part of Planning Scheme Map 59PAO



GREATER GEELONG PLANNING SCHEME



LEGEND

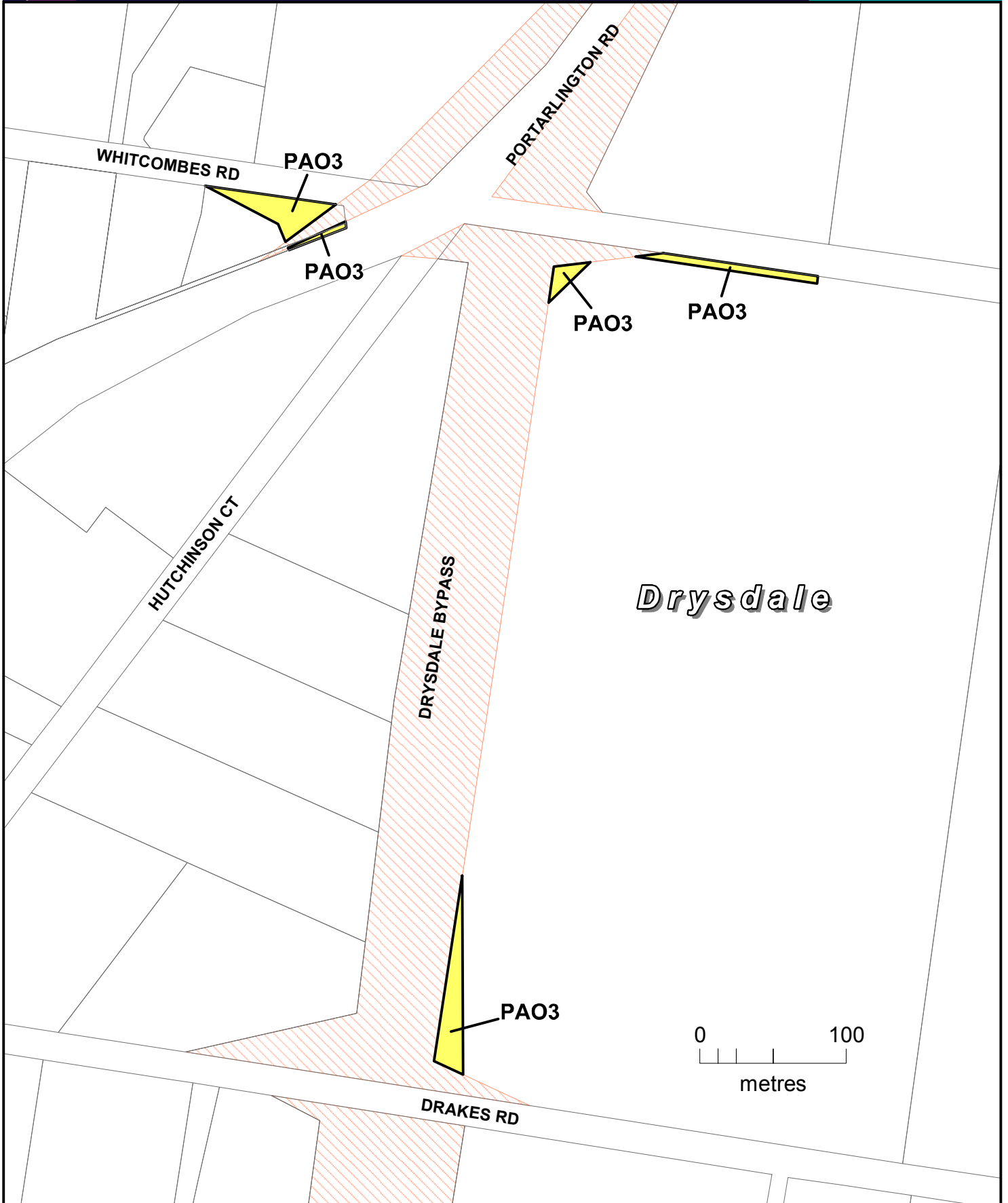
Part of Planning Scheme Maps 59PAO & 60PAO

 PAO3 PROPOSED PUBLIC ACQUISITION OVERLAY 3

 EXISTING PAO3



GREATER GEELONG PLANNING SCHEME



LEGEND

Part of Planning Scheme Map 60PAO

-  PAO3 PROPOSED PUBLIC ACQUISITION OVERLAY 3
-  EXISTING PAO3



Appendix D: Bypass Alignment Plan



Appendix E: 2046 Peak Hour Traffic Volumes

Figure 3 Estimated 2046 AM Peak Traffic Volumes

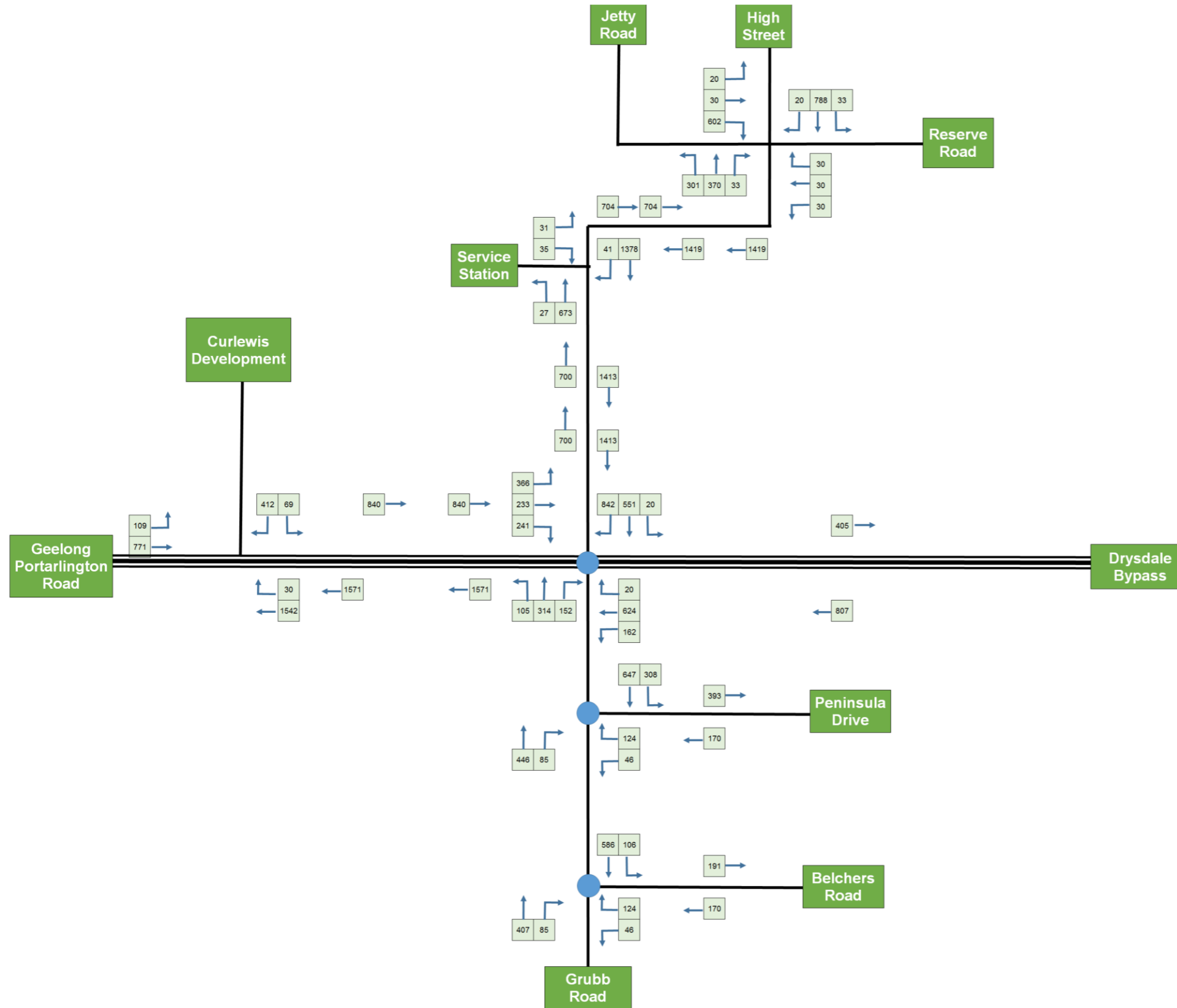
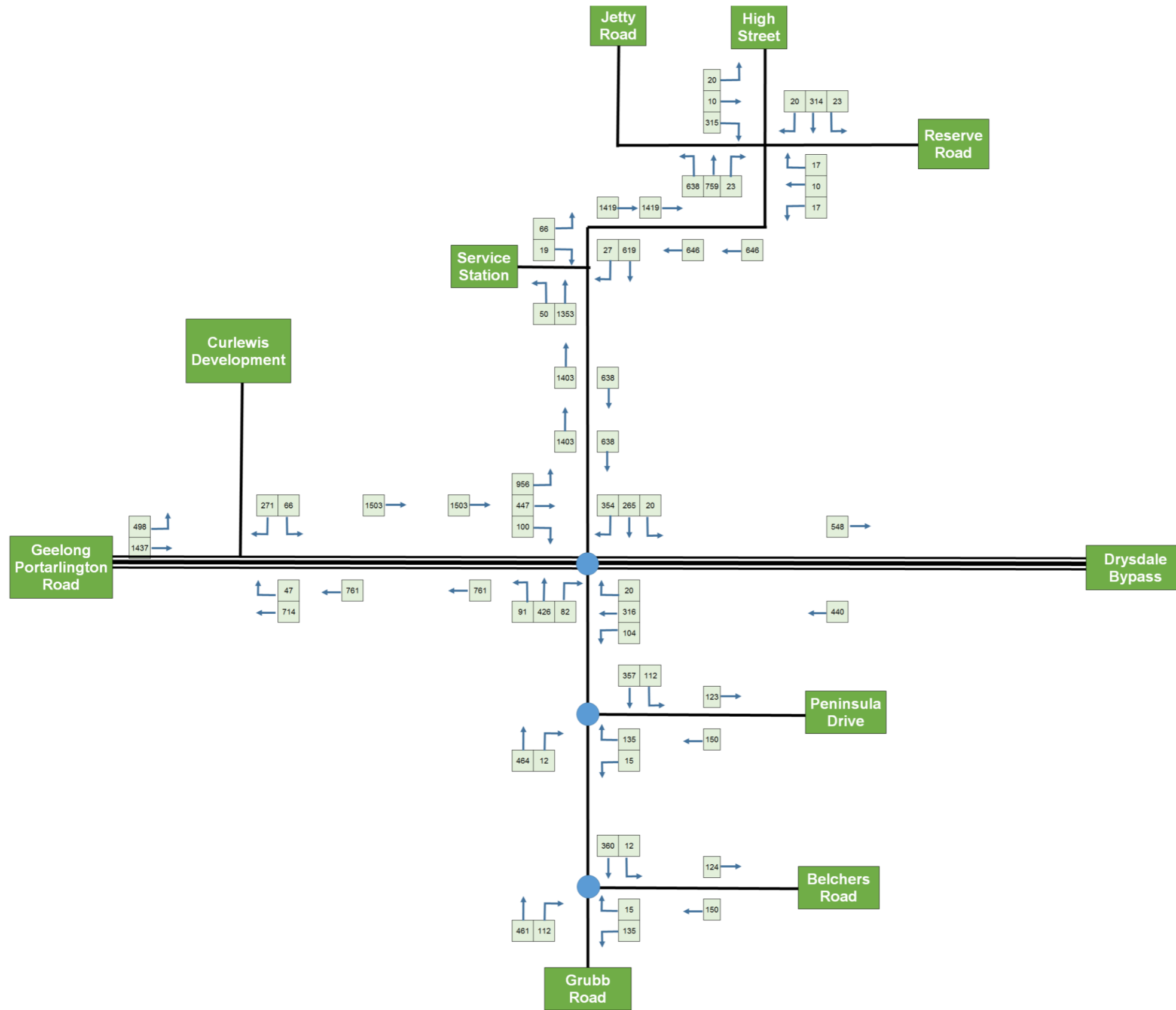


Figure 4 Estimated 2046 PM Peak Traffic Volumes

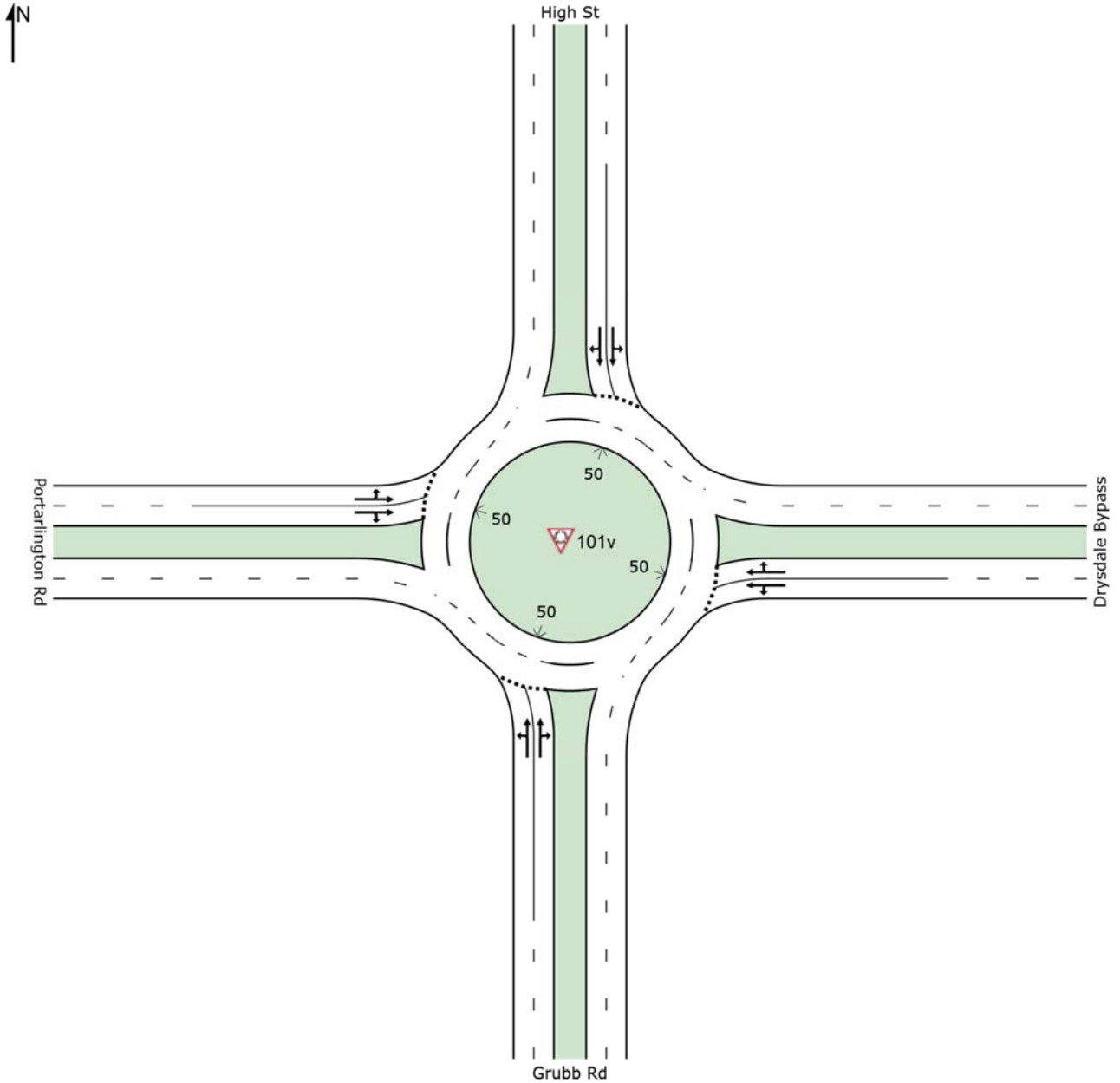


Appendix F: SIDRA Output

SITE LAYOUT

 Site: 101v [Drysdale Bypass-Grubb Rd - AM Roundabout]

New Site
Roundabout



MOVEMENT SUMMARY

Site: 101v [Drysdale Bypass-Grubb Rd - AM Roundabout]

Network: N101 [AM Roundabout]

New Site
Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Grubb Rd													
1	L2	111	2.0	111	2.0	0.617	17.2	LOS B	6.0	42.8	1.00	1.17	44.4
2	T1	331	2.0	331	2.0	0.617	17.7	LOS B	6.0	42.8	0.99	1.16	45.0
3	R2	160	2.0	160	2.0	0.617	28.5	LOS C	4.9	34.9	0.97	1.15	41.8
Approach		601	2.0	601	2.0	0.617	20.5	LOS C	6.0	42.8	0.99	1.16	44.0
East: Drysdale Bypass													
4	L2	171	2.0	171	2.0	1.004	75.5	LOS F	26.8	191.0	1.00	2.14	18.4
5	T1	657	2.0	657	2.0	1.004	79.9	LOS F	26.8	191.0	1.00	2.03	27.3
6	R2	21	2.0	21	2.0	1.004	92.7	LOS F	19.2	136.4	1.00	1.92	26.6
Approach		848	2.0	848	2.0	1.004	79.3	LOS F	26.8	191.0	1.00	2.05	25.8
North: High St													
7	L2	21	2.0	21	2.0	0.737	11.2	LOS B	7.8	55.7	0.90	1.08	52.0
8	T1	580	2.0	580	2.0	0.737	10.7	LOS B	7.8	55.7	0.90	1.08	45.6
9	R2	886	2.0	886	2.0	0.841	19.4	LOS B	12.8	91.4	0.96	1.19	49.5
Approach		1487	2.0	1487	2.0	0.841	15.9	LOS B	12.8	91.4	0.93	1.15	48.5
West: Portarlington Rd													
10	L2	385	2.0	385	2.0	0.446	4.5	LOS A	2.9	20.4	0.69	0.53	54.9
11	T1	245	2.0	245	2.0	0.446	4.4	LOS A	2.9	20.4	0.70	0.65	55.6
12	R2	254	2.0	254	2.0	0.446	12.1	LOS B	2.8	19.7	0.70	0.73	46.4
Approach		884	2.0	884	2.0	0.446	6.7	LOS A	2.9	20.4	0.69	0.62	53.3
All Vehicles		3821	2.0	3821	2.0	1.004	28.6	LOS C	26.8	191.0	0.90	1.23	40.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

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

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

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 5 (maximum specified: 10)

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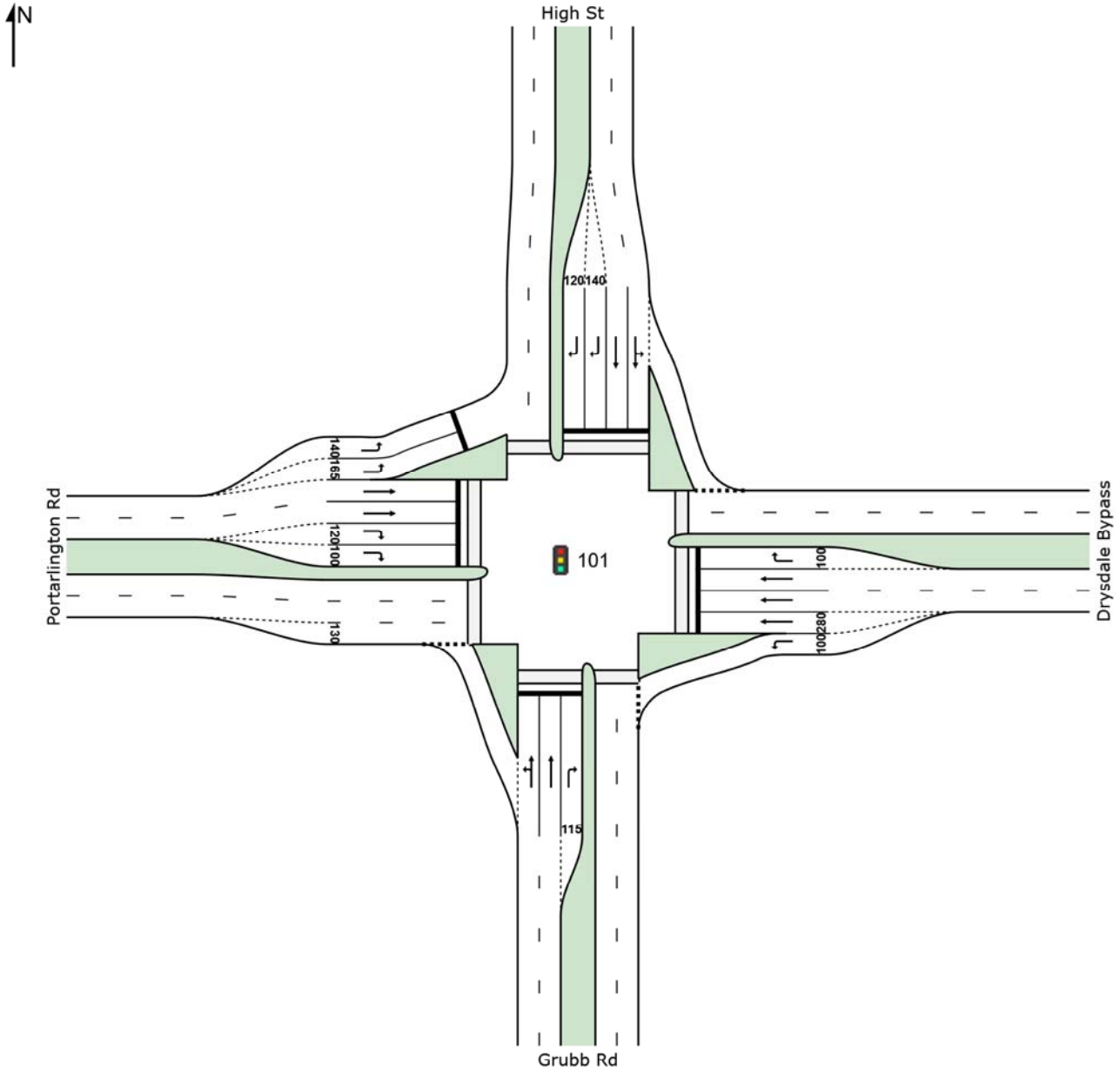
Organisation: TRAFFIX GROUP PTY LTD | Processed: Wednesday, 19 July 2017 4:18:14 PM

Project: P:\Synergy\Projects\GRP2\GRP23052\07-Analysis\SIDRA\Grubb Rd Intersection.sip7

SITE LAYOUT

 Site: 101 [Drysdale Bypass-Grubb Rd - AM Signals]

New Site
Signals - Fixed Time Isolated



PHASING SUMMARY

Site: 101 [Drysdale Bypass-Grubb Rd - AM Signals]

Network: N101 [AM Signals]

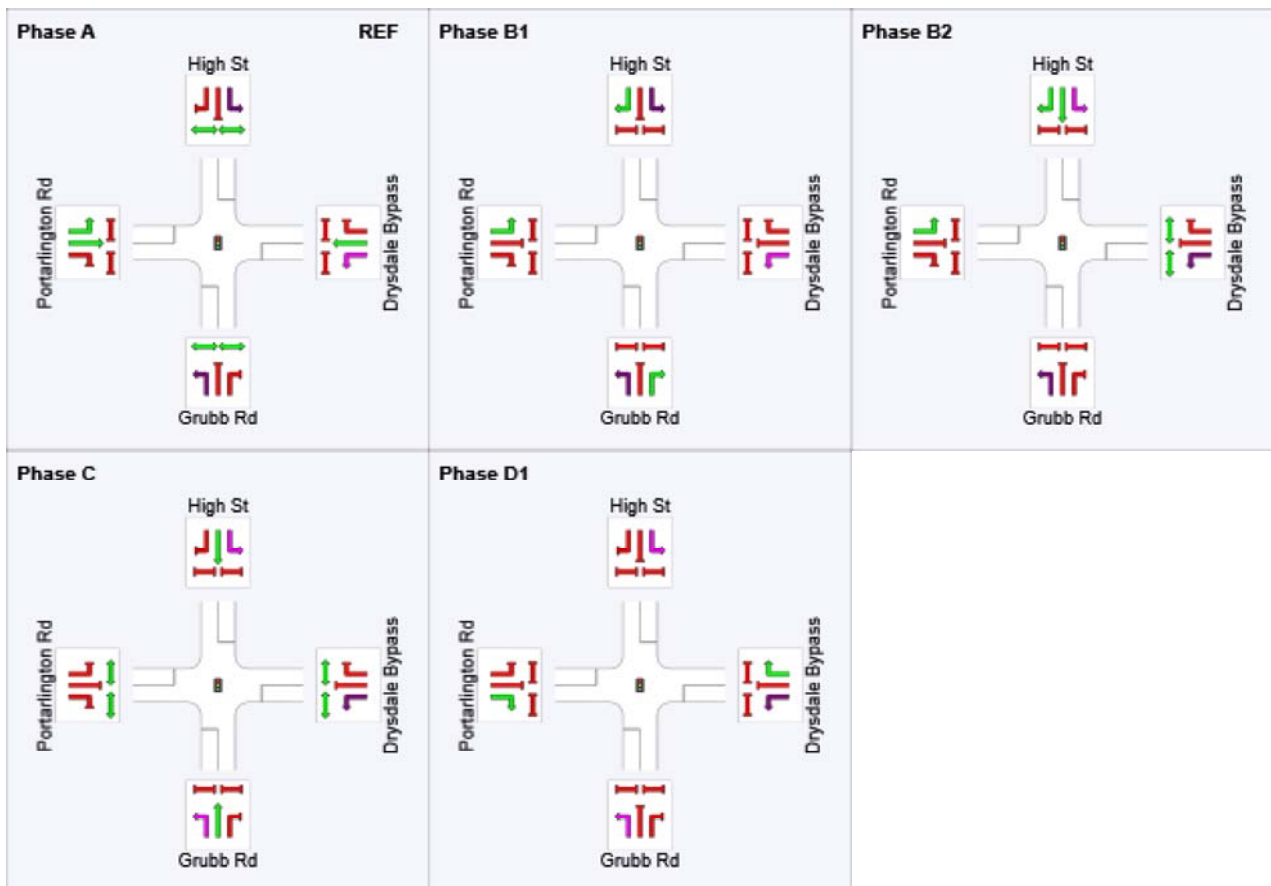
New Site
 Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Cycle Time)

Phase Times determined by the program
 Phase Sequence: Sequence1 (phase reduction applied)
 Reference Phase: Phase A
 Input Phase Sequence: A, B1, B2, C, D1, D2
 Output Phase Sequence: A, B1, B2, C, D1

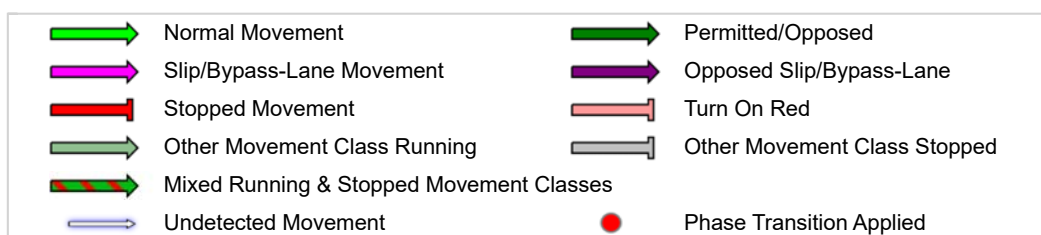
Phase Timing Results

Phase	A	B1	B2	C	D1
Phase Change Time (sec)	0	22	43	59	75
Green Time (sec)	16	15	10	10	9
Phase Time (sec)	22	21	16	16	15
Phase Split	24%	23%	18%	18%	17%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.



REF: Reference Phase
 VAR: Variable Phase



MOVEMENT SUMMARY

Site: 101 [Drysdale Bypass-Grubb Rd - AM Signals]

Network: N101 [AM Signals]

New Site

Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Grubb Rd													
1	L2	111	2.0	111	2.0	0.485	19.0	LOS B	9.2	65.7	0.78	0.72	43.9
2	T1	331	2.0	331	2.0	0.485	22.5	LOS C	9.2	65.7	0.85	0.73	38.9
3	R2	160	2.0	160	2.0	0.524	43.8	LOS D	6.6	47.3	0.96	0.80	29.6
Approach		601	2.0	601	2.0	0.524	27.5	LOS C	9.2	65.7	0.87	0.75	36.6
East: Drysdale Bypass													
4	L2	171	2.0	171	2.0	0.142	9.4	LOS A	2.2	15.4	0.38	0.65	46.0
5	T1	657	2.0	657	2.0	0.700	38.9	LOS D	10.4	74.1	0.98	0.84	36.7
6	R2	21	2.0	21	2.0	0.115	46.9	LOS D	0.9	6.2	0.94	0.70	33.6
Approach		848	2.0	848	2.0	0.700	33.2	LOS C	10.4	74.1	0.86	0.80	37.5
North: High St													
7	L2	21	2.0	21	2.0	0.519	32.4	LOS C	10.2	72.8	0.86	0.79	41.3
8	T1	580	2.0	580	2.0	0.519	28.0	LOS C	10.7	76.4	0.88	0.77	31.9
9	R2	886	2.0	886	2.0	0.703	33.5	LOS C	17.1	121.6	0.92	0.85	38.7
Approach		1487	2.0	1487	2.0	0.703	31.3	LOS C	17.1	121.6	0.91	0.82	36.8
West: Portarlington Rd													
10	L2	385	2.0	385	2.0	0.179	14.7	LOS B	3.8	27.3	0.49	0.69	47.9
11	T1	245	2.0	245	2.0	0.358	35.9	LOS D	4.8	34.5	0.92	0.73	37.9
12	R2	254	2.0	254	2.0	0.693	51.5	LOS D	5.8	41.6	1.00	0.85	22.7
Approach		884	2.0	884	2.0	0.693	31.1	LOS C	5.8	41.6	0.76	0.75	37.6
All Vehicles		3821	2.0	3821	2.0	0.703	31.1	LOS C	17.1	121.6	0.85	0.79	37.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

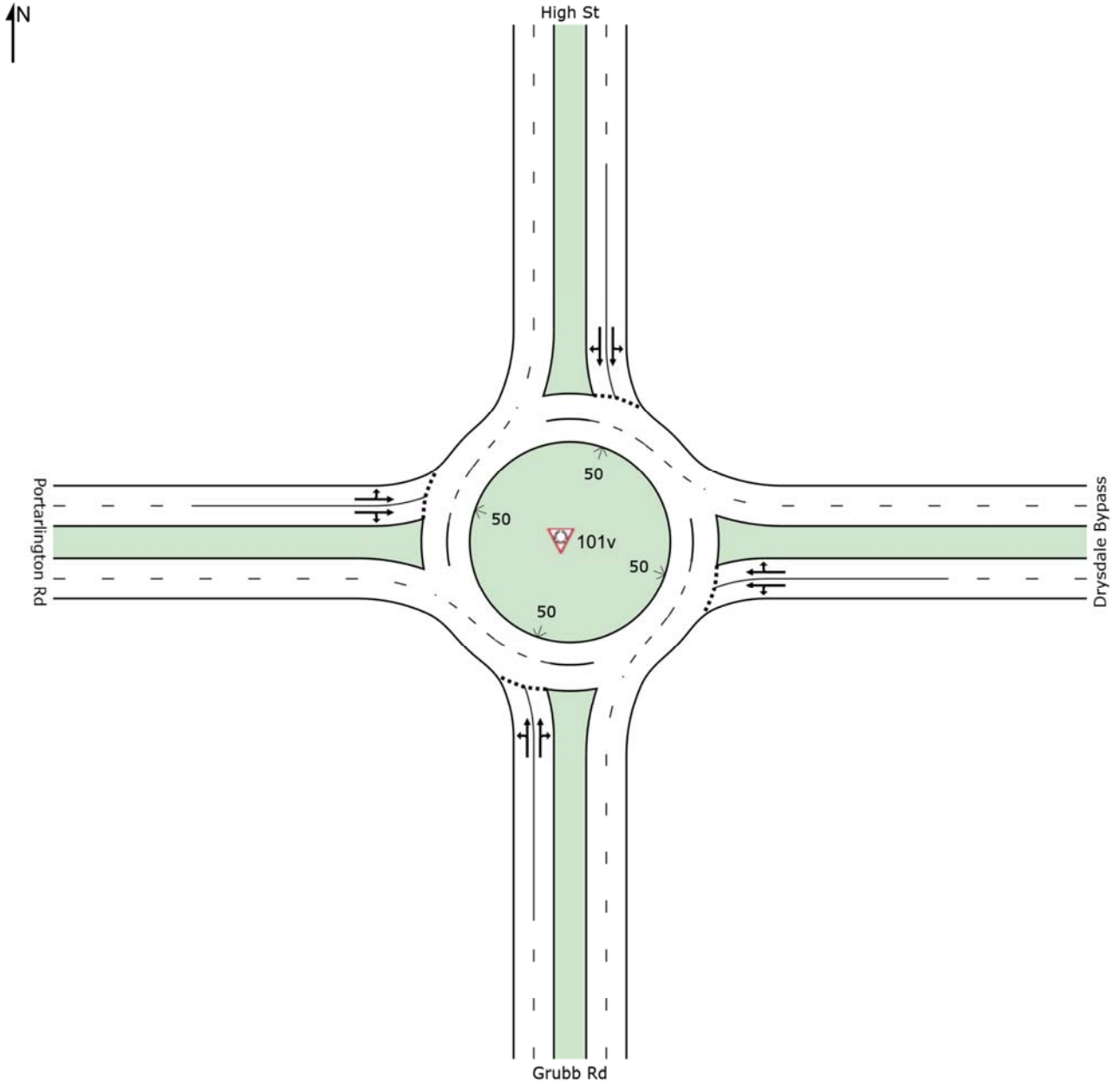
Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate	
		ped/h	sec		Pedestrian	m		per ped	
P11	South Stage 1	53	36.5	LOS D	0.1	0.1	0.90	0.90	
P12	South Stage 2	53	33.9	LOS D	0.1	0.1	0.87	0.87	
P21	East Stage 1	53	29.7	LOS C	0.1	0.1	0.81	0.81	
P22	East Stage 2	53	25.7	LOS C	0.1	0.1	0.76	0.76	
P31	North Stage 1	53	38.4	LOS D	0.1	0.1	0.92	0.92	
P32	North Stage 2	53	33.9	LOS D	0.1	0.1	0.87	0.87	
P41	West Stage 1	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P42	West Stage 2	53	39.3	LOS D	0.1	0.1	0.94	0.94	

SITE LAYOUT

 Site: 101v [Drysdale Bypass-Grubb Rd - PM Roundabout]

New Site
Roundabout



MOVEMENT SUMMARY

Site: 101v [Drysdale Bypass-Grubb Rd - PM Roundabout]

Network: N101 [PM Roundabout]

New Site
Roundabout

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Grubb Rd													
1	L2	96	2.0	96	2.0	0.342	5.3	LOS A	2.1	14.7	0.70	0.54	52.6
2	T1	448	2.0	448	2.0	0.342	5.1	LOS A	2.1	14.7	0.70	0.60	54.8
3	R2	86	2.0	86	2.0	0.342	13.0	LOS B	1.9	13.6	0.71	0.68	55.2
Approach		631	2.0	631	2.0	0.342	6.2	LOS A	2.1	14.7	0.70	0.60	54.6
East: Drysdale Bypass													
4	L2	109	2.0	109	2.0	0.263	4.9	LOS A	1.5	10.9	0.69	0.52	49.5
5	T1	333	2.0	333	2.0	0.263	4.8	LOS A	1.5	10.9	0.70	0.55	56.6
6	R2	21	2.0	21	2.0	0.263	12.6	LOS B	1.4	10.0	0.70	0.58	57.5
Approach		463	2.0	463	2.0	0.263	5.2	LOS A	1.5	10.9	0.70	0.55	55.5
North: High St													
7	L2	21	2.0	21	2.0	0.408	7.2	LOS A	2.9	20.6	0.83	0.69	53.7
8	T1	279	2.0	279	2.0	0.408	6.6	LOS A	3.2	22.8	0.83	0.69	48.0
9	R2	373	2.0	373	2.0	0.408	13.1	LOS B	3.2	22.8	0.84	0.82	52.9
Approach		673	2.0	673	2.0	0.408	10.2	LOS B	3.2	22.8	0.84	0.77	51.6
West: Portarlinton Rd													
10	L2	1006	2.0	1006	2.0	0.902	13.0	LOS B	15.8	112.3	0.96	1.23	50.1
11	T1	471	2.0	471	2.0	0.675	7.6	LOS A	5.8	41.6	0.82	0.91	55.0
12	R2	105	2.0	105	2.0	0.675	15.0	LOS B	5.8	41.6	0.82	0.91	47.0
Approach		1582	2.0	1582	2.0	0.902	11.6	LOS B	15.8	112.3	0.91	1.11	51.4
All Vehicles		3348	2.0	3348	2.0	0.902	9.4	LOS A	15.8	112.3	0.83	0.87	52.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

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

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

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 5 (maximum specified: 10)

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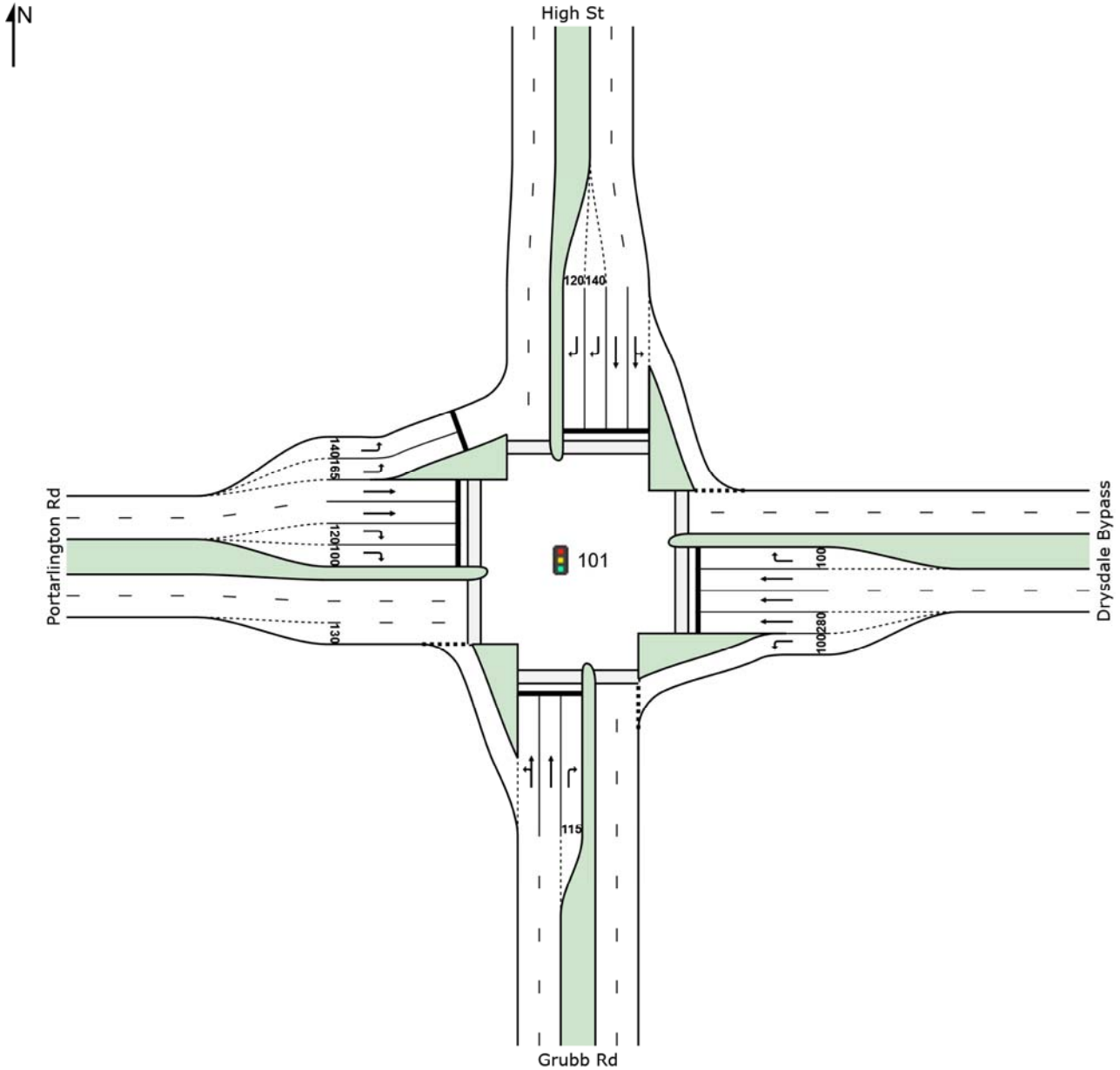
Organisation: TRAFFIX GROUP PTY LTD | Processed: Wednesday, 19 July 2017 4:18:28 PM

Project: P:\Synergy\Projects\GRP2\GRP23052\07-Analysis\SIDRA\Grubb Rd Intersection.sip7

SITE LAYOUT

 Site: 101 [Drysdale Bypass-Grubb Rd - PM Signals]

New Site
Signals - Fixed Time Isolated



PHASING SUMMARY

Site: 101 [Drysdale Bypass-Grubb Rd - PM Signals]

Network: N101 [PM Signals]

New Site

Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Cycle Time)

Phase Times determined by the program

Phase Sequence: Sequence1 (phase reduction applied)

Reference Phase: Phase A

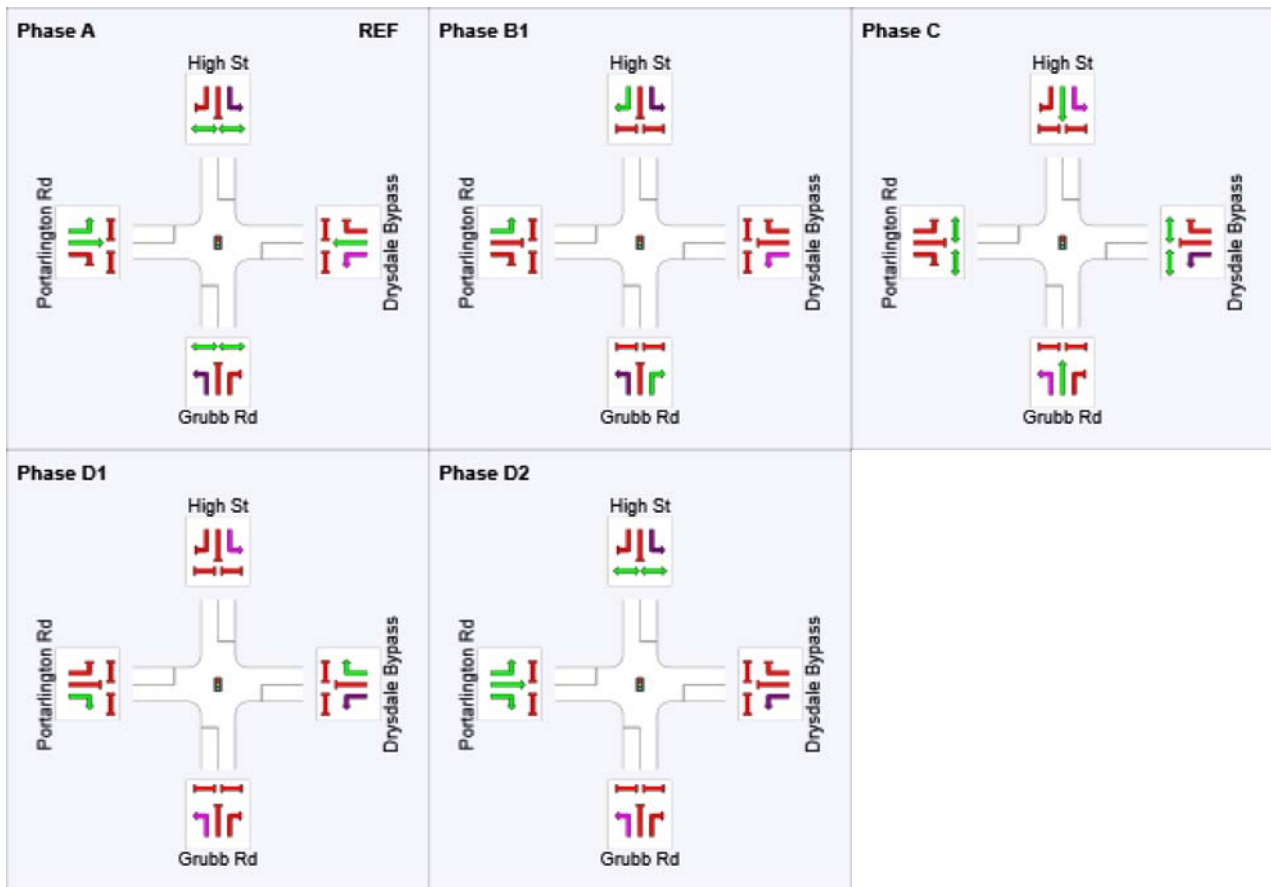
Input Phase Sequence: A, B1, B2, C, D1, D2

Output Phase Sequence: A, B1, C, D1, D2

Phase Timing Results

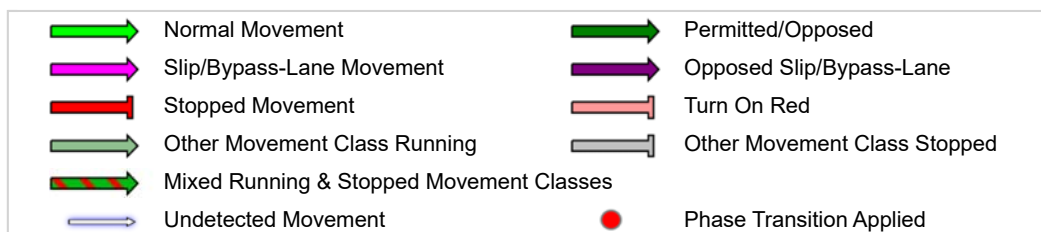
Phase	A	B1	C	D1	D2
Phase Change Time (sec)	0	17	42	67	79
Green Time (sec)	11	19	19	6	5
Phase Time (sec)	17	25	25	12	11
Phase Split	19%	28%	28%	13%	12%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.



REF: Reference Phase

VAR: Variable Phase



MOVEMENT SUMMARY

Site: 101 [Drysdale Bypass-Grubb Rd - PM Signals]

Network: N101 [PM Signals]

New Site

Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Grubb Rd													
1	L2	96	2.0	96	2.0	0.449	16.4	LOS B	8.3	59.4	0.74	0.68	46.1
2	T1	448	2.0	448	2.0	0.449	20.2	LOS C	8.3	59.4	0.81	0.71	40.5
3	R2	86	2.0	86	2.0	0.223	37.8	LOS D	3.2	22.7	0.87	0.75	31.8
Approach		631	2.0	631	2.0	0.449	22.0	LOS C	8.3	59.4	0.81	0.71	39.8
East: Drysdale Bypass													
4	L2	109	2.0	109	2.0	0.081	6.9	LOS A	0.7	5.3	0.24	0.61	49.0
5	T1	333	2.0	333	2.0	0.515	41.4	LOS D	5.2	37.1	0.98	0.77	35.8
6	R2	21	2.0	21	2.0	0.172	51.1	LOS D	0.9	6.6	0.97	0.70	32.4
Approach		463	2.0	463	2.0	0.515	33.7	LOS C	5.2	37.1	0.80	0.73	37.0
North: High St													
7	L2	21	2.0	21	2.0	0.332	23.6	LOS C	3.8	27.1	0.84	0.71	45.5
8	T1	279	2.0	279	2.0	0.332	25.3	LOS C	5.1	36.4	0.87	0.72	33.3
9	R2	373	2.0	373	2.0	0.482	40.0	LOS D	7.4	52.4	0.93	0.80	36.2
Approach		673	2.0	673	2.0	0.482	33.4	LOS C	7.4	52.4	0.90	0.76	35.7
West: Portarlington Rd													
10	L2	1006	2.0	1006	2.0	0.526	20.8	LOS C	14.5	103.2	0.71	0.79	44.3
11	T1	471	2.0	471	2.0	0.500	32.0	LOS C	9.0	64.4	0.91	0.76	39.4
12	R2	105	2.0	105	2.0	0.152	39.0	LOS D	2.0	14.0	0.87	0.73	26.7
Approach		1582	2.0	1582	2.0	0.526	25.4	LOS C	14.5	103.2	0.78	0.78	41.8
All Vehicles		3348	2.0	3348	2.0	0.526	27.5	LOS C	14.5	103.2	0.81	0.75	39.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 0.0 %

Number of Iterations: 5 (maximum specified: 10)

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P11	South Stage 1	53	39.3	LOS D	0.1	0.1	0.94	0.94	
P12	South Stage 2	53	38.4	LOS D	0.1	0.1	0.92	0.92	
P21	East Stage 1	53	35.6	LOS D	0.1	0.1	0.89	0.89	
P22	East Stage 2	53	31.3	LOS D	0.1	0.1	0.84	0.84	
P31	North Stage 1	53	33.0	LOS D	0.1	0.1	0.86	0.86	
P32	North Stage 2	53	28.9	LOS C	0.1	0.1	0.80	0.80	
P41	West Stage 1	53	35.6	LOS D	0.1	0.1	0.89	0.89	
P42	West Stage 2	53	33.9	LOS D	0.1	0.1	0.87	0.87	
All Pedestrians		421	34.5	LOS D			0.88	0.88	