

Aberdeenshire Council Portlethen Option Testing S-Paramics Testing Results

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1 INTRODUCTION

1.1 Introduction

1.1.1 As part of the Aberdeenshire Framework agreement, Aberdeenshire Council (AC) requested SIAS Limited (SIAS) to undertake scenario testing using the recently completed Portlethen S-Paramics traffic model.

1.1.2 This option testing builds on the previous option testing that was undertaken, see SIAS report Ref. TPATCPM/71543.

1.1.3 The following option tests are to be undertaken, namely:

- Review 2012 Do-Minimum Content
- 2012 New Link Road between Badentoy and Cookston Road
- 2012 Cookston Road/Muirend Road Roundabout (Faber Maunsell Design)
- 2012 Cookston Road/Muirend Road Signal Control (Faber Maunsell Design)

1.2 Study Aims

1.2.1 The overall aim of the study is, under advice from Aberdeenshire Council, to assess the ability of network improvements to aid the performance of the road network.

1.2.2 The future year scenario under consideration is 2012 for the AM and PM periods.

1.3 Objectives

1.3.1 The principal objectives of the study were defined as:

- Evaluate the operational impact of the potential infrastructure interventions
- Produce a comprehensive briefing note detailing the process and outcomes

1.3.2 The Portlethen study area is shown in Figure 1.1.





Figure 1.1 : Portlethen S-Paramics Model Study Area

2 S-PARAMICS MODEL APPLICATION

2.1 Study Tasks

2.1.1 The precise requirements of the study are set out in the following work packages. The main elements of testing are:

- Review 2012 Do-Minimum Content
- 2012 New Link Road between Badentoy and Cookston Road
- 2012 Cookston Road/Muirend Road Roundabout (Faber Maunsell Design)
- 2012 Cookston Road/Muirend Road Signal Control (Faber Maunsell Design)

2.2 Review 2012 Do-Minimum Content

2.2.1 The first stage of work was to review the 2012 scenario and ensure that the development content is agreed with Aberdeenshire Council. The previous modelling had the following committed developments in the model area, namely:

- Impact of the AWPR
- Marywell Retail Development
- Cairnrobin Business Development
- Schoolhill Housing

2.2.2 Full details of the previous model build can be found in the SIAS report *Portlethen Traffic Capacity Study* (SIAS Ref. TPATCPM/71543).



- 2.2.3 Following discussion with Aberdeenshire Council, additional industrial development was to be included to the north of Badentoy Industrial Estate (Site EmpC in the *Aberdeenshire Local Plan*).
- 2.2.4 Appendix A shows Site EmpC, the additional development area that is to be included in the revised 2012 Do-Minimum model.
- 2.2.5 The details provided by Aberdeenshire Council, showed the development schedule of the site to be 39.79 Acres (16.1Ha) in total.
- 2.2.6 As proposed by Aberdeenshire Council, the development should assume the development of:
- Class 4 Business – 25% at a build density of 3,000m² GFA/Ha
 - Class 5 Business – 25% at a build density of 3000m² GFA/Ha
 - Class 6 Business – 50% at a build density of 6500m² GFA/Ha
- 2.2.7 The TRICS trip rates that were calculated for the previous Portlethen option testing were again used for this additional development. Table 2.1 summarises the trip rates extracted from the TRICS database (Version 2009a).

Table 2.1 : TRICS Trip Rates

Development Type	AM Peak (06:30-09:30)		PM Peak (16:00 - 19:00)	
	In	Out	In	Out
Warehouse (Commercial) (GFA 100M2)	0.901	0.444	0.450	0.892
Business (GFA 100M2)	3.247	0.732	0.917	2.897

- 2.2.8 The trip rates above were then used to calculate the number of trips to and from each development. The trip totals are shown in Table 2.2.

2.3 2012 New Link between Badentoy and Cookston Road

- 2.3.1 The first test assesses a link connecting Badentoy Industrial Estate to Cookston Road. Aberdeenshire Council supplied an indicative alignment illustrating the assumed alignment and connection points to the network. Figure 2.1 shows the assumed alignment of the link road. It should be noted that the plan provided by Aberdeenshire Council (Appendix A) shows the main road to be in the East/West location, but at the request of Aberdeenshire Council, the testing has been undertaken with the main road in the north/south direction with a priority junction going into Badentoy Industrial Estate.





Figure 2.1 : Proposed Link Road from Badntoy Industrial Estate

2.4 Revised Junction Arrangement – Cookston Road/Muirend Road 2012

2.4.1 Aberdeenshire Council has advised that in a separate study Faber Maunsell have been designing alternative layouts for the Cookston Road/Muirend Road junction. Two proposals have been supplied to SIAS to assess within the Portlethen S-Paramics model.

- Roundabout Design
- Traffic Signal Design

2.4.2 Figures 2.2 and 2.3 illustrate the designs of the roundabout and traffic signal design.



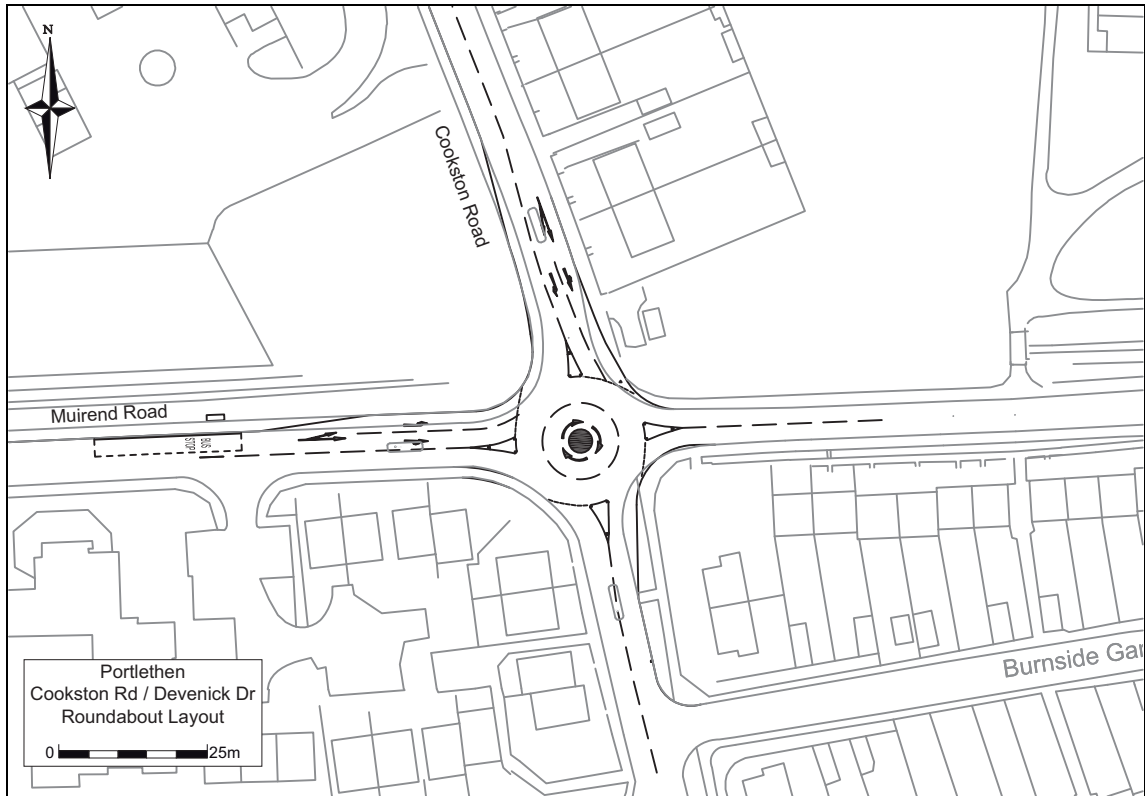


Figure 2.2 : Cookston Road/Muirend Road Roundabout Design

2.4.3 The signal design is illustrated in Figure 2.3.

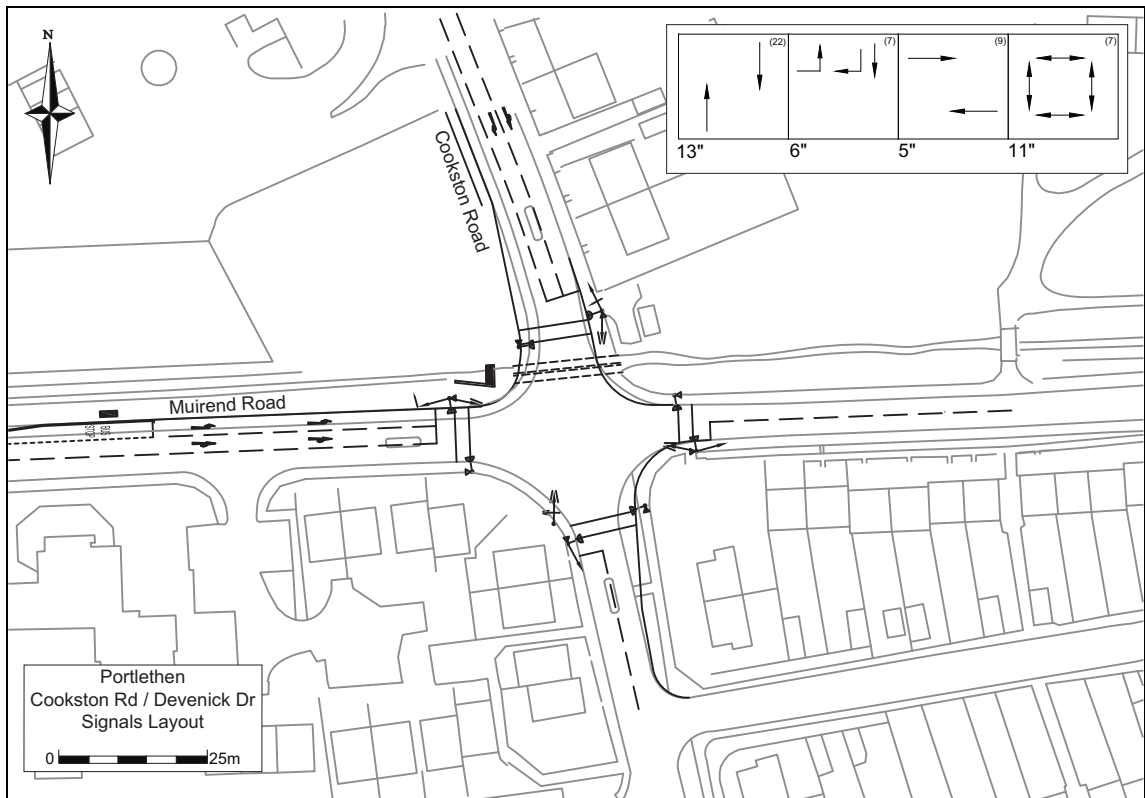


Figure 2.3 : Cookston Road/Muirend Road Signal Design



3 SCENARIO TESTING

3.1 2012 Revised Do-Minimum Content

- 3.1.1 As stated, the additional development at Badentoy comprised an additional 2,037 trips in the AM Peak Period (06:30 – 09:30) and 1972 trips in the PM Peak Period (16:00 – 19:00). As an initial test the 2012 Do-Minimum revised development content was run with no new infrastructure.
- 3.1.2 Upon running the model with no new infrastructure, in the AM Peak the model indicated problems at Badentoy Interchange, with a queue developing on the northbound off slip back onto the main A90(T) northbound by 07:45. This queue extended as far back as the Cammachmore (North) junction before clearing by 09:00.
- 3.1.3 In the PM peak, the existing queue on Badentoy Road, approaching Badentoy Interchange was shown to have reached the Industrial Estate by 16:45 and remained until approximately 18:45.
- 3.1.4 In both the AM and PM peaks, no other major queueing was observed in the network, including at Findon Interchange.

3.2 2012 New Link Road between Badentoy and Cookston Road

- 3.2.1 As can be seen in Figure 2.1, a new link road is proposed from Badentoy Industrial Estate, passing the new development and linking with Cookston Road, close to Findon Interchange.
- 3.2.2 With the new link road in place, the modelled queueing previously observed at Badentoy Interchange is no longer apparent; as traffic heading to Badentoy Industrial Estate from the north can now enter from Findon Interchange and access the industrial area from the new link road at Cookston Road. With the new link road in place, no significant queueing is observed at Findon Interchange as a result of this rerouteing.
- 3.2.3 Similarly, in the PM peak, while there are still queues on Badentoy Road, these are now clear by 18:15; as traffic heading north has the option to go via Cookston Road. Significant queueing is still evident on Badentoy Road, due to existing capacity limitations at Badentoy Interchange. With the new link road in place, some queueing is observed at Findon Interchange, with traffic from Aberdeen and Marywell being delayed by the additional traffic heading north to Aberdeen from Badentoy Industrial Estate. This is a result of the design of Findon Interchange with traffic heading north cutting across traffic heading to Portlethen from the north.

3.3 Revised Junction arrangement Cookston Road/Muirend Road- Roundabout

- 3.3.1 With the revised roundabout in place, no queues or delays are seen in either the AM or PM peak at this location. The only areas with delays are those previously noted under the new link road test.

3.4 Revised Junction arrangement Cookston Road/Muirend Road – Signalised Junction

- 3.4.1 Again, no queues or delays are observed in either peak at the signalised junction. The main delays are again centred around Badentoy Interchange.



4 MODEL RESULTS

4.1 Journey Time Results

4.1.1 Journey time routes were analysed for the following paths

- Portlethen northbound and southbound - From Findon Interchange via Cookston Road to Bruntland Road (A90)
- A90 northbound and southbound – From Findon Interchange to Newtonhill via the A90

4.1.2 Figure 4.1 shows the journey path information in the AM peak for the following scenarios:

- 2012 Do-Minimum – Original Development Content
- 2012 Do-Minimum – Revised Development Content
- 2012 New Link Road
- 2012 New Link Road and signalised junction at Cookston Road/Muirend Road
- 2012 New Link Road and roundabout at Cookston Road/Muirend Road
- 2012 Do-Minimum Original with no link road and signals at Cookston/Muirend
- 2012 Do-Minimum Original with no link road and roundabout at Cookston/Muirend

4.1.3 Figure 4.1 demonstrates that in the main the journey times remain consistent, with the exception of the A90 northbound which shows an increase of 66s over the other scenarios in the 2012 Revised Do-Minimum scenario.

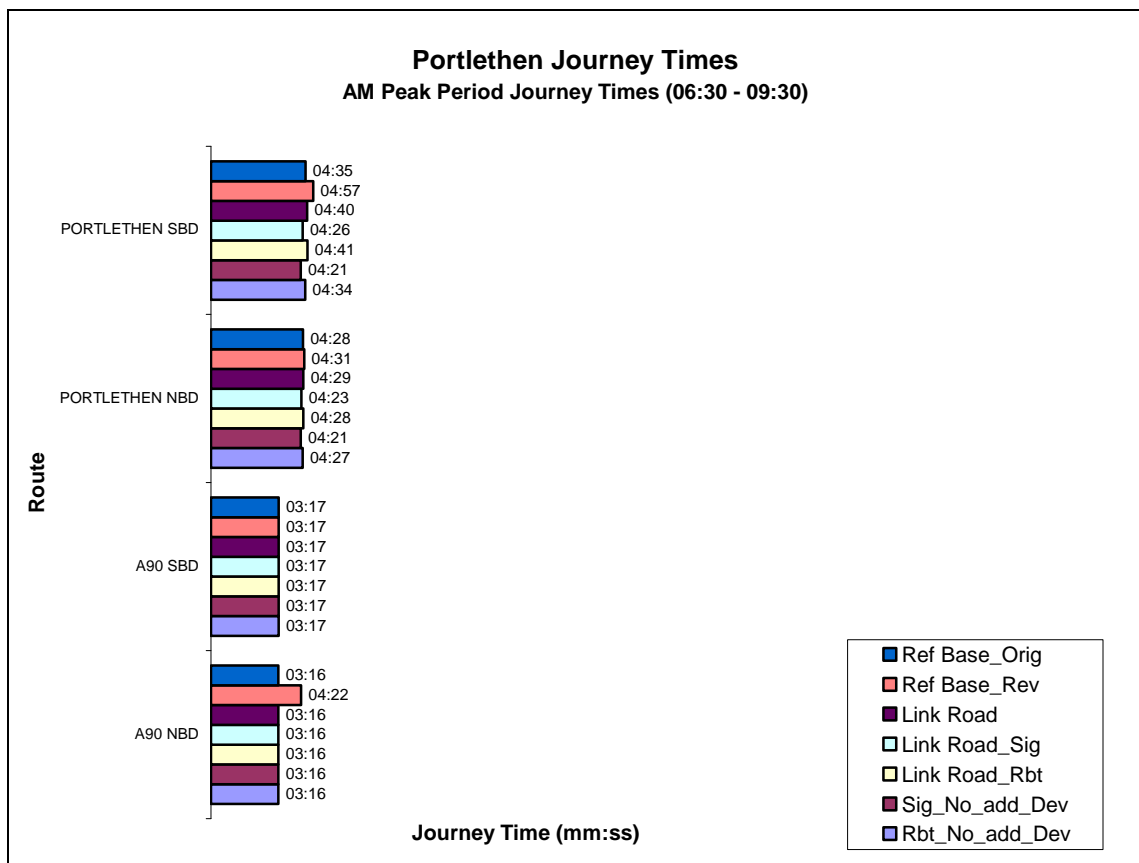


Figure 4.1 : AM Peak Journey Times



4.1.4 Figure 4.1 also shows that with or without the additional development the Portlethen northbound and southbound journey paths show lower journey times with the inclusion of the new traffic signals compared to the roundabout.

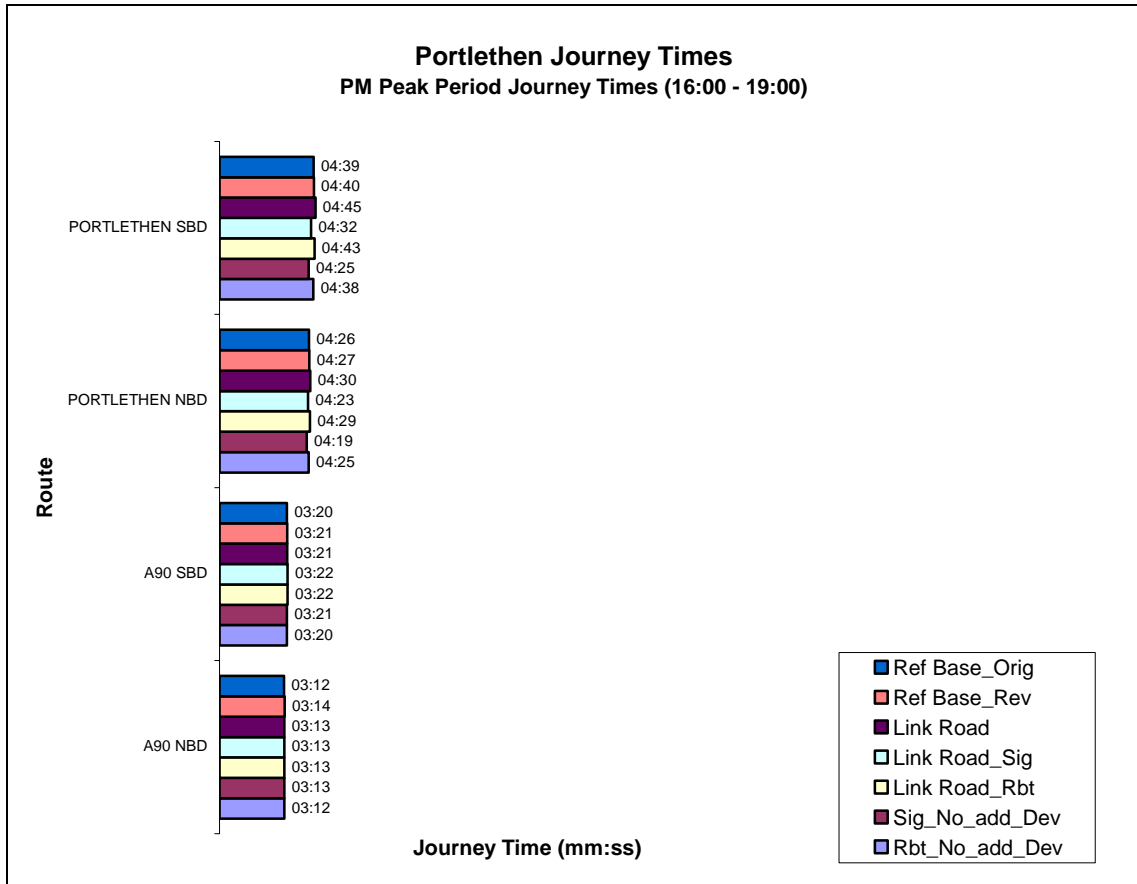


Figure 4.2 : PM Peak Journey Times

4.1.5 Figure 4.2 shows that in the PM Peak journey times on all paths are consistent, again, it should be noted that the revised signalised junction arrangement at Cookston Road/Muirend Road gives slightly lower journey times than the revised roundabout.

4.2 Queue Length Results

4.2.1 Queue Length graphs have been extracted from the model for the AM and PM peaks at Badentoy Interchange, Findon Interchange and at the Cookston Road/Muirend Road junction.

4.2.2 Figures 4.3 and 4.4 show the queues on the approaches to Badentoy Interchange on the northbound off slip and at Muirend Road (South) in the AM peak. Graphs for the other approaches can be found in Appendix B. These have not been included in the main report as there were no notable differences between the options during the AM peak.



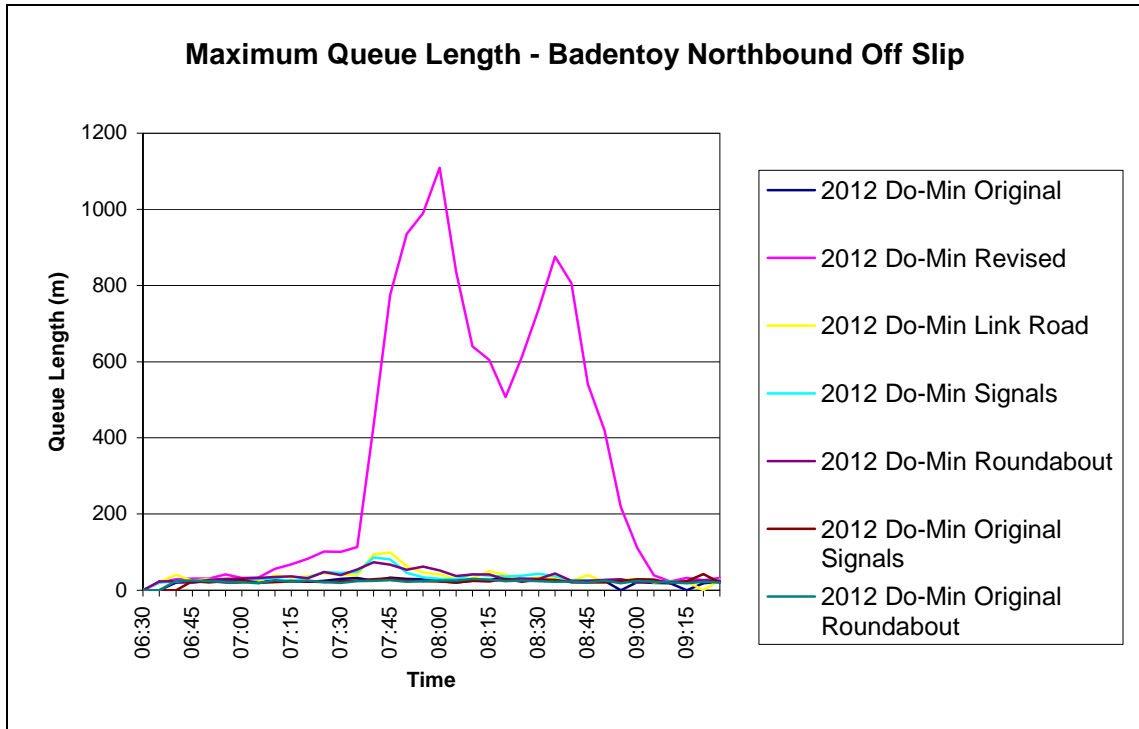


Figure 4.3 : Badentoy Northbound Off Slip AM Peak Queue Lengths

- 4.2.3 Figure 4.3 shows a queue length of up to almost 1,100m on the northbound off slip at Badentoy Interchange in the AM peak with the new development, but without the link road in place. The other scenarios show no major differences and the link road is demonstrated as providing benefits at this location.
- 4.2.4 Queue length graphs for Findon Interchange in the AM peak can be seen in Appendix B.
- 4.2.5 Figures 4.4 to 4.7 show the queue lengths on the approaches to the Cookston Road/Muirend Road junction. The graphs show that the queue lengths remain consistent, with only the signalised option generating slightly longer queue lengths due to the delays introduced by the signal stage times.



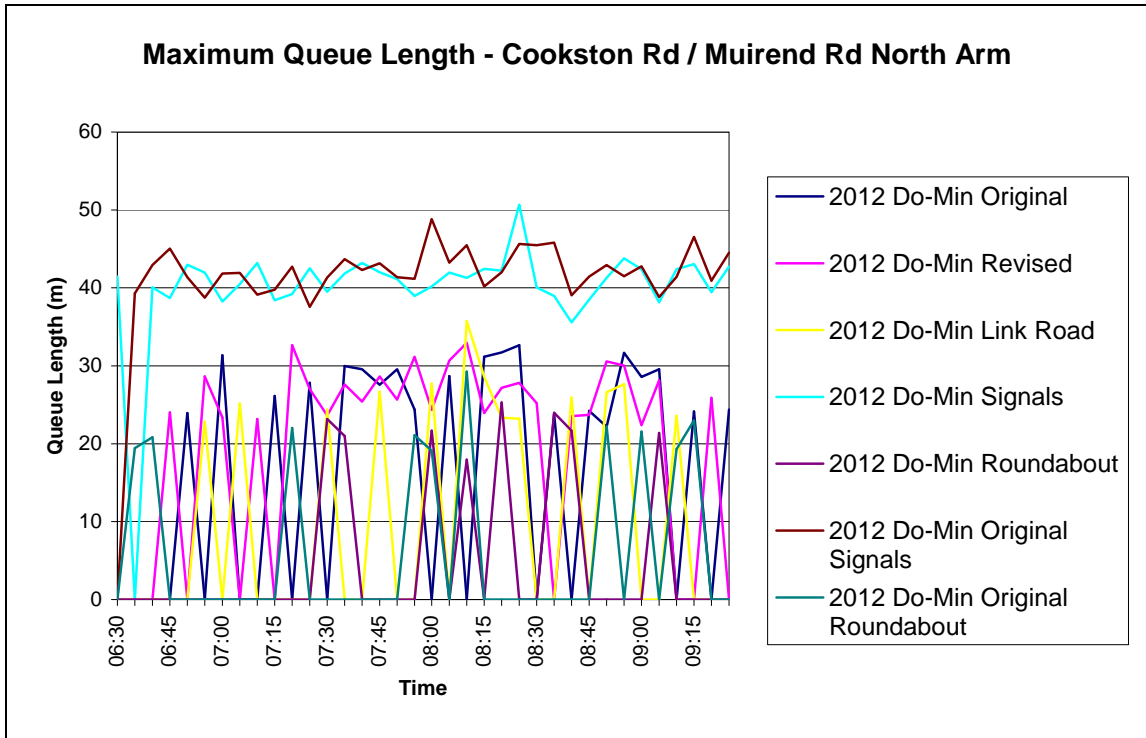


Figure 4.4 : Cookston Road/Muirend Road North Arm AM Peak Queue Length

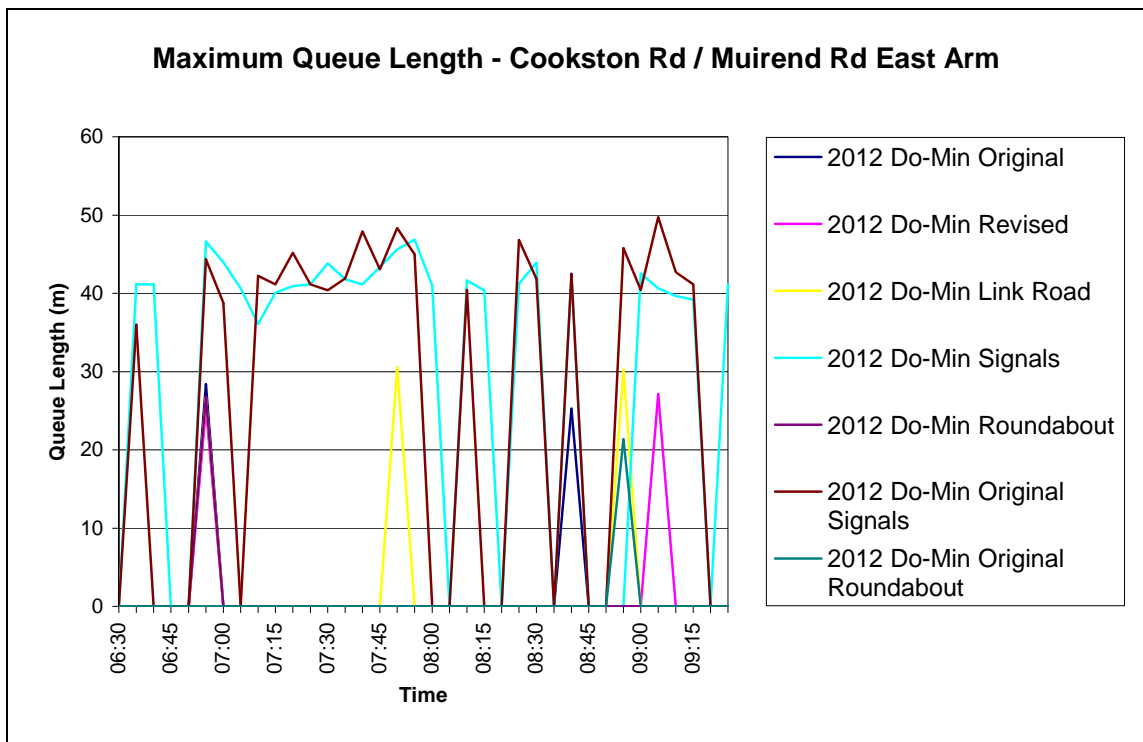


Figure 4.5 : Cookston Road/Muirend Road East Arm AM Peak Queue Length



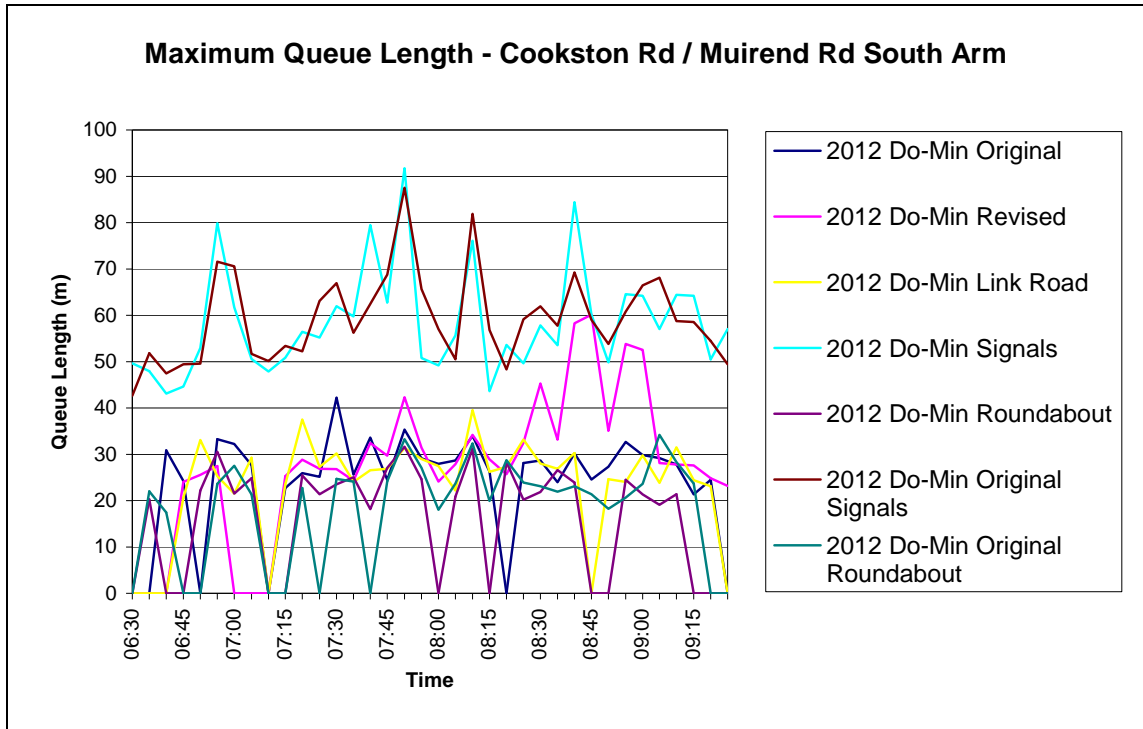


Figure 4.6 : Cookston Road/Muirend Road South Arm AM Peak Queue Length

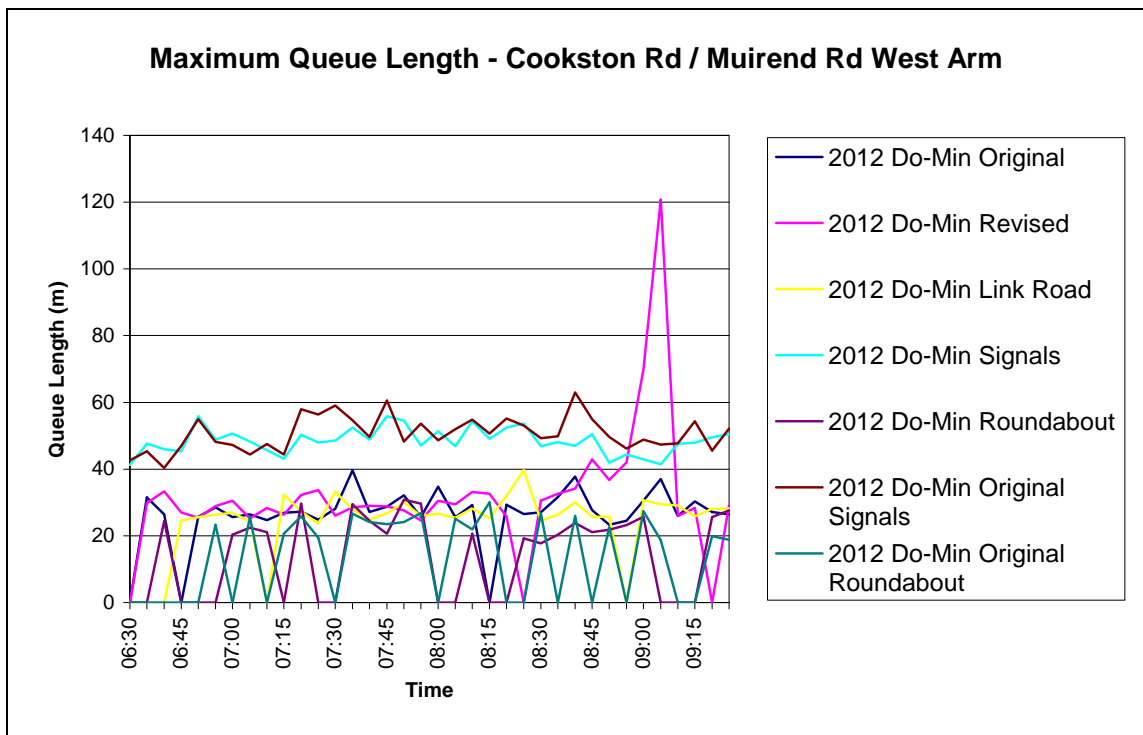


Figure 4.7 : Cookston Road/Muirend Road West Arm AM Peak Queue Length

4.2.6 Figures 4.8 to 4.10 show the queue length results for Badentoy Interchange in the PM Peak at Muirend Road (South), Badentoy Industrial Estate and Muirend Road (ASDA). The graphs show that the queue lengths remain relatively consistent.



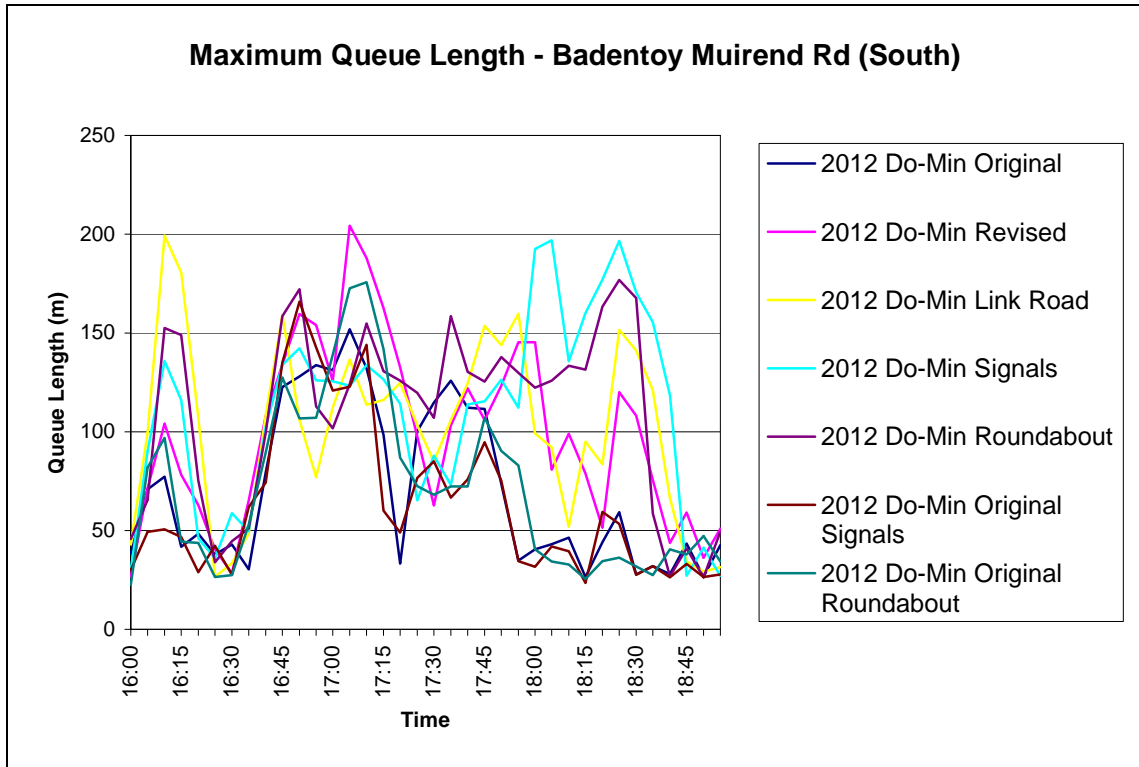


Figure 4.8 : Badentoy Muirend Road (South) PM Peak Queue Length

4.2.7 The queue length graph shown in Figure 4.9 for Badentoy Industrial Estate is the total length of queuing vehicles within the cordon area of Badentoy Road to Badentoy Interchange and includes the whole of the industrial estate area. This graph shows that without the Link Road there is more queuing and the queue length does not dissipate as quickly as the scenarios with the link road. Queue lengths for the other approaches can be found in Appendix B, again these are omitted from the main body of this report as very little variation was identified between options.



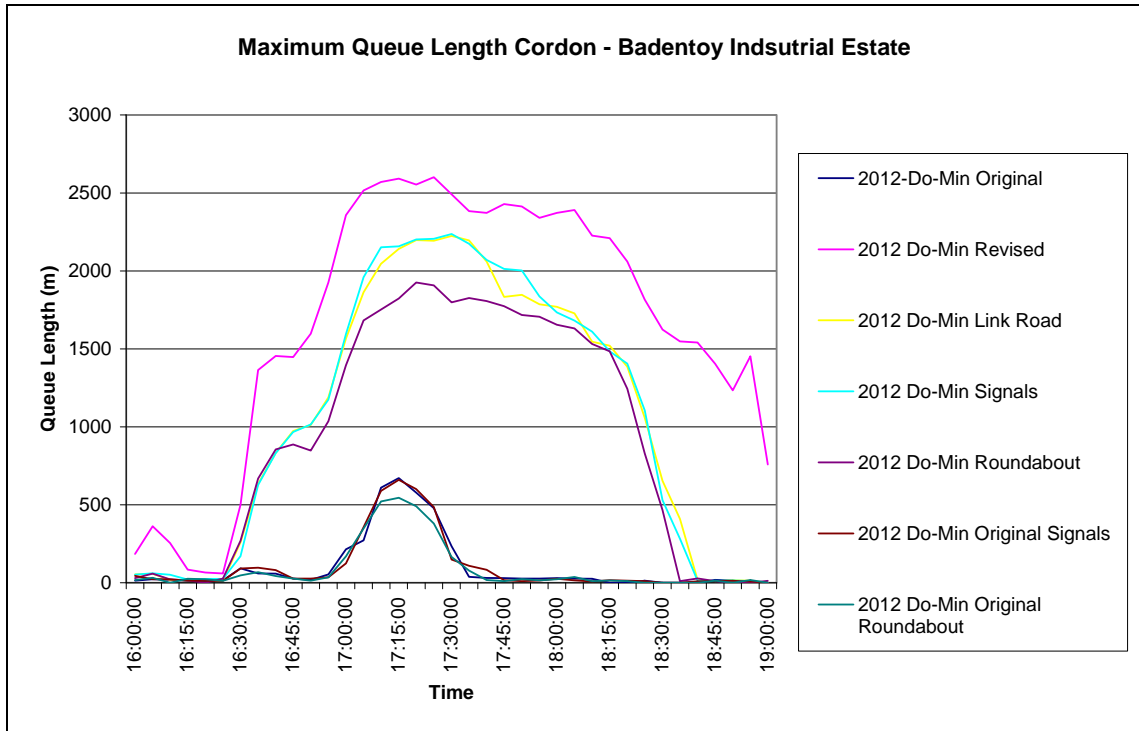


Figure 4.9 : Badentoy Industrial Estate PM Peak Queue Length Cordon

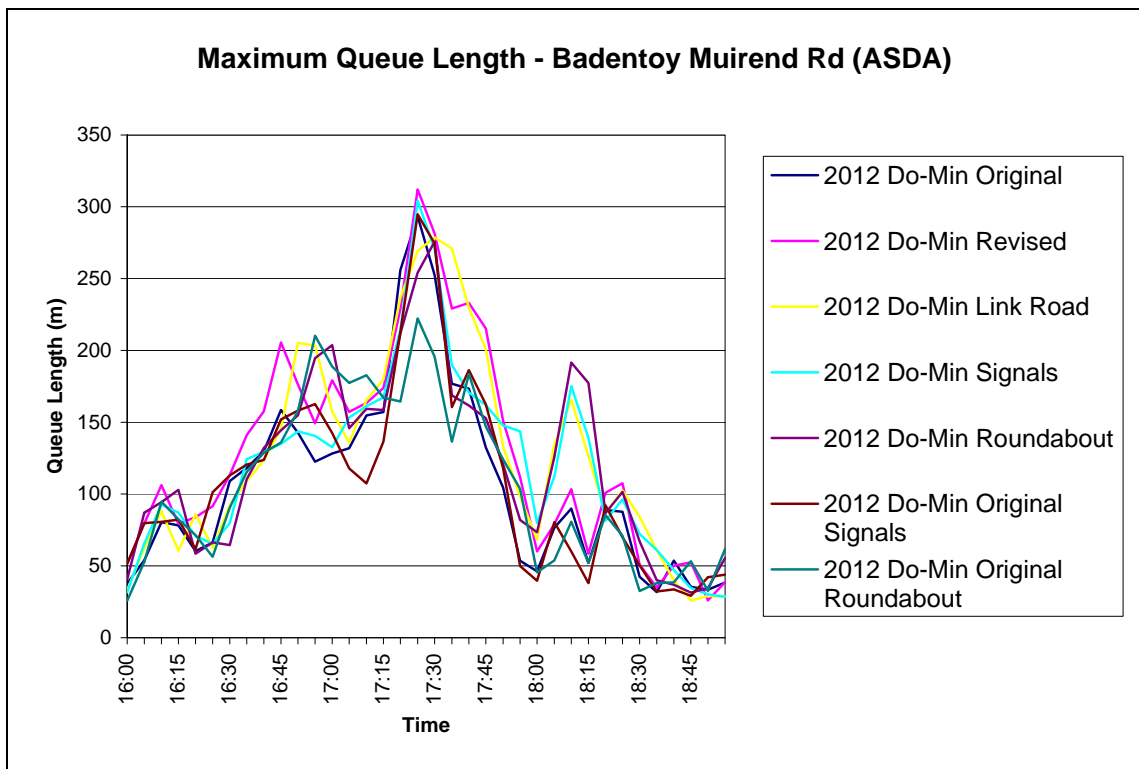


Figure 4.10 : Badentoy Muirend Road (ASDA) PM Peak Queue Length

4.2.10 Figures 4.11 and 4.12 show the queue length graphs for the Marywell and the two-way slip road approaches to Findon Interchange in the PM Peak. These figures show that there are increased queue lengths on the Marywell and the two-way slip road approaches, with the inclusion of the link road, when traffic heading from the north in the PM peak is delayed by traffic heading to



the north due to the layout of Findon Interchange. Queue length graphs for the other approaches can be seen in Appendix B.

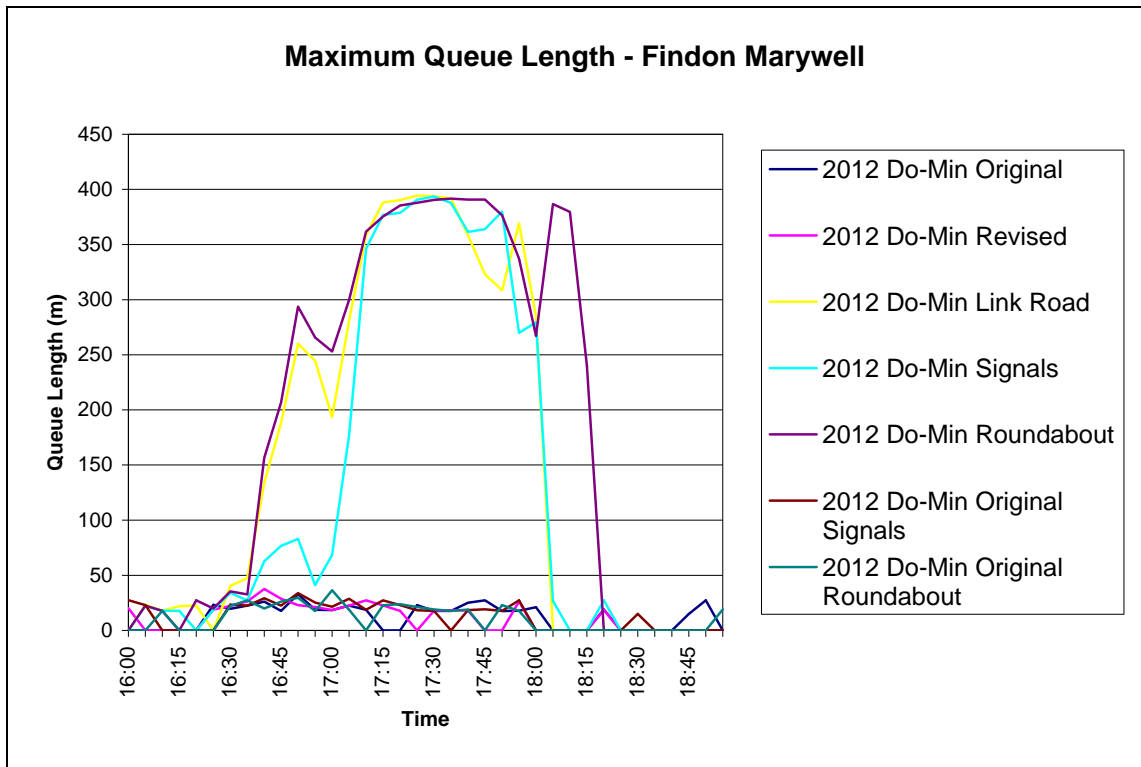


Figure 4.11 : Findon Marywell PM Peak Queue Length

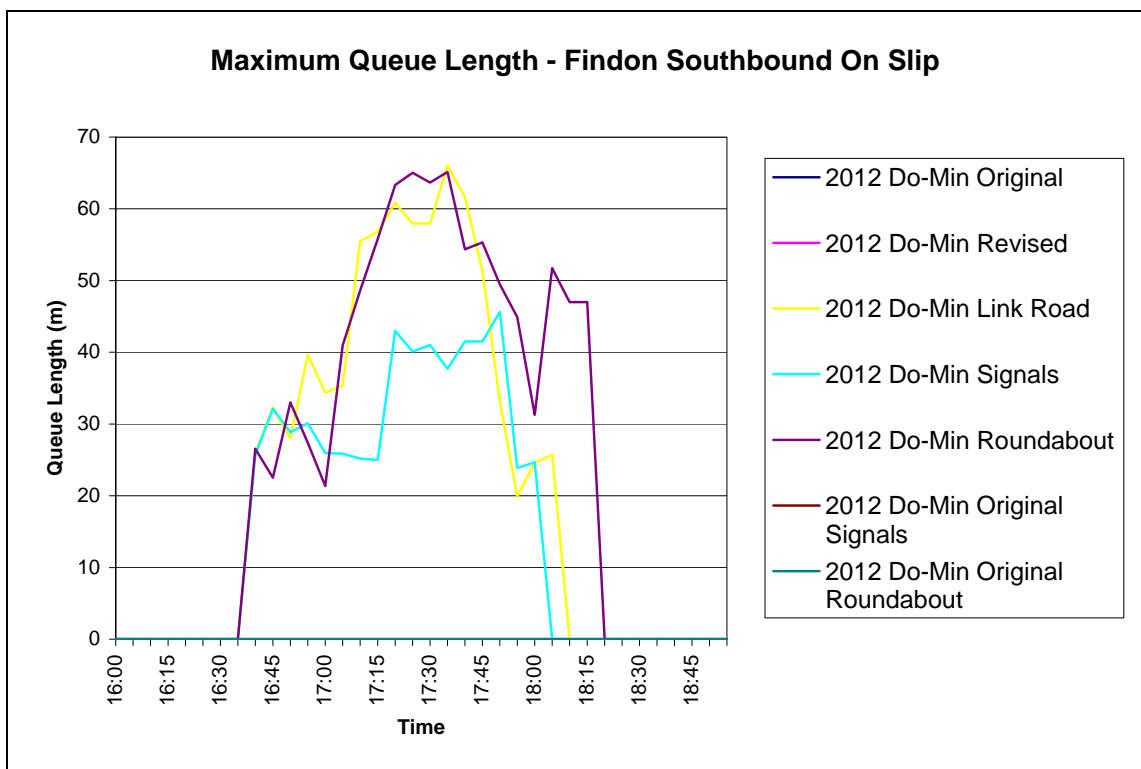


Figure 4.12 : Findon 2 ways slip Road PM Peak Queue Length



4.2.11 Figures 4.13 to 4.16 show the PM queue length graphs for the Cookston Road/Muirend Road junction. The graphs demonstrate that as in the AM peak, the queue lengths remain relatively consistent, with only the signalised options producing slightly longer queues.

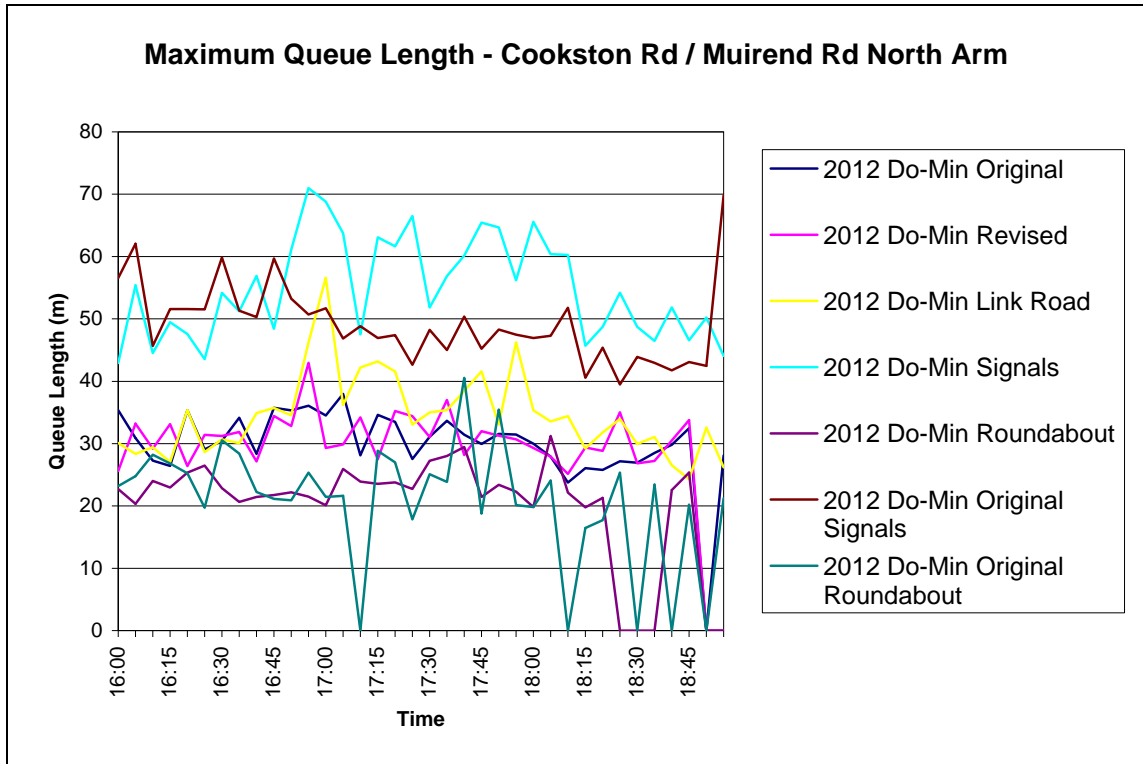


Figure 4.13 : Cookston Road/Muirend Road North Arm PM Peak Queue Length

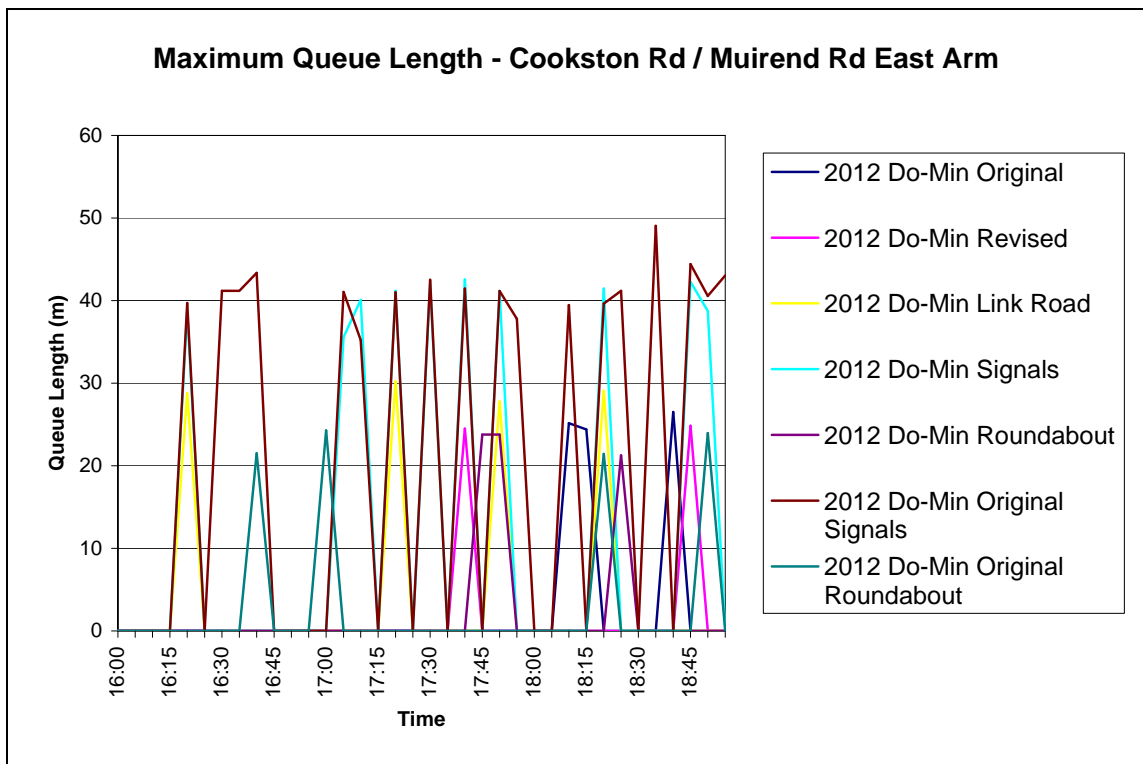


Figure 4.14 : Cookston Road/Muirend Road East Arm PM Peak Queue Length



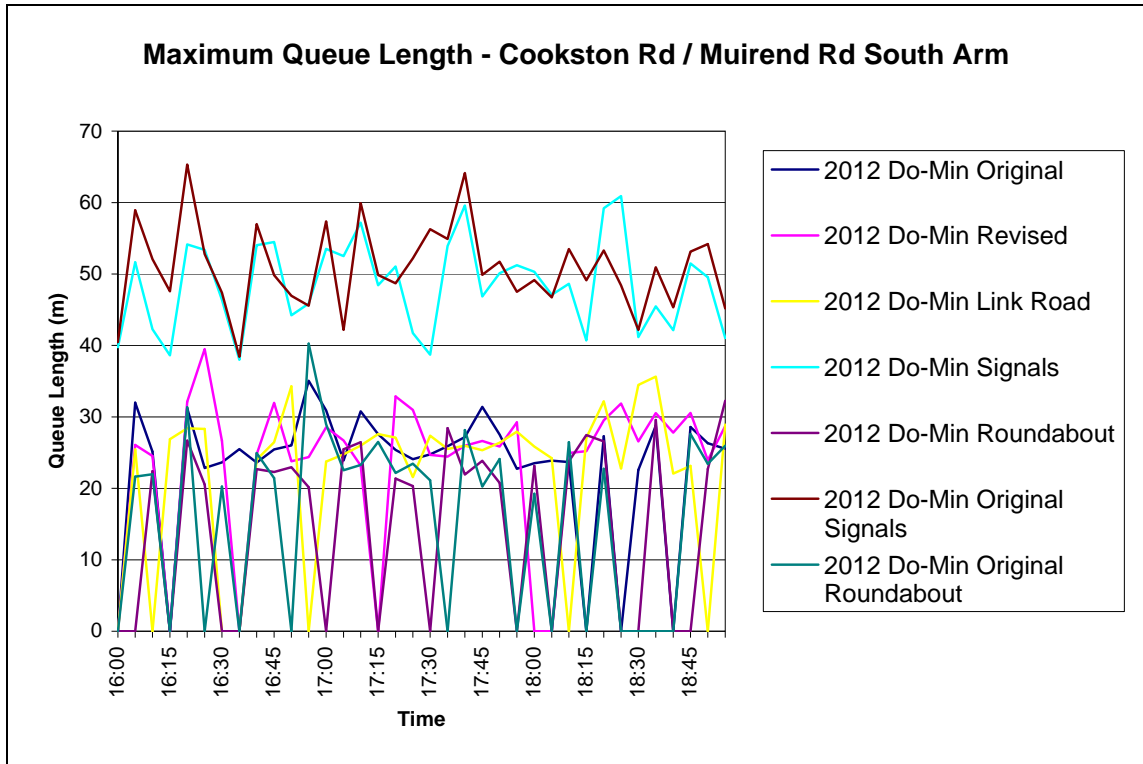


Figure 4.15 : Cookston Road/Muirend Road South Arm PM Peak Queue Length

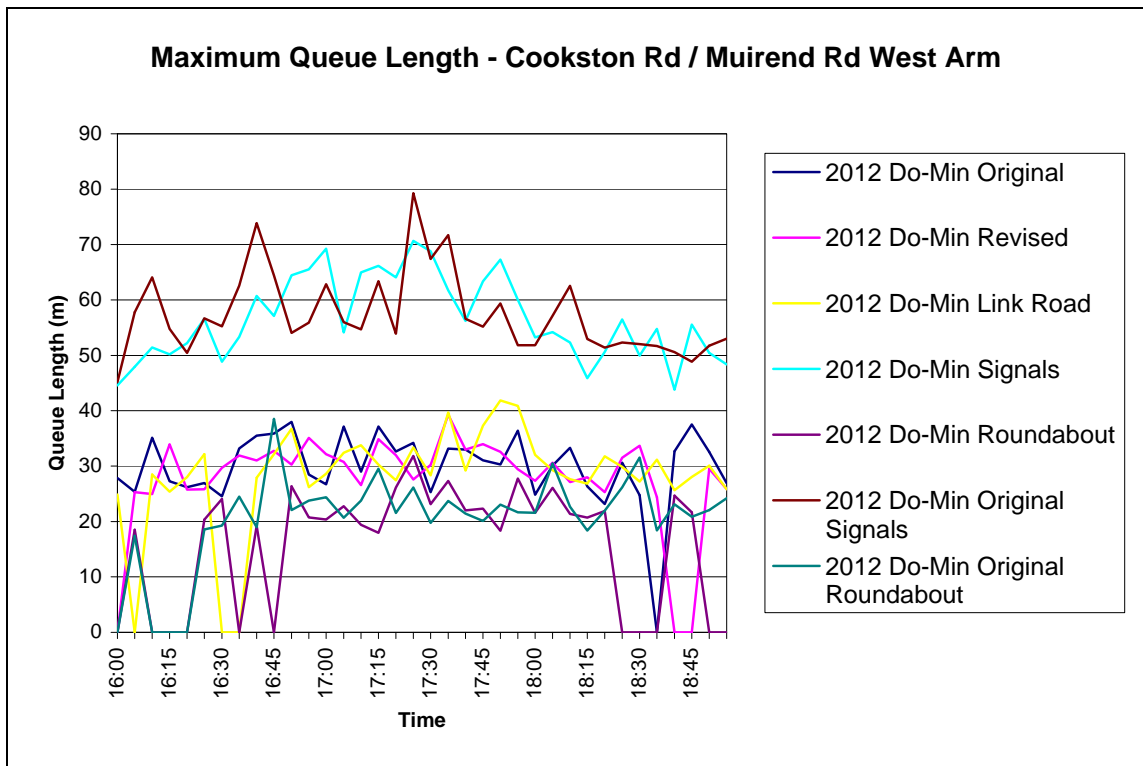


Figure 4.16 : Cookston Road/Muirend Road West Arm PM Peak Queue Length



5 SUMMARY AND CONCLUSIONS

- 5.1.1 Model testing has been carried out under agreement with Aberdeenshire Council.
- 5.1.2 The additional employment development at Badentoy Industrial Estate has been included to develop the 2012 Do-Minimum Revised model.
- 5.1.3 With the additional development in place with no additional infrastructure, a long queue develops on the northbound off slip at Badentoy Interchange, which queues back onto the A90 in the AM peak.
- 5.1.4 With the inclusion of the link road from Badentoy Industrial to Cookston Road, there are no issues in the AM peak, but in the PM peak the modeling has indicated that there may queueing to traffic heading into Portlethen from the north at Findon Interchange, caused by traffic heading to the north, due to the layout of the junction.
- 5.1.5 Faber Maunsell have developed designs for an upgraded junction at Cookston Road/Miurend Road. These have been tested with both the link road and additional development in place, and without both the link road and development in place.
- 5.1.6 There is little difference between the results for the roundabout or traffic signals, though the latter has the added benefit of improved pedestrian crossing facilities.





A DEVELOPMENT AREA







Plot	Area(Acres)	Plot	Area(Acres)
A	1.54	B	1.65
C	3.92	D	4.22
E	3.83	F	8.30
G	5.08	H	4.61
J	2.98	K	2.61
L	1.05		
Total	39.79 Acres		

PROPOSED DEVELOPMENT
BADENTOY, PORTLETHEN

SITE BOUNDARY

Scale: 1:2500 @ A3

Date: FEB 09

Dwg No: A4358/SK01A

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B MAXIMUM QUEUE LENGTHS





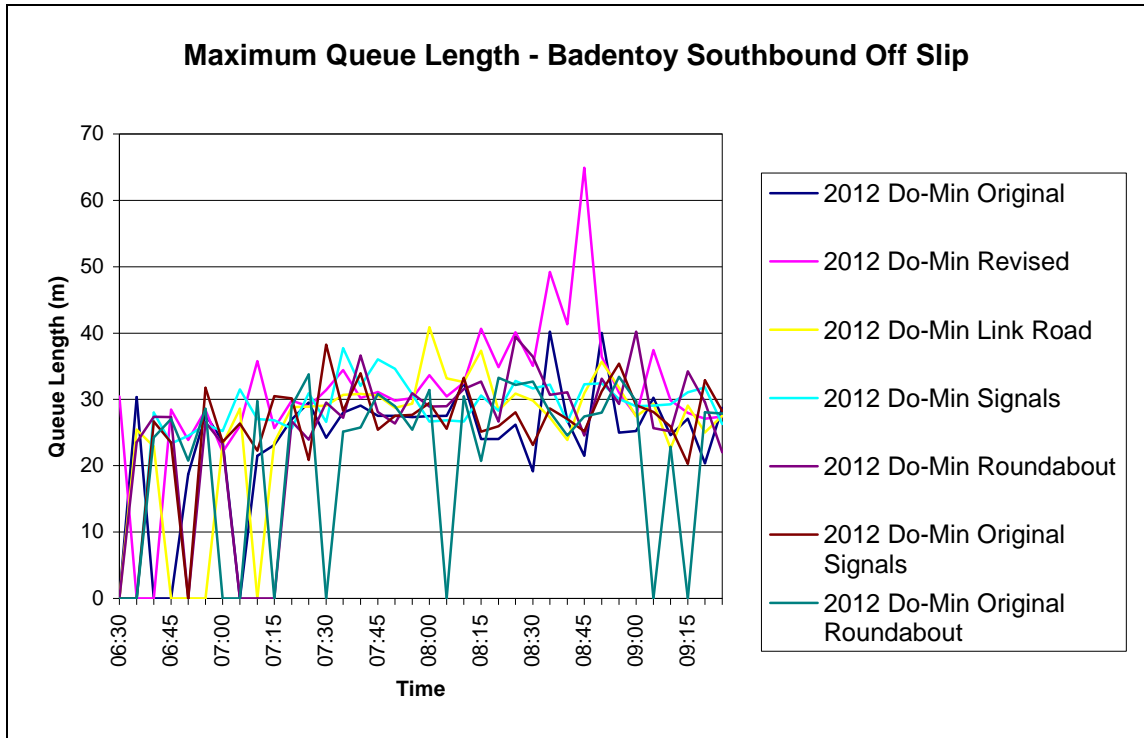


Figure B.1 : Badentoy Southbound Off Slip AM Peak Queue Lengths

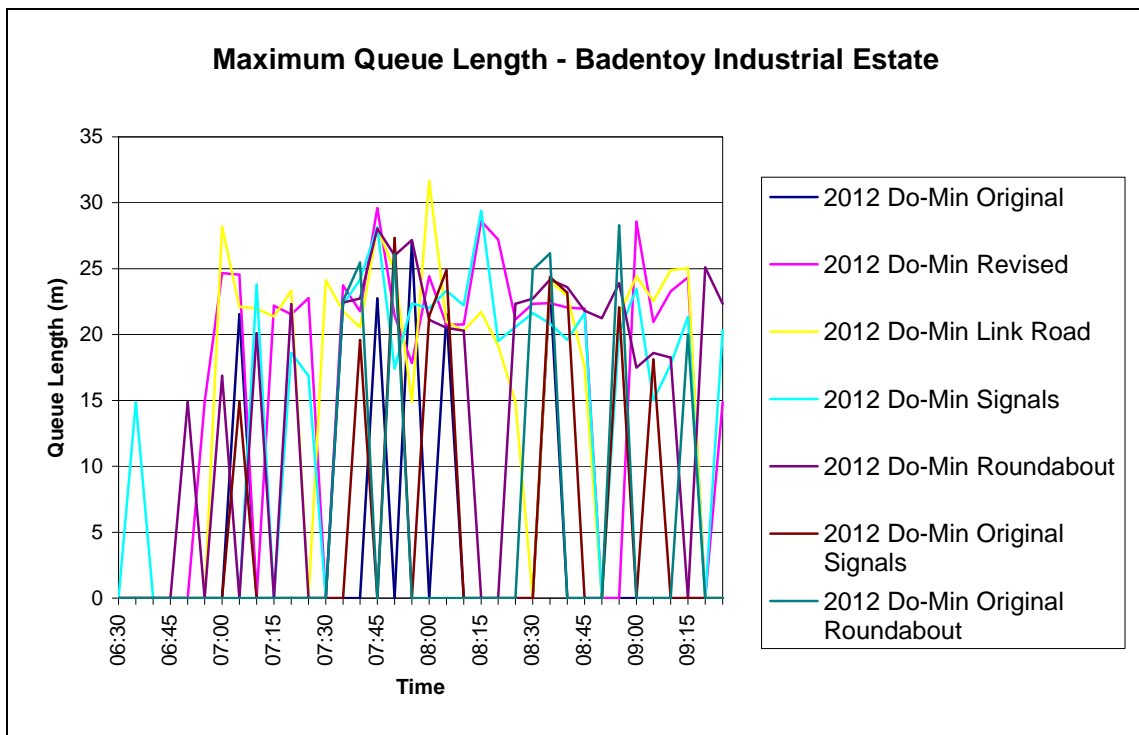


Figure B.2 : Badentoy Industrial Estate AM Peak Queue Lengths



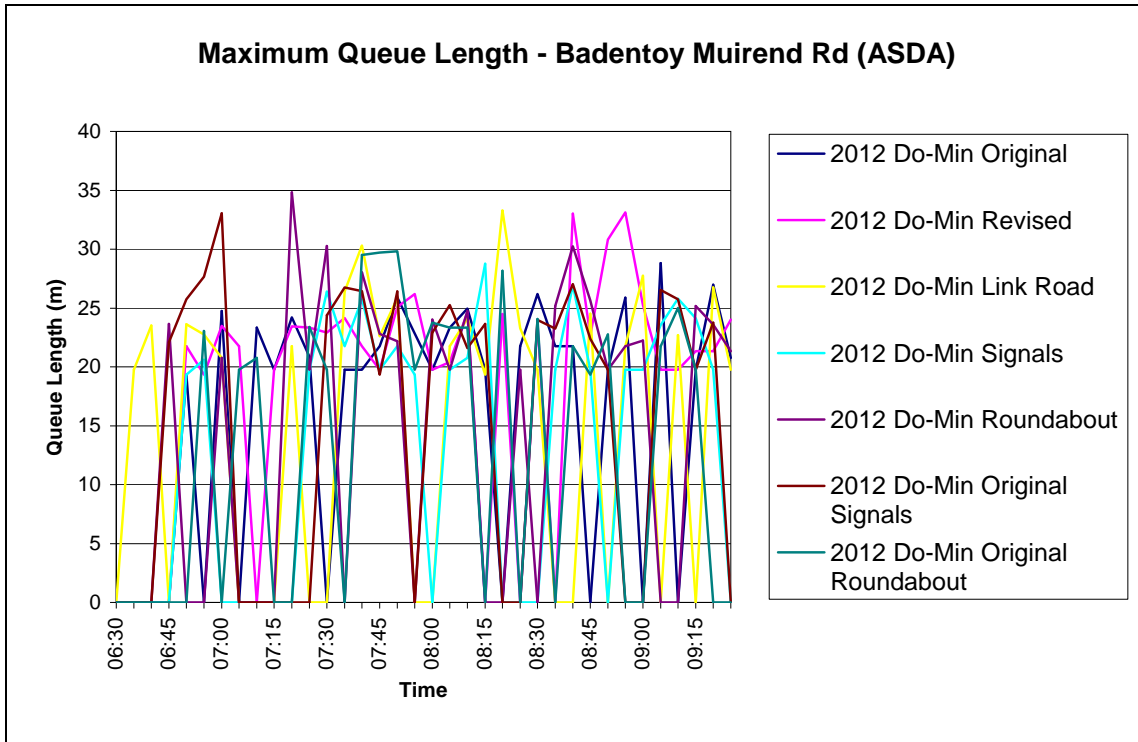


Figure B.3 : Badentoy Muirend Road (ASDA) AM Peak Queue Lengths

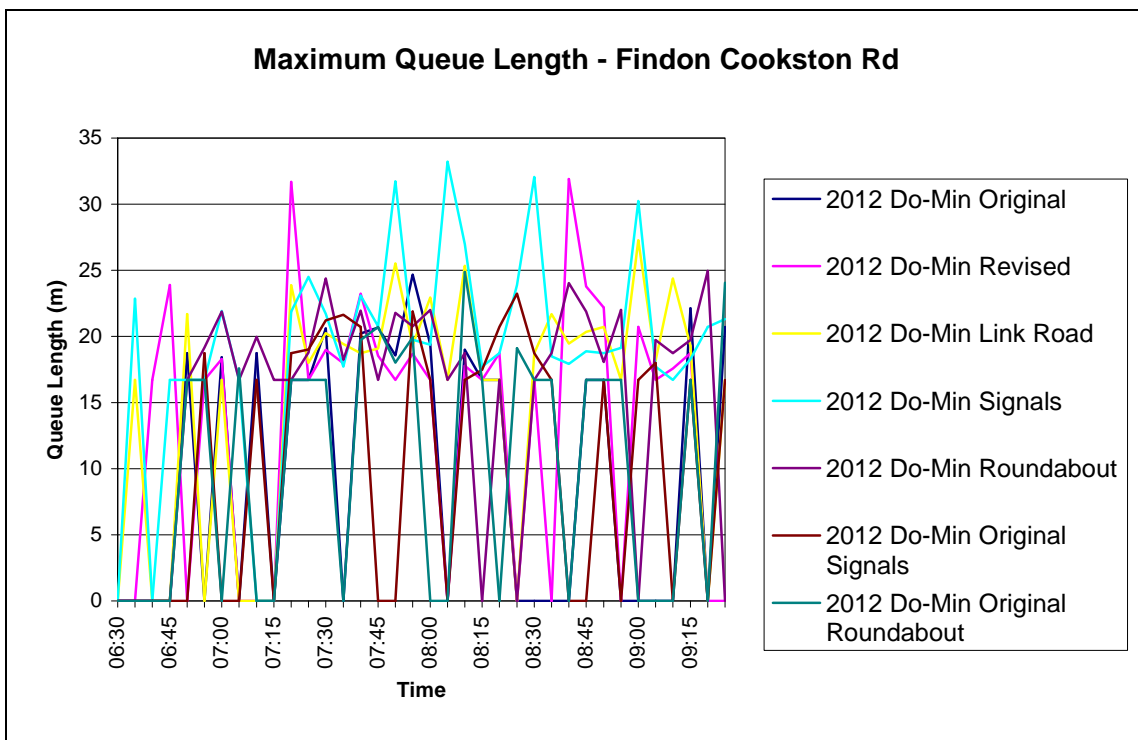


Figure B.4 : Findon Cookston Road AM Peak Queue Lengths



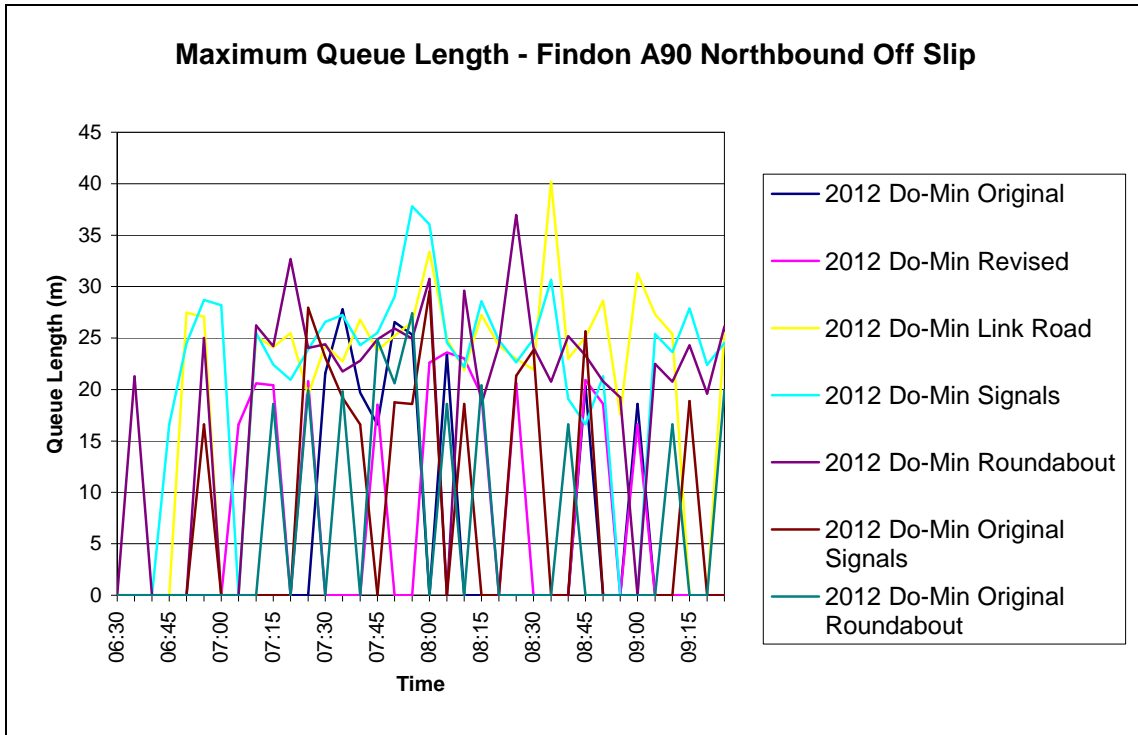


Figure B.5 : Findon A90 Northbound Off Slip AM Peak Queue Lengths

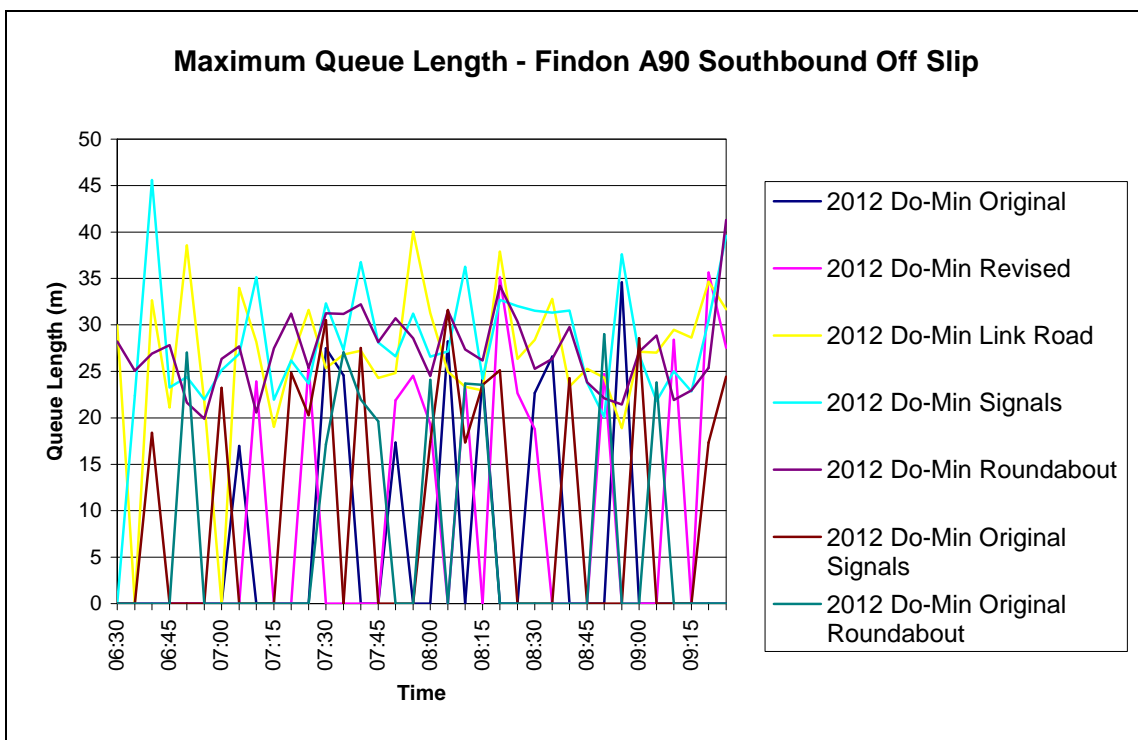


Figure B.6 : Findon A90 Southbound Off Slip AM Peak Queue Lengths



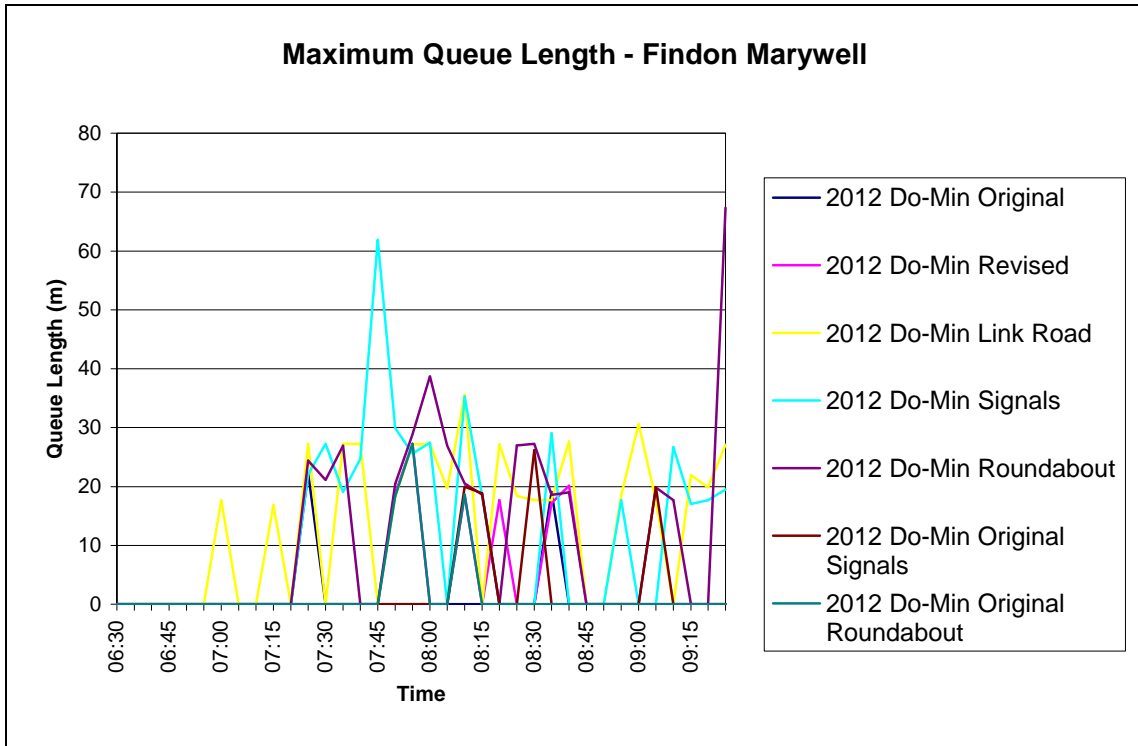


Figure B.7 : Findon Marywell AM Peak Queue Lengths

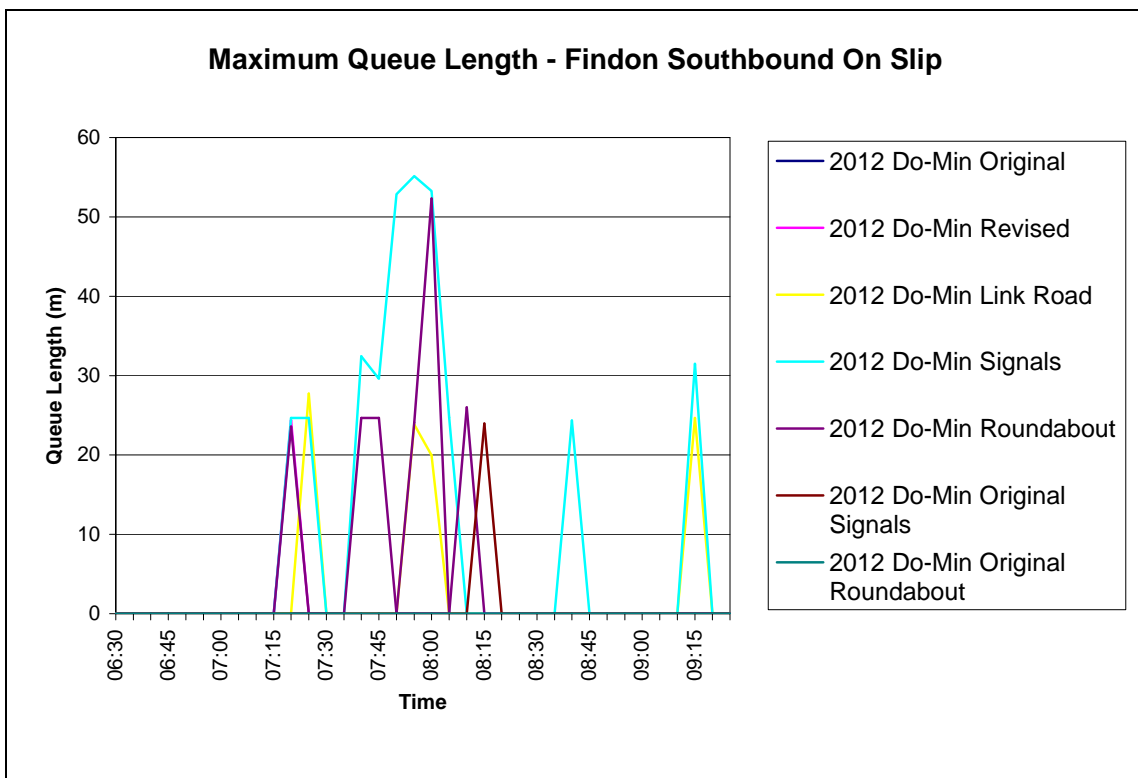


Figure B.8 : Findon Southbound On Slip AM Peak Queue Lengths



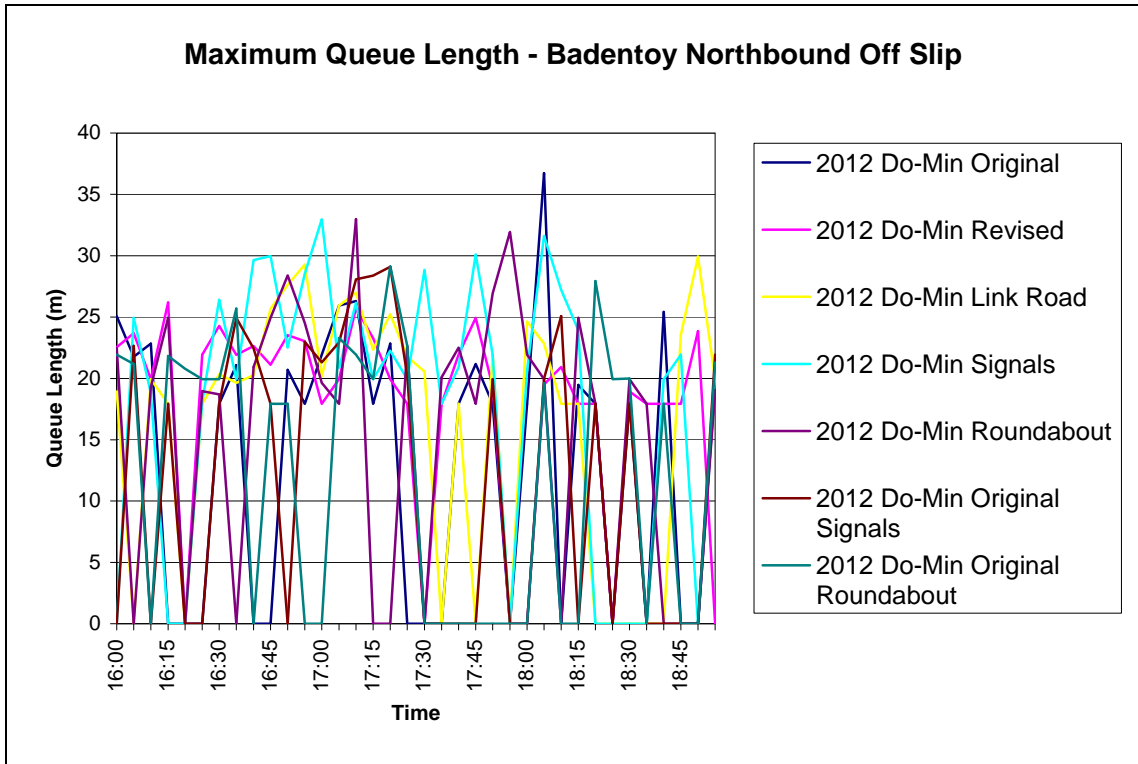


Figure B.9 : Badentoy Northbound Off Slip PM Peak Queue Lengths

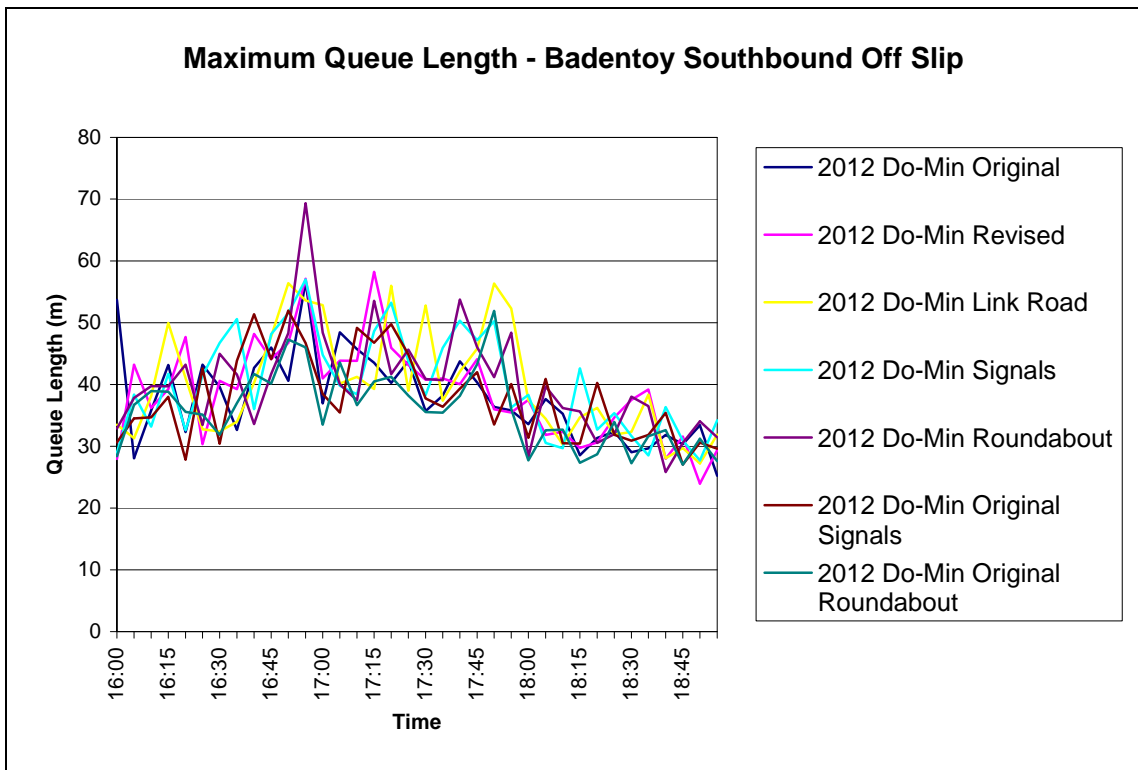


Figure B.10 : Badentoy Southbound Off Slip PM Peak Queue Lengths



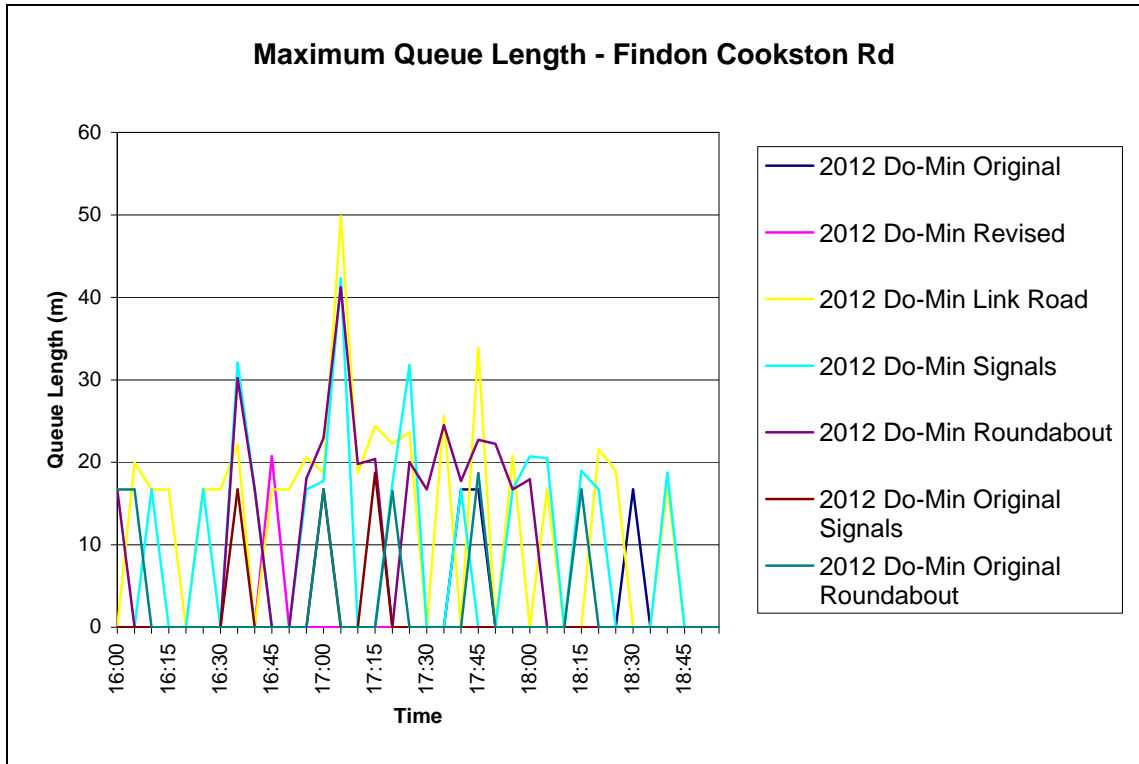


Figure B.11 : Findon Cookston Road PM Peak Queue Lengths

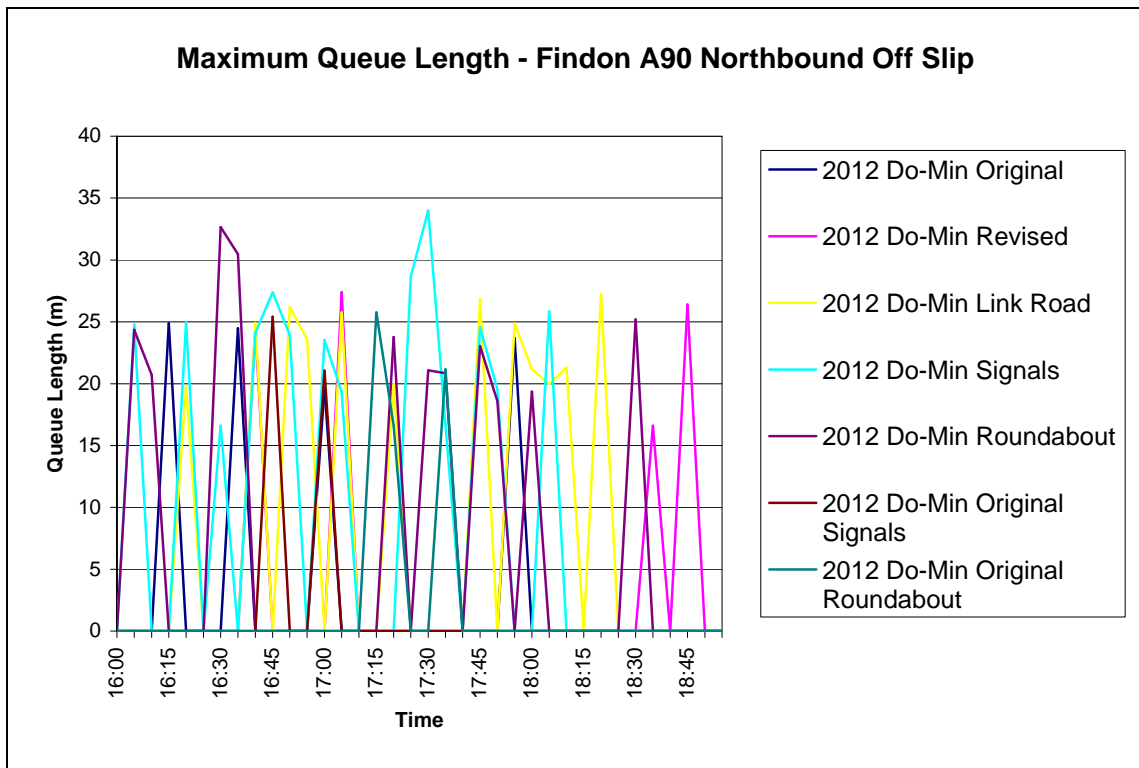


Figure B.12 : Findon A90 Northbound Off Slip PM Peak Queue Lengths



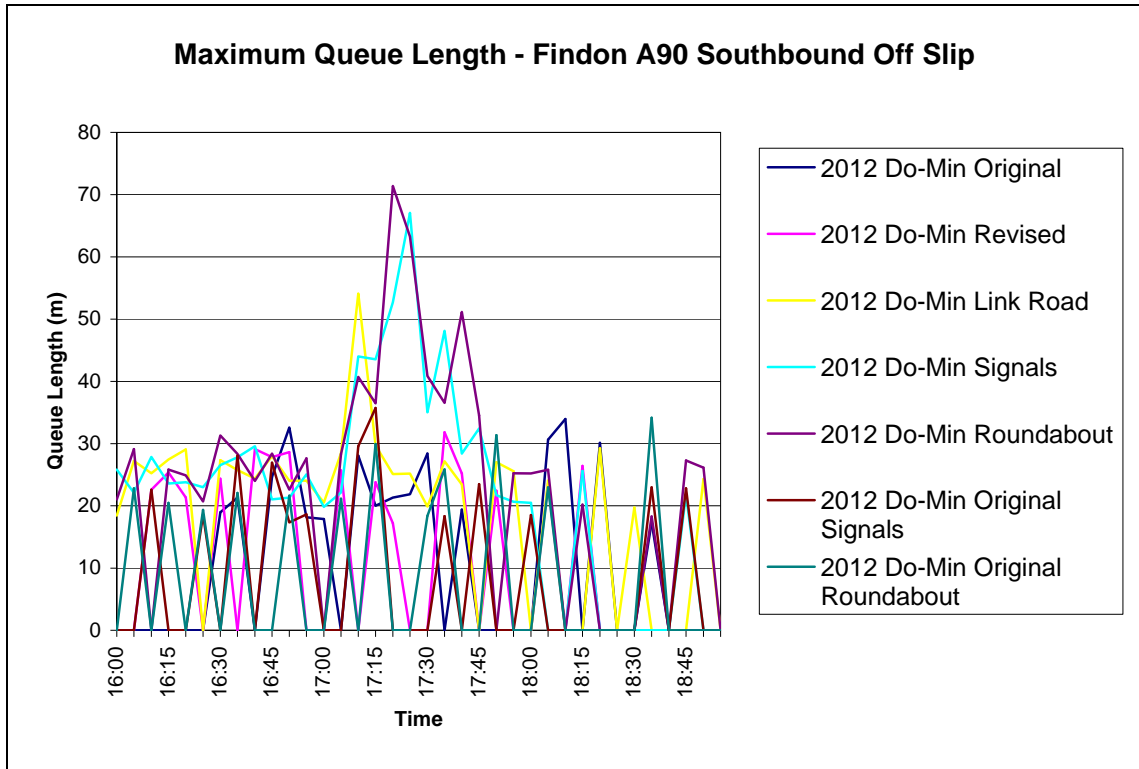


Figure B.13 : Findon A90 Southbound Off Slip PM Peak Queue Lengths

