VicRoads

Drysdale Bypass
Overview Traffic Modelling Report

July 2017

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Appendix A – Summary of Options Tested

1. Introduction

1.1 Qualifications and Experience

My name is Toby Cooper and:

- I am a Senior Traffic Engineer for GHD, based in the Geelong office.
- I have practised for over 16 years in traffic engineering and planning with a particular emphasis on the analysis of traffic data and preparation of detailed traffic microsimulation models.
- I hold a Bachelor of Arts degree with Honours in Economic Studies (BA (Econ) (Hons)) from the University of Manchester, United Kingdom.
- I am a member of the Australian Institute of Traffic Planning and Management.

1.2 Instructions and Purpose of this Report

I have been instructed by HWL Ebsworth Lawyers (HWLE) to prepare an explanatory report outlining the detailed traffic modelling work that GHD has undertaken to date for VicRoads over the past three years on the proposal to construct the Drysdale Bypass. This instruction specifically includes the southern part of the proposed Bypass where it would connect with the existing road network at Jetty Road, High Street, Grubb Road and Geelong Portarlington Road.

In this report I will summarise:

- Existing traffic conditions;
- An overview of the methodology used to derive future year traffic volumes;
- The use of traffic microsimulation to aid VicRoads in the design of the Drysdale Bypass interface with the local road network; and
- The key traffic results and conclusions from the analysis I conducted.

1.3 Scope and limitations

This report: has been prepared by GHD for VicRoads and may only be used and relied on by VicRoads for the purpose agreed between GHD and the VicRoads as set out in Section 1.2 of this report.

GHD otherwise disclaims responsibility to any person or entity other than VicRoads arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and recommendations in this report are derived from conditions encountered and information reviewed at the date of preparation of this report. GHD bears no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and recommendations in this report are based on assumptions made by GHD described in this report (refer Section 1.4 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by VicRoads and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1.4 Documents Used

In the preparation of my work for VicRoads I have used and reviewed the following reports:

- Geelong Growth Area Modelling (AECOM, Nov 2013);
- Drysdale Growth Area Modelling (AECOM, April 2016);
- Drysdale Growth Area Modelling, Addendum for Network Update in Jetty Road Growth Area (AECOM, August 2016); and
- Curlewis Drysdale Proposed Structure Plan Transport Provisions and Traffic Engineering Assessment (TTM Consulting, 2005).

1.5 Assumptions

The following have been assumed in the preparation of this report and in the work that I have conducted since the project inception:

- Forecast traffic volumes from the Victorian Integrated Transport Model (VITM) are representative of likely future traffic volumes in the area;
- Existing traffic data sources are correct and representative of typical traffic volumes in the area;
- Functional designs supplied by VicRoads are scaled correctly and meet the relevant Australian guidelines for road design;
- Options that were tested by GHD without a CAD design are assumed to be suitable layouts and would be subject to further design assessment by VicRoads; and
- The traffic modelling undertaken by GHD forms part of a wider multi-criteria assessment by VicRoads and should not be viewed or assessed in isolation.

1.6 Background

GHD was commissioned by VicRoads to undertake a number of traffic studies and assist in the evaluation of alternative intersections for the new Jetty Road, High Street, Grubb Road and Geelong-Portarlington Rd intersection. GHD has prepared a number of reports throughout this process including:

- Drysdale Bypass VISSIM Assessment (February 2015);
- Drysdale Bypass Business Case (September 2015);
- Drysdale Bypass VISSIM Assessment of Functional Designs (September 2016);
- Drysdale Bypass Consolidated Options Assessment (March 2017); and
- Other briefings and technical notes to VicRoads.

My specific role was to undertake detailed traffic modelling of these alternative intersection alignments and to provide advice to VicRoads on the traffic performance of each alignment. This report provides a summary of the work undertaken.

2. Study Area Description

2.1 Introduction

This section provides a brief overview of the study area.

2.2 Overview

The core focus of my traffic modelling work was the interface between the proposed Drysdale Bypass and the following roads located to the south of the main Drysdale township:

- Geelong Portarlington Road;
- High Street;
- Jetty Road; and
- Grubb Road.

Figure 1 presents an overview of the study area to show the main roads of focus as well as some of the more important land uses. The red line shows the indicative alignment of the bypass and the dashed green line shows the core area of focus for the traffic microsimulation that I undertook. The following land uses are also highlighted:

- Drysdale town centre located approximately 2km to the north of the main area of focus.
- Schools precinct: there are three schools in this location:
  - St Ignatius College
  - Bellarine Secondary College
  - St Thomas Catholic Primary School
- Future Sports Precinct.
- Curlewis Residential Development Area.

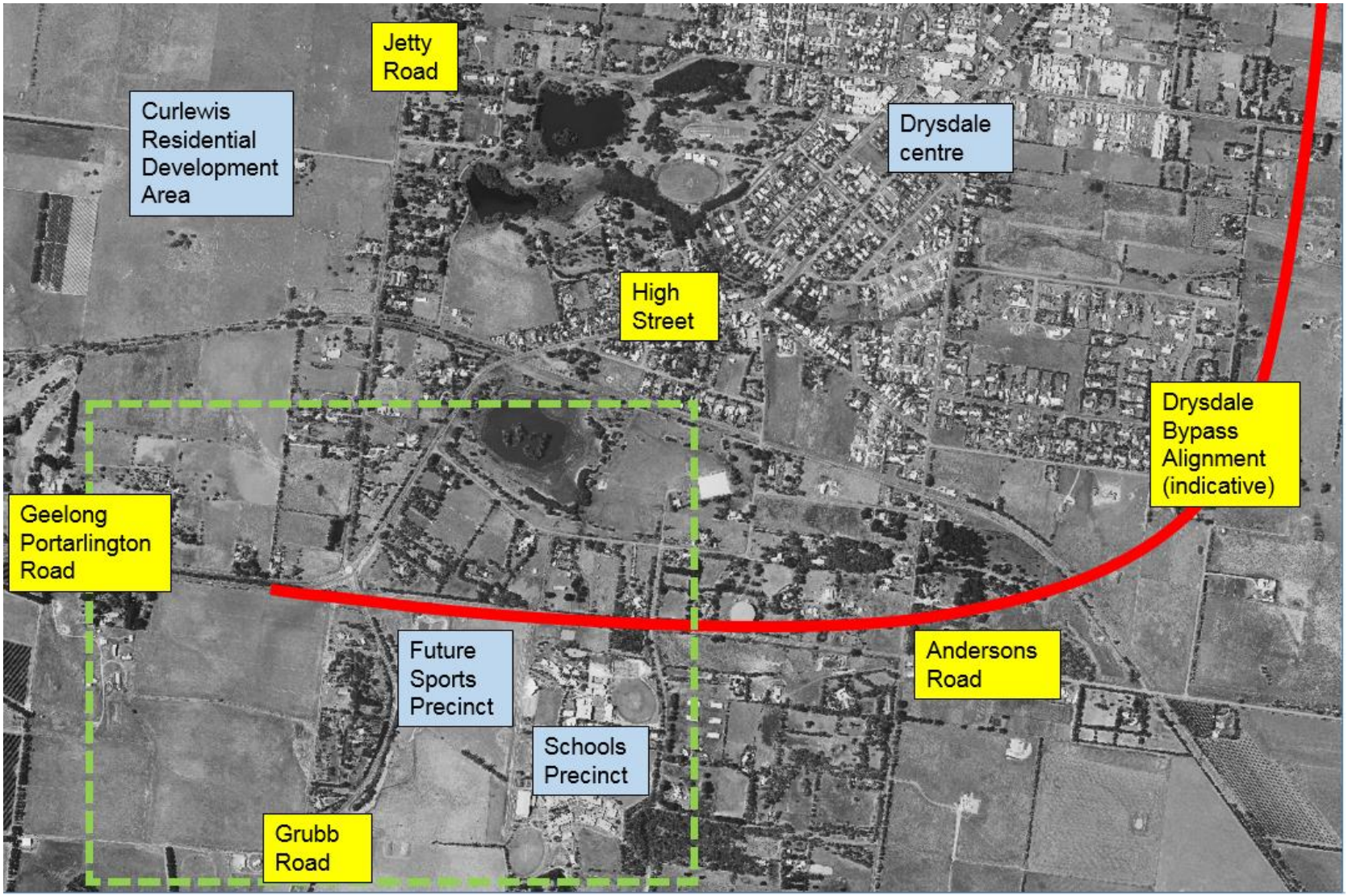


Figure 1 Core Study Area

3. Traffic Microsimulation

3.1 Introduction

This section provides a brief outline of traffic microsimulation and the modelling package used.

3.2 Why did I use traffic microsimulation?

Traffic microsimulation is a well-established tool in the traffic engineering industry. Traffic models simulate the behaviour of individual vehicles within a predefined road network. These models are used to predict the likely impact of changes to traffic flow due to changes in the transport network. This includes physical changes to road network (e.g. additional lanes on a road) to more subtle changes (e.g. modifications to traffic signal phasing).

A further benefit of traffic microsimulation is the ability to export statistics, which allows the user to make informed comparisons between different options. Typical statistical outputs include vehicle delay, vehicle travel times, queue lengths, Vehicle Kilometres Travelled (VKT) and Vehicle Time Travelled (VTT).

3.3 Modelling software

There are several software packages available. However, I proposed VISSIM in my original proposal for this project as it is a well-established microsimulation software package, which is also endorsed by VicRoads Technical Services. VISSIM provides an accurate and holistic output of traffic networks, and is ideal for locations such as the proposed Drysdale Bypass area in Drysdale.

In particular, the entire corridor was assessed as a single network, enabling the impacts of dynamic signal operation to be accounted for and network statistics to be calculated. This compares favourably to other software packages such as SIDRA, which can typically only test individual intersections in isolation.

4. Existing Traffic Volumes & Conditions

4.1 Introduction

This section sets out existing traffic volumes and conditions in the study area.

4.2 Existing Traffic Conditions

Within the study area there are three key factors influencing traffic conditions:

- A commuter peak period in the westbound direction in the AM Peak (towards Geelong) and in the eastbound direction in the PM Peak (towards Drysdale)
- School traffic is intensely centred around the drop off and pick up times for students and pupils in the adjacent schools precinct
- Traffic in the summer season anecdotally causes traffic congestion through the Drysdale township.

The commuter and school traffic have competing demands at the existing Jetty Road/High Street/Geelong Portarlington Road/Grubb Road roundabout leading to peak period congestion.

I have sourced traffic data from VicRoads to illustrate the traffic conditions for the following dates:

- Wednesday 24 February 2016;
- Thursday 25 February 2016; and
- Saturday 27 February 2016.

I have focused on two key locations to illustrate traffic conditions:

- Geelong Portarlington Road – to show commuter and general traffic conditions; and
- Peninsula Drive – to show school traffic conditions.

4.2.1 Geelong Portarlington Road

Figure 2 and Figure 3 present westbound and eastbound traffic volume data respectively for Geelong Portarlington Road immediately west of the existing roundabout with High Street and Jetty Road in 15-minute increments.

I refer to the blue and grey lines in these charts for workday traffic conditions. It can be seen that there are two very distinct peak periods:

- In Figure 2 there is a distinct peaking in weekday traffic between 07:00 and 09:00, showing commuter traffic travelling westbound (presumably to Geelong and beyond); and
- In Figure 3 there is a distinct peaking in weekday traffic between 16:00 and 18:00, showing commuter traffic travelling eastbound (from the Geelong area).

The black line in Figure 2 and Figure 3 is traffic volumes on Saturday 27 February 2016. It can be seen that traffic volumes remain relatively consistent between 10:00 and 17:00 in both directions. However, traffic volumes do not climb to anywhere near the intense commuter peak volumes shown for the preceding Wednesday and Thursday.

4.2.2 Peninsula Drive

Figure 4 and Figure 5 present traffic volumes on Peninsula Drive in the northbound and southbound directions respectively in 15 minute increments. It is clear from both figures that:

- There is a very intense increase in traffic volumes around weekday school drop off and pick up periods (blue and grey lines). During all other periods traffic volumes were very low.
- Traffic volumes on Saturday 27 February (black line) were very low in comparison to the weekday traffic volumes.

Figure 2 Geelong Portarlington Road Westbound Traffic Volumes

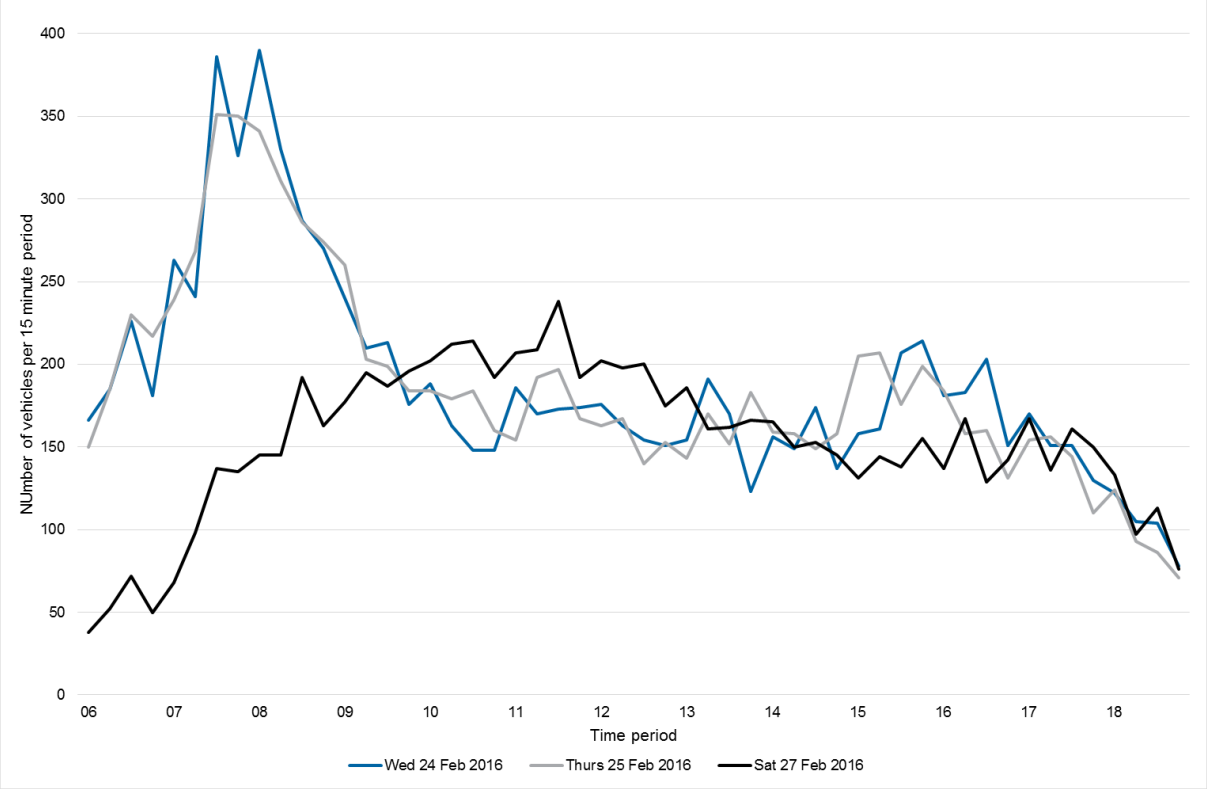


Figure 3 Geelong Portarlington Road Eastbound Traffic Volumes

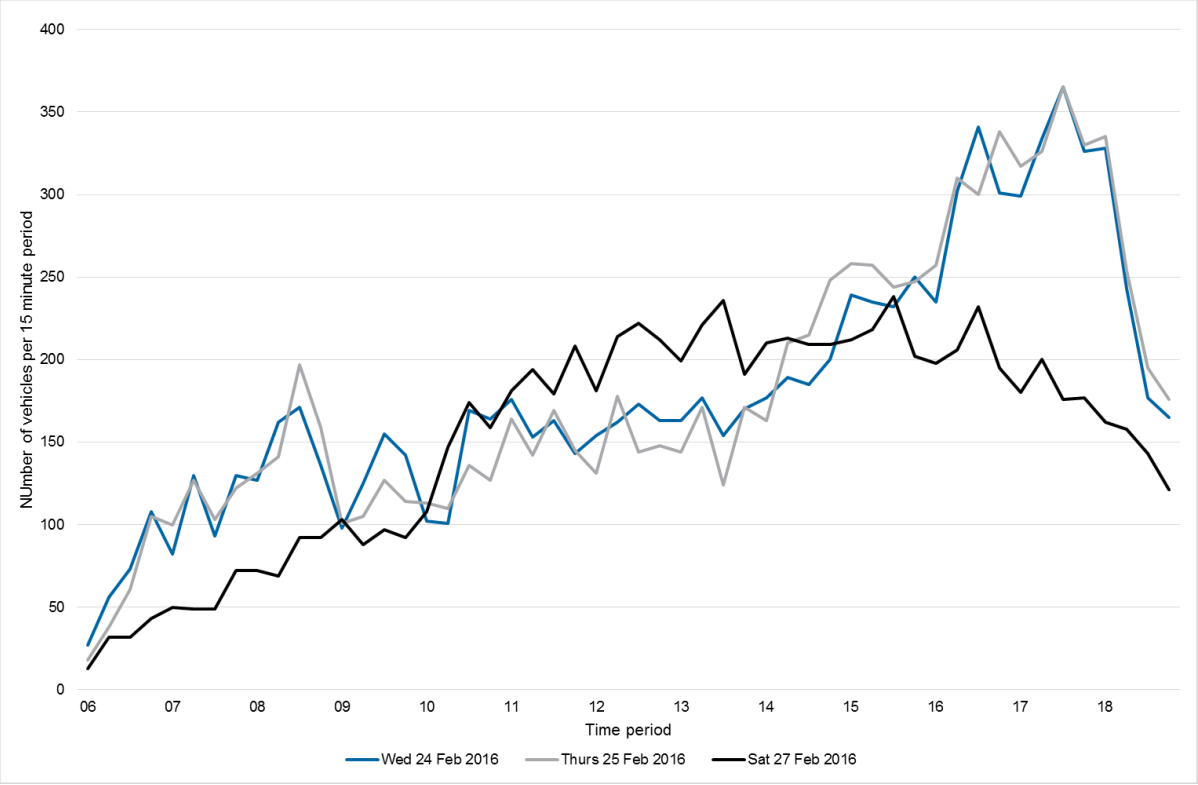


Figure 4 Peninsula Drive Northbound Traffic Volumes

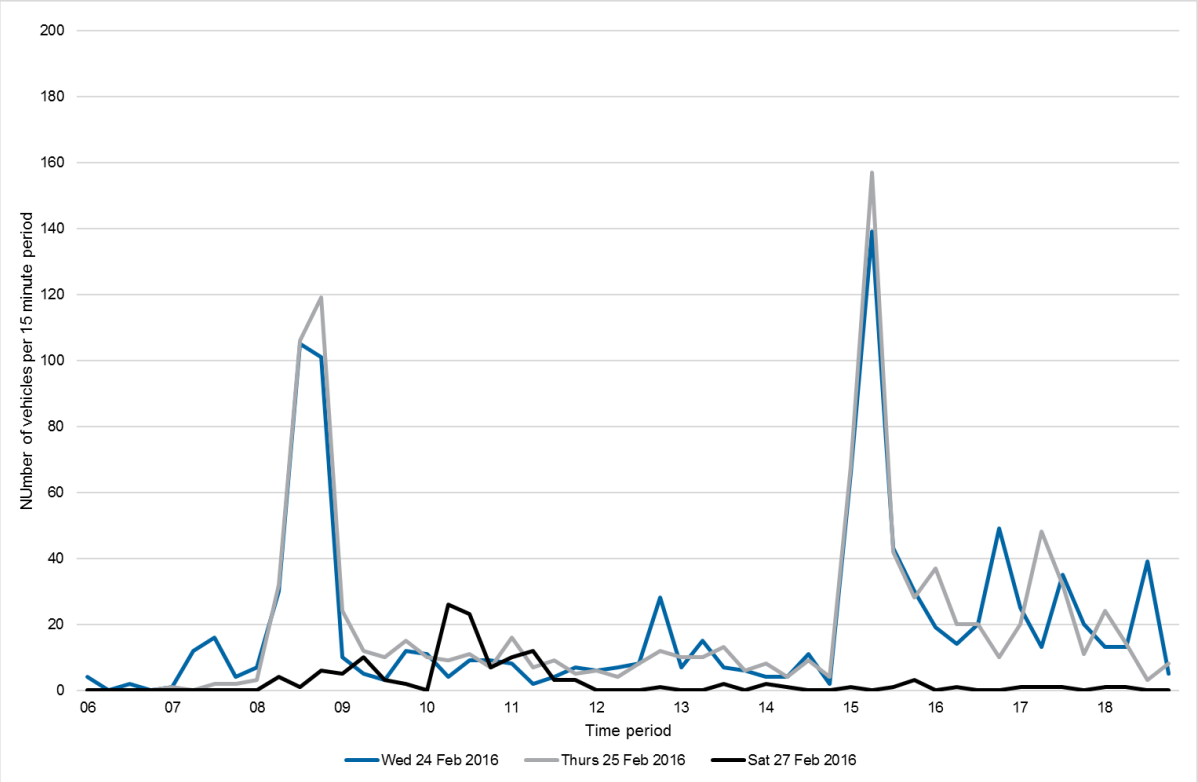
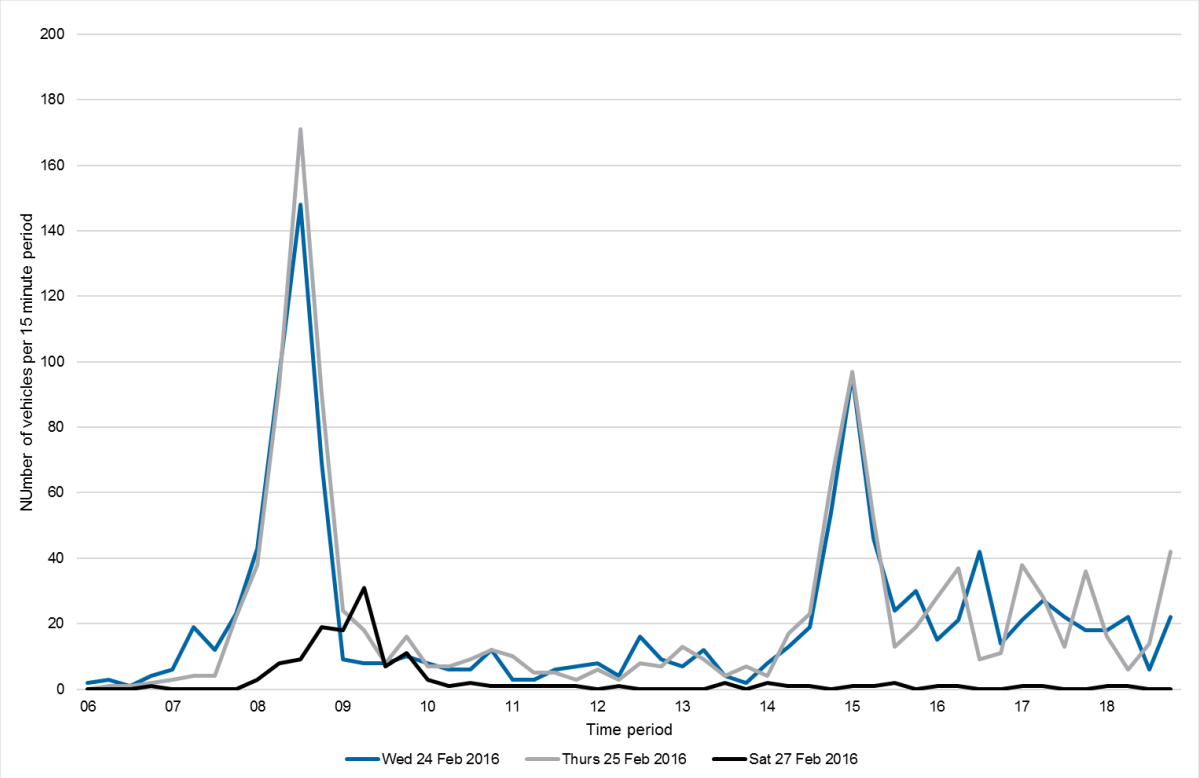


Figure 5 Peninsula Drive Southbound Traffic Volumes



5. Future Year Traffic Volumes

5.1 Introduction

This section sets out the derivation of future year traffic volumes.

5.2 Victorian Integrated Transport Model

A significant part of my work was the review and use of the Victorian Integrated Transport Model (VITM), which is a state-wide strategic transport-modelling tool. VicRoads engaged AECOM to refine VITM for the Drysdale area as part of its planning for the Drysdale Bypass.

The AECOM report therefore utilised the VITM and the results from the update of the VITM in the Drysdale area formed the basis of that report. It is from this work that I sourced traffic volumes in the preparation of my estimation of traffic volumes for the study area.

The VITM uses the latest land use projections, including the predicted number of households, employment figures and education enrolment figures across the Bellarine Peninsula for the years 2016, 2031 and 2046 to determine the most logical / likely route within the road network between each origin and destination. For the 2016 model traffic volumes in the model were calibrated to existing traffic data information by comparing modelled traffic volumes against actual traffic volumes.

5.3 VITM Future Year Traffic Volumes

The VITM provides estimates of future-year traffic volumes under a number of different scenarios. Throughout my work, I sourced data from the AECOM work to update the VITM for the Drysdale area for the following scenarios:

- 2015 Base: existing road infrastructure and land uses;
- No Bypass Scenario: existing road infrastructure with forecast land use statistics; and
- Bypass scenario: introduction of Drysdale Bypass into transport network with forecast land use statistics.

I understand that AECOM assessed a number of different options as part of their work. However, I only used data from the above scenarios as part of my assessment.

The data is presented as follows:

- Table 1 presents 24 hour VITM volumes for the main roads in the study area;
- Table 2 presents 2 hour AM Peak VITM volumes for the main roads in the study area; and
- Table 3 presents 2 hour PM Peak VITM volumes for the main roads in the study area .

From the data in Table 1 I can make the following general observations:

- Traffic on Geelong Portarlington Road is forecast to increase by approximately 39% on a typical weekday by 2046 regardless of whether the Drysdale Bypass is built or not.
- If the bypass is not built, traffic growth on High Street is likely to be modest between now and 2046 according to the VITM. However, if the bypass is built then there will be a large reduction in traffic on High Street.

There is some growth in traffic volumes on Jetty Road between now and 2046 – this is consistent with this area being developed for residential use.

Table 1 VITM 24 Hour Traffic Volumes

Location	Direction	2015 Base 24 hour volumes	2046 No Bypass 24 hour volumes	2046 Bypass 24 hour volumes	% Difference – 2046 No Bypass vs 2015 base	% Difference – 2046 Bypass vs 2015 base
Jetty Rd	SB	4,000	5,300	5,200	33%	30%
	NB	3,900	5,000	4,800	28%	23%
High St	SB	8,700	9,300	5,400	7%	-38%
	NB	8,400	9,100	5,200	8%	-38%
Grubb Rd	NB	3,600	4,100	4,100	14%	14%
	SB	3,500	4,200	4,000	20%	14%
GPR	EB	11,400	15,800	15,800	39%	39%
	WB	11,700	16,300	16,300	39%	39%
Drysdale Bypass	WB	0	0	5,800	N/A	N/A
	EB	0	0	5,600	N/A	N/A

Source: Drysdale Growth Area Modelling, Addendum for Network Update in Jetty Road Growth Area (AECOM, August 2016)

Table 2 VITM AM Peak Traffic Volumes (2 hours)

Location	Direction	2015 Base 24 hour volumes	2046 No Bypass 24 hour volumes	2046 Bypass 24 hour volumes	% Difference – 2046 No Bypass vs 2015 base	% Difference – 2046 Bypass vs 2015 base
Jetty Rd	SB	990	1,216	1,176	23%	19%
	NB	388	471	462	21%	19%
High St	SB	1,845	1,834	1,437	-1%	-22%
	NB	884	991	540	12%	-39%
Grubb Rd	NB	524	634	637	21%	22%
	SB	586	777	771	33%	32%
GPR	EB	1,079	1,514	1,496	40%	39%
	WB	2,495	3,109	3,234	25%	30%
Drysdale Bypass	WB	0	0	926	23%	0%
	EB	0	0	648	21%	0%

Source: Drysdale Growth Area Modelling, Addendum for Network Update in Jetty Road Growth Area (AECOM, August 2016)

Table 3 VITM PM Peak Traffic Volumes (2 hours)

Location	Direction	2015 Base 24 hour volumes	2046 No Bypass 24 hour volumes	2046 Bypass 24 hour volumes	% Difference – 2046 No Bypass vs 2015 base	% Difference – 2046 Bypass vs 2015 base
Jetty Rd	SB	571	759	742	33%	30%
	NB	1,111	1,337	1,204	20%	8%
High St	SB	1,168	1,198	698	3%	-40%
	NB	1,742	1,713	1,298	-2%	-25%
Grubb Rd	NB	693	937	932	35%	35%
	SB	649	746	746	15%	15%
GPR	EB	2,369	3,186	3,322	34%	40%
	WB	1,369	2,099	2,138	53%	56%
Drysdale Bypass	WB	0	0	734	33%	0%
	EB	0	0	1,084	20%	0%

Source: Drysdale Growth Area Modelling, Addendum for Network Update in Jetty Road Growth Area (AECOM, August 2016)

5.4 Definition of Peak Hours

In order to inform the testing of the various options, AM and PM peak hours needed to be defined. When testing options typically the commuter peak periods are used. For the purposes of the VISSIM modelling, it was agreed with VicRoads to test the following hourly time periods (each of which also has a preceding 30 minute warm up period):

- 8.00 to 9.00 for the AM Peak period
- 16.45 to 17.45 for the PM Peak period

Both these time periods were shown in Figure 2 and Figure 3 to be the busiest periods in the study area.

5.5 Derivation of trip matrices

For the 2046 Bypass model, a number of steps were used to estimate future year traffic volumes:

1. Existing AM and PM hourly traffic volumes were sourced from traffic counts conducted by VicRoads on a link-by-link basis.
2. These link volumes were then increased by the AM peak and PM peak % differences shown in Table 2 and Table 3 between traffic volumes for the VITM 2015 and the VITM 2046 Bypass. This approach was agreed with VicRoads as being more suitable than using 24 hour volumes shown in Table 1 because the AM and PM peak volumes in VITM take account of changes in the core peak periods rather than average changes across the day.
3. Individual traffic movement proportions were sourced from the VITM data supplied by AECOM. These proportions were then applied to 2046 Bypass link volumes to create estimated traffic patterns. It should be noted that the VITM is a strategic modelling tool and thus is quite a coarse source for the estimation of traffic volumes on a movement-by-movement basis in a relatively small study area such as this.
4. Therefore, GHD and VicRoads undertook a joint review of estimated traffic volumes on a movement-by-movement basis querying in particular those movements where VITM produced volumes that were felt to be too low or high. The key question at all times in this process was: **Are these volumes realistic?** Using traffic engineering judgement about the study area and traffic patterns, small changes to traffic volumes were made where volumes on movements were felt to be unrealistic.

5.6 User Classes

Vehicle volumes were split into light vehicles (cars and light goods vehicles) and heavy vehicles following a traffic engineering assessment with VicRoads of the likely vehicle fleet mix within the study area corridors. Typically, the following proportions were used:

- Strategic movements e.g. Geelong Portarlington Road to the Drysdale Bypass: 7% of traffic assumed to be heavy vehicles.
- Local freight routes e.g. Geelong Portarlington Road to High Street: 4% of traffic assumed to be heavy vehicles.
- Other routes e.g. Geelong Portarlington Road to Peninsula Drive: 0% of traffic assumed to be heavy vehicles.

5.7 Peak Factoring

It is important to use peak factoring where possible in order to accurately reflect the build-up of traffic during peak periods. As such, 15-minute factors were applied to the origin zone volume within the model. These profiles were based on 15-minute traffic profiles shown in the existing traffic volume data for the study area discussed in Section 4.2.

I believe that it is reasonable in an area such as this to make the assumption that existing traffic profiles will continue into the future. The relative lack of consistent and heavy congestion suggests that "peak spreading" (the broadening of traffic profiles), is likely to be minimal as peak periods do not cause undue delay to encourage changes in travel demand, and therefore the peak build-up of traffic around school drop off/pick up and commuter movements will likely continue.

5.8 Forecast Traffic Volumes

Network flow diagrams for the AM and PM Peak periods in 2046 are shown in Figure 6 and Figure 7. These network flow diagrams show estimated hourly volumes during these periods using the methodology discussed in Section 5.5.

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Figure 6 Estimated 2046 AM Peak Traffic Volumes

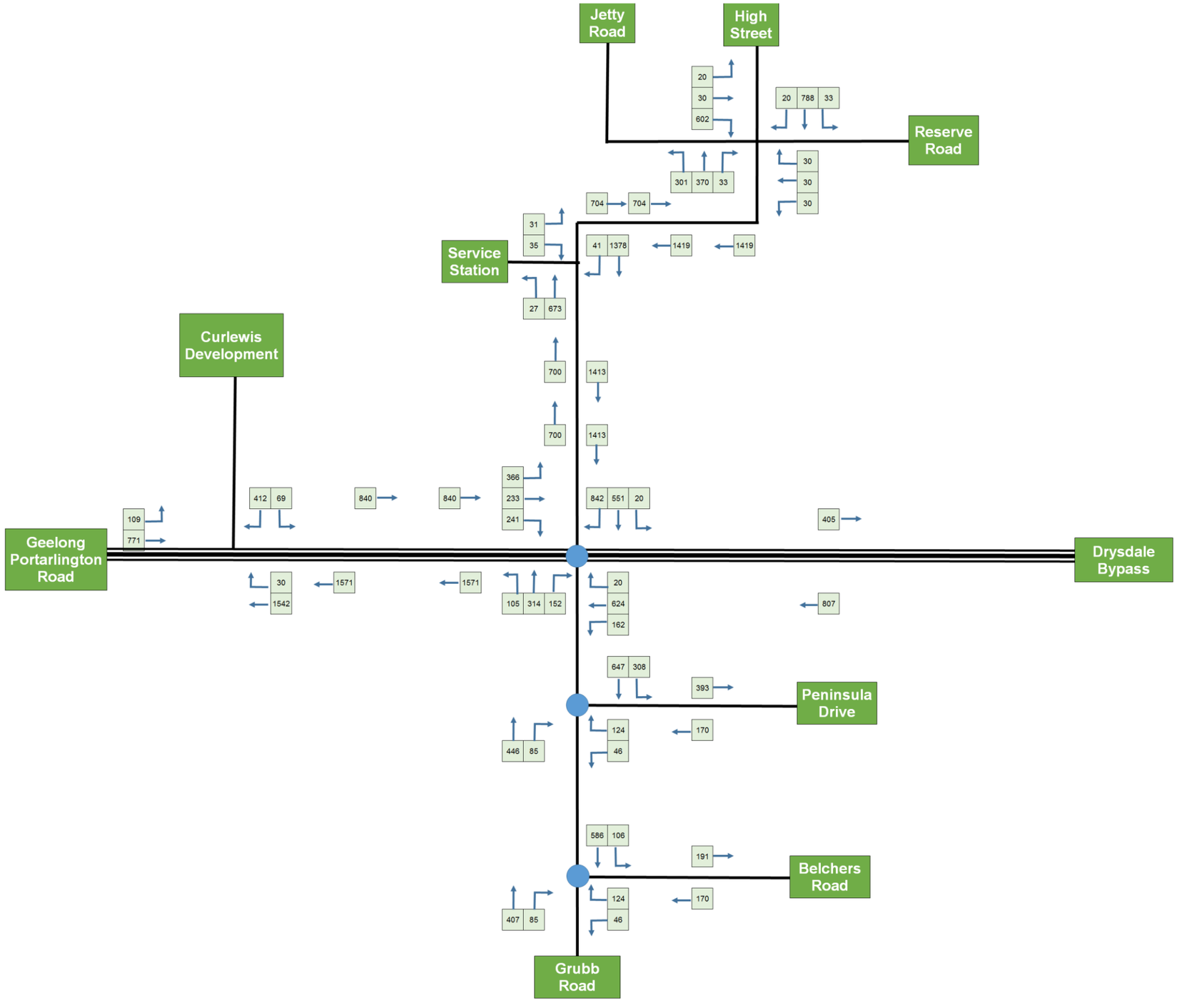
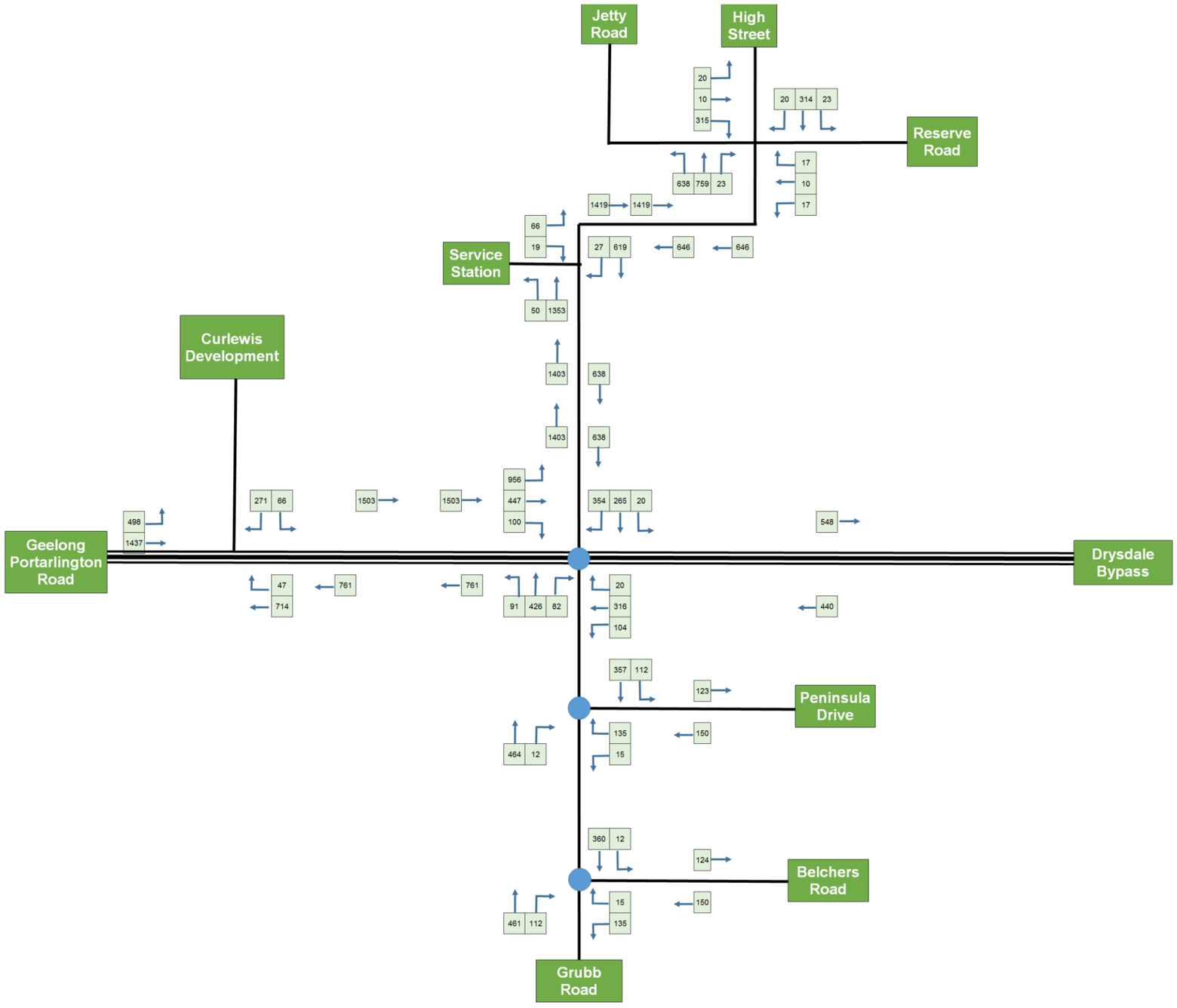


Figure 7 Estimated 2046 PM Peak Traffic Volumes



6. Summary of GHD Engagement

6.1 Introduction

This section outlines the work that I have undertaken on behalf of VicRoads since I was first engaged in 2015.

6.2 Engagements by VicRoads

Table 4 provides a brief summary of the traffic microsimulation work that I have undertaken since 2015 on behalf of VicRoads. As can be seen, a number of different options and scenarios have been tested.

Table 4 Summary of GHD engagements for Drysdale Bypass

Date of commission	Summary	Volumes Used
Jan 2015	VISSIM testing of concept designs developed by Calibre Consulting - at grade double traffic signals, double roundabouts and limited access flyover. Further testing of roundabout and signal options at Curlewis development	Derived from existing traffic volumes and AECOM VITM report (Nov 2013)
Oct 2015	Testing of existing layout, Jetty Road realignment and large roundabout options as part of wider Drysdale Bypass Business Case submission.	Derived from existing traffic volumes and AECOM VITM report (Nov 2013)
Feb 2016	Testing of original double signals option, revised Jetty Road realignment option (2 lanes on RT into Jetty Road) and large roundabout options.	Derived from existing traffic volumes and AECOM VITM report (Nov 2013)
Jul 2016	Testing of 11 different functional design options developed by Cardno.	Derived from existing traffic volumes and AECOM VITM report (April 2016)
Jul 2016	Sensitivity test for a reduction of volumes on Jetty Road.	Derived from existing traffic volumes and AECOM VITM report (April 2016) with further changes to Jetty Road
Aug 2016	Modelling of options 3a and 3b for 2031 and 2024.	Derived from existing traffic volumes and AECOM VITM report (April 2016).
Sep 2016	Testing of Cardno Options 1a and 3a using updated traffic volumes from VITM.	Derived from existing traffic volumes and revised AECOM VITM addendum report (August 2016). .
Jan 2017	Testing of a suite of consolidated options, which included further options requested by Drysdale Clifton Springs Community Association	Derived from existing traffic volumes and revised AECOM VITM report (August 2016).

7. Summary of Modelling Results

7.1 Introduction

This section provides a summary of the options tested between January and March 2017 – a set of consolidated options requested by VicRoads, and a set of different options requested by the Drysdale and Clifton Springs Community Association.

7.2 Summary of Key Issues

Throughout the work that I have undertaken for VicRoads, the analysis has shown that the critical period was the AM Peak period due to:

- Conflicting traffic patterns – in particular to and from the school precinct and commuter traffic travelling to Geelong from Drysdale and Clifton Springs.
- Intense peak periods for traffic movements due to school drop off and commuter traffic patterns that are typical of locations such as Drysdale, where school trips comprise a relatively large proportion of vehicles on the road network.

The issues in the PM Peak period were far less pronounced due to the absence of any significant school traffic patterns during this period as well as there being less conflicting traffic movements.

7.3 Summary of VicRoads Option Performance

Through the course of this project, VicRoads have developed a number of concept and functional designs that GHD have tested using VISSIM. These are summarised in the first part of Table 7 shown in Appendix A. The VicRoads layouts tested by GHD are shown in Figure 8 to Figure 25 in Appendix A.

The VicRoads options have been developed according to a number of criteria including the following:

- Road safety.
- Cost and constructability.
- Amenity.
- Connectivity.
- Road design standards.

The analysis that I undertook of the VicRoads options showed that:

- Grade separated treatments provide a high Level of Service.
- At grade traffic signal options provide a high Level of Service and are able to cope with the critical peak periods. It is likely that further flexibility can be gained from the VicRoads signal co-ordination systems that are not modelled explicitly in VISSIM.
- At-grade roundabout options typically perform quite poorly. This is because conflicting traffic movements in the AM Peak lead to infrequent gaps in circulating traffic on the roundabouts leading to large queues and very poor intersection Level of Service as a result. This is especially true in the critical peak periods when commuter and school traffic volumes are highest.

The following table presents a summary of the traffic performance and general assessment criteria for the VicRoads options, which includes a ranking of each option.

Table 5 Summary of VicRoads Proposed Options - Traffic Performance and General Criteria Assessment

Option	Main Intersection Summary	Overall Traffic Performance		VicRoads Assessment (all criteria)	General Assessment Comment
1a	Double Bridge Overpass	1	●	✖	High cost, visual impact and poor amenity.
2a	Single Bridge Overpass	2	●	✖	High cost, visual impact and poor amenity.
8	3 lane roundabout	3	●	✖	Poor road safety and functionality.
6	At grade traffic signals	4	●	✖	Close proximity of traffic signals.
3a	At grade signals	5	●	●	Good balance of all criteria
9	At grade traffic signals with cut through layout for through movements	6	●	✖	Poor road safety and functionality.
4b	At grade roundabout	7	✖	✖	Poor traffic performance.
3b	At grade roundabout	8	✖	✖	Poor traffic performance.
7	'Super Roundabout	9	✖	✖	Poor traffic performance, road safety issues.

Key:

● Satisfactory

▲ Not Assessed

✖ Unsatisfactory

7.4 Preliminary Assessment of DCSCA Option Performance

VicRoads, through on-going community engagement, has been in discussion with local community groups such as the Drysdale Clifton Springs Community Association (DCSCA) on a wide range of topics related to the Drysdale Bypass. Some of these discussions have centred on alternative intersection layouts, the latest proposal by DCSCA was received by VicRoads in March 2017. As such VicRoads has requested that GHD complete a preliminary traffic analysis of these alternative arrangements, which are presented in Figure 26 to Figure 33 in Appendix A.

Identified issues with the DCSCA alternative options included:

- Ability to design in accordance with relevant design guidelines and standards.
- Road safety concerns including potential traffic weaving and high speed-differential merges.
- Functionality (not intuitive "self explaining" road designs).
- Potential impact of two close proximity roundabouts on the free flowing bypass (particularly heavy vehicles).
- Impact on adjacent properties and land acquisition.
- Pedestrians and Cyclists (on & off-road) safety and connectivity.
- Constructability (in a cost effective manner).

It should be noted that the designs supplied to GHD were in the form of sketches and thus the results of the VISSIM assessment should be viewed as preliminary with further refinement and assessment required should VicRoads wish to consider further analysis.

The preliminary analysis of the DCSCA options showed that:

- The single roundabout options with additional left turn slip lanes performed poorly and should therefore be discounted due to poor traffic performance
- The double roundabout options with additional slip lanes provided a good Level of Service but further analysis is required by VicRoads on whether these options meet overall assessment criteria, of which traffic performance is one element.

The summary of this assessment is shown in the table below.

Table 6 Summary of DCSCA Proposed Options - Traffic Performance and General Criteria Assessment

Option	Main Intersection Summary	Overall Traffic Performance		VicRoads Assessment (all criteria)	General Assessment Comment
10a	At grade roundabout with left turn slip lanes	3	✖	✖	Poor traffic performance.
10b	At grade roundabout with left turn slip lanes	4	✖	✖	Poor traffic performance
11a	At grade roundabouts with left turn slip lanes, Grubb Road realigned towards Peninsula Drive.	1	●	▲	Under review at time of VISSIM assessment
11b	At grade roundabouts with limited left turn slip lanes, Grubb Road realigned towards Peninsula Drive.	2	●	▲	Under review at time of VISSIM assessment

Key:

● Satisfactory

▲ Not Assessed

✖ Unsatisfactory

8. Conclusions

This explanatory report has outlined the traffic modelling work that I have conducted for VicRoads on the Drysdale Bypass, a proposed new road connection in the Drysdale Township. My work focused on the interface between the proposed Drysdale Bypass and the following roads located to the south of the main Drysdale township:

- Geelong Portarlington Road;
- High Street;
- Jetty Road; and
- Grubb Road.

I have outlined the existing conditions, the use of traffic of microsimulation, estimation of future year traffic volumes and provided a brief summary of the results from my analysis. It should be noted that the traffic modelling work that I undertook forms one part of the overall assessment by VicRoads of each option. Therefore, the results should not be viewed in isolation.

Within the study area there are three key factors influencing traffic conditions, which I expect to continue into the future:

- A commuter peak period in the westbound direction in the AM Peak (towards Geelong) and in the eastbound direction in the PM Peak (towards Drysdale)
- School traffic is intensely centred around the drop off and pick up times for students and pupils in the adjacent schools precinct
- Traffic in the summer season anecdotally causes traffic congestion through the Drysdale township.

I tested a number of options as follows:

- VicRoads options: ranging from grade separated treatments to at grade roundabout and signalised options
- DCSCA options: these are typically alternative roundabout options to the ones proposed by VicRoads

The traffic analysis that I conducted for the VicRoads options showed that:

- Grade separated treatments provide a high Level of Service.
- At grade traffic signal options provide a high Level of Service and are able to cope with the critical peak periods.
- At-grade roundabout options typically perform quite poorly due to conflicting traffic movements and the intense peak periods likely at this site.

The preliminary analysis of the DCSCA options showed that:

- The single roundabout options with additional left turn slip lanes performed poorly.
- The double roundabout options with additional slip lanes provided a good Level of Service but it is unclear whether these options meet overall assessment criteria, of which traffic performance is one element.

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

Appendices

Appendix A – Summary of Options Tested

Table 7 Option Design Summary

Option	Main Intersection Summary	Jetty Road and High St Summary	Drysdale Bypass/Princess St	Figures
VicRoads Options				
1a	Double bridge overpass	Signalised intersection	Small roundabout	Figure 8, Figure 9
2a	Single bridge overpass	Signalised intersection	Small roundabout	Figure 10, Figure 11
3a	At grade signals	Signalised intersection	Small roundabout	Figure 12, Figure 13
3b	At grade roundabout	Roundabout	Small roundabout	Figure 14, Figure 15
4b	At grade roundabout	Roundabout	Large roundabout	Figure 16, Figure 17
6	At grade traffic signals	Original signals design	Small roundabout	Figure 18, Figure 19
7	“Super” roundabout	N/A	Small roundabout	Figure 20, Figure 21
8	3 lane roundabout	Roundabout	Small roundabout	Figure 22, Figure 23
9	At grade traffic signals with cut through layout for through movements	Roundabout	Small roundabout	Figure 24, Figure 25
DCSCA Options				
10a	At grade roundabout with left turn slip lanes	Roundabout	Small roundabout	Figure 26, Figure 27
10b	At grade roundabout with left turn slip lanes	Roundabout	Small roundabout	Figure 28, Figure 29
11a	Revised roundabout layout with slip lanes.	N/A	Small roundabout	Figure 30, Figure 31
11b	Revised roundabout layout with slip lanes further updated by GHD.	N/A	Small roundabout	Figure 32, Figure 33

Figure 8 VicRoads Option 1a Layout

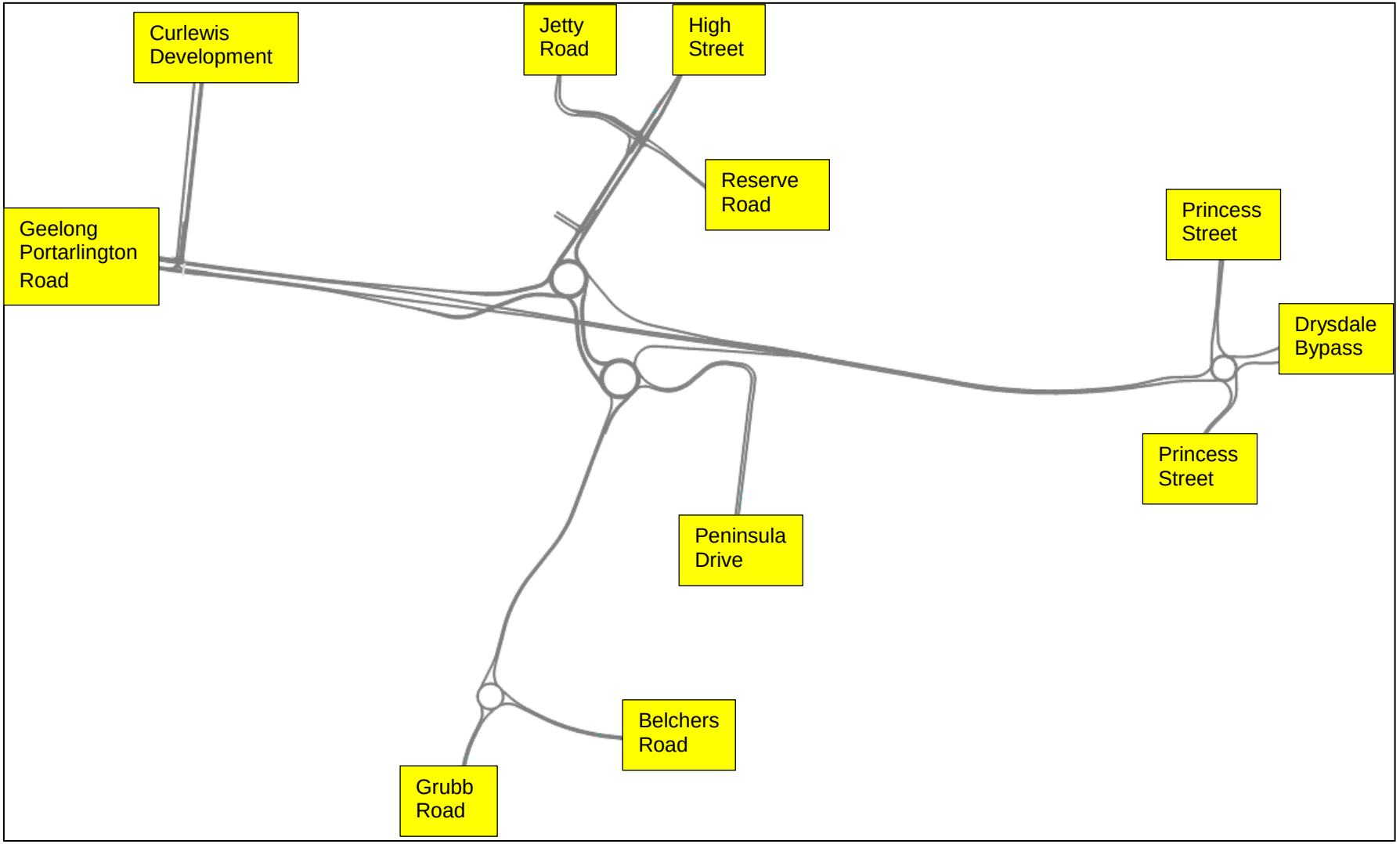


Figure 9 VicRoads Option 1a Layout – Zoomed In

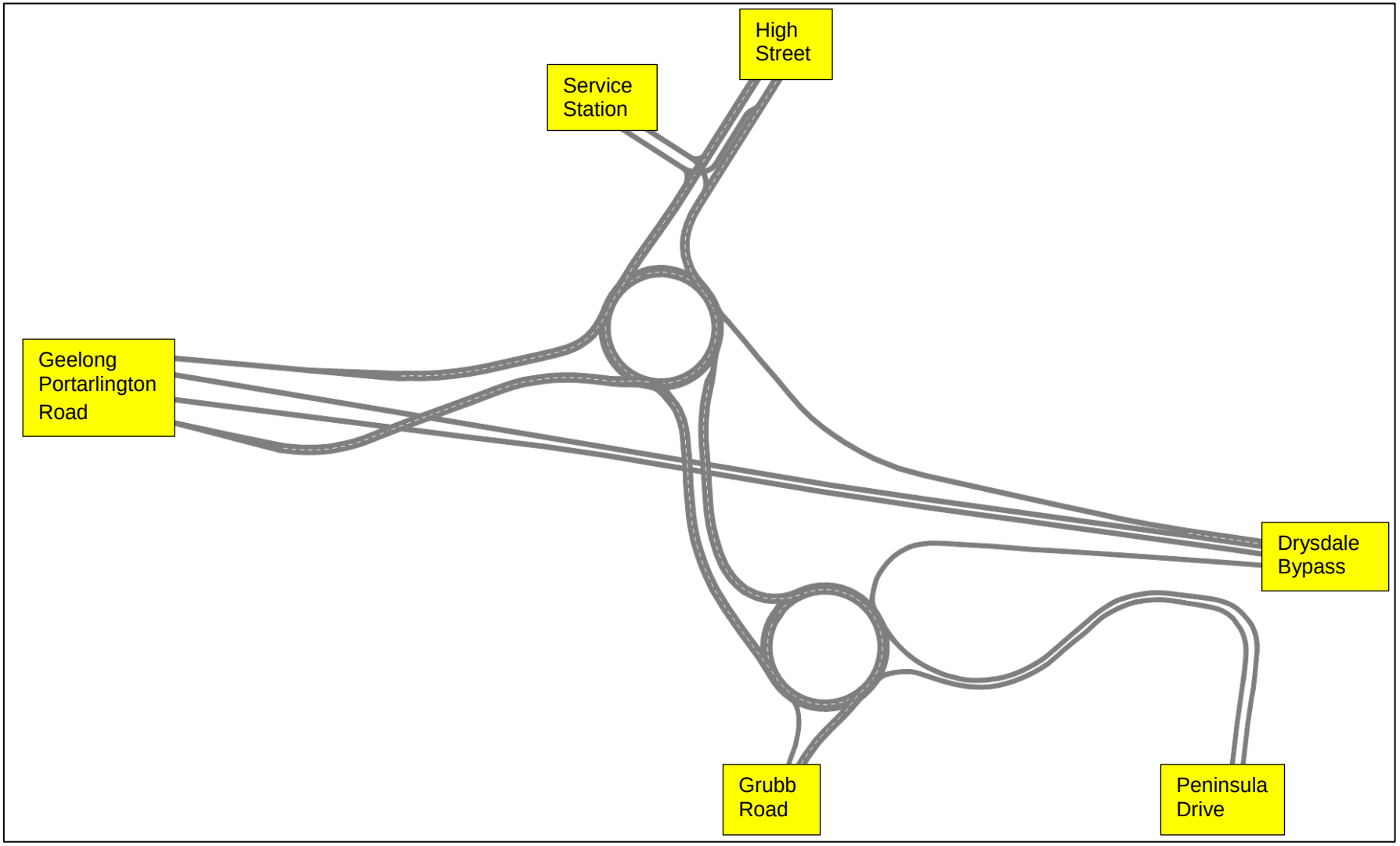


Figure 10 VicRoads Option 2a Layout

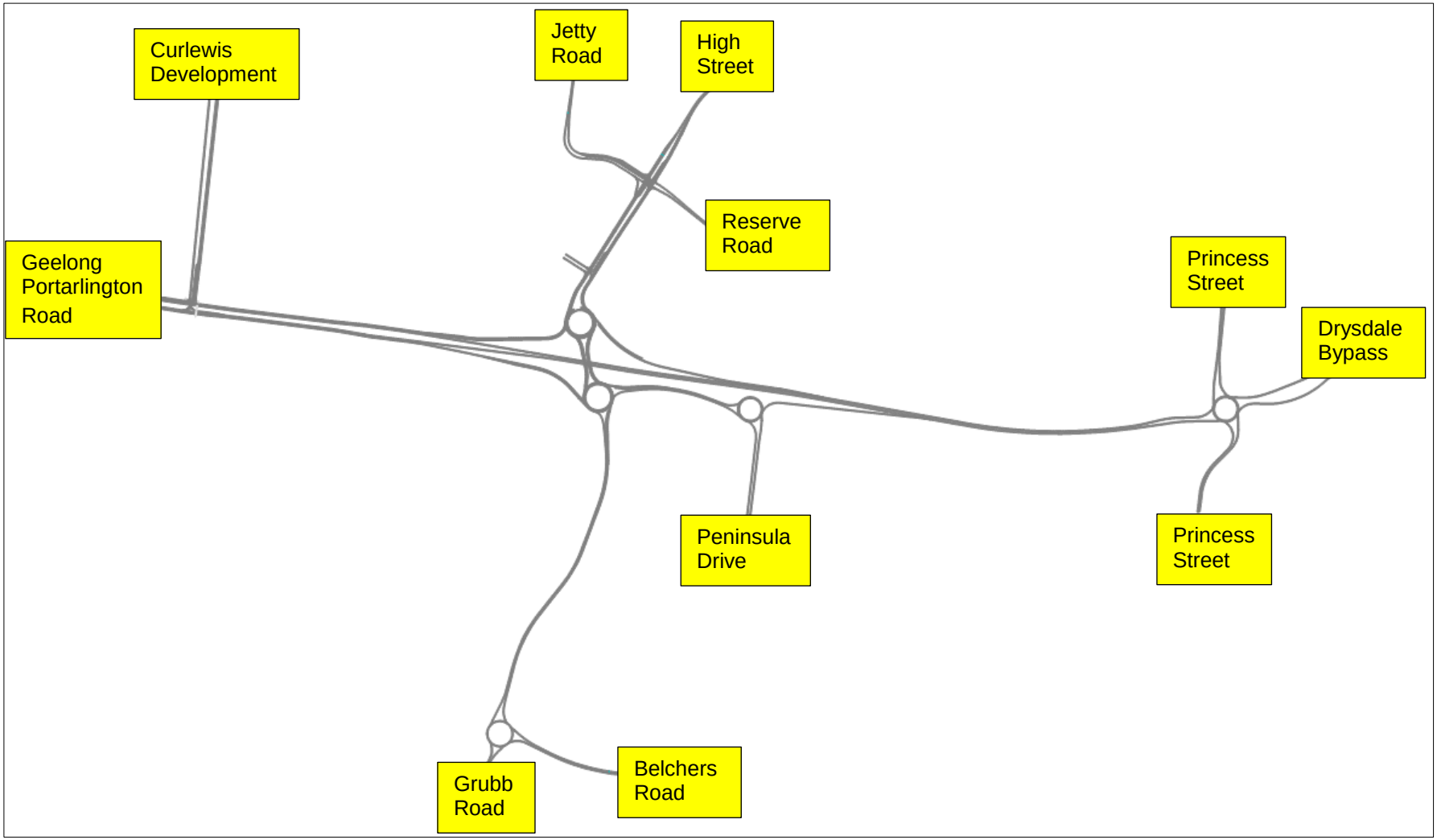


Figure 11 VicRoads Option 2a Layout – Zoomed In

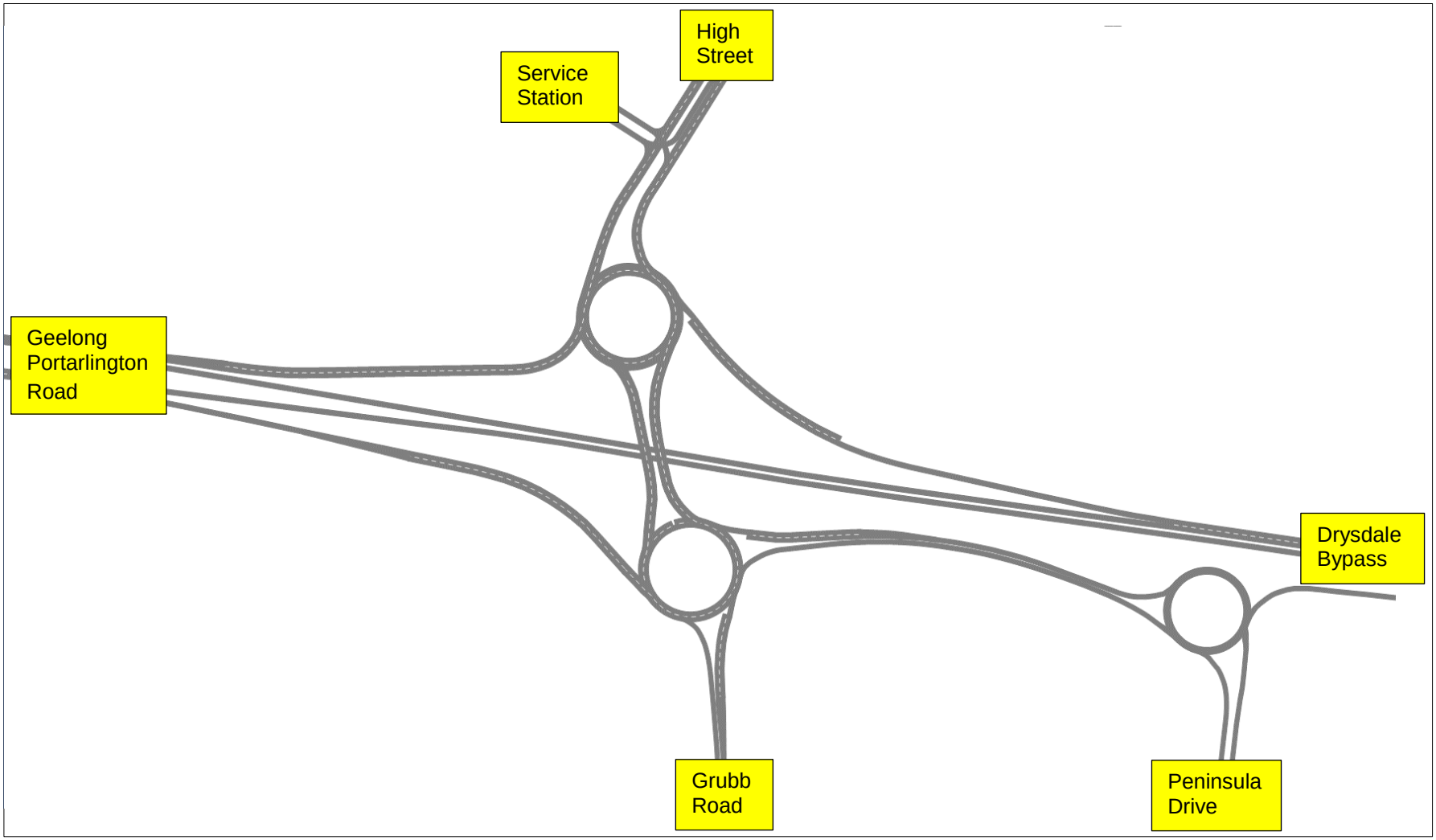


Figure 12 VicRoads Option 3a Layout

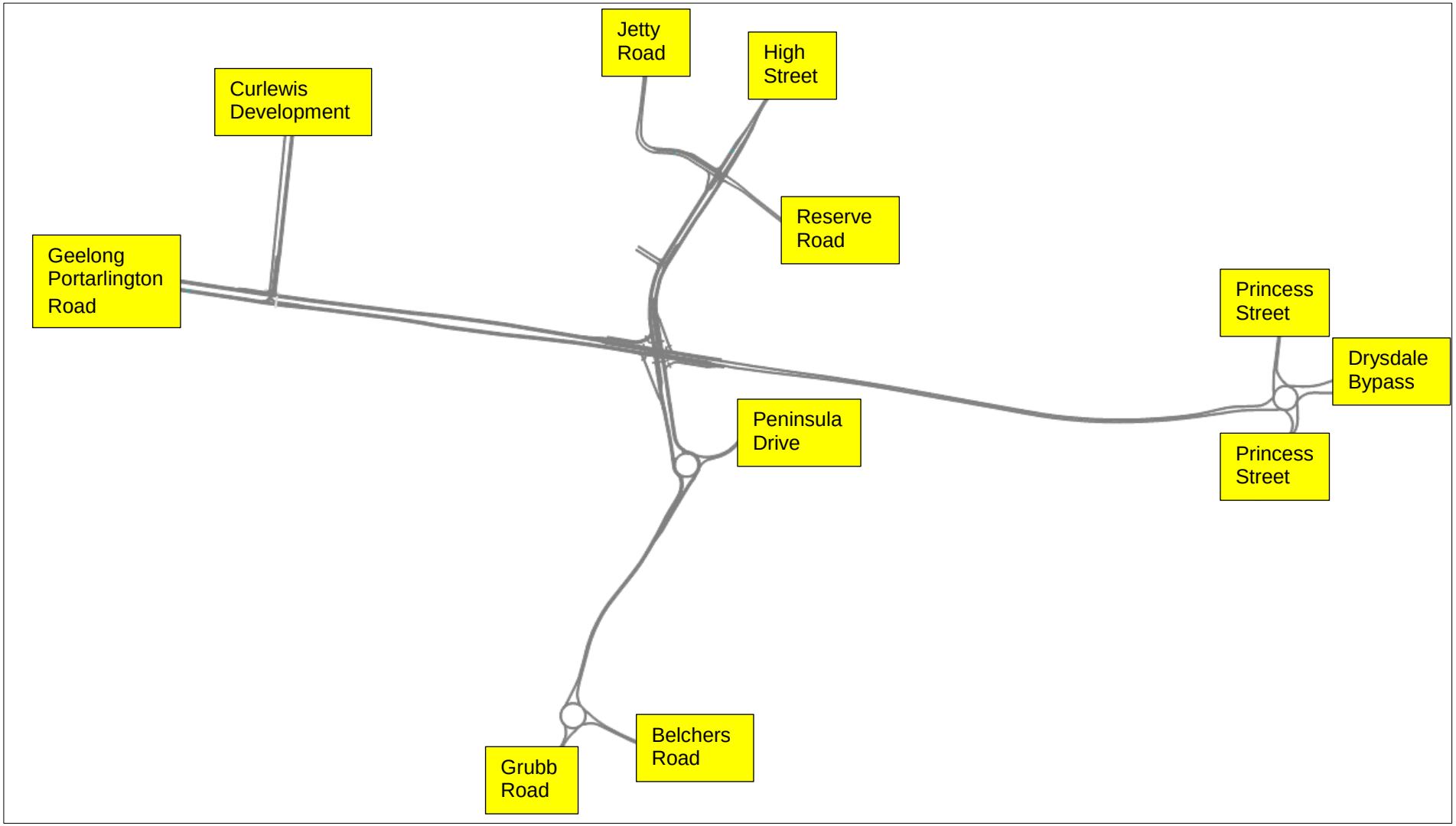


Figure 13 VicRoads Option 3a Layout – Zoomed In

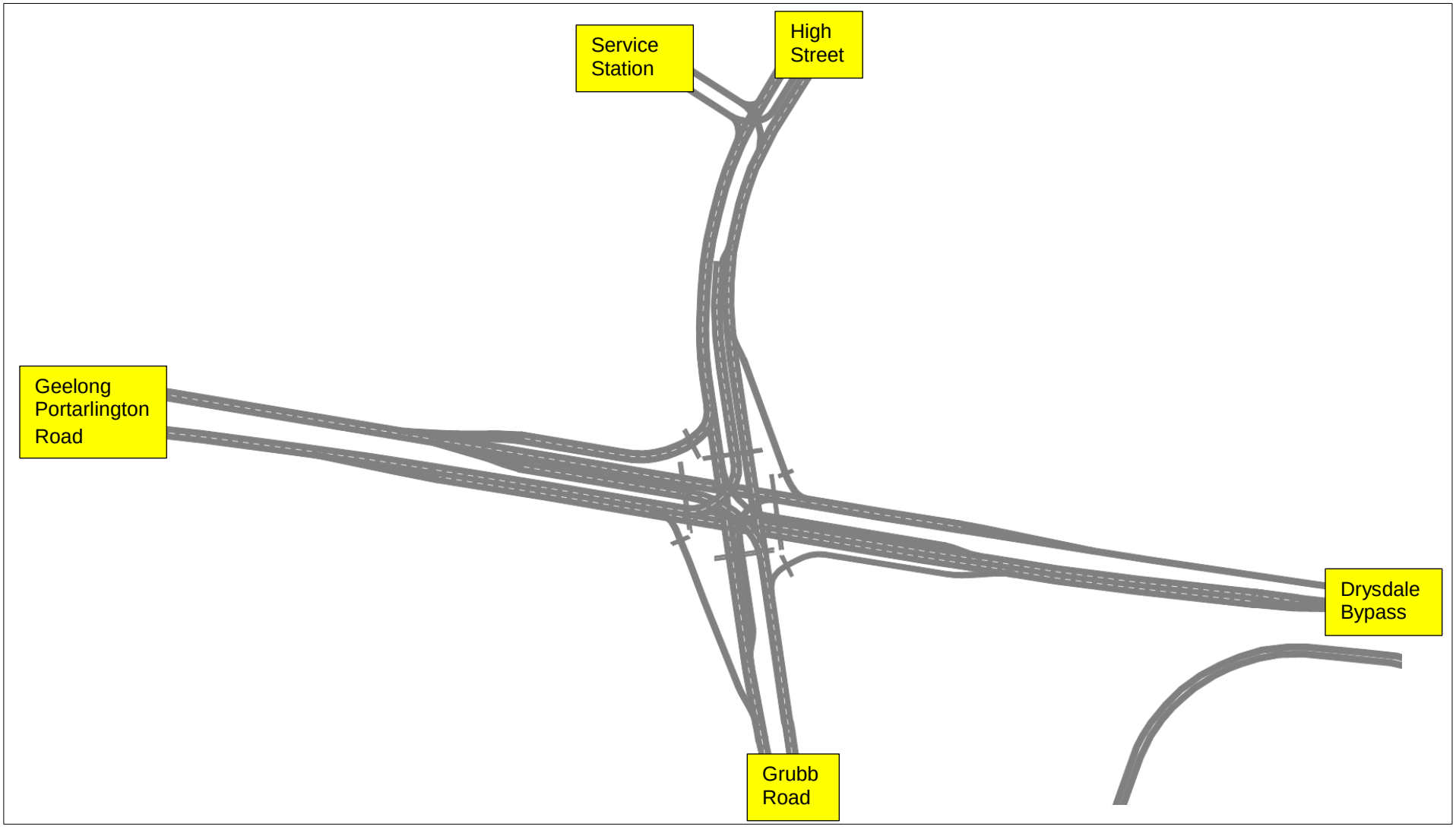


Figure 14 VicRoads Option 3b Layout

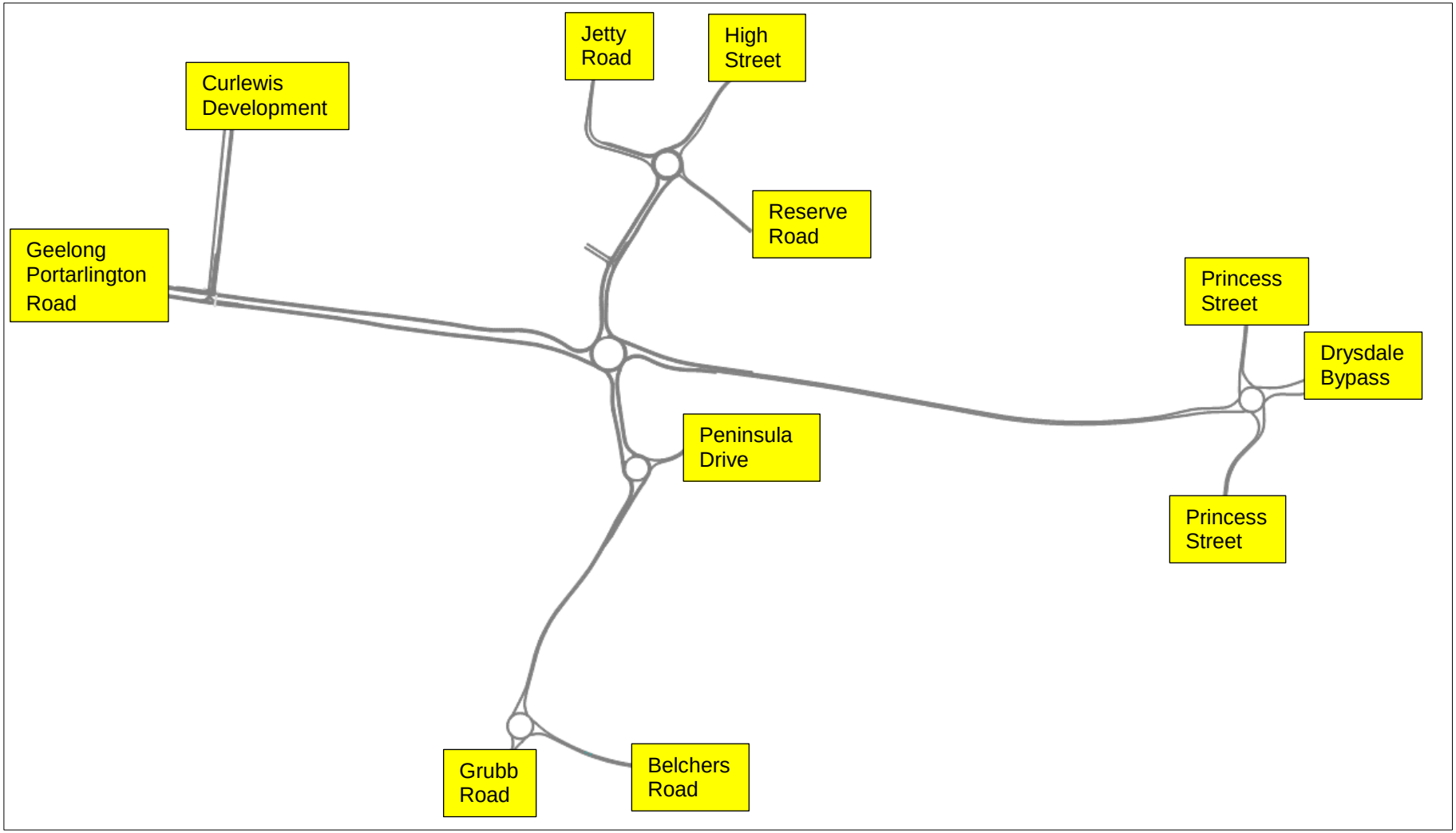


Figure 15 VicRoads Option 3b Layout – Zoomed In

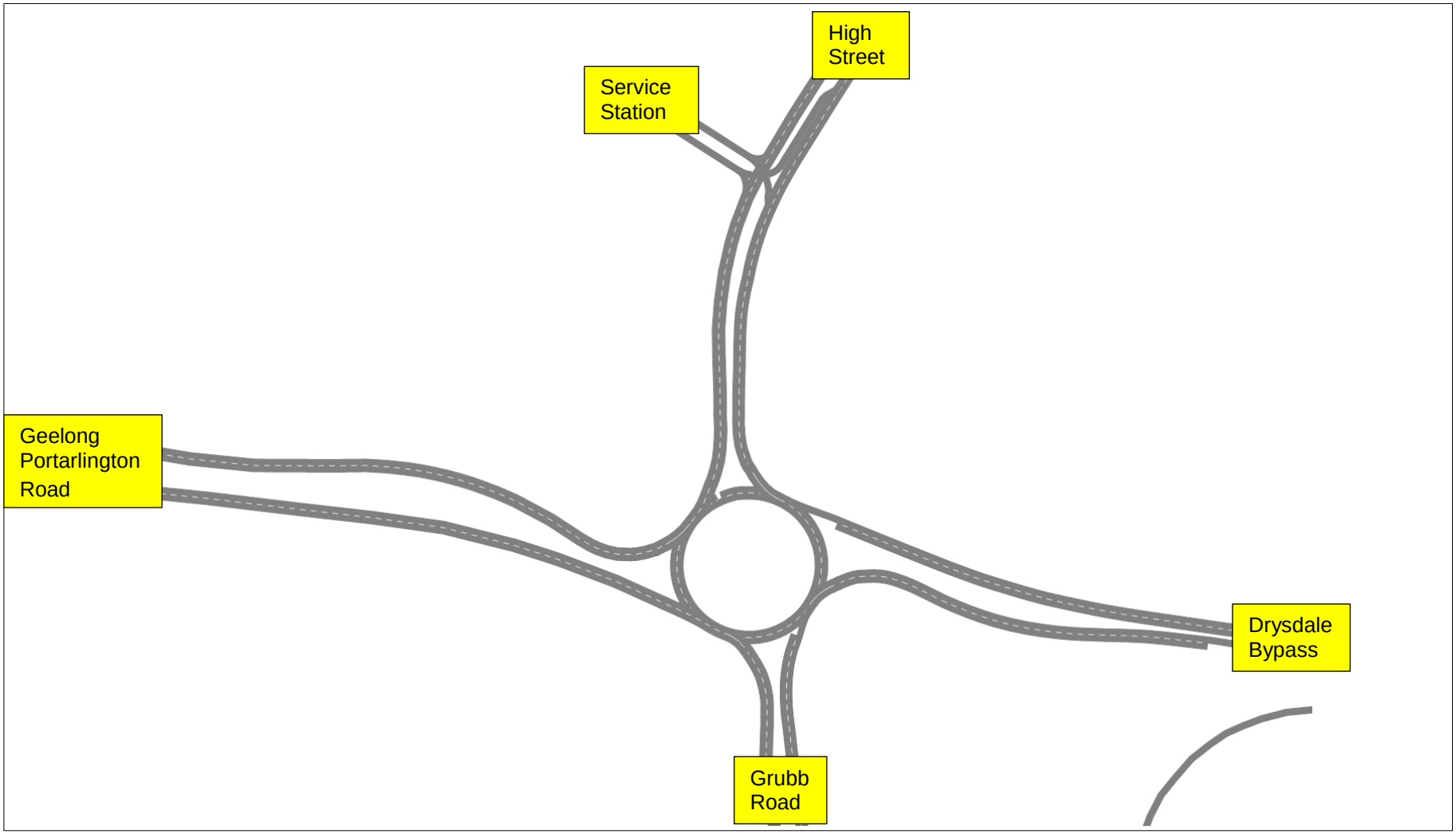


Figure 16 VicRoads Option 4b Layout

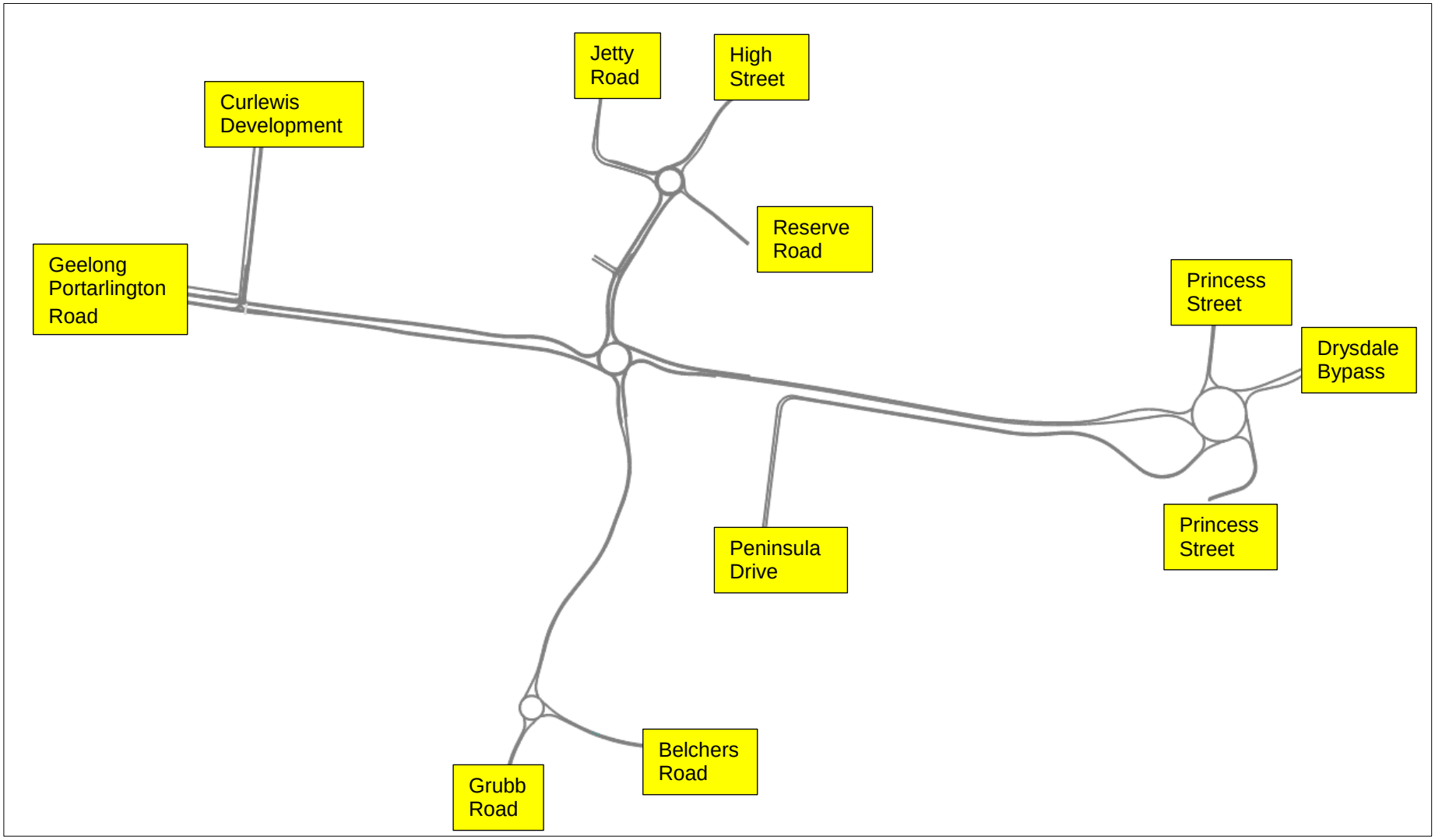


Figure 17 VicRoads Option 4b Layout – Zoomed In

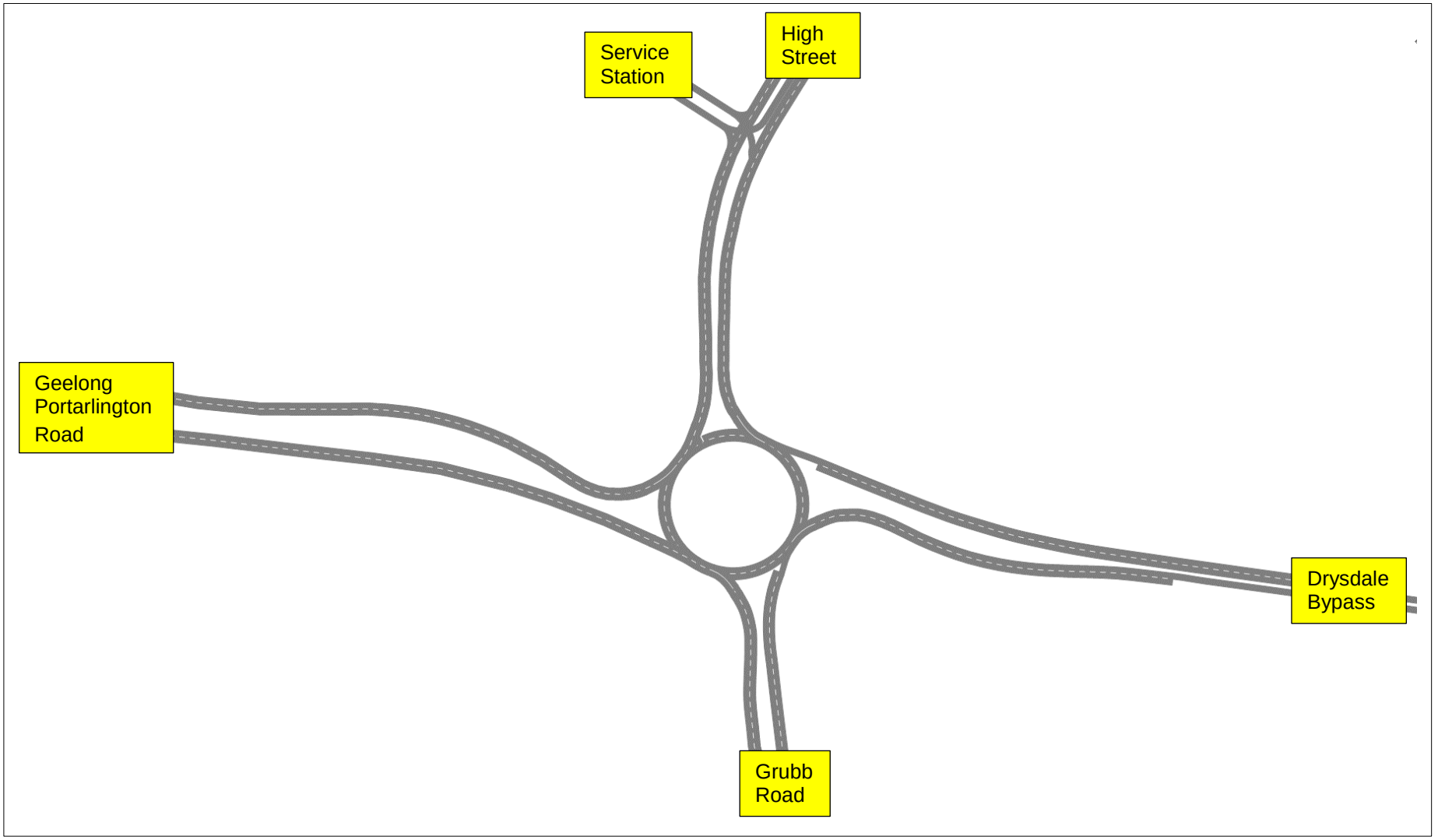


Figure 18 VicRoads Option 6 Layout

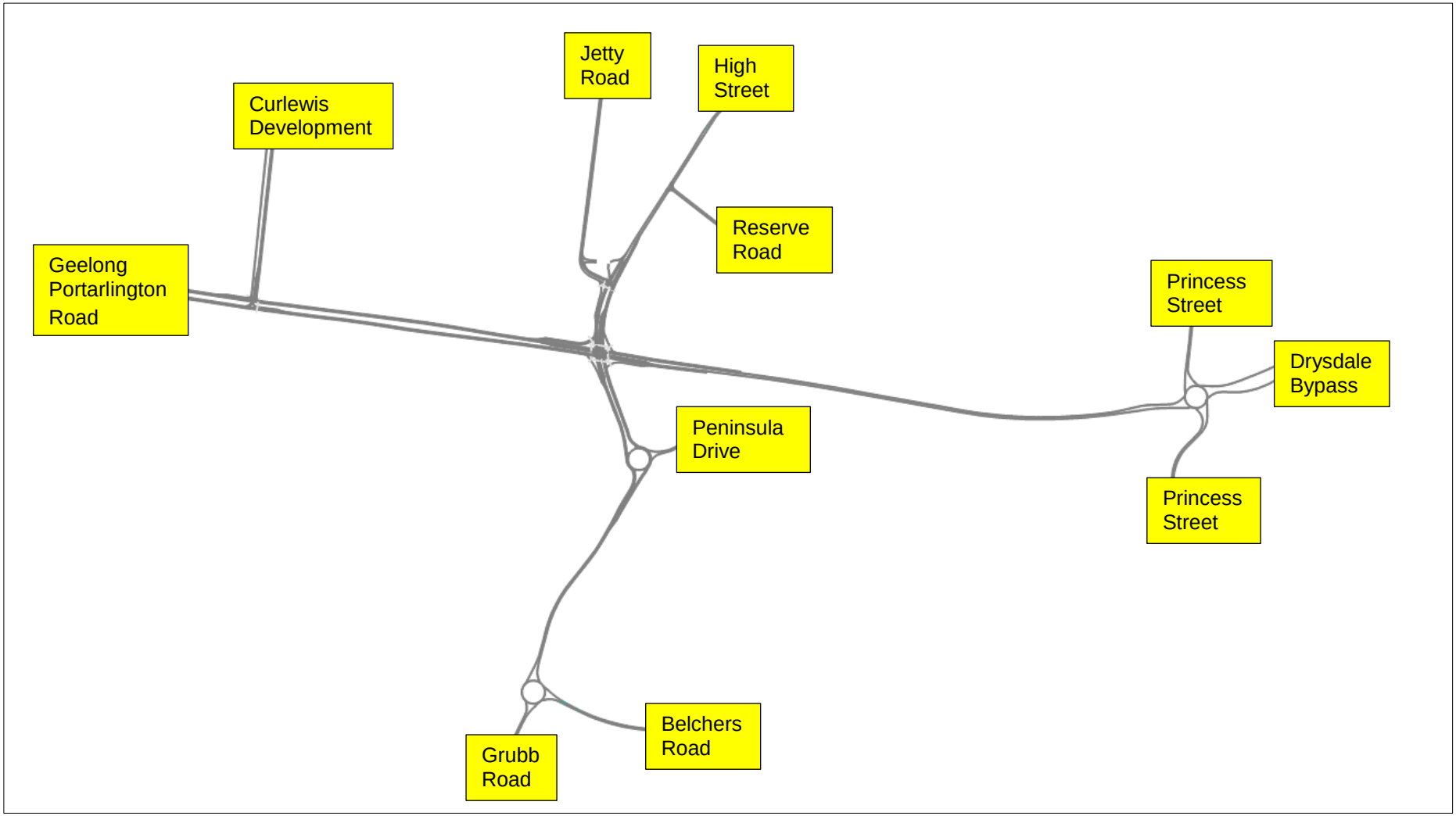


Figure 19 VicRoads Option 6 Layout – Zoomed In

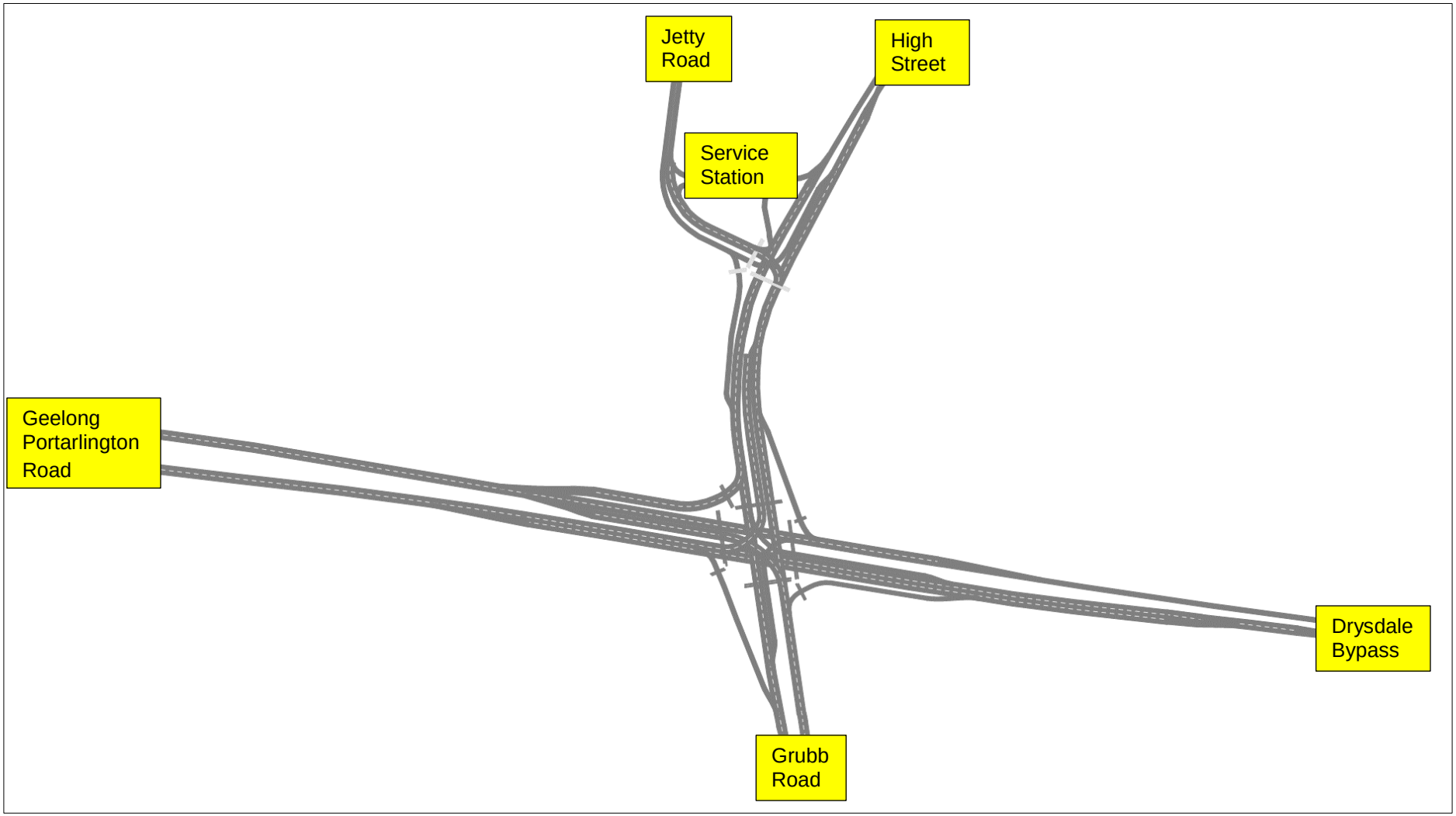


Figure 20 VicRoads Option 7 Layout

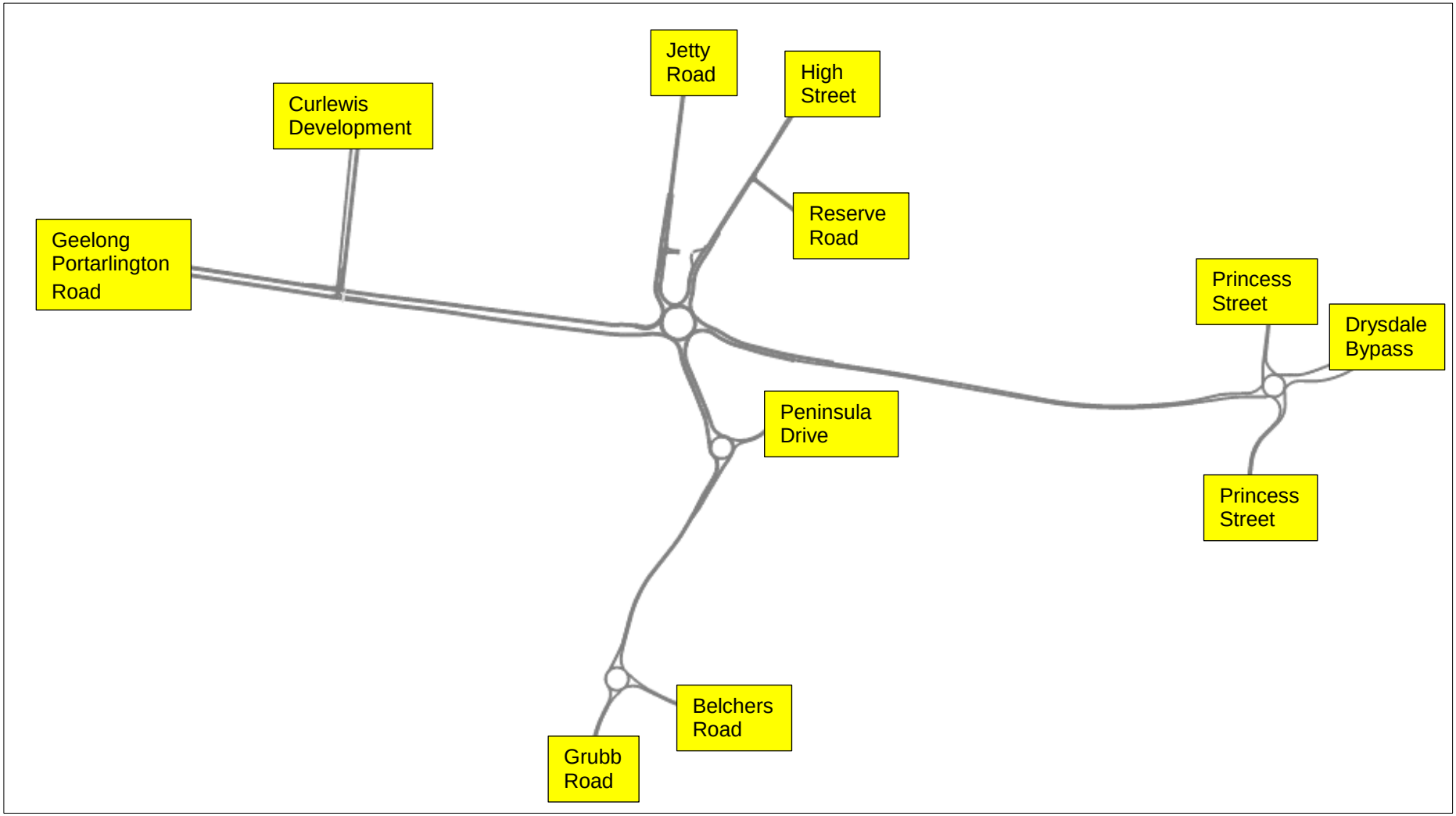


Figure 21 VicRoads Option 7 Layout – Zoomed In

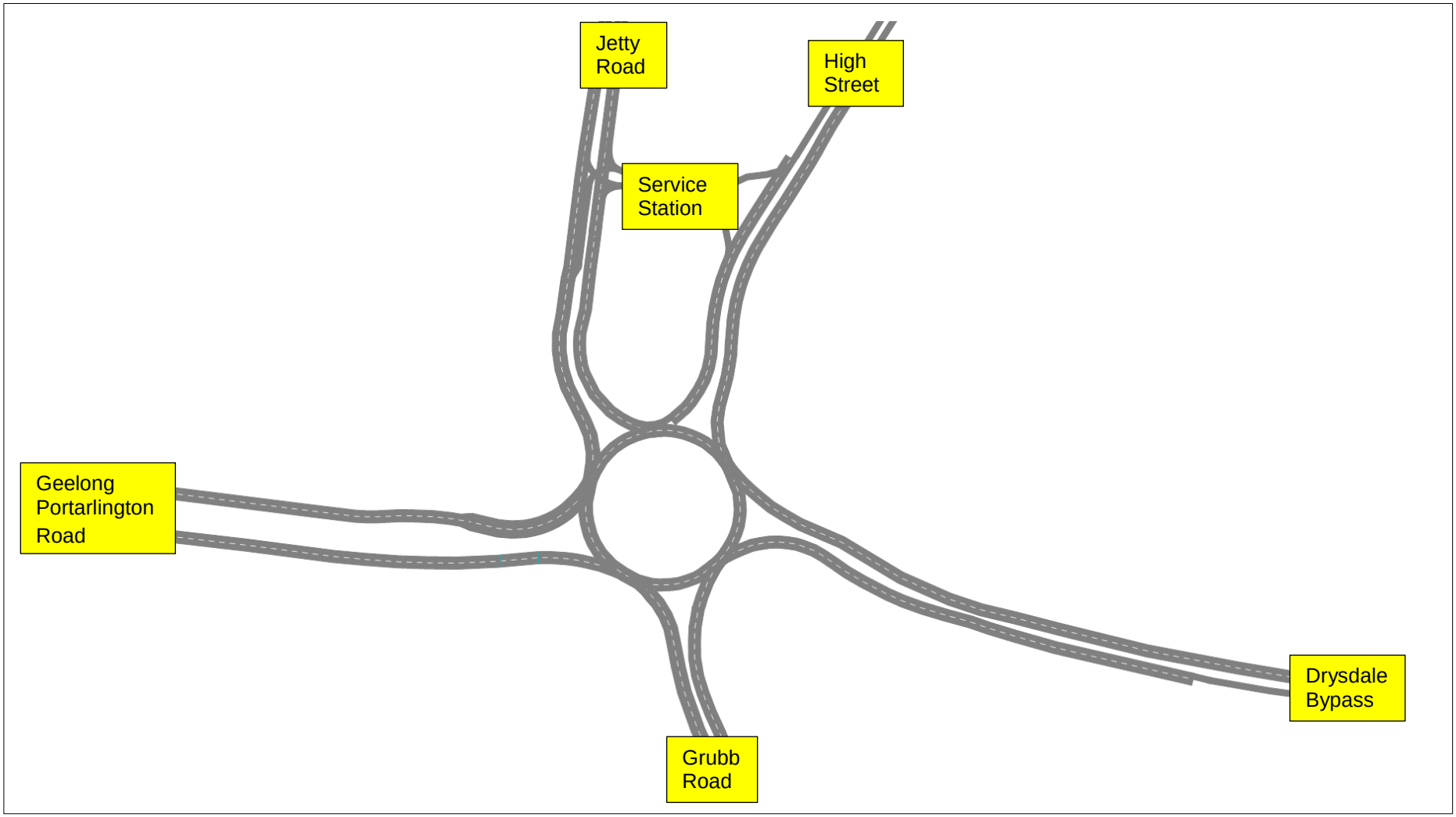


Figure 22 VicRoads Option 8 Layout

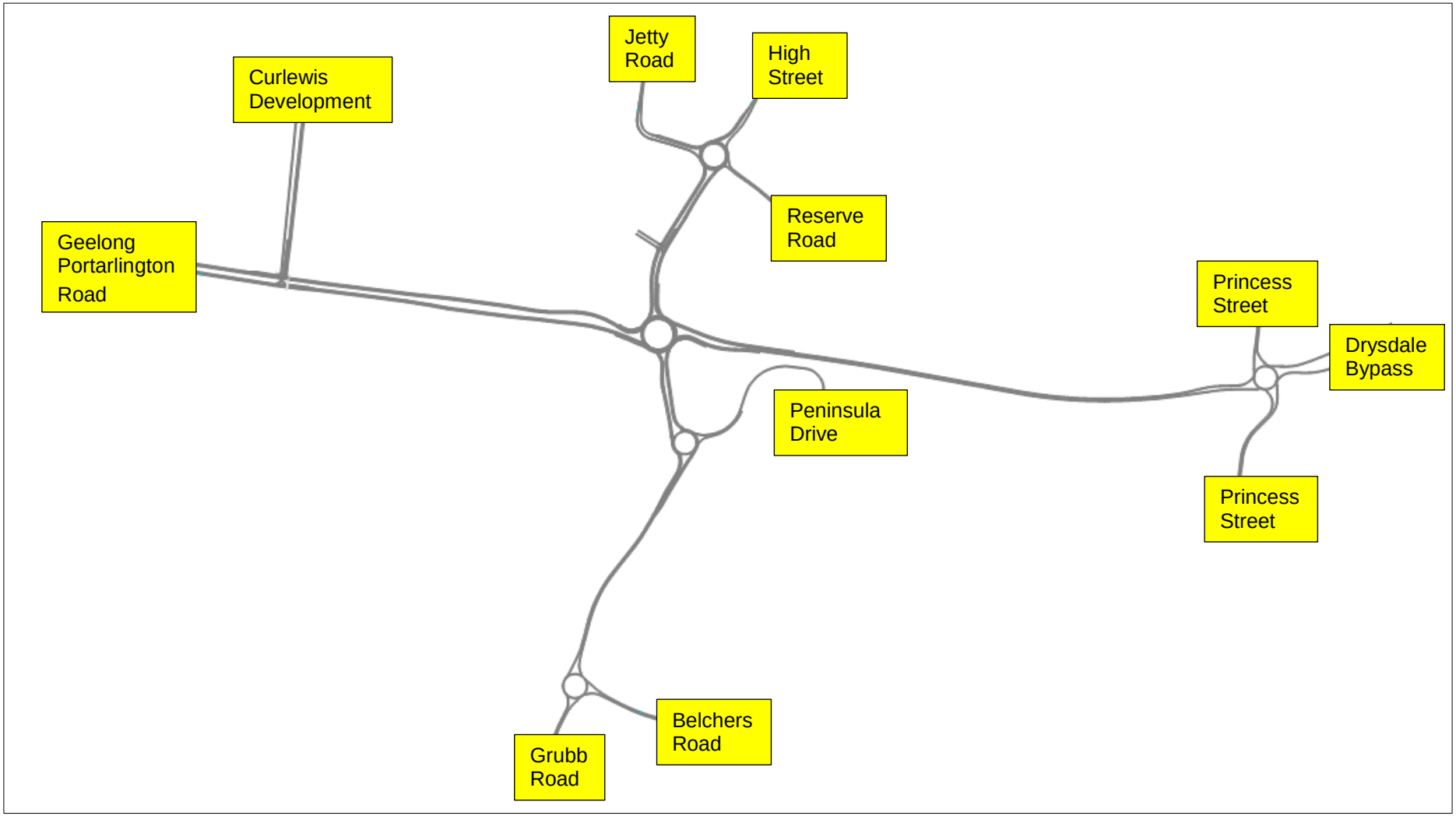


Figure 23 VicRoads Option 8 Layout – Zoomed In

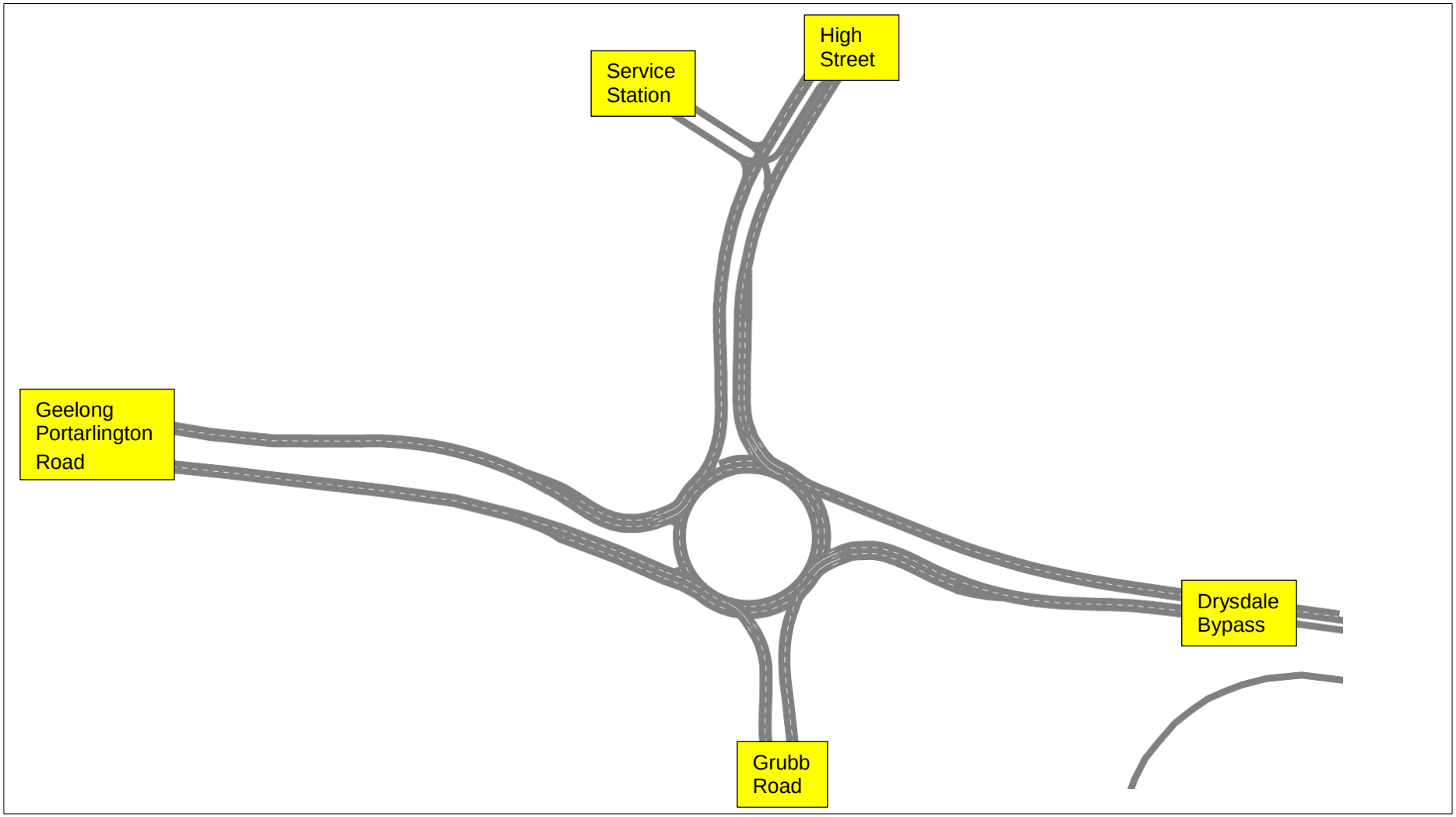


Figure 24 VicRoads Option 9 Layout

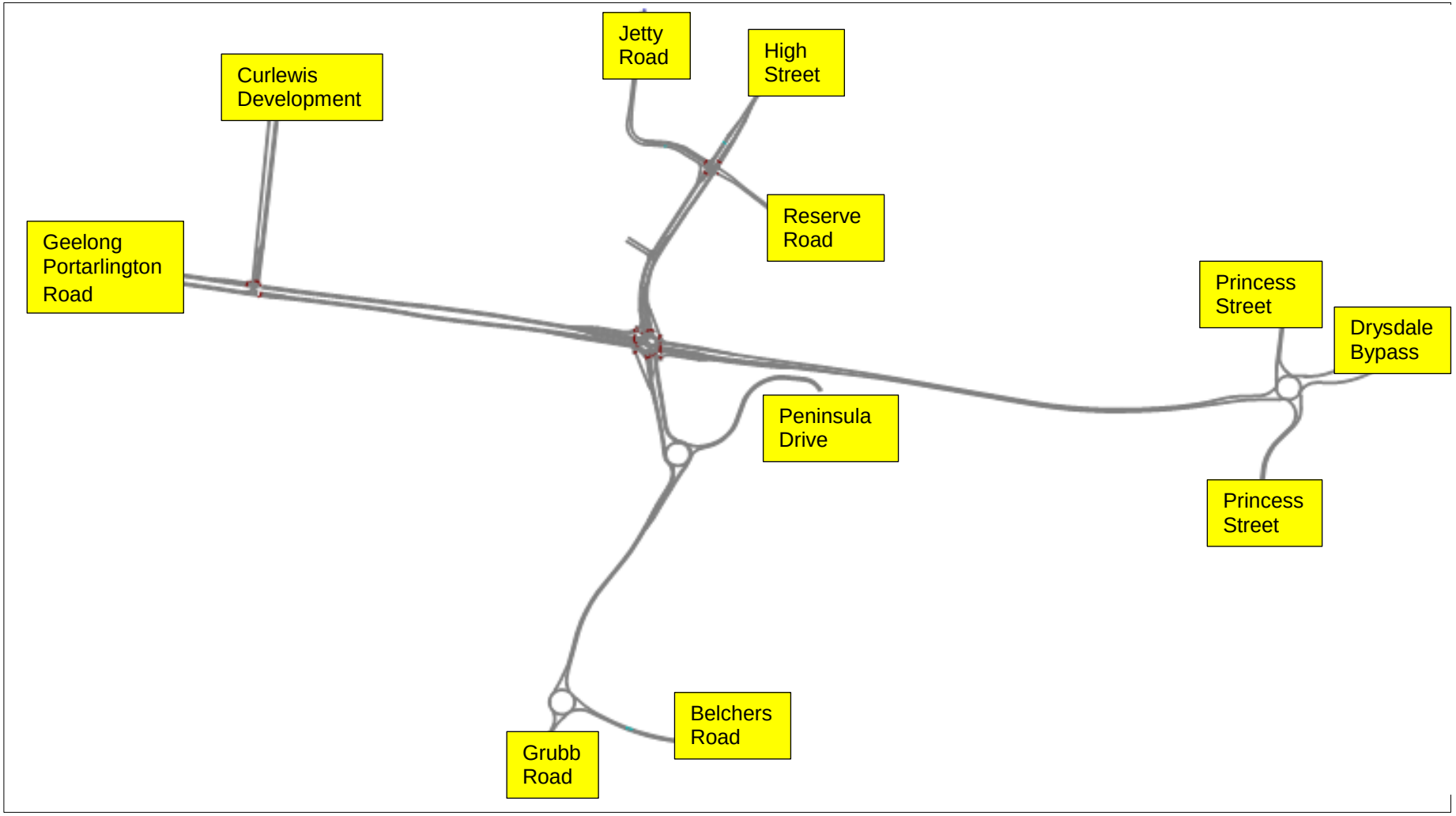


Figure 25 VicRoads Option 9 Layout – Zoomed In

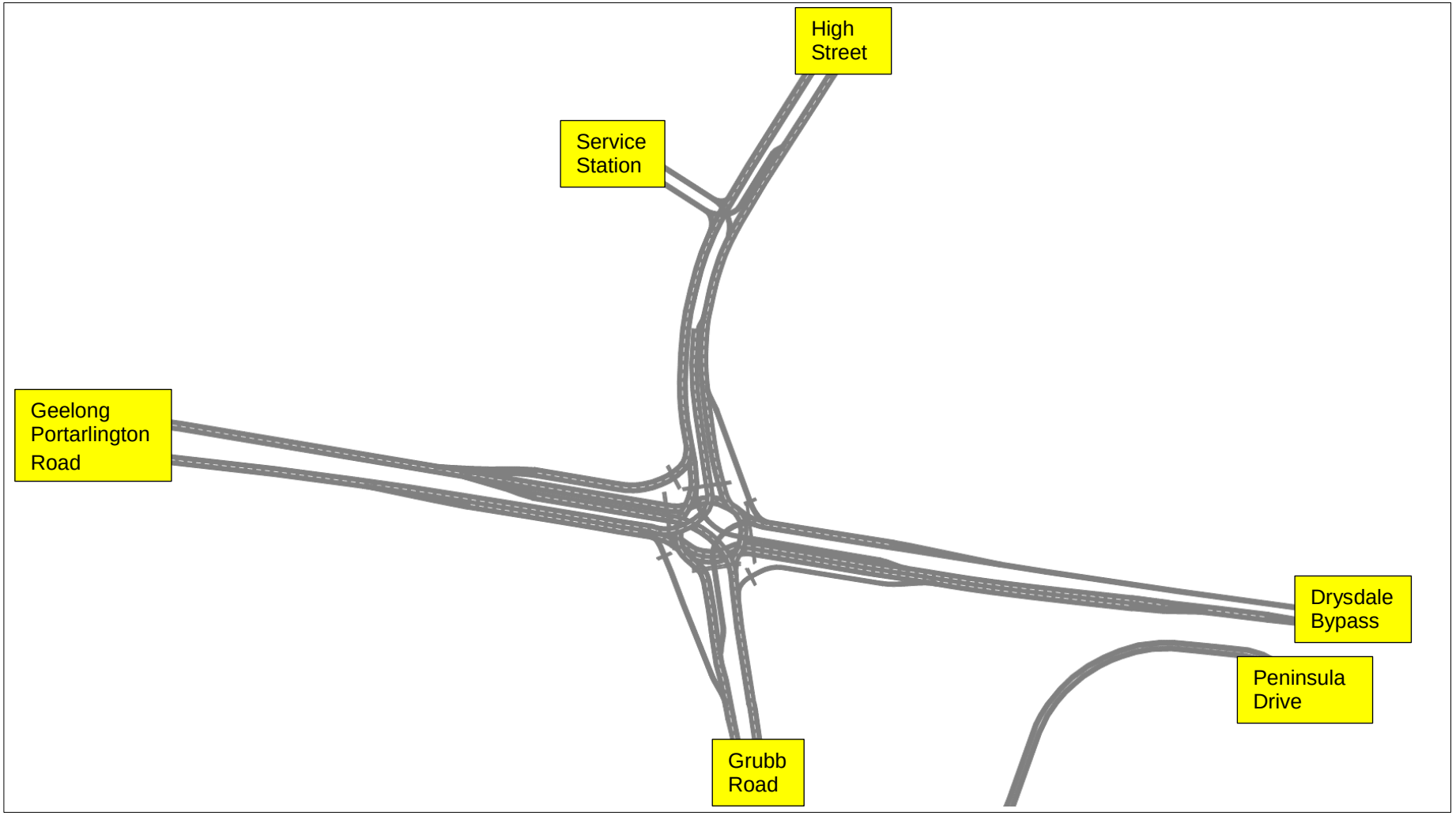


Figure 26 DCSCA Option 10a Layout

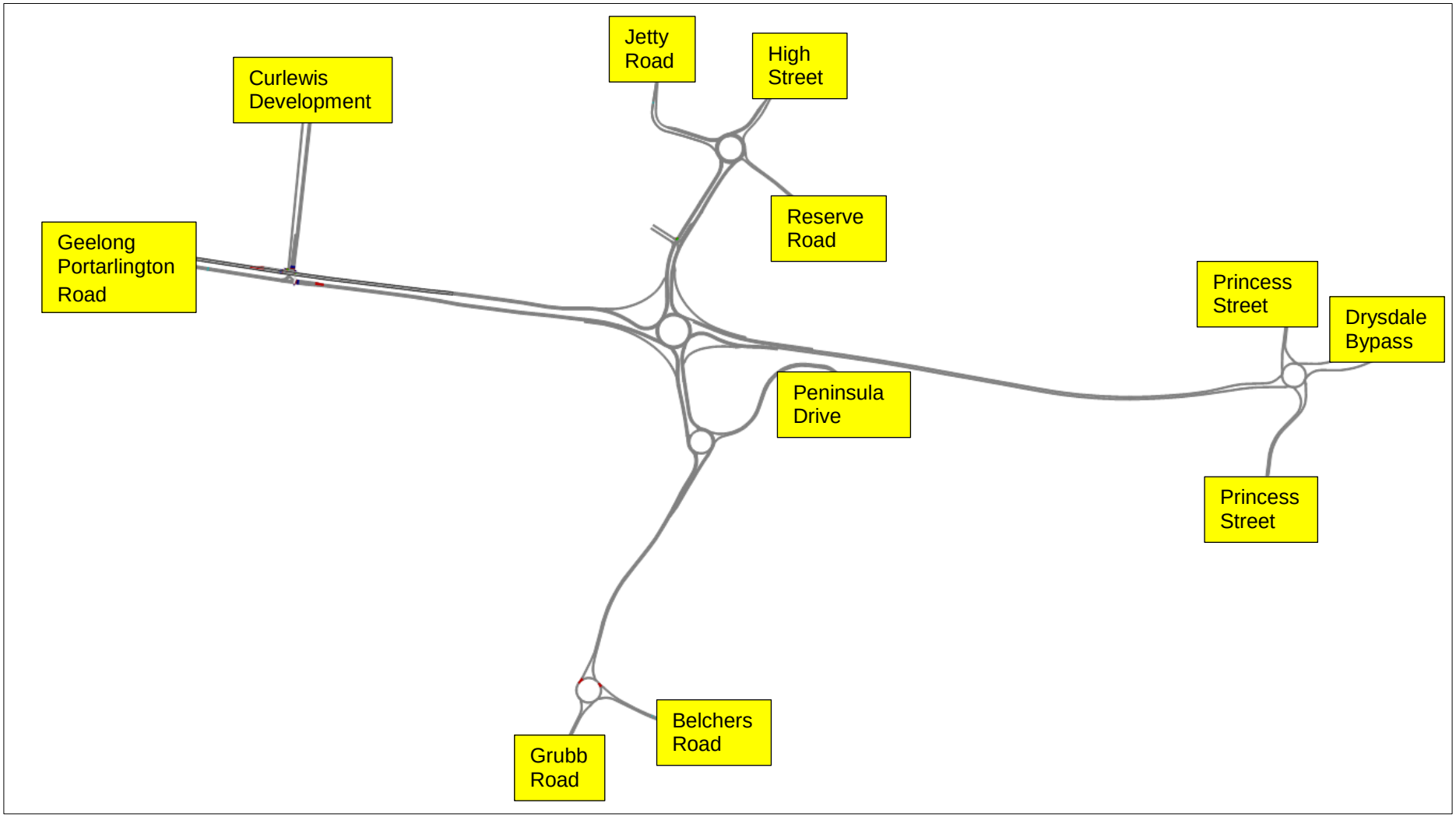


Figure 27 DCSCA Option 10a Layout – Zoomed In

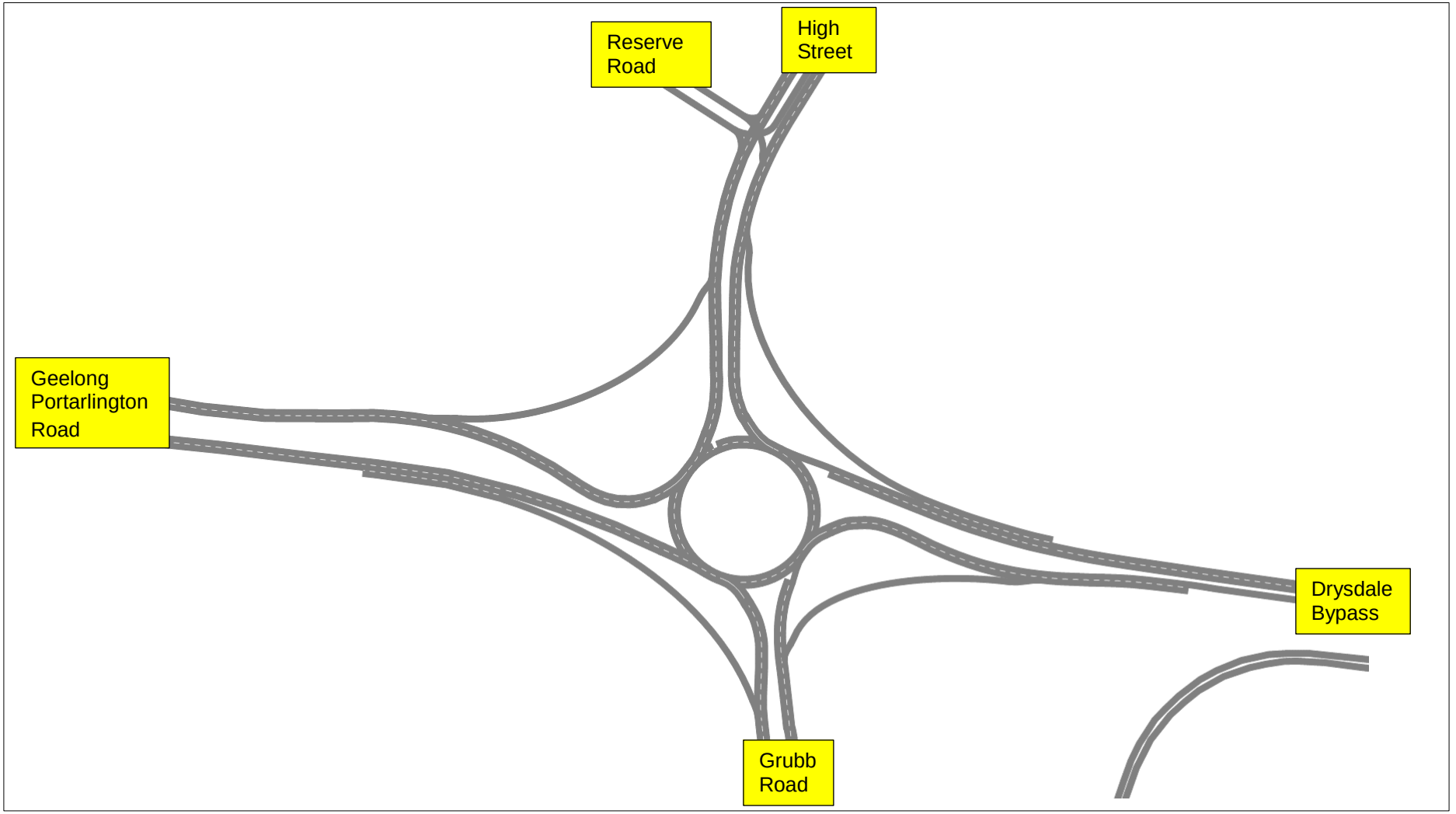


Figure 28 DCSCA Option 10b Layout

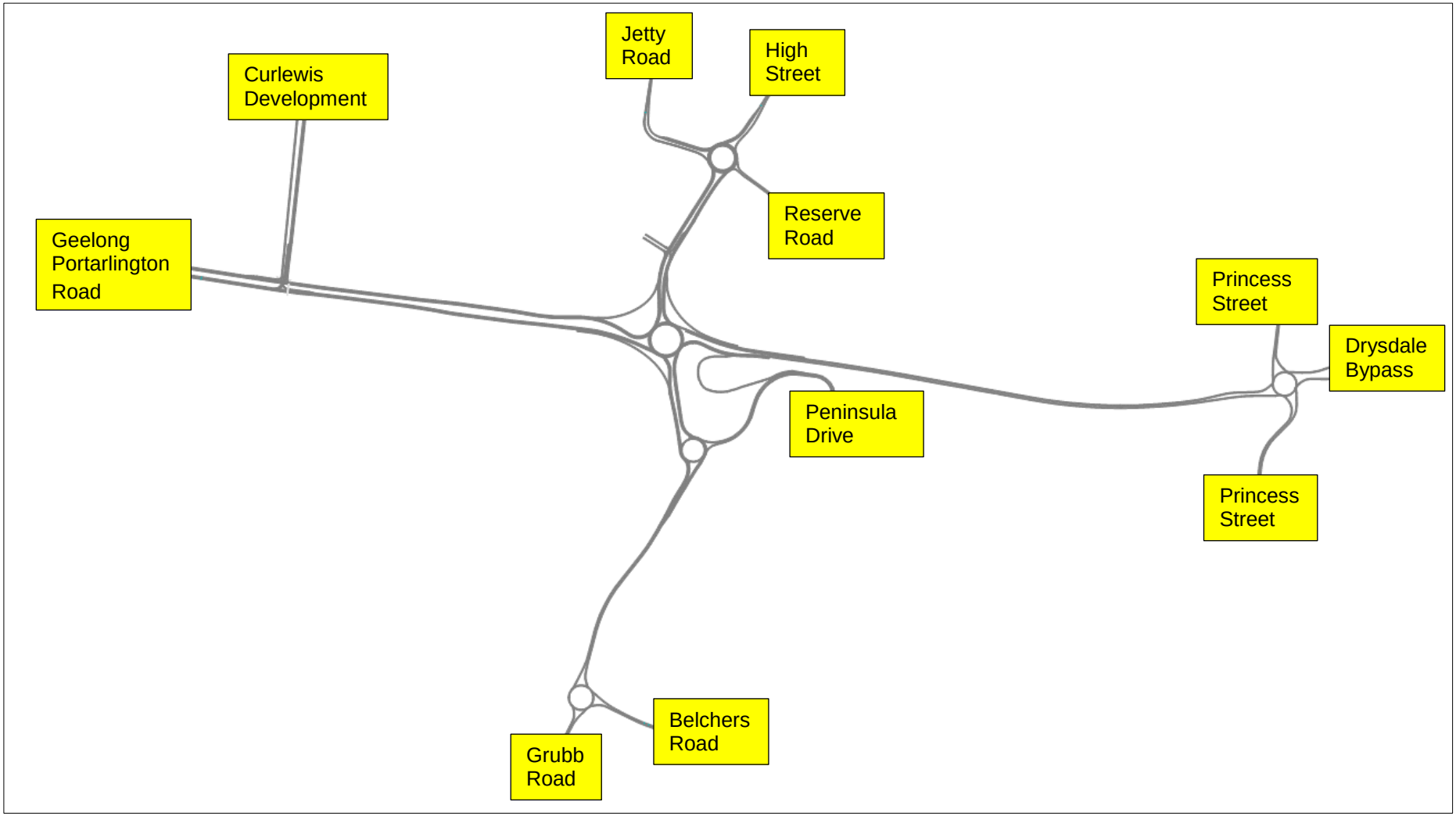


Figure 29 DCSCA Option 10b Layout – Zoomed In

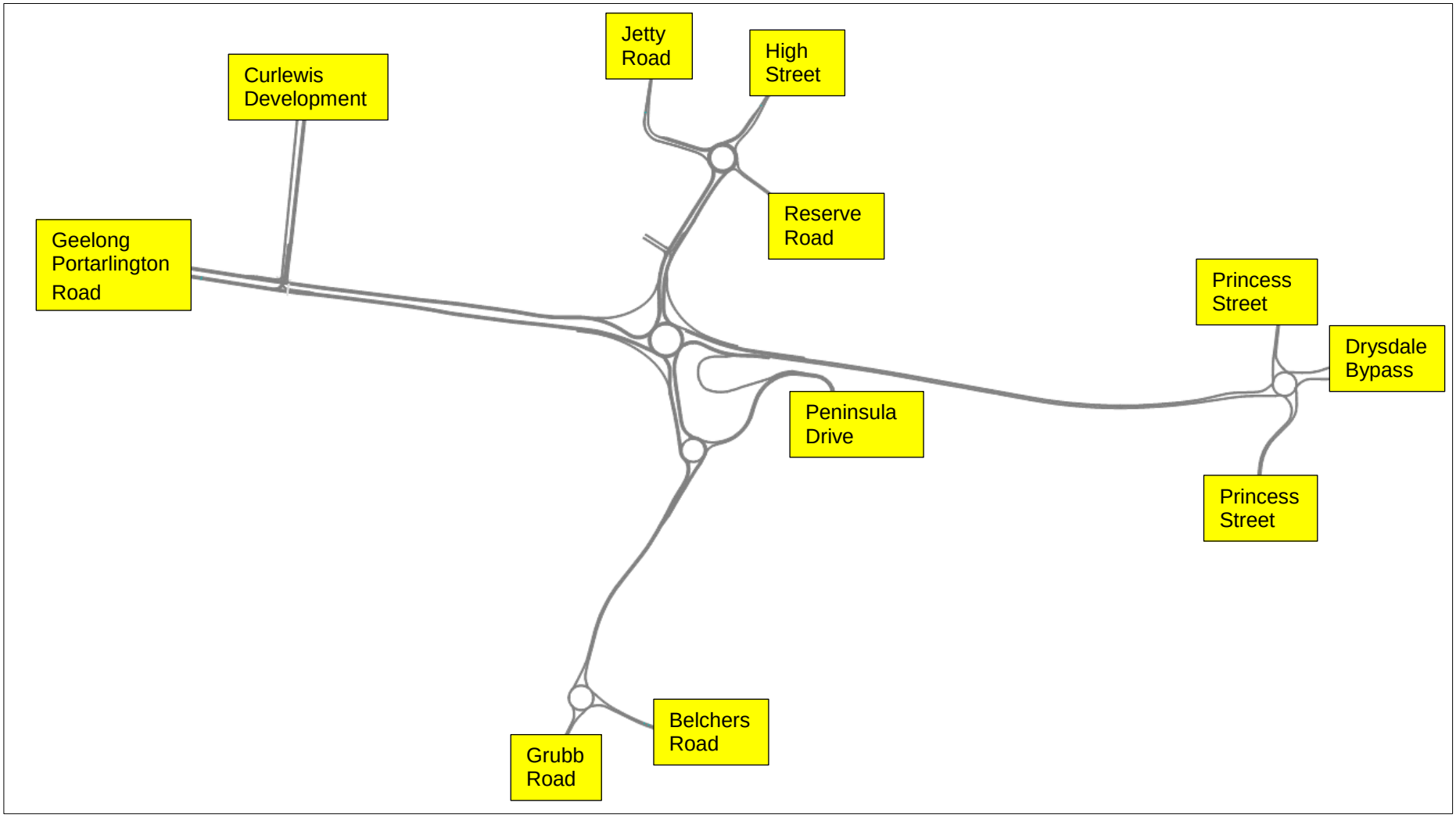


Figure 30 DCSCA Option 11a Layout

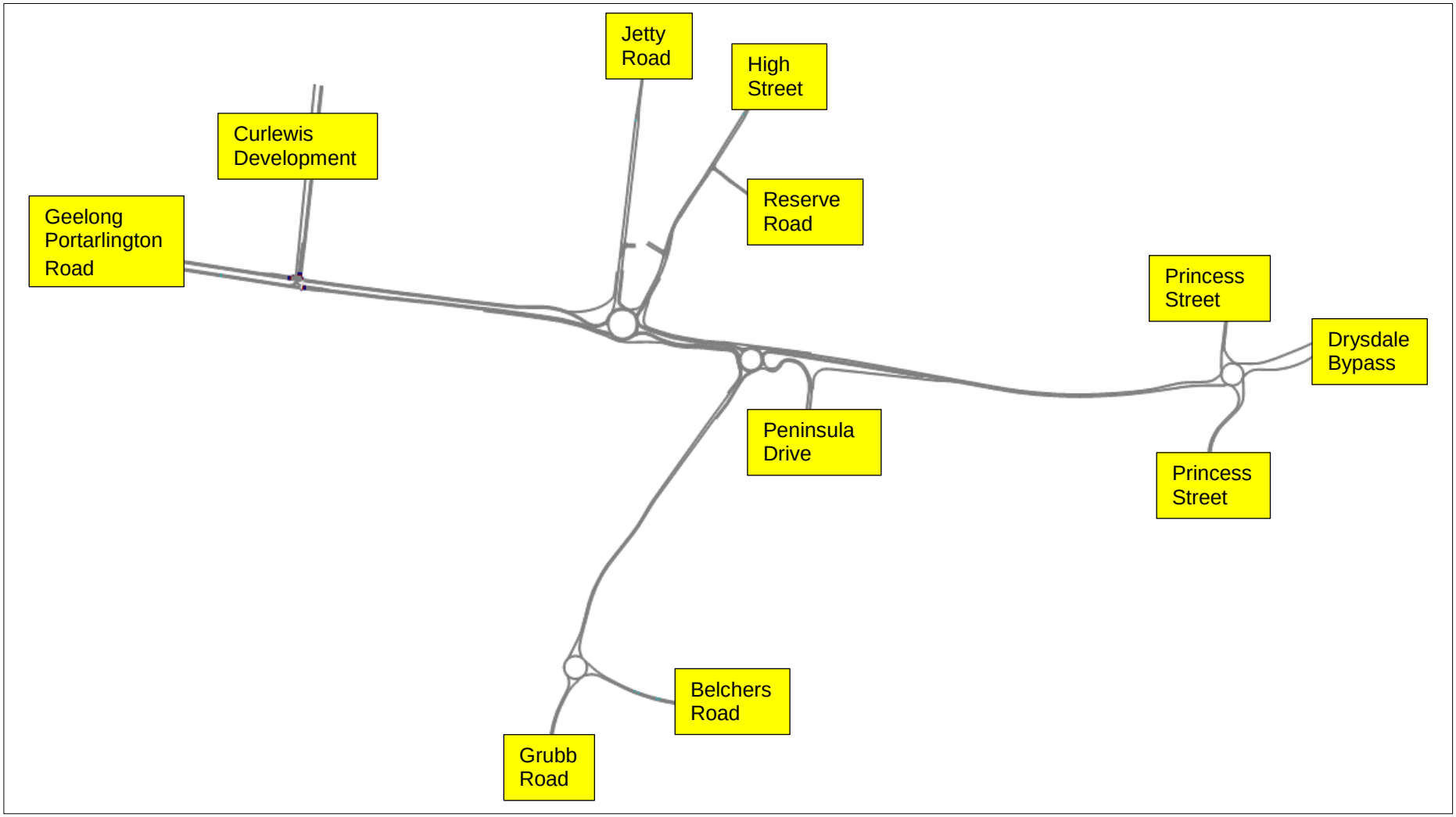


Figure 31 DCSCA Option 11a Layout – Zoomed In

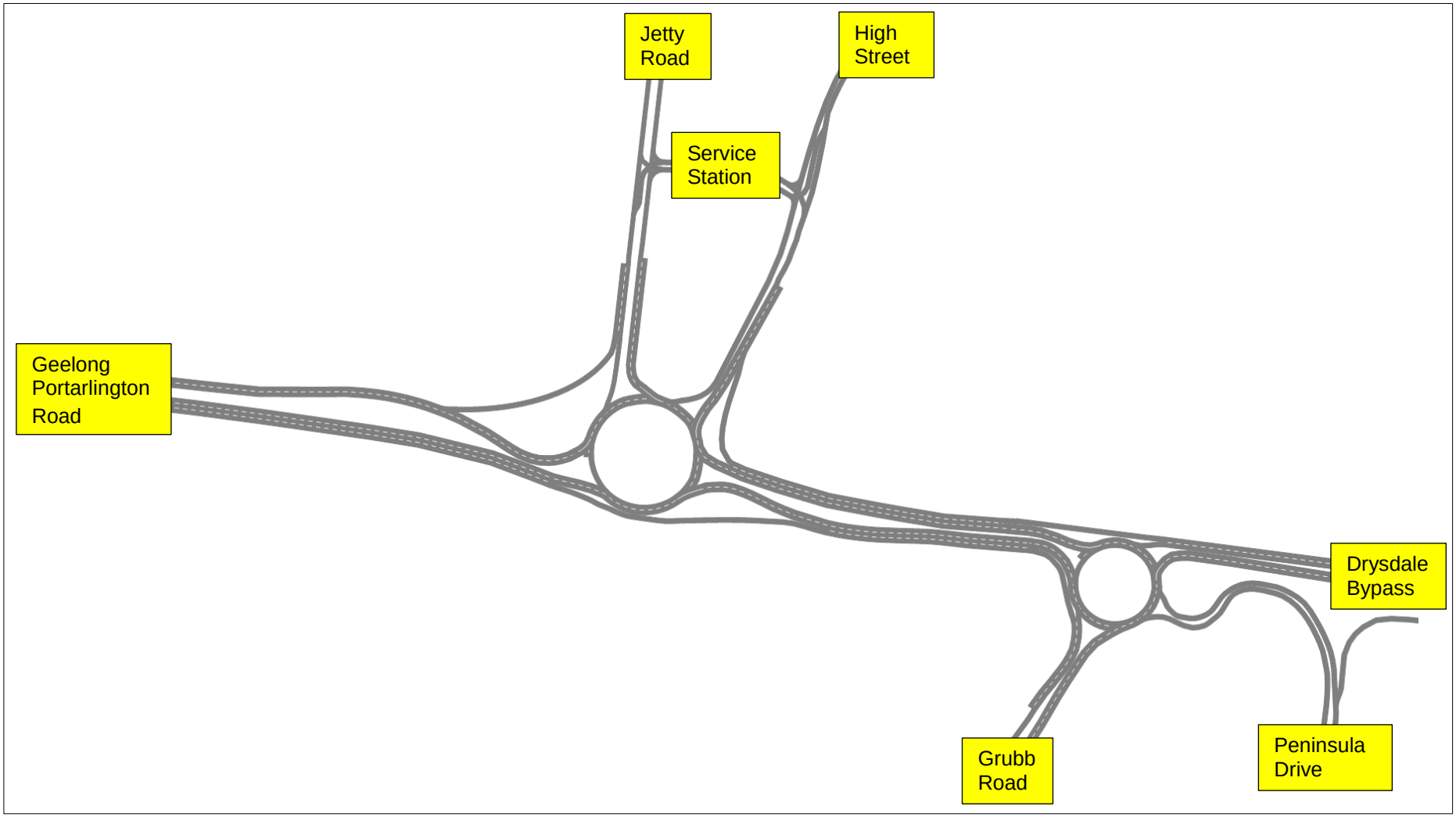


Figure 32 DCSCA Option 11b Layout

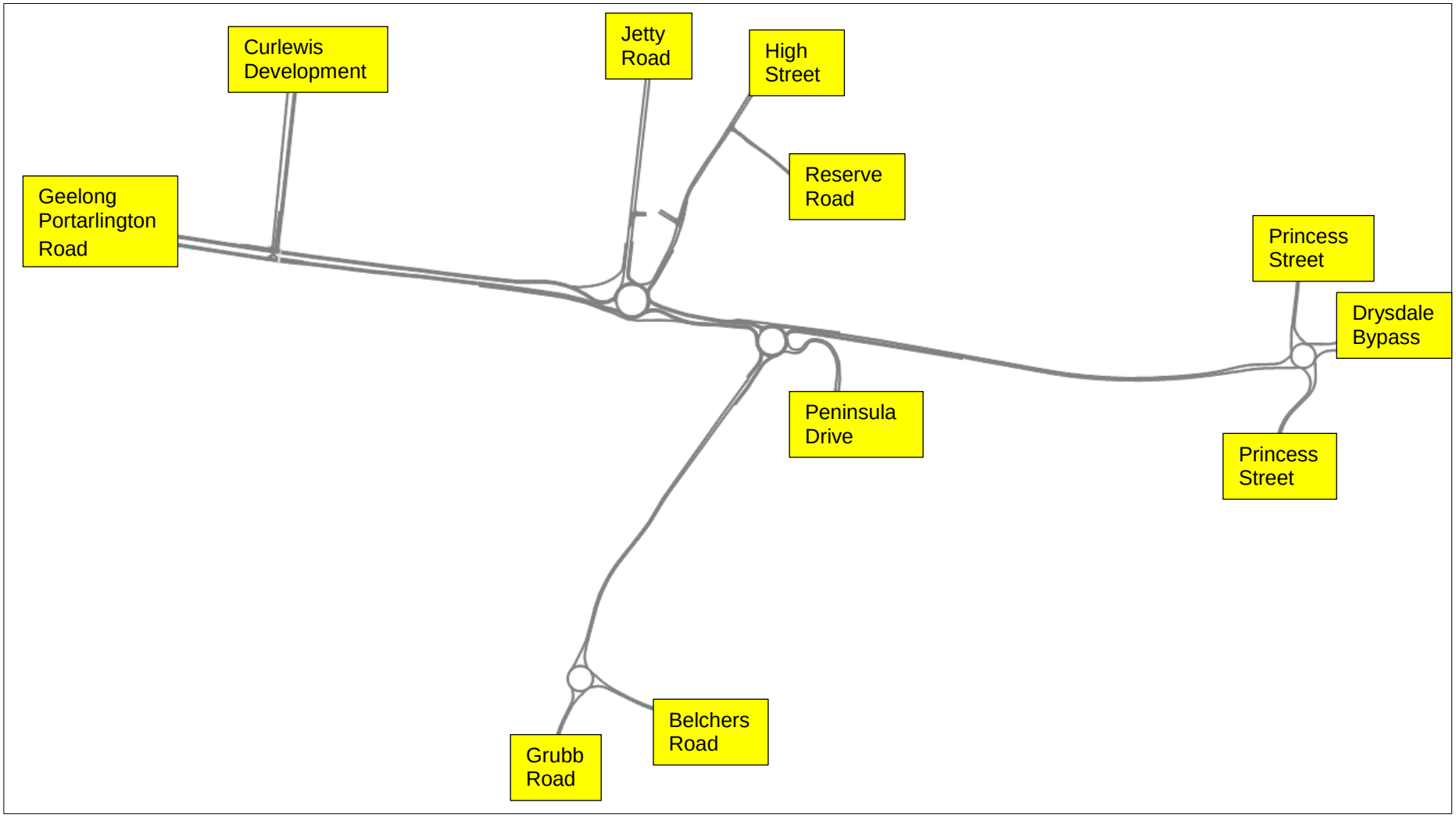
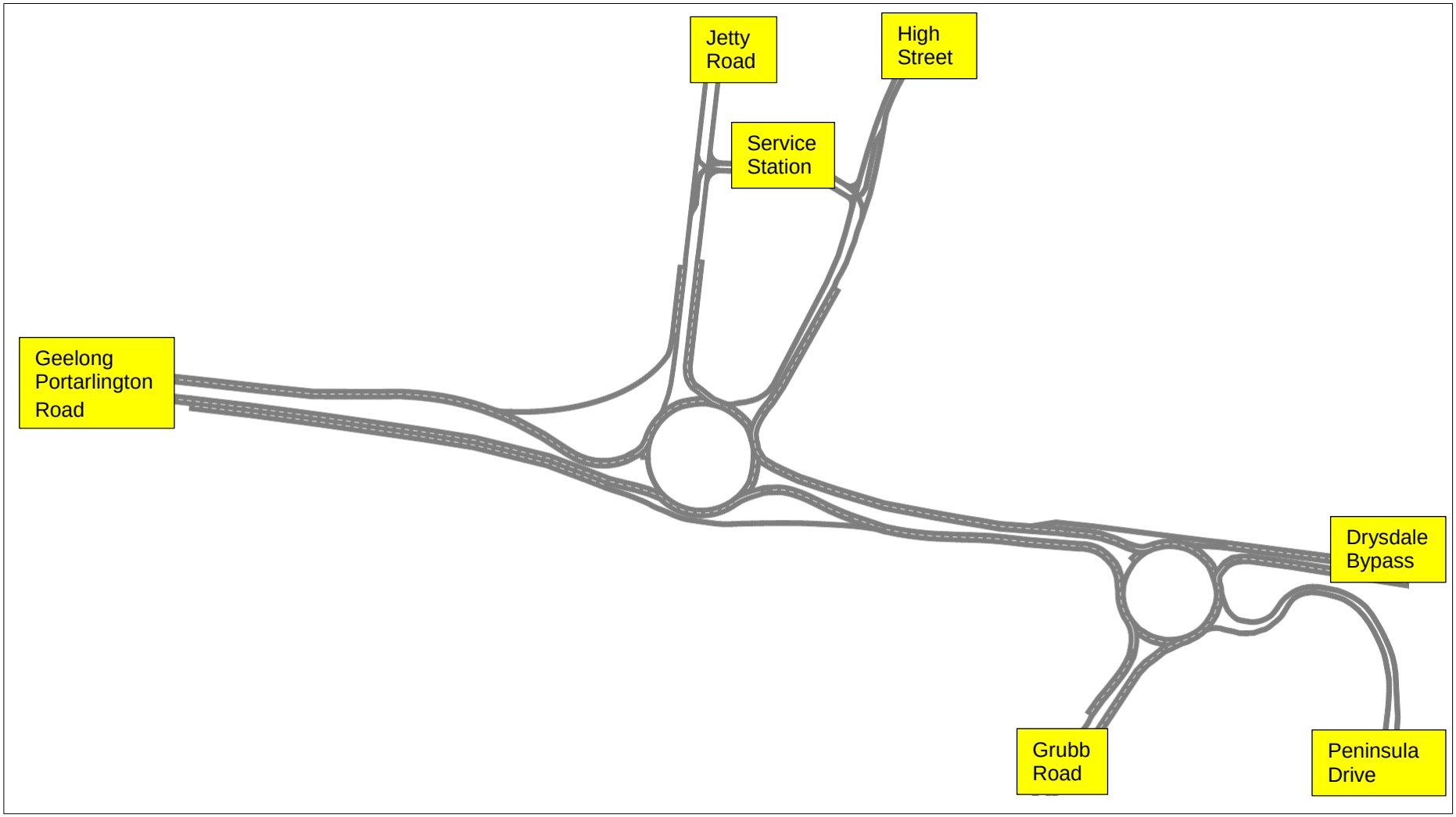


Figure 33 DCSCA Option 11b Layout – Zoomed In



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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
A	Toby Cooper	Martin Smith		Martin Smith		14/07/2017
B	Toby Cooper	Martin Smith		Martin Smith		19/07/2017

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